

**Item No.2019:386:33 Proposal for graduation requirement for B.Tech. degree Programmes (Regular, Diploma holder, and B.Sc. (Maths) pass student) in Agricultural, Civil, Computer, Electrical, Electronics & Communication, Information Technology, Industrial and Production, and Mechanical Engineering Batches of 2018-19.**

## **Registrar**

The Board of Faculty Technology (BOFT) in its 265<sup>th</sup> meeting held on 03.12.2018 discussed the following agenda items:

**Item 265-3: To consider the graduation requirements for the batch 2018-19 (As per the model curriculum of AICTE).**

The Board of Faculty of Technology in its meeting held on 03.12.2018, considered the Revised Graduation Requirements (**As per the model curriculum of AICTE**) for batch 2018-19 of students of B.Tech. degree Programme (Regular, Diploma holder, and B.Sc. (Maths) pass student) in Agriculture, Civil, Computer, Electrical, Electronics & Communication, Information Technology, Industrial and Production and Mechanical Engineering. The Board of Faculty of Technology recommended that these may be got approved by the Academic Council.

Therefore, please find enclosed herewith the Agenda Note of the above mentioned item to be included in the next meeting of the Academic Council.

**Encl:** Agenda note as discussed above

**(Dr. J. P. Pandey)**  
**Dean, Technology**

**Agenda item: Proposal for graduation requirement for B.Tech. degree Programme (Regular, Diploma holder, and B.Sc. (Maths) pass student) in Agriculture, Civil, Computer, Electrical, Electronics & Communication, Information Technology, Industrial and Production and Mechanical Engineering Batch of 2018-19.**

The Graduation Requirement for B.Tech. degree Programme (Regular, Diploma holder, and B.Sc. (Maths) pass student) in Agricultural Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Electronics & Communication Engineering, Information Technology, Industrial and Production Engineering and Mechanical Engineering Batch of 2018-19 has to be revised as per the model curriculum proposed by All India Council for Technical Education (AICTE).

The Board of Faculty of Technology in its 265<sup>th</sup> meeting held on 03.12.2018, considered the revised Graduation Requirements of B.Tech. degree Programme (Regular, Diploma holder, and B.Sc. (Maths) pass student) in various departments for batch 2018-19.

The Agricultural Engineering Department has recently revised Graduation Requirements of B.Tech. degree Programme (Regular) as per the guidelines of 5th Dean Committee based course program, therefore, the graduation requirements for the Regular batch 2018-19 of Agricultural Engineering department will be same as for the batch 2017-18. New revised graduation requirement

for the B. Tech Agricultural Engineering lateral entry (Diploma Students) for Batch 2018-19 is proposed for its consideration.

The revised graduation requirements (revised as per the model curriculum of AICTE) for regular and Lateral entry batch 2018-19 of all other departments are proposed as hereunder for its consideration and approval.

<b>Department</b>	<b>Change in Graduation Requirement</b>	<b>Reason</b>
1. Agricultural Engineering	Graduation Requirements for B.Tech. Programmes (Regular) in Agricultural Engineering for Batch 2018-19 will be same as for batch 2017-18 with additional course TIC-100 Induction Programme (2 weeks) for first year I Semester students	<b>No Change except TIC-100 Induction Programme (2 weeks) is added for first year I semester 2018-19</b>  (recently revised as per the guidelines of 5th Dean Committee based course program)
	New graduation requirement for the B. Tech Agricultural Engineering later entry (Diploma Students) for Batch 2018-19	<b>Revised</b>  (revised as per the guidelines of 5 <sup>th</sup> Dean Committee based course prog.)
2. Civil Engg. 3. Computer Engineering 4. Electrical Engineering 5. Electronics and Communication Engineering 6. Industrial & Production Engineering 7. Information Technology 8. Mechanical Engineering	New Revised Graduation Requirements for B.Tech. Programmes (Regular) for Batch 2018-19.  Graduation Requirements for B.Tech. Programmes later entry (Diploma Students) for Batch 2018-19 will be same as for batch 2017-18.	<b>Revised</b>  (revised as per the model curriculum of AICTE)  <b>No Change</b>

Therefore the Graduation Requirements for batch 2018-19 of students of B.Tech. degree Programme (Regular, Diploma holder, and B.Sc. (Maths) pass student) in Agriculture, Civil, Computer, Electrical, Electronics & Communication, Information Technology, Industrial and Production and Mechanical Engineering as proposed above may kindly be approved.

**Dean, Technology**

**PROPOSED GRADUATION REQUIREMENTS  
COLLEGE OF TECHNOLOGY  
(2018-19 BATCH)**

**(Revised as per the model curriculum proposed by All India Council for Technical Education (AICTE))  
(BASED ON V DEANS COMMITTEE RECOMMENDATIONS)**

**Submitted to**

**ACADEMIC COUNCIL FOR APPROVAL**

**COLLEGE OF TECHNOLOGY**

**Graduation Requirement for B. Tech. Agricultural Engineering**

**(Regular Students) 2018-19 Batch**

**(As per Dean's Vth Committee recommendation)**

S No	Course Number	Course Name	Credit Hours
<b>I Semester</b>			
1.	BPM-131	Engineering Mathematics-I	3(3+2+0)
2.	TCE-113	Engineering Drawing	2(1+0+1x2x2)
3.	TCE/TSW-115	Surveying and Leveling	3(2+0+1x2x2)
4.	TIP-102	Workshop Technology and Practices	3(1+0+2x2x2)
5.	APS-103	Principles of Soil Science	3(2+0+1x2x2)
6.	BPC-164	Engineering Chemistry	3(2+0+1x2x2)
7.	TID/TCE/TSW /TME-109	Introduction to Environmental Engineering and Disaster Management	3(3+0+0)
8.	TPF-111	Heat and Mass Transfer	2(2+0+0)
	TIC-100	<b>Induction Programme (2 weeks)</b>	
		Work Program	1(0+0+1x1x3)
			<b>Total</b> <b>23(16+2+7)</b>

**II Semester**

1.	BPP-197	Engineering Physics	3(2+0+1x2x2)
2.	TCE-142	Engineering Mechanics	3(2+0+1x2x2)
3.	BPM-132	Engineering Mathematics-II	4(4+1+0)
4.	TPF-122	Entrepreneurship Development and Business Management	3(2+0+1x2x2)
5.	TSW-124	Fluid Mechanics and Open Channel Hydraulics	3(2+0+1x2x2)
6.	TIT-106	Computer Programming and Data Structures	3(2+0+1x2x2)
7.	TME-140	Theory of Machines	2(2+0+0)

8.	TCE-226	Strength of Materials	2(1+0+1x2x2)
			<b>Total</b> <b>23(17+1+6)</b>

### **III Semester**

1.	APH/APP/APE-207	Principles of Horticultural Crops and Plant Protection	2(1+0+1x2x2)
2.	APA-201	Principles of Agronomy ( For Agril Engineering)	3(2+0+1x2x2)
3.	TID-227	Building Construction and Cost Estimation	2(2+0+0)
4.	TID-221	Irrigation Engineering	3(2+0+1x2x2)
5.	TSW-211	Soil Mechanics	2(1+0+1x2x2)
6.	BPM-235	Agril Engineering Mathematics-III	2(2+1+0)
7.	TME-233	Machine Design	2(2+0+0)
8.	TME-205	Thermodynamics, Refrigeration and Air Conditioning	3(2+0+1x2x2)
9.	TMP-235	Fundamentals of Renewable Energy Sources	3(2+0+1x2x2)
		NSS 101	1(0+0+1x1x3)
			<b>Total</b> <b>23(16+1+7)</b>

### **IV Semester**

1.	BHS-280	Communication Skills and Personality Development	2(1+0+1x2x2)
2.	TEC-262	Applied Electronics and Instrumentation	3(2+0+1x2x2)
3.	TMP-236	Renewable Power Sources	3(2+1+1x2x2)
4.	TEE-262	Electrical Machines and Power Utilization	3(2+1+1x2x2)
5.	TCT-243	Web Designing and Internet Applications	2(1+0+1x2x2)
6.	TID-232	Sprinkler and Micro Irrigation Systems	2(1+0+1x2x2)
7.	TPF-242	Engineering Properties of Agricultural Produce	2(1+0+1x2x2)
8.	TSW-222	Watershed Hydrology	3(2+0+1x2x2)
9.	TMP-238	Farm Machinery and Equipment-I	3(2+1+1x2x2)
		NSS 102	0
			<b>Total</b> <b>23(14+3+9)</b>

### **V Semester**

1.	TMP-315	Tractor Systems and Controls	3(2+1+1x2x2)
2.	TMP-351	Tractor and Automotive Engines	3(2+1+1x2x2)
3.	TID/TPF-355	Agricultural Structures and Environmental Control	3(2+0+1x2x2)
4.	TMP-353	Farm Machinery and Equipment-II	3(2+1+1x2x2)
5.	TSW-371	Soil and Water Conservation Engineering	3(2+0+1x2x2)
6.	TSW-373	Watershed Planning and Management	3(2+0+1x2x2)
7.	TID-353	Drainage Engineering	2(1+0+1x2x2)
8.	TPF-351	Post Harvest Engineering of Cereals, Pulses and Oil Seeds	3(2+0+1x2x2)
9.		Nss-201	1(0+0+1x1x3)
			<b>Total</b> <b>24(15+3+9)</b>

### **VI Semester**

1.	TMP-354	Auto CAD Applications	2(0+0+2x2x2)
2.	TID-362	Groundwater, Wells and Pumps	4(3+0+1x2x2)
3.	TPF-364	Post Harvest Engineering of Horticultural Crops	2(1+0+1x2x2)
4.	TSW-382	Water Harvesting and Soil Conservation Structures	3(2+0+1x2x2)

5.	TMP-366	Tractor and Farm Machinery Operation and Maintenance	2(0+0+2x2x2)
6.	TPF-362	Dairy and Food Engineering	3(2+0+1x2x2)
7.	TMP-376	Bio-energy Systems: Design and Applications	3(2+1+1x2x2)
8.	TID/TSW/TPF/ TMP-391	Skill Development Training-I (Student READY) Registration only	5(0+5)
9.		NSS-202	0
			<b>Total</b> <b>24(10+1+14)</b>

## VII Semester

### Student READY (Rural and Entrepreneurship Awareness Development Yojana)

1.	TID/TSW/TPF/ TMP-493	10- weeks Industrial Attachment /Internship (Student READY)	10(0+10)
2.	TID/TSW/TPF/ TMP-495	10- weeks Experiential Learning On campus (Student READY)	10(0+10)
3.	TID/TSW/TPF/ TMP-492	Skill Development Training-II (Student READY) Registration only	5(0+5)
			<b>Total</b> <b>25(0+25)</b>

**Educational tour during winter/January break**

## VIII Semester

### Student READY (Rural and Entrepreneurship Awareness Development Yojana)

1.	To be selected from the list of elective courses	Elective course	3(2+0+1x1x2)
2.		Elective course	3(2+0+1x1x2)
3.		Elective course	3(2+0+1x1x2)
4.		Design of Structures	2(1+0+1x2x2)
5.	TID/TSW/TPF/ TMP-499	Project Planning and Report Writing (Student READY)	10(0+10)
6.	TID/TSW/TPF/ TMP-494	Educational Tour (Registration only)	-
			<b>Total</b> <b>21(7+0+14)</b>
			<b>Grand Total</b> <b>186(95+11+91)</b>

## COLLEGE OF TECHNOLOGY

### Graduation Requirement for B. Tech. Agricultural Engineering

#### (Lateral Entry) 2018-19 Batch

(As per Dean's Vth Committee recommendation)

S. No.	Course Number	Course Name	Credit Hours
<b>I Semester</b>			
1.	APH/APP/APE-207	Principles of Horticultural Crops and Plant Protection	2(1+0+1x2x2)
2.	APA-201	Principles of Agronomy ( For Agril Engineering)	3(2+0+1x2x2)
3.	TID-227	Building Construction and Cost Estimation	2(2+0+0)

4.	TID-221	Irrigation Engineering	3(2+0+1x2x2)
5.	TSW-211	Soil Mechanics	2(1+0+1x2x2)
6.	TME-233	Machine Design	2(2+0+0)
7.	TME-205	Thermodynamics, Refrigeration and Air Conditioning	3(2+0+1x2x2)
8.	TMP-235	Fundamentals of Renewable Energy Sources	3(2+0+1x2x2)
9.	TPF-111	Heat and Mass Transfer	2(2+0+0)
	TIC-100	Induction Programme (2 weeks)	
		Work Program	1(0+0+1x1x3)
		NSS 101	1(0+0+1x1x3)
			<b>Total</b> <b>24 (15+0+7)</b>

## II Semester

1.	BHS-280	Communication Skills and Personality Development	2(1+0+1x2x2)
2.	TEC-262	Applied Electronics and Instrumentation	3(2+0+1x2x2)
3.	TMP-236	Renewable Power Sources	3(2+1+1x2x2)
4.	TEE-262	Electrical Machines and Power Utilization	3(2+1+1x2x2)
5.	TCT-243	Web Designing and Internet Applications	2(1+0+1x2x2)
6.	TID-232	Sprinkler and Micro Irrigation Systems	2(1+0+1x2x2)
7.	TPF-242	Engineering Properties of Agricultural Produce	2(1+0+1x2x2)
8.	TSW-222	Watershed Hydrology	3(2+0+1x2x2)
9.	TMP-238	Farm Machinery and Equipment-I	3(2+1+1x2x2)
		NSS 102	0
			<b>Total</b> <b>23(14+3+9)</b>

## III Semester

1.	TMP-315	Tractor Systems and Controls	3(2+1+1x2x2)
2.	TMP-351	Tractor and Automotive Engines	3(2+1+1x2x2)
3.	TID/TPF-355	Agricultural Structures and Environmental Control	3(2+0+1x2x2)
4.	TMP-353	Farm Machinery and Equipment-II	3(2+1+1x2x2)
5.	TSW-371	Soil and Water Conservation Engineering	3(2+0+1x2x2)
6.	TSW-373	Watershed Planning and Management	3(2+0+1x2x2)
7.	TID-353	Drainage Engineering	2(1+0+1x2x2)
8.	TPF-351	Post Harvest Engineering of Cereals, Pulses and Oil Seeds	3(2+0+1x2x2)
9.		NSS-201	1(0+0+1x1x3)
			<b>Total</b> <b>24(15+3+9)</b>

## IV Semester

1.	TMP-354	Auto CAD Applications	2(0+0+2x2x2)
2.	TID-362	Groundwater, Wells and Pumps	4(3+0+1x2x2)
3.	TPF-364	Post Harvest Engineering of Horticultural Crops	2(1+0+1x2x2)
4.	TSW-382	Water Harvesting and Soil Conservation Structures	3(2+0+1x2x2)
5.	TMP-366	Tractor and Farm Machinery Operation and Maintenance	2(0+0+2x2x2)
6.	TPF-362	Dairy and Food Engineering	3(2+0+1x2x2)
7.	TMP-376	Bio-energy Systems: Design and Applications	3(2+1+1x2x2)
8.	TID/TSW/TPF/TMP-391	Skill Development Training-I (Student READY) Registration only	5(0+5)
9.		NSS-202	0

			<b>Total</b>	<b>24(10+1+14)</b>
<b>V Semester</b>				
<b>Student READY (Rural and Entrepreneurship Awareness Development Yojana)</b>				
1.	TID/TSW/TPF/ TMP-493	10- weeks Industrial Attachment /Internship (Student READY)	10(0+10)	
2.	TID/TSW/TPF/ TMP-495	10- weeks Experiential Learning On campus (Student READY)	10(0+10)	
3.	TID/TSW/TPF/ TMP-492	Skill Development Training-II (Student READY) Registration only	5(0+5)	
			<b>Total</b>	<b>25(0+25)</b>
Educational tour during winter/January break				
<b>VI Semester</b>				
<b>Student READY</b>				
<b>(Rural and Entrepreneurship Awareness Development Yojana)</b>				
1.	To be selected from the list of elective courses	Elective course	3(2+0+1x1x2)	
2.		Elective course	3(2+0+1x1x2)	
3.		Elective course	3(2+0+1x1x2)	
4.	TCE-408	Design of Structures	2(1+0+1x2x2)	
5.	TID/TSW/TPF/ TMP-499	20-weeks Project Planning and Report Writing (Student READY)	10(0+10)	
6.	TID/TSW/TPF/ TMP-494	Educational Tour (Registration only)	-	
			<b>Total</b>	<b>21(7+0+14)</b>
			<b>Grand Total</b>	<b>141 (62+7+79)</b>

## COLLEGE OF TECHNOLOGY

### Graduation Requirement for B. Tech. Agricultural Engineering

#### (Lateral Entry) 2018-19 Batch

(As per Dean's Vth Committee recommendation)

S No	Course Number	Course Name	Credit Hours	Pre-requisite
<b>Basic Engineering (10)</b>			<b>23 (12+1+7x2x2)</b>	
1.	TME-205	Thermodynamics, Refrigeration and Air Conditioning	3(2+0+1x2x2)	NIL
2.	TSW-211	Soil Mechanics	2(1+0+1x2x2)	NIL
3.	TID-227	Building Construction and Cost Estimation	2(2+0+0)	NIL
4.	TME-233	Machine Design	2(2+0+0)	NIL
5.	TEC-262	Applied Electronics and Instrumentation	3(2+0+1x2x2)	NIL
6.	TEE-262	Electrical Machines and Power Utilization	3(2+1+1x2x2)	NIL

7.	TMP-354	Auto CAD Applications	2(0+0+2x2x2)	NIL
8.	TCT-243	Web Designing and Internet Applications	2(1+0+1x2x2)	NIL
9.	TCE-408	Design of Structures	2(1+0+1x2x2)	NIL
10.	TPF-111	Heat and Mass Transfer	2(2+0+0)	NIL
<b>Applied Sciences (3)</b>			<b>7 (4+0+3x2x2)</b>	
1.	APH/APP/A PE-207	Principles of Horticultural Crops and Plant Protection	2(1+0+1x2x2)	NIL
2.	APA-201	Principles of Agronomy ( For Agril Engineering)	3(2+0+1x2x2)	NIL
3.	BHS-280	Communication Skills and Personality Development	2(1+0+1x2x2)	NIL
<b>Dept. of Soil and Water Conservation Engineering (4)</b>			<b>12 (8+0+4x2x2)</b>	
1.	TSW-222	Watershed Hydrology	3(2+0+1x2x2)	NIL
2.	TSW-371	Soil and Water Conservation Engineering	3(2+0+1x2x2)	NIL
3.	TSW-373	Watershed Planning and Management	3(2+0+1x2x2)	NIL
4.	TSW-382	Water Harvesting and Soil Conservation Structures	3(2+0+1x2x2)	NIL
<b>Dept. of Irrigation and Drainage Engineering (4)</b>			<b>11(7+0+4x2x2)</b>	
1.	TID-221	Irrigation Engineering	3(2+0+1x2x2)	NIL
2.	TID-232	Sprinkler and Micro Irrigation Systems	2(1+0+1x2x2)	NIL
3.	TID-353	Drainage Engineering	2(1+0+1x2x2)	NIL
4.	TID-362	Groundwater, Wells and Pumps	4(3+0+1x2x2)	NIL
<b>Dept. of Farm Machinery and Power Engineering (8)</b>			<b>23 (14+6+9x2x2)</b>	
1.	TMP-235	Fundamentals of Renewable Energy Sources	3(2+0+1x2x2)	NIL
2.	TMP-236	Renewable Power Sources	3(2+1+1x2x2)	NIL
3.	TMP-238	Farm Machinery and Equipment-I	3(2+1+1x2x2)	NIL
4.	TMP-315	Tractor Systems and Controls	3(2+1+1x2x2)	NIL
5.	TMP-351	Tractor and Automotive Engines	3(2+1+1x2x2)	NIL
6.	TMP-353	Farm Machinery and Equipment-II	3(2+1+1x2x2)	NIL
7.	TMP-366	Tractor and Farm Machinery Operation and Maintenance	2(0+0+2x2x2)	NIL
8.	TMP-376	Bio-energy Systems: Design and Applications	3(2+1+1x2x2)	NIL
<b>Dept. of Post Harvest Process and Food Engineering (5)</b>			<b>13 (8+0+5x2x2)</b>	
1.	TPF-242	Engineering Properties of Agricultural Produce	2(1+0+1x2x2)	NIL
2.	TID/TPF-355	Agricultural Structures and Environmental Control	3(2+0+1x2x2)	NIL
3.	TPF-351	Post Harvest Engineering of Cereals, Pulses and Oil Seeds	3(2+0+1x2x2)	NIL
4.	TPF-364	Post Harvest Engineering of Horticultural Crops	2(1+0+1x2x2)	NIL
5.	TPF-362	Dairy and Food Engineering	3(2+0+1x2x2)	TPF-111
<b>Elective Courses (Any 3 courses)</b>			<b>9 (6+0+3x1x2)</b>	

1.	TSW-422	Floods and Control Measures	3(2+0+1x1x2)	NIL
2.	TSW-424	Wasteland Development	3(2+0+1x1x2)	NIL
3.	TSW-426	Information Technology for Land and Water Management	3(2+0+1x1x2)	NIL
4.	TSW/TID-428	Remote Sensing and GIS Applications	3(2+0+1x1x2)	NIL
5.	TID-434	Management of Canal Irrigation System	3(2+0+1x1x2)	NIL
6.	TID-444	Minor Irrigation and Command Area Development	3(2+0+1x1x2)	NIL
7.	TID-454	Precision Farming Techniques for Protected Cultivation	3(2+0+1x1x2)	NIL
8.	TID-424	Water Quality and Management Measures	3(2+0+1x1x2)	NIL
9.	TMP-422	Farm Machinery Design and Production	3(2+0+1x1x2)	NIL
10.	TMP-452	Human Engineering and Safety	3(2+0+1x1x2)	NIL
11.	TMP-412	Tractor Design and Testing	3(2+0+1x1x2)	NIL
12.	TMP-432	Hydraulic Drives and Controls	3(2+0+1x1x2)	NIL
13.	TMP-462	Photovoltaic Technologies and Systems	3(2+0+1x1x2)	NIL
14.	TPF-462	Food Quality and Control	3(2+0+1x1x2)	NIL
15.	TPF-464	Food Plant Design and Management	3(2+0+1x1x2)	TPF-111
16.	TPF-466	Process Equipment Design	3(2+0+1x1x2)	TPF-111
17.	TPF-468	Waste and By-products Utilization	3(2+0+1x1x2)	NIL
<b>Total course work Credit Hours</b>			<b>96(56+8+27x2x2)</b>	
<b>NSS</b>			<b>2(0+0+2x1x3)</b>	
<b>Further those students who have not taken Hindi at the High school level shall also offer BPH-105 Elementary Hindi</b>			Non-credit course	
	TID/TSW/TP F/TMP-494	Educational tour (During first week of January) Compulsory Non Credit Course	Non-credit course	
		<b>One-year Student READY (Rural and Entrepreneurship Awareness Development Yojana) programme</b>	<b>40 (0+0+40)</b>	
	TID/TSW/TP F/TMP-391	4-weeks Skill Development Trainings I during semester break after IV <sup>th</sup> and VI <sup>th</sup> semester	5 (0+0+5)	
	TID/TSW/TP F/TMP-492	4-weeks Skill Development Trainings II during semester break after VI <sup>th</sup> semester	5 (0+0+5)	
.	TID/TSW/TP F/TMP-493	10- weeks Industrial Attachment/ Internship	10 (0+0+10)	
	TID/TSW/TP F/TMP-495	10- weeks Experiential Learning On campus	10 (0+0+10)	
	TID/TSW/TP F/TMP-499	20-weeks Project Planning and Report Writing	10 (0+0+10)	
		<b>Total Credit Hours Load of B. Tech. (Agricultural Engineering)</b>	<b>141(62+7+79)</b>	

**Proposal for Curriculum**  
**Bachelor of Technology**  
**in**  
**Civil Engineering**  
**(As per AICTE Model Curriculum 2018)**



**Department of Civil Engineering**  
**College of Technology**  
**G.B. Pant University of Agriculture and Technology,**  
**Pantnagar (Uttarakhand)-263145**

**DETAILED 4 YEAR**

**CURRICULUM CONTENTS**

**UNDERGRADUATE DEGREE IN ENGINEERING AND  
TECHNOLOGY**

**BRANCH: CIVIL ENGINEERING**

**COURSE PROPOSALS**

## **B.TECH CIVIL ENGG COURSE CURRICULUM AS PER AICTE**

### **Semester wise breakup of courses for 2018 batch (Regular)**

<b>First Semester:</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
			(L-T-P)
1	BPP-199 Mechanics	Nil	5 (3-1-2)6
2	BPM-141 Calculus, Multivariable Calculus and Linear Algebra	Nil	4(3-1-0) 4
3	TCE-114 Engineering Graphics and Design	Nil	3(1-0-2x2) 5
4	BHS-186 English	Nil	3(2-0-2) 4
5	TCE/TID/TME/TSW-109 Introduction to Environmental Engineering and Disaster Management	Nil	3(3-0-0) 3
6	TIP-103 Workshop Practices	Nil	3(1-0-2x2) 5
7	TIC-100 Induction Programme	Nil	Two Weeks
		<b>Total</b>	<b>21      27</b>

<b>Second Semester:</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
			(L-T-P)
1	BPC-102 Chemistry-I	Nil	4(3-0-3)6
2	TEE-104 Basic Electrical Engineering	Nil	5(3-1-2) 6
3	BPM-151 Differential equations	Nil	5(4-1-0) 5

	and Complex Variables-Differentiation	Nil	
4	TIT-121 Programming for Problem Solving	Nil	4(3-0-2) 5
5	TWP-101 Work Programme	Nil	1(0-0-2)2
6	BHS-188 Industrial Sociology	Nil	3(3-0-0) 3
7	TCE-191 Practical Training-I	Nil	2 weeks
		<b>Total</b>	<b>22      27</b>

<b>Third Semester:</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
			<b>(L-T-P)</b>
1	TEC-227 Basic Electronics Engineering	Nil	4(3-0-2) 5
2	TCE-205 Computer -aided Civil Engineering	Nil	2(1-0-2) 3
	Drawing	Nil	
3	TCE-206 Engineering Mechanics	Nil	4(3-1-0) 4
4	BPM-241 Transform,	Nil	3(2-1-0) 3
	Discrete Mathematics and Complex	Nil	
	Variables-Integration	Nil	
5	BHS-286 Effective Technical Communication	Nil	3(3-0-0) 3
6	TCE-207 Engineering Geology	Nil	2(2-0-0) 2
7	TCE-213 Surveying	Nil	3(2-0-3) 5
8	NSS-101	Nil	1(0-0-4) 4
		<b>Total</b>	<b>22      29</b>

<b>Fourth Semester:</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
	<b>(L-T-P)</b>		
1	TME-209 Mechanical Engineering	Nil	3(2-2-0) 4
2	TCE-208 Disaster Preparedness & Planning	Nil	2(2-0-0) 2
3	TCE-209 Introduction to Fluid Mechanics	Nil	4(2-1-2)5
4	TCE-212 Introduction to Solid Mechanics	Nil	4(3-0-2) 5
5	TCE-216 Advanced Surveying & Geomatics	Nil	4(3-0-2) 5
6	TCE-214 Materials, Testing & Evaluation	Nil	3(2-0-2) 4
7	TCE-215 Civil Engineering -	Nil	2(2-0-0) 2
	Societal & Global Impact	Nil	
8	NSS-102	Nil	0(0-0-4)4
9	TCE-291 Practical Training-II	Nil	2 weeks
	<b>Total</b>		<b>22      31</b>

<b>Fifth Semester:</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
	<b>(L-T-P)</b>		
1	TCE-301 Theory of Structures	Nil	3(3-0-0) 3
2	TCE-302 Hydraulic Engineering	Nil	4(3-0-2) 5
3	TCE-303 Structural Engineering	Nil	3(3-0-0) 3
4	TCE-304 Geotechnical Engineering-I	Nil	4(3-0-2) 5

5	TCE-306 Environmental Engineering	Nil	4(3-0-2) 5
6	TCE-307 Transportation Engineering	Nil	4(3-0-2) 5
7	BHS-100 Constitution of India	Nil	0(1-0-0)1
8	NSS-201	Nil	1(0-0-4)4
		<b>Total</b>	<b>23      31</b>

<b>Sixth Semester:</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
			<b>(L-T-P)</b>
1	TCE-308 Construction Engineering & Management	Nil	3(3-0-0) 3
2	TCE-309 Hydrology & Water Resources Engineering	Nil	3(3-0-0) 3
3	Elective-I	Nil	3(3-0-0) 3
4	Elective-II	Nil	3(3-0-0) 3
5	Open Elective-I	Nil	3(3-0-0) 3
6	Elective-III	Nil	3(3-0-0) 3
7	Elective-IV	Nil	3(3-0-0) 3
8	NSS-202	Nil	0(0-0-4)4
9	TCE-391 Practical Training - III	Nil	4 weeks
		<b>Total</b>	<b>21      25</b>

<b>Seventh Semester:</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>

			<b>(L-T-P)</b>
1	TCE-401 Engineering Economics, Estimation & Costing	Nil	3(2-0-2) 4
2	Elective-V	Nil	3(3-0-0) 3
3	Elective-VI	Nil	3(3-0-0) 3
4	Open Elective-II	Nil	3(3-0-0) 3
5	TCE-495A Project-I	Nil	4(0-0-8)8
6	TIP-454 Principles of Management	Nil	2(2-0-0) 2
		<b>Total</b>	<b>18      23</b>

<b>Eight Semester:</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
			<b>(L-T-P)</b>
1	Elective-VII	Nil	2(2-0-0) 2
2	Elective-VIII	Nil	2(2-0-0) 2
3	Open Elective-III	Nil	3(3-0-0) 3
4	Open Elective-IV	Nil	3(3-0-0) 3
5	TCE-495B Project-II	Nil	8(0-0-16) 16
6	BHS-401 Values and Ethics for Engineers	Nil	2(2-0-0) 2
7	TCE-491 Seminar	Nil	1(0-0-2) 2
		<b>Total</b>	<b>21      30</b>

**Total number of credits for graduation requirement = 170**

**Note:**

1. Those students who had not taken Hindi at High School or equivalent level are essentially required to clear the course BHS-173, Elementary Hindi.
2. An Induction Programme of Two week is to be offered to the students at the start of first year.
3. The Student can take open elective from other departments of the University
4. Practical Training of 30 days duration will be completed by the student at the end of first year, second year and third year.

**GRADUATION REQUIREMENT FOR B.TECH. IN CIVIL  
ENGINEERING FOR 2018 BATCH**

A: LIST OF CORE COURSES			
Sl No	Course No. and Name	Prerequisite	Credit Hours
			(L-T-P)
1	BPP-199 Mechanics	Nil	5 (3-1-2)6
2	BPM-141 Calculus, Multivariable Calculus and Linear Algebra	Nil	4(3-1-0) 4
3	TEE-104 Basic Electrical Engineering	Nil	5(3-1-2) 6
4	TCE-114 Engineering Graphics and Design	Nil	3(1-0-2x2) 5
5	TWP-101 Work Programme	Nil	1(0-0-2)2
6	TCE/TID/TME/TSW-109 Introduction to Environmental Engineering and Disasters	Nil	3(3-0-0) 3
7	BHS-188 Industrial Sociology	Nil	3(3-0-0) 3
8	BPC-102 Chemistry-I	Nil	4 (3-0-3)6
9	BPM-151 Differential equations and Complex Variables-Differentiation	Nil	5(4-1-0) 5
10	TIT-121 Programming for Problem Solving	Nil	4(3-0-2) 5
11	TIP-103 Workshop Practices	Nil	3(1-0-2x2) 5
12	BHS-186 English	Nil	3(2-0-2) 4
13	TEC-227 Basic Electronics Engineering	Nil	4(3-0-2) 5
14	BPM-241 Transform, Discrete Mathematics and Complex Variables-Integration	Nil	3(2-1-0) 3

15	TME-209 Mechanical Engineering	Nil	3(2-2-0) 4
16	BHS-286 Effective Technical Communication	Nil	3(3-0-0) 3
17	BHS-401 Values and Ethics for Engineers	Nil	2(2-0-0) 2
18	BHS-100 Constitution of India	Nil	0(1-0-0)1
19	TIP-454 Principles of Management	Nil	2(2-0-0) 2
20	NSS-101	Nil	1(0-0-4) 4
21	NSS-102	Nil	0(0-0-4)4
22	NSS-201	Nil	1(0-0-4)4
23	NSS-202	Nil	0(0-0-4)4
		<b>Total</b>	<b>62 90</b>

<b>LIST OF PROFESSIONAL COURSES</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
			<b>(L-T-P)</b>
1	TCE-205 Computer -aided Civil Engineering Drawing	Nil	2(1-0-2) 3
2	TCE-206 Engineering Mechanics	Nil	4(3-1-0) 4
3	TCE-207 Engineering Geology	Nil	2(2-0-0) 2
4	TCE-208 Disaster Preparedness & Planning	Nil	2(2-0-0) 2
5	TCE-209 Introduction to Fluid Mechanics	Nil	4(2-1-2) 5
6	TCE-212 Introduction to Solid Mechanics	Nil	4(3-0-2) 5
7	TCE-213 Surveying	Nil	3 (2-0-3) 5
8	TCE-214 Materials, Testing & Evaluation	Nil	3(2-0-2) 4
9	TCE-215 Civil Engineering - Societal & Global Impact	Nil	2(2-0-0) 2
10	TCE-216 Advanced Surveying & Geomatics	Nil	4(3-0-2) 5
11	TCE-301 Theory of Structures	Nil	3(3-0-0) 3
12	TCE-302 Hydraulic Engineering	Nil	4(3-0-2) 5
13	TCE-303 Structural Engineering	Nil	3(3-0-0) 3
14	TCE-304 Geotechnical Engineering-I	Nil	4(3-0-2) 5
15	TCE-306 Environmental Engineering	Nil	4(3-0-2) 5
16	TCE-307 Transportation Engineering	Nil	4(3-0-2) 5
17	TCE-308 Construction Engineering	Nil	3(3-0-0) 3
	& Management		
18	TCE-309 Hydrology &	Nil	3(3-0-0) 3

	Water Resources Engineering		
19	TCE-401 Engineering Economics	Nil	3(2-0-2) 4
	Estimation & Costing	Nil	
20	TCE-491 Seminar	Nil	1(0-0-2) 2
21	TCE-405 Project-I	Nil	6(0-0-12)12
22	TCE-406 Project-II	Nil	6(0-0-12) 12
23	TCE-191 Practical Training -I	Nil	2 weeks
24	TCE-291 Practical Training-II	Nil	2 weeks
25	TCE-391 Practical Training-III	Nil	2 weeks
		<b>Total</b>	<b>74</b> <b>99</b>

<b>LIST OF PROGRAMME ELECTIVE COURSES</b>		<b>Prerequisite</b>	<b>Credit Hours</b>
<b>Sl No</b>	<b>Course No. and Name</b>		<b>(L-T-P)</b>
1	TCE-351 Design of concrete structure-II	Nil	3(3-0-0) 3
2	TCE-352 Design of steel structure	Nil	3(3-0-0) 3
3	TCE-353 Railway & Airport Engineering	Nil	3(3-0-0) 3
4	TCE-354 Water & Waste Water Engineering	Nil	3(3-0-0) 3
5	TCE-402 Design of Hydraulic Structures	Nil	3(3-0-0) 3
6	TCE-403 Earthquake Engineering	Nil	3(3-0-0) 3
7	TCE-407 Hydraulic Machines and Water Power Development	Nil	3(3-0-0) 3
8	TCE-408 Geotechnical Engineering-II	Nil	3(3-0-0) 3
9	TCE-409 Structural Analysis by Matrix Methods	Nil	3(3-0-0)3
10	TCE-412 Rock Engineering	Nil	3(3-0-0)3
11	TCE-435 Presstressed Concrete	Nil	3(3-0-0)3
12	TCE-438 Limit State Design	Nil	3(3-0-0)3
13	TCE-440 Advanced Fluid Mechanics	Nil	3(3-0-0)3
14	TCE-443 Flood Control & Water Power Development	Nil	3(3-0-0)3
15	TCE-445 Water Resources Systems	Nil	3(3-0-0)3
16	TCE-451 Advanced Foundation Engineering	Nil	3(3-0-0)3
17	TCE-452 Soil Dynamics & Machine Foundations	Nil	3(3-0-0)3
18	TCE-433 Bridge Engineering	Nil	3(3-0-0)3

19	TCE-475 Introduction to Finite Element Method	Nil	3(3-0-0) 3
20	TCE-476 Optimization Techniques	Nil	3(3-0-0) 3
21	TCE-477 Numerical Methods for Engineers	Nil	3(3-0-0) 3
22	TCE-478 Ground Water Engineering	Nil	3(3-0-0) 3
23	TCE-479 Hydraulic and irrigation Structures	Nil	3(3-0-0) 3
24	TCE-482 Urban Hydrology and Hydraulics	Nil	3(3-0-0) 3

<b>LIST OF COURSES (ALREADY APPROVED)</b>			
<b>A: LIST OF CORE COURSES</b>			
<b>Sl No</b>	<b>Course No. and Name</b>	<b>Prerequisite</b>	<b>Credit Hours</b>
1	TWP-101 Work Programme	Nil	1(0-0-2)2
2	TCE/TID/TME/TSW-109 Introduction to	Nil	3(3-0-0) 3
3	Environmental Engineering and Disasters	Nil	
4	BHS-188 Industial Sociology	Nil	3(3-0-0) 3
5	TCE-435 Pressstressed Concrete	Nil	3(3-0-0)3
6	TCE-438 Limit State Design	Nil	3(3-0-0)3
7	TCE-440 Advanced Fluid Mechanics	Nil	3(3-0-0)3
8	TCE-443 Flood Control & Water Power Development	Nil	3(3-0-0)3
9	TCE-445 Water Resources Systems	Nil	3(3-0-0)3
10	TCE-451 Advanced Foundation Engineering	Nil	3(3-0-0)3
11	TCE-452 Soil Dynamics & Machine Foundations	Nil	3(3-0-0)3
12	TCE-433 Bridge Engineering	Nil	3(3-0-0)3

13	NSS-101	Nil	1(0-0-4) 4
14	NSS-102	Nil	0(0-0-4)4
15	NSS-201	Nil	1(0-0-4)4
16	NSS-202	Nil	0(0-0-4)4

## PROPOSAL FOR A NEW COURSE

1	College	C.B.S.&H.
2	Department	Physics
3	Title of the Course & Course No.	Mechanics (BPP-199)
4	Catalogue Description	Attached
5	To be offered	B.Tech, Mechanical and Civil Engineering
6	Credits	5(3-1-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Outgrowth of instructors Research Program <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Proposed syllabus is mandatory to be implemented

	course be offered at this present time	as per AICTE norms
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Not required
14	What is the exact place of this course in the development of the educational program of your department	Core course for B. Tech Mechanical and Civil Engineering students
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Mechanics**

**2. Course No. : BPP-199**

**3. Credits Hours : 5 (3-1-2)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

Scalar and vector quantities, Newton's equations of motion, Conservative and non conservative forces, Non-inertial frames of reference, Harmonic, forced and damped oscillators, Definition and motion of a rigid body in the plane, Introduction to three-dimensional rigid body motion

## **6. Topical Outline**

### **Module 1:**

Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction.

### **Module 2:**

Scalar and vector quantities, Scalar and vector fields, Potential energy function;  $\mathbf{F} = -\nabla V$ , equipotential surfaces and meaning of gradient; Conservative and non-conservative forces, curl of a force field; Central forces; Conservation of Angular Momentum; Energy equation and energy diagrams; Elliptical, parabolic and hyperbolic orbits; Kepler problem and its Application.

### **Module 3:**

Non-inertial frames of reference; Rotating coordinate system: Five-term acceleration formula- Centripetal and Coriolis accelerations; Applications: Foucault pendulum.

### **Module 4:**

Harmonic oscillator; Damped harmonic motion – over-damped, critically damped and lightly-damped oscillators; Forced oscillations and resonance.

### **Module 5:**

Definition and motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinate system rotating and translating in the plane, Angular momentum about a point of a rigid body in planar motion; Euler's laws of motion, their independence from Newton's laws, and their necessity in describing rigid body motion; Examples.

### **Module 6:**

Introduction to three-dimensional rigid body motion — only need to highlight the distinction from two-dimensional motion in terms of (a) Angular velocity vector, and its rate of change and (b) Moment of inertia tensor; inertial coefficients, parallel and perpendicular axis theorem, moment of inertia of rigid bodies like sphere, spherical shell, disk, cylinder, and motion on inclined plane.

### **Practical Work:**

Experiments related with Error Analysis, Moment of Inertia of different bodies, Parallel axis theorem and different types of oscillations.

## **7. Text /Reference Books:**

- (i)Engineering Mechanics, 2nd ed. — MK Harbola
- (ii) Introduction to Mechanics — MK Verma
- (iii) An Introduction to Mechanics — D Kleppner & R Kolenkow
- (iv) Principles of Mechanics — JL Synge & BA Gri
- (v) Mechanics — JP Den Hartog
- (vi) Engineering Mechanics - Dynamics, 7th ed. - JL Meriam
- (vii) Mechanical Vibrations — JP Den Hartog
- (viii) Theory of Vibrations with Applications — WT Thomson
- (ix) Mechanics by J.C.Upadhyaya
- (x) Mechanics by D.C.Mathur
- (xi) Berkeley Physics Course Volume 1

## **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **Dept. of Mathematics, Statistics & Computer Science, CBSH**

### **Branch/Course Civil Engineering**

#### Semester-wise structure of curriculum

[L= Lecture, T = Tutorials, P = Practicals & C = Credits]

#### Semester I (First year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
1.	Basic Sciences course	<b>BPM 141</b>	Calculus, Multivariable Calculus and Linear Algebra	3L	1T	0P	4

#### Semester II (First year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
1.	Basic Sciences course	<b>BPM 151</b>	Differential Equations & Complex variables- Differentiation	4L	1T	0P	5

#### Semester III (Second year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
1.	Basic Sciences course	<b>BPM 241</b>	Transforms, Discrete Mathematics & Complex variables- Integration	2L	1T	0P	3

## PROPOSAL FOR A NEW COURSE

1	College	Basic Sciences & Humanities
2	Department	atics, Statistics & Computer Science
3	Title of the Course & Course No.	Calculus, Multivariable Calculus & Linear Algebra (BPM 141)
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To understand mathematical concepts and their applications to engineering.
9	General educational purpose	A. General Education Yes B. Department specialization No C. Students Research No D. Out growth of instructors Research Programme No
10.	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge No represented by the department C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department Yes F. A summarizing or integrated course No G. In your judgment does this course overlap to a considerable extent with any other course No
11	What are the urgent reasons why this course be offered at this present time	Mandatory implementation of the proposed syllabus by AICTE
12	The course will not replace my existing courses	New course
13	The courses will not require additional staff over and above	Program basic course
14	What is the exact place of this courses in the development of the educational programme of your department	Basic Science course
15	Topical outline: Lecture	Attached
16	Practical	No

17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

1. **Name of the course**     **Calculus, Multivariable Calculus & Linear Algebra**  
 2. **Course No.**                **BPM 141**  
 3. **Credits Hours**            **4 (3-1-0)**  
 4. **Pre-requisite**            **Nil**

## 5. Syllabus /Catalogue Description

### *Calculus:*

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Rolle's theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders.

### *Sequences and series:*

Convergence of sequence and series, tests for convergence, power series, Taylor's series. Series for exponential, trigonometric and logarithmic functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

### **Multivariable Calculus**

***Multivariable Calculus (Differentiation)*** Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

***Multivariable Calculus (Integration)*** Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes by (double integration) Center of mass and Gravity

(constant and variable densities). Theorems of Green, Gauss and Stokes, orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds.

### **Matrices and Linear Algebra**

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Orthogonal transformation and quadratic to canonical forms

### **6. Textbooks/References:**

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9<sup>th</sup> Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.
6. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
7. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Pub., 5<sup>th</sup> edition

### **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
Total	100 Marks

### **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Engineering Graphics & Design, TCE-114
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(1-0-4)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical and practical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	<p>A. General Education                                   <b>Yes</b></p> <p>B. Department specialization                           <b>Yes</b></p> <p>C. Students Research                                   <b>No</b></p> <p>D. Out growth of instructors</p> <p>Research Programme                                   <b>No</b></p>
10	Relation to other courses	<p>A. Pre-requisite                                       <b>Nil</b></p> <p>B. An introductory survey of knowledge represented by the department                           <b>No</b></p> <p>C. An introductory survey of a special area of knowledge   <b>No</b></p> <p>D. A further development of course                   <b>No</b></p> <p>E. An introductory survey of a special area of knowledge represented by some other department   <b>No</b></p> <p>F. a summarizing or integrated course                   <b>No</b></p> <p>G. in your judgment does this course overlap to a considerable extent with any other course.                   <b>No</b></p>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented

12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Engineering science course
14	What is the exact place of this courses in the development of the educational programme of your department	Engineering science course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course :** **Engineering Graphics & Design**  
**2. Course No. :** **TCE- 114**  
**3. Credits Hours :** **3(1-0-4)**  
**4. Pre-requisite :** **NIL**

## **5. Syllabus /Catalogue Description**

### **Detailed contents**

*Traditional Engineering Graphics:*

Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry; Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection, Shortest Distance.

***Computer Graphics:***

Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing; Co-ordinate Systems.

***(Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory)***

***Module 1: Introduction to Engineering Drawing*** covering,

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;

***Module 2: Orthographic Projections*** covering,

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes;

***Module 3: Projections of Regular Solids*** covering,

Those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

***Module 4: Sections and Sectional Views of Right Angular Solids*** covering,

Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

***Module 5: Isometric Projections*** covering,

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

***Module 6: Overview of Computer Graphics*** covering,

listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

***Module 7: Customisation & CAD Drawing***

consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

## **6. Text /Reference Books:**

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. (Corresponding set of) CAD Software Theory and User Manuals

## **7. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks

Lab	20
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Basic Science & Humanities
2	Department	Social Science & Humanities
3	Title of the Course & Course No.	English BHS 186
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give practical knowledge in the field of English to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will replace my existing courses	New Course
13	The courses will not require additional staff over and above	Additional staff required
14	What is the exact place of this courses in the development of the educational programme of your department	It has the potential to hone correct structural and spoken skills.
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff	Yes
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course :** English

**2. Course No. :** BHS186

**3. Credits Hours :** 2(2-0-2)

**4. Pre-requisite :** Nil

#### **5. Syllabus /Catalogue Description**

Vocabulary Building, Basic Writing Skills, Identifying Common Errors in Writing, Nature and Style of Writing, Writing practices.

## **6. Topical Outline**

### **Unit I Vocabulary Building**

- 1 Word Formation
- 2 Root words from foreign languages and their use in English
- 3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
- 4 Synonyms, antonyms, and standard abbreviations.

### **Unit II Basic Writing Skills**

- 1 Sentence Structures: Clauses in sentences, simple, compound and complex sentences, fragmented sentences, parallel sentences and split infinitives.
- 2 Importance of proper punctuation
- 3 Paragraph writing: Organizing principles of paragraphs in documents, précis writing

### **Unit III Identifying Common Errors in Writing**

- 1 Subject-verb agreement, Noun-pronoun agreement, Modifiers, misplaced and dangling.
- 2 Articles, Prepositions

### **Unit IV Nature and Style of Writing**

1. Definition and Importance of style, features
2. Choice of words and phrases
3. Sentence structure and length
4. Paragraph structure and length
5. Final draft

### **Unit V Writing Practices**

- 1 Comprehension
- 2 Report writing
- 3 Job application and resume

## **7. Laboratory work**

Listening Comprehension, Pronunciation, Intonation, Stress and Rhythm, Common Everyday Situations: Conversations and Dialogues, Communication at Workplace, Interviews, Formal Presentations, GD.

### **Suggested Readings:**

1. *Remedial English Grammar*. F.T. Wood. Macmillan.2007
2. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
3. *Study Writing*. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
4. *Communication Skills*. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
5. *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

## **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
<hr/>	
Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	College of Basic Sciences and Humanities
2	Department	Chemistry
3	Title of the Course & Course No.	Concepts of chemistry in engineering, BPC102
4	Catalogue Description	Attached
5	To be offered	B.Tech students
6	Credits	4 (3-0-1X3)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of chemistry for B.Tech students.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>Yes</b> C. An introductory survey of a special area of knowledge <b>Yes</b> D. A further development of course <b>Yes</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Proposed syllabus by AICTE and College of

	course be offered at this present time	Technology to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	
14	What is the exact place of this courses in the development of the educational programme of your department	Mandatory course for B.Tech students
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist and need to be renovated as per new syllabus
19	Would introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

## **Course code BSC102**

**Title Chemistry-I (Concepts of chemistry in engineering)**

**Category Basic Science Course**

**Detailed contents**

**(i) Atomic and molecular structure (8 lectures)**

Schrodinger equation, particle in a box. Wave functions of hydrogen atom and their applications to explore their spatial variations. Molecular orbital theory of diatomic molecules.  $\pi$ -MOs of butadiene, benzene and aromaticity.

**(ii) Spectroscopic techniques and applications (6 lectures)**

Microwave spectra, selection rules, nuclear magnetic resonance ,magnetic resonance imaging, surface characterisation, diffraction and scattering. electronic spectroscopy, fluorescence.

**(iii) Engineering materials (4 lectures)**

Classification of lubricants, mechanism of lubrication. Physical chemistry of polymers, Molecular mass & their determination, polymerisation processes, composites, blends and their applications.

**(iv) Use of free energy in chemical equilibrium (5 lectures)**

Thermodynamic functions: Estimations of entropy and free energies in physical and chemical processes. Free energy and emf., Cell potentials, Nernst equation, transition state theory of reaction rate. Use of free energy considerations in metallurgy through Ellingham diagrams.

**(v) Periodic properties (5 Lectures)**

Variations of orbital energies of atoms, atomic, ionic sizes, ionization energies, electron affinity, electronegativity, polarizability, coordination numbers, effective nuclear charge, Isomerism in complexes, crystal field theory.

**(vi) Stereochemistry (5 lectures)**

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformation.

**(vii) Organic reactions and synthesis of a drug molecule (4 lectures)** Introduction to substitution, addition, elimination, oxidation, reduction, cyclization and ring openings reactions. Synthesis of aspirin & paracetamol.

**(viii) Water Chemistry and corrosion (5 lectures)**

Methods of water treatment. Theories of corrosion and corrosion protection

**Laboratory**

Choice of 10-12 experiments from the following:

1. Determination of surface tension and viscosity
2. Thin layer chromatography
3. Determination of Iron, copper, chloride content and hardness of water
4. Determination of the rate constant of a reaction
5. Synthesis of a polymer/drug/ coordination compound
6. Partition coefficient of a substance between two immiscible liquids
7. Adsorption of acetic acid by charcoal
8. Ion exchange column for removal of hardness of water
9. Colligative properties using freezing point depression
10. Determination of cell constant and conductance of solutions
11. Potentiometry - determination of redox potentials and emfs

12. Saponification/acid value of an oil
13. Chemical analysis of a salt
14. Lattice structures and packing of spheres
15. Models of potential energy surfaces
16. Chemical oscillations- Iodine clock reaction
17. Use of the capillary viscosimeters to demonstrate the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg

### **Suggested Text Books**

- (i) University chemistry, by B. H. Mahan
- (ii) Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
- (iii) Fundamentals of Molecular Spectroscopy, by C. N. Banwell
- (iv) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
- (v) Physical Chemistry, by P. W. Atkins
- (vi) Organic Chemistry: Structure and Function by K. P. C. Vollhardt and N. E. Schore, 5th Edition  
<http://bcs.whfreeman.com/vollhardtschore5e/default.asp>

### **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Basic Sciences & Humanities
2	Department	atics, Statistics & Computer Science
3	Title of the Course & Course No.	Differential Equations & Complex variables-Differentiation ( BPM 151)
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	5(4-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To understand mathematical concepts and their applications to engineering.
9	General educational purpose	A. General Education Yes B. Department specialization No C. Students Research No D. Out growth of instructors Research Programme No
10.	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge No represented by the department C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department Yes F. A summarizing or integrated course No G. In your judgment does this course overlap to a considerable extent with any other course No
11	What are the urgent reasons why this course be offered at this present time	Mandatory implementation of the proposed syllabus by AICTE
12	The course will not replace my existing courses	New course
13	The courses will not require additional staff over and above	Program basic course
14	What is the exact place of this courses in the development of the educational programme of your department	Basic Science course
15	Topical outline: Lecture	Attached
16	Practical	No

17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

1. Name of the course    **Differential Equations & Complex variables-Differentiation**

2. Course No.                **BPM 151**  
 3. Credits Hours            **5 (4-1-0)**  
 4. Pre-requisite             **Nil**

### 5. Syllabus /Catalogue Description

#### *First order ordinary differential equations*

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for  $p$ , equations solvable for  $y$ , equations solvable for  $x$  and Clairaut's type.

#### *Ordinary differential equations of higher orders*

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

#### *Partial Differential Equations – First order*

First order partial differential equations, solutions of first order linear and non-linear PDEs.

#### *Partial Differential Equations – Higher order*

Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method. Flows, vibrations and diffusions, second-order linear equations and their classification, Initial and boundary conditions (with an informal description of well-posed problems), D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. One dimensional diffusion equation and its solution by separation of variables.

Boundary-value problems: Solution of boundary-value problems for various linear PDEs in various geometries.

### ***Complex Variables***

#### ***Complex Variable – Differentiation***

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Möbius transformations and their properties.

### **6. Textbooks/References:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition,
5. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.
6. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Pub., 5<sup>th</sup> edition

### **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
Total	100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Civil Engineering</b>	
3	Title of the Course & Course No.	<b>Computer Aided Civil Engineering Drawing</b> <b>TCE-205</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Civil Engineering</b>	
6	Credits	<b>2(1-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	To give theoretical and practical knowledge in the field of Drawing related to Civil Engineering to the students.	
9	General educational purpose	A. General Education B. Department specialization C. Students Research D. Out growth of instructors Research Programme	Yes Yes No No
10	Relation to other courses	A. Pre-requisite B. An introductory survey of knowledge represented by the department C. An introductory survey of a special area of knowledge D. A further development of course E. An introductory survey of a special area of knowledge represented by some other department F. a summarizing or integrated course G. in your judgment does this course overlap to a	No No No No No No

		considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>
13	The courses will not require additional staff over and above	<b>Program Core Course</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Civil Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course :** Computer Aided Civil Engineering Drawing
- 2. Course No.** : TEC- 205
- 3. Credits Hours** : 2(1-0-2)
- 4. Pre-requisite** : Nil

**5. Syllabus /Catalogue Description**

**Module 1 (Lectures 2) INTRODUCTION;** Introduction to concept of drawings, Interpretation of typical drawings, Planning drawings to show information concisely and comprehensively; optimal layout of drawings and Scales; Introduction to computer aided drawing, co-ordinate systems, reference planes. Commands: Initial settings, Drawing aids, Drawing basic entities, Modify commands, Layers, Text and Dimensioning, Blocks. Drawing presentation norms and standards.

**Module 2: (Lectures 2) SYMBOLS AND SIGN CONVENTIONS:** Materials, Architectural, Structural, Electrical and Plumbing symbols. Rebar drawings and structural steel fabrication and connections drawing symbols, welding symbols; dimensioning standards

**Module 3: (Lectures 1) MASONRY BONDS:** English Bond and Flemish Bond – Corner wall and Cross walls - One brick wall and one and half brick wall

**Module 4: (Lectures 7) BUILDING DRAWING:** Terms, Elements of planning building drawing, Methods of making line drawing and detailed drawing. Site plan, floor plan, elevation and section drawing of small residential buildings. Foundation plan. Roof drainage plans. Depicting joinery, standard fittings & fixtures, finishes. Use of Notes to improve clarity

**Module 5: (Lectures 3) PICTORIAL VIEW:** Principles of isometrics and perspective drawing. Perspective view of building.

**6. Text /Reference Books:**

1. Subhash C Sharma & Gurucharan Singh (2005), “Civil Engineering Drawing”, Standard Publishers

2. Ajeet Singh (2002), "Working with AUTOCAD 2000 with updates on AUTOCAD 200I", Tata-Mc Graw-Hill Company Limited, New Delhi
3. Sham Tickoo Swapna D (2009), "AUTOCAD for Engineers and Designers", Pearson Education,
4. Venugopal (2007), "Engineering Drawing and Graphics + AUTOCAD", New Age International Pvt. Ltd.,
5. Balagopal and Prabhu (1987), "Building Drawing and Detailing", Spades publishing KDR building, Calicut,
6. (Corresponding set of) CAD Software Theory and User Manuals.
7. Malik R.S., Meo, G.S. (2009) Civil Engineering Drawing, Computech Publication Ltd New Asian.
8. Sikka, V.B. (2013), A Course in Civil Engineering Drawing, S.K.Kataria& Sons,

#### **List of Practical:**

**Experiment 1-2:** Buildings with load bearing walls including details of doors and windows  
Taking standard drawings of a typical two storeyed building including all joinery, rebars, finishing and other details and writing out a description of the Facility in about 500 -700 words.

**Experiment 3:** RCC framed structures

**Experiment 4:** Reinforcement drawings for typical slabs, beams, columns and spread footings.

**Experiment 5:** Industrial buildings - North light roof structures - Trusses

**Experiment 6:** Perspective view of one and two storey buildings

#### **8. Marks Distribution**

I Pre final Exam	15 Marks
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II Pre final Exam	15 Marks
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Lab Final Exam	20 Marks
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Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Basic Sciences & Humanities
2	Department	atics, Statistics & Computer Science
3	Title of the Course & Course No.	Transforms, Discrete Mathematics & Complex Variables –Integration (BPM 241)
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3 (2-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To understand mathematical concepts and their applications to engineering.
9	General educational purpose	A. General Education Yes B. Department specialization No C. Students Research No D. Out growth of instructors Research Programme No
10.	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge No represented by the department C. An introductory survey of a special No area of knowledge D. A further development of course No E. An introductory survey of a special Yes area of knowledge represented by some other department F. A summarizing or integrated course No G. In your judgment does this course No overlap to a considerable extent with any other course
11	What are the urgent reasons why this course be offered at this present time	Mandatory implementation of proposed syllabus by AICTE
12	The course will not replace my existing courses	New course
13	The courses will not require additional staff over and above	Program basic course
14	What is the exact place of this courses in the development of the educational programme of your department	Basic Science course
15	Topical outline: Lecture	Attached
16	Practical	No

17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

1. Name of the course **Transforms, Discrete Mathematics & Complex Variables-Integration**
2. Course No. **BPM 241**
3. Credits Hours **3(2-1-0)**
4. Pre-requisite **- Nil -**

## 5. Syllabus /Catalogue Description

### Transform Calculus

#### *Transform Calculus -1*

Polynomials – Orthogonal Polynomials – Lagrange's, Chebysev Polynomials; Trigonometric Polynomials;

Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs and PDEs by Laplace Transformmethod.

#### *Transform Calculus-2*

Fourier transforms, Z-transform and Wavelet transforms: properties, methods, inverses and their applications.

### Discrete Mathematics

#### *Partially ordered sets:*

Complete partial ordering, chain, lattice, complete, distributive, modular and complemented lattices. Boolean and pseudo Boolean lattices.

#### *Introduction to Graphs:*

Graphs and their basic properties – degree, path, cycle, subgraph, isomorphism, Eulerian and Hamiltonian walk, trees.

### ***Complex Variables - Integration***

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

### **6. Textbooks/References:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
3. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
4. C. L. Liu, Elements of Discrete Mathematics, 2nd Ed., Tata McGraw-Hill, 2000.
5. N. Deo, Graph Theory, Prentice Hall of India, 1974.
6. S. Lipschutz and M. L. Lipson, Schaum's Outline of Theory and Problems of Discrete Mathematics, 2nd Ed., Tata McGraw-Hill, 1999.
7. J. P. Tremblay and R. P. Manohar, Discrete Mathematics with Applications to Computer Science, Tata McGraw-Hill, 1997.
8. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Pub., 5<sup>th</sup> edition

### **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
Total	100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Engineering Mechanics TCE-206
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Engineering Mechanics**  
**2. Course No. : TCE- 206**  
**3. Credits Hours : 4(3-1-0)**  
**4. Pre-requisite : NIL**

## **5. Syllabus /Catalogue Description**

**Module 1:** *Introduction to Engineering Mechanics covering, Force Systems Basic concepts, Particle equilibrium in 2-D & 3-D; Principle of Transmissibility of forces, Transfer of a force to parallel position, Varignon theorem, Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; various types of supports and corresponding reactions*

**Module 2:** *Centroid and Centre of Gravity covering, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Second moment of area: rectangular second moment of area, polar second moment of area, product second moment of area, radius of gyration, parallel axes theorem, perpendicular axes theorem, second moment of area of geometrically composite sections. Principal Axis*

**Module 3:** *Basic Structural Analysis covering, Equilibrium in three/2D dimensions; Method of Sections; Method of Joints; How to determine if a member is in tension or compression; Simple determinate Trusses; Zero force members; Beams & types of beams subjected to different type of loadings and reactions*

**Module 4:** *Bending moment and shear force, concept of bending moment and shear force, calculation of bending moment and shear force at any section, sign convention. B.M.D and S.F.D. for cantilever simply supported and overhanging beams and determinate simple frames subjected to various types of linearly varying loads/point load/moment.*

**Module 5:** *Torsion of circular and non-circular section, derivation of shear stress produced in a circular shaft subjected to torsion, maximum torque transmitted by solid and hollow circular shaft, power transmitted by shaft, torsional rigidity, Combined torsion and bending of circular shafts, principal stress and maximum shear stresses under combined loading of bending and torsion, Analysis of close-coiled-helical springs, Shear Centre, Shear Flow, Introduction to Torsion of non-circular sections.*

**Module 6:** *Slope and deflection- Relationship between moment, slope and deflection, Macaulay's method, moment area method, conjugate beam method, Use of these methods to calculate slope and deflection for determinant beams, frames.*

**Module 7:** *Columns and struts, Failure of short column, Euler's theory for long columns, critical load, effective length of a column, slenderness ratio, limitations of Euler's theory, critical slenderness ratio,*

**Module 8:** *Thin Pressure Vessels*, circumferential or hoop stress, longitudinal stress, cylindrical pressure vessel (under internal pressure) thin cylindrical sheet with hemispherical ends, thin spherical sheet under internal pressure

## **6. Text /Reference Books:**

- 1.Engineering Mechanics, D.S. Bedi, Khanna Book Publishing Co. (P) Ltd., Delhi
- 2.Engineering Mechanics, R. S. Khurmi, S. Chand Publishing
- 3.A Textbook of Engineering Mechanics, R.K. Bansal, Laxmi Publications
- 4.Engineering Mechanics, Sharma, Pearson1.Engineering Mechanics, D.S. Bedi, Khanna Book Publishing Co. (P) Ltd., Delhi

## **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Basic Science & Humanities
2	Department	Social Science & Humanities
3	Title of the Course & Course No.	Effective Technical CommunicationBHS 286
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give practical knowledge in the field of technical communication to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will replace my existing courses	New Course
13	The courses will not require additional staff over and above	Additional staff required
14	What is the exact place of this courses in the development of the educational programme of your department	It has a potential to upgrade the communication skills of the students.
15	Topical outline : Lecture	Attached
16	Practical:	-
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	Yes
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course** : **Effective Technical Communication**  
**2. Course No.** : **BHS286**  
**3. Credits Hours** : **3(3-0-0)**  
**4. Pre-requisite** : **Nil**

**5. Course Catalogue:** Information Design and Development, Technical Writing, Grammar and Editing, Self Development and Assessment, Communication and Technical Writing, Writing reports, resume and Ethics

## **6.Course Outline**

**Module 1:** Information Design and Development- Different kinds of technical documents, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.

**Module 2:** Technical Writing, Grammar and Editing- Technical writing objectives, forms of discourse, Writing drafts and revising, technical writing style and language. Basics of grammar: correction based on parts of speech, uses of articles, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication: features, types, process, barriers and channels of communication.

**Module 3:** Self Development and Assessment- Self assessment, managing time, rapid reading, taking notes.

**Module 4:** Communication and Technical Writing- Public speaking, Group discussion, Oral presentation and aids, Interviews.

Writing reports: letter form, memos form, general surveys, proposals, business letters, creating resume and writing notice, agenda and minutes of meetings.

**Module 5:** Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone Etiquettes, Engineering ethics, managing time.

## **7.Text/Reference Books:**

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New

York, 2004

2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003.
3. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
4. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004.
5. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.

#### **8. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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#### **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	<b>Engineering Geology</b> <b>TCE-207</b>
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	2(2-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.

9	General educational purpose	A. General Education B. department specialization C. Students Research D. Out growth of instructors  Research Program	<b>Yes</b> <b>Yes</b> <b>No</b> <b>No</b>
10	Relation to other courses	A. Pre-requisite  B. An introductory survey of knowledge represented by the department  C. An introductory survey of a special area of knowledge  D. A further development of course  E. An introductory survey of a special area of knowledge represented by some other department  F. A summarizing or integrated course  G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>  <b>No</b>  <b>No</b>  <b>No</b>  <b>No</b>  <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented	
12	The course will not replace my existing courses	New Course	
13	The courses will not require additional staff over and above	Program Core Course	
14	What is the exact place of this courses in the development of the educational program of your department	Core Course of B. Tech Civil Engineering Department	
15	Topical outline : Lecture	Attached	
16	Practical:	NA	
17	Text Book and Supplementary readings	Attached	
18	Classroom, Laboratory and other facilities:	Required facilities exist	

19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Engineering Geology**  
**2. Course No. : TCE- 207**  
**3. Credits Hours : 2(2-0-0)**  
**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

### **Module 1: Introduction-**

Branches of Geology, scope of geological studies to civil engineering projects, Mineralogy-Mineral, origin and composition, physical properties of minerals, basics of optical mineralogy, Rock forming minerals.

### **Module 2: Petrology –**

Rock forming process, Characteristics of igneous, sedimentary and metamorphic rocks, Classification of rocks, Engineering use of rocks.

### **Module 3: Physical Geology –**

Weathering, Erosion and denudation. Factors affecting weathering. Engineering considerations, Superficial deposits and its importance, river meandering, alluvium, glacial deposits, Desert landforms, Loess.

### **Module 4: Strength Behaviour of Rocks -**

Stress strain in rocks, Dip and strike, Outcrop, Inlier and outlier, Discontinuities, Fold – types and nomenclature, Recognition of fold, Faults- Parts of fault, classification of fault, Joints, Engineering significance of fold, fault and joints.

#### **Module 5: Rocks masses as Construction Material**

Definition of rock masses, Main features affecting quality of rocks, Classification of rock material strength, Rock quality designation, Rock mass description.

#### **Module 6: Geology for Dams, Reservoir and Tunnels**

Geological examination of Dams, reservoir and tunnels sites in relation to engineering defects in rocks, Needed precautions for unsuited conditions.

### **6. Text /Reference Books:**

1. Engineering and Engineering Geology by Parbin Singh
2. Engineering Geology by D Venkat Reddy
3. A Geology for Engineers by FGH Blyth
4. Engineering Geology by PK Mukherjee

### **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks

Total

100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>
2	Department	<b>Civil Engineering</b>
3	Title of the Course & Course No.	<b>Surveying</b> <b>TCE-213</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Civil Engineering</b>
6	Credits	<b>3(2-0-3)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>To give theoretical and practical knowledge in the field of Surveying to the students.</b>
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>

11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>
13	The courses will not require additional staff over and above	<b>Program Core Course</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Civil Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course                   :** **Surveying**  
**2. Course No.                         :** **TEC-213**  
**3. Credits Hours                   :** **3(2-0-3)**  
**4. Per-requisite                   :** **NIL**

#### **5. Syllabus /Catalogue Description**

**Module 1: Introduction:** Introduction: definition, object, classification, principles of surveying. Linear measurements: instruments, ranging of a line, measuring on a sloping ground,

**Module 2: Chain & Plain Table Surveying:** **Chain surveying:** Types of Chains, off-sets, obstacles in chaining, errors in chaining and correction applied. **Plane-table survey:** principles of plane tabling, instruments used, setting, leveling, centering and orientation, Radiation Method, Intersection Method, Traversing Method, Resection Method.

**Module 3: Compass Surveying:** Traverse bearings and angles, Types of Compass, meridians, dip and declination, local attraction and its elimination, adjustment of closing error, Latitude and Longitude.

**Module 4: Theodolite Survey :** classification of Theodolites, Definitions, reading Varnier scale of Theodolite, adjustments of a Theodolite, uses of Theodolite, measurement of horizontal & vertical angles, traverse survey with the Theodolite, traverse computation, adjustment of closed traverse, computation of area of closed traverse, Latitude Departure of a line, Omitted measurements.

**Module 5: Leveling:** Introduction, the level & types of levels, leveling staff, principles of leveling, terms and their abbreviations, adjustments of a level, classification of leveling, booking and reducing the levels i.e. rise and fall and height of instrument method, curvature & refraction corrections, distance to the visible horizon, difficulties in leveling, errors in leveling, sensitiveness of a level tube and its measurement, permanent adjustments of a level

**Module 6: Contouring:** Definition, contour interval and horizontal equivalent characteristics of contours, contours of natural features, methods of contouring, interpolation of contours, contour gradients

## 6. Text /Reference Books:

1. T.P.Kanetkar & S.V. Kulkarni "Surveying and Levelling Vol. I"
2. B.C.Punamia "Surveying Vol. I & II", Laxmi Publications
3. Basak N. N. "Surveying & Levelling", Tata McGraw-Hill publishing Company
4. Subramanyan "Surveying & Levelling" Oxford University Press
5. Bhavikatti, S.S., Surveying and Levelling, Vol. I, I.K. International, 2010
6. Arora, K.R., Surveying, Vol-I, and II, Standard Book House, 2015.

## 7. List of Practical:

1. To study the given metric survey chain, Prismatic and Surveyor's Compass.

2. To find the area of the given field by perpendicular offset method
3. Plane Table traversing and study of equipments of Plane Table Surveying.
4. To determine reduced level of all the station and difference of level between first and last station by rise and fall method
5. To prepare a Contour Map of an area using Dumpy Level/Theodolite and finding the cutting and filling volume.
6. Measurement of Horizontal and Vertical angles using Theodolite
7. To determine the height of any object using a Theodolite by trigonometric method.

## 8. Marks Distribution

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab Final Exam	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Disaster Preparedness & Planning Management TCE-208
4	Catalogue Description	Attached
5	To be offered	B. Tech, Civil Engineering
6	Credits	2(2-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course :Disaster Preparedness & Planning Management**

**2. Course No. : TCE- 208**

**3. Credits Hours : 2(2-0-0)**

**4. Pre-requisite : NIL**

**5. Syllabus /Catalogue Description**

**Module 1:**Introduction-Concepts and definitions: disaster, hazard, vulnerability, risks-severity, frequency and details, capacity, impact, prevention, mitigation).

**Module 2:**Disasters-Disasters classification; natural disasters (floods, draught, cyclones,volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

**Module 3:**Disaster Impacts-Disaster impacts (environmental, physical, social, ecological,economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

**Module 4:**Disaster Risk Reduction (DRR)-Disaster management cycle – its phases;prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control, security, communications); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

**Module 5:**Disasters, Environment and Development-Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

## **6. Text /Reference Books:**

9. <http://ndma.gov.in/> (Home page of National Disaster Management Authority)
- 10.<http://www.ndmindia.nic.in/> (National Disaster management in India, Ministry of Home Affairs).
- 11.Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
- 12.Singh B.K., 2008, Handbook of Disaster Management: Techniques & Guidelines, Rajat Publication.
- 13.Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation
- 14.Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California, EMSA no.214, June 2003
- 15.Inter Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC

## **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks

### **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Introduction to Fluid Mechanics TCE209
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b>

		E. An introductory survey of a special area of knowledge represented by some other department <b>No</b>  F. a summarizing or integrated course <b>No</b>  G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Introduction to Fluid Mechanics**

**2. Course No. : TCE- 209**

**3. Credits Hours : 3 (2-0-2)**

#### **4. Pre-requisite : Nil**

#### **5. Syllabus /Catalogue Description**

Introduction and Properties of fluids, Newton's law of viscosity. Fluid statics- Pressure and its measurement, pressure forces on plane and curved surfaces. Buoyancy and flotation, Kinematics of fluid flow; different types of fluid flows, stream function, velocity potential, rotational flow, continuity equation. Dynamics of fluid flow; Euler's equation of motion, Bernoulli's theorem and its applications. Momentum equation and its applications. Dimensional analysis and similitude, model analysis.

#### **6. Topical Outline**

**Module 1:** Basic Concepts and Definitions – Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; Vapour pressure, boiling point, cavitation; Surface tension, capillarity, Bulk modulus of elasticity, Compressibility.

**Module 2:** Fluid Statics - Fluid Pressure: Pressure at a point, Pascals law, pressure variation with temperature, density and altitude. Piezometer, Single Column Manometer, U-Tube Manometer, Differential Manometer, Micromanometers. pressure gauges, Hydrostatic pressure and force on: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies. Determination of specific gravity of solids and liquids using principle of buoyancy.

**Module 3:** Fluid Kinematics- Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One-, two- and three -dimensional continuity equations in Cartesian coordinates.

**Module 4:** Fluid Dynamics- Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation : venturimeter, orifice meter and pitot tube; Flow through orifices and mouthpieces, Coefficients of contraction, velocity and discharge. Momentum principle; Forces exerted by fluid flow on pipe bend, fixed and moving plates, hydraulic structures; moments of momentum

equation, Vortex Flow – Free and Forced; Dimensional Analysis and Dynamic Similitude – Dimensionally homogeneous equations. *Buckingham's  $\pi$ -Theorem*. Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number. Geometrical, kinematic and dynamic and complete similarity between models and prototypes. Model scales.

## **Lab Experiments**

1. Stability of Floating Body
2. Hydrostatics Force on Surfaces
3. Verification of Bernoulli's Theorem
4. Calibration of Venturimeter
5. Calibration of Orifice meter
6. Calibration of rectangular and triangular weirs
7. Determination of coefficients of contraction, velocity and discharge for orifices and notches
8. Flow Visualisation—and determining critical Reynolds number
9. Study of Pressure Measuring Devices
10. Impacts of jets

## **7. Text /Reference Books:**

1. Engineering Fluid Mechanics, R. J. Garde and A. G. Mirajgaoker, NemChand and Bros, Roorkee
2. Hydraulics and Fluid Mechanics, P.N. Modi and S.M. Seth, Standard Book House
3. Fluid Mechanics and Hydraulic Machines, R.K.Bansal, Laxmi Publications (P) Ltd
4. Fluid Mechanics: Including Hydraulic Machines, A.K. Jain, Khanna Publishers

## **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
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Total	100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Introduction to Solid Mechanics TCE-212
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	4(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Introduction to Solid Mechanics**

**2. Course No. : TCE- 212**

**3. Credits Hours : 4(3-0-2)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

**Module 1:** *Simple Stresses and Strains*-Concept of stress and strain, St. Venant's principle, stress and strain diagram, Elasticity and plasticity – Types of stresses and strains, Hooke's law

– stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them, elongation of various bars under self load and external loads – Bars of varying section – composite bars – Temperature stresses. Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

**Module 2:** Compound Stresses and Strains- Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, ellipse of stress and their applications. Two dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain. Relationship between elastic constants.

**Module 3:** *Flexural Stresses-Theory of simple bending* – Assumptions – Derivation of

bending equation:  $M/I = f/y = E/R$  - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

**Module 4:** *Shear Stresses- Derivation of formula* – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

**Module 5:** *Theories of failure*- Introduction to elastic theories of failure, elementary idea of Rankine theory, St. Venant theory, Tresca theory, Haigh's theory and Von Mises's theories of failure.

**Module 6:** *Strain Energy*: concept of strain energy and complementary strain energy, strain energy in linearly elastic members under axial, flexural and transverse shear loading, real work and virtual work principle, virtual work on a rigid and on an elastic body. Various energy theorems: principle of conservation of energy, Betti's law of reciprocal work, Maxwell's law of reciprocal deflection, Minimum energy theorem, Castigliano's first theorem, Castigliano's second theorem. Displacements in statically determinate beams, trusses and portal frames under external loads using energy methods.

**Module 7:** *Indeterminacy of structures*, Static and Kinematic indeterminacy of simple regular structures e.g. beams, portal frames and trusses etc. introduction of basic methods of analysis of statically indeterminate structures, method of consistent deformation applied to simple beams, portal frames and trusses, Three moments equation.

#### **List of Experiments:**

- 1.** Tension test
- 2.** Bending tests on simply supported beam and Cantilever beam.
- 3.** Compression test on concrete
- 4.** Impact test
- 5.** Shear test
- 6.** Investigation of Hook's law that is the proportional relation between force and stretching in elastic deformation,
- 7.** Determination of torsion and deflection,
- 8.** Measurement of forces on supports in statically determinate beam,
- 9.** Determination of shear forces in beams,
- 10.** Determination of bending moments in beams,
- 11.** Measurement of deflections in statically determinate beam,
- 12.** Measurement of strain in a bar
- 13.** Bend test steel bar;
- 14.** Yield/tensile strength of steel bar;

## **6. Text /Reference Books:**

- 1.** Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New York, USA.
- 2.** Kazmi, S. M. A., "Solid Mechanics" TMH, Delhi, India.
- 3.** Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall, 2004
- 4.** Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 2nd ed. New York, NY: McGraw Hill, 1979
- 5.** Laboratory Manual of Testing Materials - William Kendrick Hall
- 6.** Mechanics of Materials - Ferdinand P. Beer, E. Russel Johnston Jr., John T. DEwolf – TMH 2002.
- 7.** Strength of Materials by R. Subramanian, Oxford University Press, New Delhi.

## **7. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks

## **PROPOSAL FOR A NEW COURSE**

1	College	<b>Technology</b>
2	Department	<b>Civil Engineering</b>
3	Title of the Course & Course No.	<b>Advanced Surveying and Geomatics</b> <b>TCE-216</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Civil Engineering</b>
6	Credits	<b>4(3-0-2)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>To give theoretical and practical knowledge in the field of Surveying and Geomatics to the</b>



18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course : Surveying and Geomatics**  
**2. Course No. : TEC- 216**  
**3. Credits Hours : 4(3-0-2)**  
**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

**Module 1: Tacheometry:** optical measurement of distance, stadia method, tangential method. **Triangulation and Trilateration :** triangulation – network types- Signals. Baseline – corrections in Base line - Satellite station Intervisibility of height and distances.

**Module 2: Curves:** Elements of simple and compound curves – Method of setting out– Elements of Reverse curve - Transition curve – length of curve – Elements of transition curve - Vertical curves.

**Module 3: Modern Field Survey Systems:** Digital and Auto Level, Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Total Station – Parts of a Total Station – Accessories –Advantages and Applications, Field Procedure for total station survey; Global Positioning Systems- Segments, GPS measurements, Surveying with GPS, Co-ordinate transformation.

**Module 4: Photogrammetry Surveying:** Introduction, Basic concepts, perspective geometry of aerial photograph, Definitions, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping, methods.

**Module 5: Remote Sensing:** Introduction –Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition: platforms and sensors; visual image interpretation; digital image processing.

## **6. Text /Reference Books:**

7. T.P.Kanetkar & S.V. Kulkarni "Surveying and Levelling Vol. I and II"
8. B.C.Punamia "Surveying Vol. II & III", Laxmi Publications
9. Basak N. N. "Surveying & Levelling", Tata McGraw-Hill publishing Company
10. Subramanyan "Surveying & Levelling" Oxford University Press
11. Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010
12. Chandra, A.M., Higher Surveying, Third Edition, New Age International (P) Limited, 2002.
13. Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001.
14. Arora, K.R., Surveying, Vol-I, II and III, Standard Book House, 2015.

## **7. List of Practical:**

1. To prepare a Contour Map of an area using Dumpy Level/Theodolite and finding the cutting and filling volume.
2. Tracing of horizontal curve with the Tape and Theodolite.
3. Finding the coordinates (Northing, Easting and Elevation) of points using Total Station.
4. Setting of Horizontal Curve with Total Station.
5. Study of Hand Held Global Positioning System (G.P.S.) and marking of Points using GPS
6. Finding the Reduced Levels of ground points using Digital Levels
7. To study the topography map.

## **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab Final Exam	20 Marks

Final Exam 50 Marks

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Total 100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Material Testing and Evaluation TCE-214
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education                  Yes B. department specialization       Yes C. Students Research                  No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite                      No B. An introductory survey of knowledge represented by the department       No C. An introductory survey of a special area of knowledge                      No D. A further development of course                      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course                      No G. in your judgment does this course overlap to a considerable extent with any other course. No

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Material Testing and Evaluation**

**2. Course No. : TCE- 214**

**3. Credits Hours : 3(1-1-2)**

**4. Pre-requisite : Nil**

**5. Syllabus /Catalogue Description**

**Module 1:** *Introduction to Engineering Materials covering, Cements, M-Sand, Concrete(plain, reinforced and steel fibre/ glass fibre-reinforced, light-weight concrete, High Performance Concrete, Polymer Concrete) Ceramics, and Refractories, Bitumen and asphaltic materials, Timbers, Glass and Plastics, Structural Steel and other Metals, Paints and Varnishes, Acoustical material and geo-textiles, rubber and asbestos, laminates and adhesives, Graphene, Carbon composites and other engineering materials including properties and uses of these*

**Module 2:** *Introduction to Material Testing covering, What is the “Material Engineering”?; Mechanical behavior and mechanical characteristics; Elasticity – principle and characteristics; Plastic deformation of metals; Tensile test – standards for different material (brittle, quasi-brittle, elastic and so on) True stress – strain interpretation of tensile test; hardness tests; Bending and torsion test; strength of ceramic; Internal friction, creep – fundaments and characteristics; Brittle fracture of steel – temperature transition approach; Background of fracture mechanics; Discussion of fracture toughness testing – different materials; concept of fatigue of materials; Structural integrity assessment procedure and fracture mechanics*

**Module 3:** *Standard Testing & Evaluation Procedures covering, Laboratory for mechanical testing; Discussion about mechanical testing; Naming systems for various irons, steels and nonferrous metals; Discussion about elastic deformation; Plastic deformation; Impact test and transition temperatures; Fracture mechanics – background; Fracture toughness – different materials; Fatigue of material; Creep.*

#### **List of Experiments:**

8. Gradation of coarse and fine aggregates
9. Different corresponding tests and need/application of these tests in design and quality control
10. Tensile Strength of materials & concrete composites
11. Compressive strength test on aggregates
12. Tension I - Elastic Behaviour of metals & materials
13. Tension II - Failure of Common Materials
14. Direct Shear - Frictional Behaviour
15. Concrete I - Early Age Properties
16. Concrete II - Compression and Indirect Tension
17. Compression – Directionality
18. Soil Classification
19. Consolidation and Strength Tests
20. Torsion test
21. Hardness tests (Brinnel's and Rockwell)
22. Tests on closely coiled and open coiled springs
23. Theories of Failure and Corroboration with Experiments
24. Bituminous Mix Design and Tests on bituminous mixes - Marshall method

## Concrete Mix Design as per BIS

## **6. Text /Reference Books:**

1. Chudley, R., Greeno (2006), 'Building Construction Handbook' (6th ed.),R. ButterworthHeinemann
2. Khanna, S.K., Justo, C.E.G and Veeraragavan, A, ' Highway Materials and Pavement Testing', Nem Chand& Bros, Fifth Edition
3. Various related updated & recent standards of BIS, IRC, ASTM, RILEM, AASHTO, etc. corresponding to materials used for Civil Engineering applications
4. Kyriakos Komvopoulos (2011), Mechanical Testing of Engineering Materials, Cognella
5. E.N. Dowling (1993), Mechanical Behaviour of Materials,Prentice Hall International Edition 6. American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards (post 2000) 7. Related papers published in international journals

## **7. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Civil Engineering – Societal & Global Impact TCE215
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	2(2-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Civil Engineering – Societal &Global Impact**  
**2. Course No. : TCE- 215**  
**3. Credits Hours : 2(2-0-0)**  
**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

**Module 1:** Understanding the importance of Civil Engineering in shaping and impacting the world; The ancient and modern Marvels and Wonders in the field of Civil Engineering; Future Vision for Civil Engineering, Pre-industrial revolution days, Agricultural revolution, first and second industrial revolutions, IT revolution; Recent major Civil Engineering breakthroughs and innovations; Present day world and future projections, Ecosystems in Society and in Nature; the steady erosion in Sustainability; Human Development Index and Ecological Footprint of India Vs other countries and analysis;

**Module 2:** Infrastructure - Habitats, Megacities, Smart Cities, futuristic visions; Transportation (Roads, Railways & Metros, Airports, Seaports, River ways, Sea canals, Tunnels (below ground, under water); Futuristic systems (ex, Hyper Loop)); Energy generation (Hydro, Solar (Photovoltaic, Solar Chimney), Wind, Wave, Tidal, Geothermal, Thermal energy); Water provisioning; Telecommunication needs (towers, above-ground and underground cabling); Awareness of various Codes & Standards governing Infrastructure development; Innovations and methodologies for ensuring Sustainability;

**Module 3:** Environment- Traditional & futuristic methods; Solid waste management, Water purification, Wastewater treatment & Recycling, Hazardous waste treatment; Flood control (Dams, Canals, River interlinking), Multi-purpose water projects, water foot print, Atmospheric pollution; Global warming phenomena and Pollution Mitigation measures, Environmental Metrics & Monitoring; Other Sustainability measures; Innovations and methodologies for ensuring Sustainability, Global warming, its impact and possible causes; Evaluating future requirements for various resources; GIS and applications for monitoring systems;.

**Module 4:** Built environment – Facilities management, Climate control; Energy efficient built environments and LEED ratings, Recycling, Temperature/ Sound control in built environment, Security systems; Intelligent/ Smart Buildings; Aesthetics of built environment, Role of Urban Arts Commissions; Conservation, Repairs & Rehabilitation of Structures & Heritage structures; Innovations and methodologies for ensuring Sustainability

**Module 5:** Civil Engineering Projects – Environmental Impact Analysis procedures; Waste(materials, manpower, equipment) avoidance/ Efficiency increase; Advanced construction techniques for better sustainability; Techniques for reduction of Green House Gas emissions in various aspects of Civil Engineering Projects; New Project Management paradigms & Systems (Ex. Lean Construction), contribution of Civil Engineering to GDP, Contribution employment(projects, facilities management), Quality of products, Health & Safety aspects for stakeholders; Innovations and methodologies for ensuring Sustainability during Project development;

## **6. Text /Reference Books:**

1. Žiga Turk (2014), Global Challenges and the Role of Civil Engineering, Chapter 3 in: Fischinger M. (eds) Performance-Based Seismic Engineering: Vision for an Earthquake Resilient Society. Geotechnical, Geological and Earthquake Engineering, Vol. 32. Springer, Dordrecht
  2. Brito, Ciampi, Vasconcelos, Amaral, Barros (2013) Engineering impacting Social, Economical and Working Environment, 120th ASEE Annual Conference and Exposition
  3. NAE Grand Challenges for Engineering (2006), Engineering for the Developing World, The Bridge, Vol 34, No.2, Summer 2004.
  4. Allen M. (2008) Cleansing the city. Ohio University Press. Athens Ohio.
  5. Ashley R., Stovin V., Moore S., Hurley L., Lewis L., Saul A. (2010). London Tideway Tunnels Programme – Thames Tunnel Project Needs Report – Potential source control and SUDS applications: Land use and retrofit options
  6. <http://www.thamestunnelconsultation.co.uk/consultation-documents.aspx>
  7. Ashley R M., Nowell R., Gersonius B., Walker L. (2011). Surface Water Management and Urban Green Infrastructure. Review of Current Knowledge. Foundation for Water Research FR/R0014
  8. Barry M. (2003) Corporate social responsibility – unworkable paradox or sustainable paradigm? Proc ICE Engineering Sustainability 156. Sept Issue ES3 paper 13550. p 129-130
  9. Blackmore J M., Plant R A J. (2008). Risk and resilience to enhance sustainability with application to urban water systems. J. Water Resources Planning and Management. ASCE. Vol. 134, No. 3, May.
  10. Bogle D. (2010) UK's engineering Council guidance on sustainability. Proc ICE Engineering Sustainability 163. June Issue ES2 p61-63
  11. Brown R R., Ashley R M., Farrelly M. (2011). Political and Professional Agency Entrapment: An Agenda for Urban Water Research. Water Resources Management. Vol. 23, No.4. European Water Resources Association (EWRA) ISSN 0920-4741.
- AICTE Model Curriculum for Undergraduate degree in Civil Engineering (Engineering & Technology)
- 68 | Page
12. Brugnach M., Dewulf A., Pahl-Wostl C., Taillieu T. (2008) Toward a relational concept of uncertainty: about knowing too little, knowing too differently and accepting not to know. Ecology and Society 13 (2): 30
  13. Butler D., Davies J. (2011). Urban Drainage. Spon. 3rd Ed.

14. Cavill S., Sohail M. (2003) Accountability in the provision of urban services. Proc. ICE. Municipal Engineer 156. Issue ME4 paper 13445, p235-244.
15. Centre for Water Sensitive Cities (2012) Blueprint for a water sensitive city. Monash University.
16. Charles J A. (2009) Robert Rawlinson and the UK public health revolution. Proc ICE Eng History and Heritage. 162 Nov. Issue EH4. p 199-206

## **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Theory of structures TCE-301
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education                  Yes B. department specialization       Yes C. Students Research                  No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite                      No B. An introductory survey of knowledge represented by the department       No C. An introductory survey of a special area of knowledge                      No D. A further development of course                      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course                      No G. in your judgment does this course overlap to a considerable extent with any other course. No

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Theory of Structures**

**2. Course No. : TCE- 301**

**3. Credits Hours : 3(3-0-0)**

**4. Per-requisite : Nil**

## **5. Syllabus /Catalogue Description**

**Module 1:**Concept of influence lines, Muller – Breslau principle, influence line for statically determinate beams, simple trusses, and three hinge arches, use of influence line in evaluating the

structural quantity for various loadings, moving loads, simply supported beams under moving loads, maximum bending moment and shear force at a given section, absolute maximum shear force and bending moment (assuming total loads on span remains constant), Influence lines for statically indeterminate structures.

**Module 2:** Statically indeterminate structures: Kinematic indeterminacy, Displacement methods of analysis of statically indeterminate structures: slope deflection method, moment distribution method, column analogy method and Kani's method for structures having members with constant flexural rigidities, continuous beams and portal frame without joint translation, portal frame with side sway, portal frames with inclined columns, portal frame with storey column unequal in height and bases fixed and hinged, symmetry and anti-symmetry in structures

**Module 3:** *Arch structure*, influence line for three hinged symmetrical parabolic arch, absolute maximum bending moment, under single concentrated load, light cables under uniformly distributed loads per unit horizontal span, expression for horizontal reaction, cable tension at the ends, length of cable with both ends at same level and at different levels, Anchor of cables, temperature stresses in suspension cables, Two hinged arch, expression for horizontal reaction, influence lines for horizontal reaction, bending moment, shear force and normal thrust, least work solution of fixed symmetrical parabolic arch.

**Module 4:** *Stiffening girders in suspension bridges*, three hinged stiffening girders equilibrium of cables, equilibrium of girder, bending moment diagram, influence lines for horizontal reaction, influence line for loads in suspenders, influence line for bending moment, maximum bending moment diagram due to a single point load and uniformly distributed load, influence lines for shear force, shear force diagram.

**Module 5:** *Introduction to matrix methods of structural analysis*, Flexibility and stiffness methods applied to trusses, beams and frames by both system and element approach.

## 6. Text /Reference Books:

1. Structural Analysis, R. Agor, Khanna Publishing House
2. Mechanics of Materials, BC Punmia & AK Jain, Laxmi Publications
3. Theory of Structures Vol-I, Pandit & Gupta, TMH Publication

## 7. Marks Distribution

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks

Final Exam 50 Marks

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Total 100 Marks

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### **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Hydraulic Engineering TCE302
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	4(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No

		F. a summarizing or integrated course <b>No</b>  G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Hydraulic Engineering**
- 2. Course No. : TCE- 302**
- 3. Credits Hours : 4 (3-0-2)**
- 4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

Laminar flow, Measurement of viscosity.Turbulent Flow, theories of turbulence, Resistance to flow of fluid in smooth and rough pipes, Moody's diagram.Boundary layer analysis, boundary layer thickness.Flow separation and Control.Introduction to open channel flow, classification of channel flow.Uniform flow and its computations, most economical section.Non-Uniform flow and computations, Hydraulic Jump, Surge, Flow through pipes, Analysis of pipe network, Computational Fluid Dynamics, Hydro informatics.

## **6. Topical Outline**

**Module 1:** Laminar Flow- Laminar flow through: circular pipes, annulus and parallel plates. Stoke's law, Measurement of viscosity.

**Module 2:** Turbulent Flow- Reynolds experiment, Transition from laminar to turbulent flow. Definition of turbulence, scale and intensity, Causes of turbulence, instability, mechanism of turbulence and effect of turbulent flow in pipes. Reynolds stresses, semi-empirical theories of turbulence, Prandtl's mixing length theory, universal velocity distribution equation. Resistance to flow of fluid in smooth and rough pipes, Moody's diagram.

**Module 3:**Boundary Layer Analysis-Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and Turbulent boundary layers on a flat plate; Laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients.Flow separation and Control.

**Module 4:** Introduction to Open Channel Flow-Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution in channel section.

**Module 5:** Uniform Flow-Continuity Equation, Energy Equation and Momentum Equation, Characteristics of uniform flow, Chezy's formula, Manning's formula. Factors affecting Manning's Roughness Coefficient. Most economical section of channel. Computation of Uniform flow, Normal depth.

**Module 6:** Non-Uniform Flow- Specific energy, Specific energy curve, critical flow, discharge curve Specific force and Critical depth. Channel Transitions. Measurement of Discharge and Velocity – Venturi Flume, Standing Wave Flume, Parshall Flume, Broad Crested Weir. Measurement of Velocity- Current meter, Floats, Hot-wire anemometer. Gradually Varied Flow-Dynamic Equation of Gradually Varied Flow, Classification of channel bottom slopes, Classification of surface profile, Characteristics of surface profile. Computation of water surface profile by graphical, numerical and analytical approaches. Direct Step method, Standard step method and Direct integration method.

**Module 7:** Hydraulic Jump- Theory of hydraulic jump, Elements and characteristics of hydraulic jump in a rectangular Channel, length and height of jump, location of jump, Types, applications and location of hydraulic jump. Energy dissipation and other uses, surge as a moving hydraulic jump. Positive and negative surges.

**Module 8:** Flow through Pipes: Loss of head through pipes, Darcy-Wiesbatch equation, minor losses, total energy equation, hydraulic gradient line, Pipes in series, equivalent pipes, pipes in parallel, flow through laterals, flows in dead end pipes, siphon, power transmission through pipes, nozzles. Analysis of pipe networks: Hardy Cross method. Water hammer in pipes and control measures. Branching of pipes, three reservoir problem.

**Module 9:** Computational Fluid Dynamics: Basic equations of fluid dynamics, Grid generation, Introduction to inviscid incompressible flow, Boundary layer flow as applicable to C.F.D. Hydro informatics: Concept of hydro informatics – scope of internet and web based modeling in water resources engineering.

### Practical Work:

1. Laminar and Turbulent flows in pipes
2. Velocity distribution and length of establishment of flow in pipes
3. Determination of friction factor of pipes
4. Determination of Minor loss coefficients.
5. Uniform Flow in open channels
6. Venturi Flume
7. Flow over Broad-crested weir
8. Flow over Spillway
9. Flow over a hump
10. Hydraulic Jump
11. Flow under Sluice Gate
12. Velocity Distribution in Open channel flow
13. Studies in Wind Tunnel
14. Measurement of viscosity

## 7. Text /Reference Books:

5. Engineering Fluid Mechanics, R. J. Garde and A. G. Mirajgaoker, NemChand and Bros, Roorkee
6. Hydraulics and Fluid Mechanics, P.N. Modi and S.M. Seth, Standard Book House
7. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill.
8. Open channel Flow, K. Subramanya, Tata McGraw Hill.
9. Open Channel Hydraulics, VenTe Chow, Tata McGraw Hill.
10. Burnside, C.D., "*Electromagnetic Distance Measurement*," Beekman Publishers, 1971.

## 8. Marks Distribution

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Structural Engineering TCE-303
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Structural Engineering**

**2. Course No. : TCE- 303**

**3. Credits Hours : 3(3-0-0)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

**Module 1:**Introduction- concepts of energy principles, safety, sustainable development in performance; what makes a structure; principles of stability, equilibrium; what is a structural

engineer, role of engineer, architect, user, builder; what are the functions' what do the engineers design, first principles of process of design

**Module 2:** Planning and Design Process; Materials, Loads, and Design Safety; Behaviour and Properties of Concrete and Steel; Wind and Earthquake Loads

**Module 3:** *Materials and Structural Design Criteria*:Introduction to the analysis and design of structural systems. Analysis of determinate trusses, beams, and frames, and design philosophies for structural engineering. Laboratory experiments dealing with the analysis of determinate structures; Various Design Philosophies

**Module 4:** *Design of Structural Elements*;Concrete Elements, Steel Elements, Structural Joints; Theories and concepts of both concrete and steel design and analysis both at the element and system levels. Approximate Analysis Methods as a Basis for Design; Design of Reinforced Concrete Beams for Flexure; Design of Reinforced Concrete Beams for Shear; Bond, Anchorage, and Serviceability; Reinforced Concrete Columns; Reinforced Concrete Slabs; Philosophy of steel Design, Riveted Connections

**Module 5:** *System Design Concepts*;Special Topics that may be Covered as Part of the Design Project Discussions; Cable Structures; Prestressed Concrete Bridges; Constructability and Structural Control; Fire Protection

## **6. Text /Reference Books:**

- 1.Advanced Structural Analysis, A.K. Jain, Nem Chand Bros.
- 2.PrestressedConcrete, Srikant B. Vanakudre, Khanna Publishing House
- 3.Design of Prestressed Concrete, Krishnan Raju, Tata McGraw Hill
- 4.Design of Steel Structures, N. Subramanian, Oxford University Press
- 5.Reinforced Concrete Vol. II, H.J. Shah, Charotar Publications
- 6.Structural Analysis, R. Agor, Khanna Publishers

## **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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### **PROPOSAL FOR A NEW COURSE**

1	College	Technology	
2	Department	Civil Engineering	
3	Title of the Course & Course No.	Geotechnical Engineering—I TCE–304	
4	Catalogue Description	Attached	
5	To be offered to	B.Tech. Civil Engineering students	
6	Credits	4 (3–0–2)	
7	Is this a New Course	Yes	
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.	
9	General educational purpose	A. General Education	Yes
		B. Department specialization	Yes
		C. Students Research	No
		D. Out growth of instructors	No
		E. Research Programme	No
10	Relation to other courses	A. Pre-requisite	No
		B. An introductory survey of knowledge represented by the department	No

		C. An introductory survey of a special area of knowledge D. A further development of course E. An introductory survey of a special area of knowledge represented by some other department F. A summarizing or integrated course G. In your judgment does this course overlap to a considerable extent with any other course	<b>No</b> <b>No</b> <b>No</b> <b>No</b> <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Mandatory to be implemented <i>w.e.f.</i> next semester	
12	The course will not replace my existing courses	New Course	
13	The course will not require additional staff over and above	Programme Core Course	
14	What is the exact place of this course in the development of the educational programme of your department	Professional Core Course of B. Tech. Civil Engineering Department	
15	Topical outline	Attached	
16	Practicals	Attached	
17	Text Book and Supplementary readings	Attached	
18	Classroom, Laboratory and other facilities	Required facilities exist in the Department	
19	Would the introduction of this course require additional staff	No	
20	Sequence of action	Proposed by AICTE for implementation	
21	Approved by	Course curriculum committee and BOFT	

<b>1. Name of the course</b>	<b>: Geotechnical Engineering–I</b>
<b>2. Course No.</b>	<b>: TCE–304</b>
<b>3. Credits Hours</b>	<b>: 4 (3–0–2)</b>
<b>4. Pre-requisite</b>	<b>: Nil</b>

### **5. Syllabus / Catalogue Description :**

**Module 1:** Introduction—Types of soils, their formation and deposition, Definitions: soil mechanics, soil engineering, rock mechanics, geotechnical engineering. Scope of soil engineering. Comparison and difference between soil and rock. Basic Definitions and Relationships—Soil as three-phase system in terms of weight, volume, voids ratio, and porosity. Definitions: moisture content, unit weights, degree of saturation, voids ratio, porosity, specific gravity, mass specific gravity, etc. Relationship between volume weight, voids ratio—moisture content, unit weight—percent air voids, saturation—moisture content, moisture content—specific gravity etc. Determination of various parameters such as: Moisture content by oven dry method, pycnometer, sand bath method. Specific gravity by density bottle method, pycnometer method, measuring flask method. Unit weight by water displacement method, submerged weight method, core—cutter method, sand—replacement method.

**Module 2:** Plasticity Characteristics of Soil—Introduction, definitions of plasticity of soil, consistency limits—liquid limit, plastic limit, shrinkage limit, plasticity, liquidity and consistency indices, flow and toughness indices, activity and sensitivity. Determination of liquid limit, plastic limit and shrinkage limit. Use of consistency limits. Classification of Soils—Introduction of soil classification: particle size classification, textural classification, unified soil classification system, Indian standard soil classification system. Identification: field identification of soils, general characteristics of soil in different groups.

**Module 3:** Permeability of Soil: Darcy's law, validity of Darcy's law. Determination of coefficient of permeability: Laboratory methods—constant-head method, falling-head method. Field method—pumping-in test, pumping-out test. Permeability aspects: permeability of stratified soils, factors affecting permeability of soil. Seepage Analysis—Introduction, stream and potential functions, characteristics of flow nets, graphical method to plot flow nets. Effective Stress Principle: Introduction, effective stress principle, nature of effective stress, effect of water table. Fluctuations of effective stress, effective stress in soils saturated by capillary action, seepage pressure, quick sand condition.

**Module 4:** Compaction of Soil: Introduction, theory of compaction, laboratory determination of optimum moisture content and maximum dry density. Compaction in field, compaction specifications and field control. Consolidation of Soil: Introduction, comparison between compaction and consolidation, initial, primary and secondary consolidation, spring analogy for primary consolidation, interpretation of consolidation test results, Terzaghi's theory of consolidation, final settlement of soil deposits, computation of consolidation settlement and secondary consolidation.

**Module 5:** Stresses in soils: Introduction, stresses due to point load, line load, strip load, uniformly loaded circular area, rectangular loaded area. Influence factors, Isobars, Boussinesq's equation, Newmark's

Influence Chart. Contact pressure under rigid and flexible area, computation of displacements from elastic theory.

**Module 6:** Shear Strength: Mohr circle and its characteristics, principal planes, relation between major and minor principal stresses, Mohr-Coulomb theory, types of shear tests—direct shear test, merits of direct shear test, triaxial compression tests, test behaviour of UU, CU and CD tests, pore-pressure measurement, computation of effective shear strength parameters. Unconfined compression test, vane shear test.

**Module 7:** Stability of Slopes: Introduction, types of slopes and their failure mechanisms, factor of safety, analysis of finite and infinite slopes, wedge failure, Swedish circle method, friction circle method, stability numbers and charts. Soil Exploration: Introduction, methods of site exploration and soil investigation, methods of boring, soil samplers, sampling procedures, trial pits, borings, penetrometer tests, analysis of borehole logs, geophysical and advance soil exploration methods.

**Practical/Laboratory Work** : Practicals on

1. Field Density using Core Cutter method.
2. Field Density using Sand replacement method.
3. Natural moisture content using Oven Drying method.
4. Field identification of Fine Grained soils.
5. Specific gravity of Soils.
6. Grain size distribution by Sieve Analysis.
7. Grain size distribution by Hydrometer Analysis.
8. Consistency limits by Liquid limit
9. Consistency limits by Plastic limit
10. Consistency limits by Shrinkage limit.
11. Permeability test using Constant-head test method.
12. Permeability test using Falling-head method.
13. Compaction test: Standard Proctor test.
14. Compaction test: Modified Proctor test.
15. Relative density.
16. Consolidation Test.
17. Triaxial Test (UU)
18. Vane shear test
19. Direct Shear Test
20. Unconfined Compression Strength Test.

**6. Text / Reference Books** :

1. Basic and Applied Soil Mechanics: Gopal Ranjan and A.S.R. Rao, New Age International (P) Ltd., Publishers, New Delhi.

2. Soil Mechanics and Foundation Engineering: V.N.S. Murthy, UBS Publishers & Distributors Ltd., New Delhi.
3. Soil Mechanics & Foundation Engineering: K.R. Arora, Standard Publishers & Distributors Ltd., Nai Sarak, New Delhi.
4. Geotechnical Engineering: Purushothama Raj, Dorling Kindersley (India) Pvt. Ltd., New Delhi.
5. Engineering Properties of Soils: Shashi K. Gulhati, Tata McGraw-Hill , Publishing Co. Ltd., New Delhi.
6. Soil Mechanics and Foundation Engineering: Bharat Singh and Shamsher Prakash, Nem Chand & Bros., Civil Lines, Roorkee, India.

## **7. Marks Distribution :**

I Prefinal Exam.	: 15 Marks
II Prefinal Exam.	: 15 Marks
Practical/Laboratory Work	: 20 Marks
Semester Final Exam.	: 50 Marks
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Total	: 100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Civil Engineering</b>	
3	Title of the Course & Course No.	<b>Environmental Engineering</b> <b>TCE-306</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Civil Engineering</b>	
6	Credits	<b>4(3-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	To give theoretical and practical knowledge in the field of Drawing related to Civil Engineering to the students.	
9	General educational purpose	A. General Education B. Department specialization C. Students Research D. Out growth of instructors Research Programme	<b>Yes</b> <b>Yes</b> <b>No</b> <b>No</b>
10	Relation to other courses	A. Pre-requisite B. An introductory survey of knowledge represented by the department C. An introductory survey of a special area of knowledge D. A further development of course E. An introductory survey of a special area of knowledge represented by some other department F. a summarizing or integrated course G. in your judgment does this course overlap to a	<b>No</b> <b>No</b> <b>No</b> <b>No</b> <b>No</b> <b>No</b>

		considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>
13	The courses will not require additional staff over and above	<b>Program Core Course</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Civil Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Environmental Engineering**

**2. Course No. : TCE-306**

**3. Credits Hours : 4(3-0-2)**

**4. Pre-requisite : Nil**

#### **5. Syllabus /Catalogue Description**

**Module 1: (Lectures 13) Water:** -Sources of Water and quality issues, water quality requirement for different beneficial uses, Water quality standards, water, Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.

**Water Treatment:** aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes

**Module 2: (Lectures 13)** *Sewage-* Domestic and Storm water, Quantity of Sewage, Sewage flow variations. Conveyance of sewage- Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems. Small bore systems, Storm Water- Quantification and design of Storm water; Sewage and Sullage, Pollution due to improper disposal of sewage, National River cleaning plans,

Wastewater treatment, aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – quality requirements for various purposes.

**Module 3: (Lectures 8)** *Air -* Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air pollution-ill effects of air pollutants, automobile pollution, lapse rate and effect of lapse rates on dispersion of air pollutants, Air quality standards, Control measures for Air pollution, construction and limitations

**Module 4: (Lectures 2)** *Noise-* Basic concept, measurement and various control methods.

**Module5: (Lectures 4)** *Solid waste management-*Municipal solid waste, Composition, MSW management: Collection, transport, treatment and disposal of MSW. Special MSW: waste from commercial establishments and other urban areas, solid waste from construction activities, biomedical wastes, Effects of solid waste on environment: effects on air, soil, water (surface and ground). Disposal of solid waste-segregation, reduction at source, recovery and recycle. Disposal methods-Integrated solid waste management. Hazardous waste: Types and nature of hazardous waste as per the HW Schedules of regulating authorities.

**Module 6: (Lectures 3)** *Building Plumbing-*Introduction to various types of home plumbing systems for water supply and waste water disposal, high rise building plumbing, Pressure reducing valves, Break pressure tanks, Storage tanks, Building drainage for high rise buildings, various kinds of fixtures and fittings used.

**Module 7: (Lectures 2)** Government authorities and their roles in water supply, sewerage disposal. Solid waste management and monitoring/control of environmental pollution.

## **6. Text /Reference Books:**

- 25.** Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, New Jersey.
- 26.** Introduction to Environmental Engineering by P. Aarne Vesilind, Susan M. Morgan, Thompson /Brooks/Cole; Second Edition 2008.
- 27.** Peavy, H.s, Rowe, D.R, Tchobanoglous, G. *Environmental Engineering*, Mc-Graw - Hill International Editions, New York 1985.

## **List of Practical:**

1. Physical Characterization of water: Turbidity, Electrical Conductivity, pH
2. Analysis of solids content of water: Dissolved, Settleable, suspended, total, volatile, inorganic etc.
3. Alkalinity and acidity,
4. Hardness: total hardness, calcium and magnesium hardness
5. Analysis of ions: chloride
6. Optimum coagulant dose Chemical Oxygen Demand (COD)
7. Dissolved Oxygen (D.O) and Biochemical Oxygen Demand (BOD)
8. Break point Chlorination

## **8. Marks Distribution**

I Pre final Exam                            15 Marks

II Pre final Exam                            15 Marks

Lab Final Exam                            20 Marks

Final Exam                                    50 Marks

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Total                                        100 Marks  
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>
2	Department	<b>Civil Engineering</b>
3	Title of the Course & Course No.	<b>Transportation Engineering</b> <b>TCE-307</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Civil Engineering</b>
6	Credits	<b>4(3-0-2)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	To give theoretical and practical knowledge in the field of Transportation/Highway Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a

		considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>
13	The courses will not require additional staff over and above	<b>Program Core Course</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Civil Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Transportation Engineering**

**2. Course No. : TEC- 307**

**3. Credits Hours : 4(3-0-2)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

**Module 1 :** Highway development and planning-Classification of roads, road development in India, Current road projects in India; highway alignment and project preparation.

**Module 2:** Geometric design of highways:- Introduction; highway cross section elements; sight distance, design of horizontal alignment; design of vertical alignment; design of intersections.

**Module 3:** Traffic engineering & control- Traffic Characteristics, traffic engineering studies, traffic flow and capacity, traffic regulation and control; design of road intersections; design of parking facilities.

**Module 4:** Pavement materials- Materials used in Highway Construction- Soils, Stone aggregates, bituminous binders, bituminous paving mixes; Portland cement and cement concrete: desirable properties, tests, requirements for different types of pavements.

**Module 5:** Design of pavements- Introduction; flexible pavements, factors affecting design and performance; stresses in flexible pavements; design of flexible pavements as per IRC; rigid pavements- components and functions; factors affecting design and performance of CC pavements; stresses in rigid pavements; design of concrete pavements as per IRC.

## **6. Text /Reference Books:**

- 15.** Khanna, S.K., Justo, C.E.G and Veeraragavan, A, 'Highway Engineering', Revised 10th Edition, Nem Chand & Bros, 2017.
- 16.** Kadiyalai, L.R., 'Traffic Engineering and Transport Planning', Khanna Publishers.
- 17.** Partha Chakraborty, ' Principles Of Transportation Engineering, PHI Learning,
- 18.** Fred L. Mannering, Scott S. Washburn, Walter P. Kilareski, "Principles of Highway Engineering and Traffic Analysis", 4th Edition, John Wiley
- 19.** Srinivasa Kumar, R, Textbook of Highway Engineering, Universities Press, 2011.
- 20.** Paul H. Wright and Karen K. Dixon, Highway Engineering, 7<sup>th</sup> Edition, Wiley Student Edition, 2009.
- 21.** C. S. Papacostas and P. D. Prevendouros "Transportation Engineering & Planning", PHI Learning Pvt. Ltd.
- 22.** C. Jotin Khisty and B Kent Lall "Transportation Engineering", PHI Learning Pvt. Ltd.

## **7. List of Practical:**

1. To determine the shape of aggregate mass particle by Angularity Number Test and Flakiness Index value test.
2. To find out the impact value of aggregate by Impact Testing Machine
3. To find out the abrasion value of given road aggregates by Los Angles abrasion test.
4. To find out the bearing pressure of the sub grade and to workout the thickness of pavement required for the sub grade by conducting North Dakota test.
5. To determine the softening point of the given asphaltic bitumen using Ring And Ball Apparatus
6. To find out the bitumen grades by penetration test.
7. To find out the California Bearing Ratio (CBR) value of remoulded soil sample in lab.
8. To find out the design and evaluating the bituminous pavement mixes by Marshal stability test

## **8. Marks Distribution**

I Pre final Exam                            15 Marks

II Pre final Exam                            15 Marks

Lab Final Exam                            20 Marks

Final Exam                                    50 Marks

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Total    100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Basic Science & Humanities
2	Department	Social Science & Humanities
3	Title of the Course & Course No.	Constitution of IndiaBHS 100
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	1(1-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Indian constitution to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will replace my existing courses	New Course
13	The courses will not require additional staff over and above	No
14	What is the exact place of this courses in the development of the educational programme of your department	It has the potential to hone their constitutional awareness.
15	Topical outline : Lecture	Attached
16	Practical:	-
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

<b>1. Name of the course</b>	<b>:</b>	<b>Constitution of India</b>
<b>2. Course No.</b>	<b>:</b>	<b>BHS100</b>
<b>3. Credits Hours</b>	<b>:</b>	<b>1(1-0-0) Mandatory Courses</b>
<b>4. Pre-requisite</b>	<b>:</b>	<b>Nil</b>

**5.Course Catalogue:** Historical perspective of the Constitution of India, Fundamental Right, Directive Principles, Federal structure and Parliamentary form of Government, Self Government, constitutional amendments, Emergency Provisions.

## **6. Course Outline**

### **Unit-I**

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India

### **Unit-II**

1. Scheme of the fundamental rights
2. The scheme of the Fundamental Duties and its legal status
3. Scheme of the Fundamental Right to Equality
4. Scheme of the Fundamental Right to certain Freedom under Article 19
5. Scope of the Right to Life and Personal Liberty under Article 21

### **Unit-III**

1. The Directive Principles of State Policy – Its importance and implementation
2. Federal structure and distribution of legislative and financial powers between the Union and the States

3. Parliamentary Form of Government in India – The constitution powers and status of the President of India
4. Local Self Government – Constitutional Scheme in India

#### **Unit-IV**

1. Amendment of the Constitutional Powers and Procedure
2. The historical perspectives of the constitutional amendments in India
3. Emergency Provisions: National Emergency, President Rule, Financial Emergency

#### **7.Text/Reference Books:**

1. Durga Das Basu, Introduction to the Constitution of India, Prentice Hall of India Pvt. Ltd.. New Delhi
2. Indian Polity by Laxmikanth
3. Indian Administration by SubhashKashyap
4. Indian Constitution by D.D. Basu
5. Indian Administration by Avasti and Avasti

#### **8.Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Construction Engineering and Management TCE-308
4	Catalogue Description	Attached
5	To be offered to	B.Tech. Civil Engineering students
6	Credits	3 (3-0-0)
7	Is this a New Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors <b>No</b> E. Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b>

		G. In your judgment does this course overlap to a considerable extent with any other course
		No
11	What are the urgent reasons why this course be offered at this present time	Mandatory to be implemented <i>w.e.f.</i> next semester
12	The course will not replace my existing courses	New Course
13	The course will not require additional staff over and above	Programme Core Course
14	What is the exact place of this course in the development of the educational programme of your department	Professional Core Course of B. Tech. Civil Engineering Department
15	Topical outline	Attached
16	Practicals	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities	Required facilities exist in the Department
19	Would the introduction of this course require additional staff	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

<b>1. Name of the course</b>	<b>: Construction Engineering and Management</b>
<b>2. Course No.</b>	<b>: TCE-308</b>
<b>3. Credits Hours</b>	<b>: 3 (3-0-0)</b>
<b>4. Pre-requisite</b>	<b>: Nil</b>

### **5. Syllabus / Catalogue Description:**

**Module 1:** Basics of Construction: Unique features of construction, construction projects—types and features, phases of a project, agencies involved and their methods of execution; Construction project planning—Stages of project planning, pre-tender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of details. Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data. Techniques of planning—Bar charts, Gantt Charts. Networks—basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths, calendaring networks. PERT: Assumptions underlying PERT analysis, determining three time estimates, analysis, slack computations, calculation of probability of completion.

**Module 2:** Construction Methods: basics of Formwork and Staging, Common building construction methods (conventional walls and slabs, conventional framed structure with blockwork walls, Modular construction methods for repetitive works, Pre-cast concrete construction methods, Basics of Slip forming for tall structures.

**Module 3:** Construction Equipment basics: Conventional construction methods vs Mechanized methods and advantages of latter, Equipment for Earthmoving, Dewatering, Concrete mixing, transporting & placing; Cranes, Hoists and other equipment for lifting, Equipment for transportation of materials, Equipment Productivities.

**Module 4:** Planning and organizing construction site and resources: Site—site layout including enabling structures, developing site organization, Documentation at site; Manpower—planning, organizing, staffing, motivation, Materials—concepts of planning, procurement and inventory control, Equipment—basic concepts of planning and organizing, Funds—cash flow, sources of funds, Histograms and S-Curves. Earned Value, Resource Scheduling—Bar chart, line of balance technique, resource constraints and conflicts, resource aggregation, allocation, smoothening and leveling, Common Good Practices in Construction.

**Module 5:** Project Monitoring and Control: Supervision, record keeping, periodic progress reports, periodical progress meetings. Updating of plans: purpose, frequency and methods of updating. Common causes of time and cost overruns and corrective measures. Basics of Modern Project management systems such as Lean Construction, Use of Building Information Modelling (BIM) in project management, Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety, Health and Environment on

project sites: accidents; their causes, effects and preventive measures, costs of accidents, occupational health problems in construction, organizing for safety and health.

**Module 6:** Contracts Management basics: Importance of contracts, Types of Contracts, parties to a contract, Common contract clauses (Notice to proceed, rights and duties of various parties, notices to be given, Contract duration and Price). Performance parameters, Delays, penalties and liquidated damages, Force Majeure, Suspension and Termination, Changes and variations, Dispute Resolution methods.

**Module 7:** Construction Costs: Make-up of construction costs, Classification of costs, time–cost trade-off in construction projects, compression and decompression.

**Practical/Laboratory Work** : Nil

**6. Text / Reference Books** :

1. Construction Project management Theory & Practice: Neeraj Kumar Jha, Pearson Education India, 2015.
2. Construction Technology: R. Chudley, ELBS Publishers, 2007.
3. Construction Planning Methods and Equipment, R.L. Peurifoy, McGraw Hill, 2011.
4. Building Construction: P.C. Varghese, Prentice Hall India, 2007.
5. Project Planning with PERT and CPM, B.C. Punmia, K.K. Khandelwal, Laxmi Publications, 2016.
6. Construction Methods and Management, S.W. Nunnally, Prentice Hall, 2006.
7. National Building Code, Bureau of Indian Standards, New Delhi, 2017.

**7. Marks Distribution** :

I Prefinal Exam. : 25 Marks

II Prefinal Exam. : 25 Marks

Semester Final Exam. : 50 Marks

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Total : 100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Hydrology and Water Resources Engineering TCE309
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(2-2-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Hydrology and Water Resources Engineering**

**2. Course No. : TCE- 309**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

Introduction to hydrology, Precipitation, Abstractions from precipitation, Runoff, Groundwater and well hydrology, Well hydraulics, Water withdrawals and uses for various purposes, Analysis of surface water

supply, Irrigation-types, crop water requirement and soil-water relationships, Distribution systems; canal systems, canal alignment.Theories of regime channels, canal outlets.Water logging and lining of canals.Drainage of waterlogged land.Dams and spillways- types and classification, embankment, concrete gravity, arch and buttress dams. Elementary profile of gravity dams.Reservoirs.

## 6. Topical Outline

**Module 1:** Introduction - hydrologic cycle, water-budget equation, history of hydrology, World water balance, applications in engineering, sources of data.

**Module 2:** Precipitation - forms of precipitation, characteristics of precipitation in India, measurement of precipitation, rain gauge network, mean precipitation over an area, depth-area-duration relationships, maximum intensity/depth-duration-frequency relationship, Probable Maximum Precipitation (PMP), rainfall data in India.

**Module 3:** Abstractions from precipitation - evaporation process, evaporimeters, analytical methods of evaporation estimation, reservoir evaporation and methods for its reduction, evapotranspiration, measurement of evapotranspiration, evapotranspiration equations, potential evapotranspiration over India, actual evapotranspiration, interception, depression storage, infiltration, infiltration capacity, measurement of infiltration, modelling infiltration capacity, classification of infiltration capacities, infiltration indices.

**Module 4:** Runoff - runoff volume, SCS-CN method of estimating runoff volume, flow duration curve, flow-mass curve, hydrograph, factors affecting runoff hydrograph, components of hydrograph, base flow separation, effective rainfall, unit hydrograph surface water resources of India. Hydrologic routing for channel flow and storage. Muskingum method.

**Module 5:** Ground water and well hydrology - forms of subsurface water, saturated formation, aquifer properties, geologic formations of aquifers, well hydraulics: steady state flow in wells, equilibrium equations for confined and unconfined aquifers, aquifer tests.

**Module 6:** Water withdrawals and uses – water for energy production, water for agriculture, water for hydroelectric generation; flood control. Analysis of surface water supply, Water requirement of crops-

Crops and crop seasons in India, cropping pattern, duty and delta; Quality of irrigation water; Soil-water relationships, root zone soil water, infiltration, consumptive use, irrigation requirement, frequency of irrigation; Methods of applying water to the fields: surface, sub-surface, sprinkler and trickle / drip irrigation.

**Module 7:**Distribution systems - canal systems, alignment of canals, canal losses, estimation of design discharge. Design of channels- rigid boundary channels, alluvial channels, Kennedy's and Lacey's theory of regime channels. Canal outlets: non-modular, semi-modular and modular outlets. Water logging: causes, effects and remedial measures. Lining of canals, types of lining. Drainage of irrigated lands: necessity, methods.

**Module 8:** Dams and spillways - embankment dams: Classification, design considerations, estimation and control of seepage, slope protection. Gravity dams: forces on gravity dams, causes of failure, stress analysis, elementary and practical profile. Arch and buttress dams. Spillways: components of spillways, types of gates for spillway crests; Reservoirs- Types, capacity of reservoirs, yield of reservoir, reservoir regulation, sedimentation, economic height of dam, selection of suitable site.

## 7. Text /Reference Books:

1. K Subramanya, Engineering Hydrology, Mc-Graw Hill.
2. K N Muthreja, Applied Hydrology, Tata Mc-Graw Hill.
3. K Subramanya, Water Resources Engineering through Objective Questions, Tata Mc-Graw Hill.
4. G L Asawa, Irrigation Engineering, Wiley Eastern
5. L W Mays, Water Resources Engineering, Wiley.
6. J D Zimmerman, Irrigation, John Wiley & Sons
7. C S P Ojha, R Berndtsson and P Bhunya, Engineering Hydrology, Oxford.

## 8. Marks Distribution

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Design of Concrete Structures-II TCE-351
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Design of Concrete Structures-II**

**2. Course No. : TCE- 352**

**3. Credits Hours : 3(3-0-0)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

Design of continuous beams and building frames,Moment redistribution, Estimation of wind and seismic loads, Desirable features of earthquake resistant construction, Detailing for earthquake resistant

construction – ductility criteria; Water tank and staging; Introduction, Design criteria, Design of rectangular and circular water tank, Design of Intze tank, Staging for overhead tank; Introduction to bridge engineering, Investigation for bridges, IRC loadings, Design of slab culvert; Design of Masonry walls and columns; Pre-stressed concrete, Introduction, pre-stressing system, losses in pre-stress, Design of simple span girders, Design of end block; Design of staircases; Design of cantilever and counter-forte type retaining wall; All design steps/process to as per the most recent BIS code of practices

## **6. Text /Reference Books:**

1. Reinforced Concrete Vol.II by Mallick&Gupta
2. R.C.C.Structures Vol.II by Jain &JaiKrishna
3. Prestressed Concrete by N. Krishnaraju
4. Structural Design and Drawing by N. Krishnaraju
5. Fundamentals of Reinforced Concrete by N.C. Sinha and S.K. Roy
6. Comprehensive R.C.C. Design by Punmia, Jain and Jain

## **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Design of Steel Structure TCE-352
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education                  Yes B. department specialization       Yes C. Students Research                  No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite                      No B. An introductory survey of knowledge represented by the department       No C. An introductory survey of a special area of knowledge                      No D. A further development of course                      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course                      No G. in your judgment does this course overlap to a considerable extent with any other course. No

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Design of Steel Structure**

**2. Course No. : TCE- 352**

**3. Credits Hours : 3(3-0-0)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

Design Requirements & Design Process, Analysis Procedures & Design Philosophy, Introduction to Limit State Design. Properties of materials; loads and stresses, Design of Joints: - design of simple type,

welded and bolted connections, concentric and eccentric. Design of Tension members: Types of sections, net area, net effective section for angles and flats and tees in tension, block shear failure, design of ties subjected to axial tension, axial tension and bending. Design of compression members: Shapes of compression members, specifications, Strength and design of simple and built up compression members. Design of beams/flexural members: Design Criteria, Design of simple and built up section, lateral stability of beams with unrestrained compression flanges. Beam columns: Uniaxial and biaxial bending cases. Theory of plastic bending, Plastic hinge and mechanism, Collapse load for beams & simple cases of Portal frames, Design considerations. All design steps/process to as per the most recent BIS code of practices

## **6. Text /Reference Books:**

- 1.Design of Steel Structures by S. S. Bhavikatti.
- 2.Design of Steel Structures by S. K. Duggal.
- 3.Design of steel structures by N Subramanian
4. IS 800-2007

## **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>
2	Department	<b>Civil Engineering</b>
3	Title of the Course & Course No.	<b>Water and Wastewater Engineering</b> <b>TCE-354</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Civil Engineering</b>
6	Credits	<b>3(3-0-0)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	To give theoretical and practical knowledge in the field of Drawing related to Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a

		considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>
13	The courses will not require additional staff over and above	<b>Program Core Course</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Civil Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Transport of Water and Wastewater**

**2. Course No. : TCE-354**

**3. Credits Hours : 3(3-0-0)**

**4. Pre-requisite : Nil**

#### **5. Syllabus /Catalogue Description**

**Module 1: (Lectures 17) Water Supply Systems:** Water Demand, Storage requirements, impounding reservoirs, intake structures, design of distribution systems, distribution and balancing reservoirs, pipe materials, appurtenances, design for external loads, maintenance and operation.

**Module 2: (Lectures 17) Sanitary Sewerage Systems:** Flow estimation, sewer materials, hydraulic design of sewers, materials for sewers, appurtenances, manholes, quality and characteristics of sewage, disposing of sewer effluents, sewage pumps and pumping stations, corrosion prevention, operation and maintenance, safety.

**Module 3: (Lectures 11) Storm water Drainage Systems:** Drainage layouts, storm runoff estimation, hydraulics of flow in storm water drains, materials, cross sections, design of storm water drainage systems, inlets,

## 6. Text /Reference Books:

28. Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, New Jersey.
29. Introduction to Environmental Engineering by P. Aarne Vesilind, Susan M. Morgan, Thompson /Brooks/Cole; Second Edition 2008.
30. Peavy, H.s, Rowe, D.R, Tchobanoglous, G. *Environmental Engineering*, Mc-Graw - Hill International Editions, New York 1985.
31. Garg S K. Environmental EngineeringI & II, Khanna Publishers, New delhi

## 8. Marks Distribution

I Pre final Exam	25 Marks
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II Pre final Exam	25 Marks
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Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Design of Hydraulic Structures TCE 402
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Design of Hydraulic Structures**

**2. Course No. : TCE 402**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

**5. Syllabus /Catalogue Description**

Estimation of crop water requirement; Design of lined and unlined channels; Analysis for surface and sub-surface flow at hydraulic structures; Bligh's and Khosla's theory. Design of barrages and weirs; Design of Head and cross regulators; Design of canal falls, transitions and cross drainage works; Design principles for gravity dams- Forces acting on gravity dams, 2-D stability analysis of concrete gravity dams; Design principles for earthen dams- Criteria for safe design of earthen dam, section of an earthen dam, stability analysis of earthen dams. Spillways and energy dissipation below spillways. River Protection and Training Works (Revetments, Dikes, Gabions, Spurs, Bank Protective measures and Bed control structures), Design of river training and flood protection structures.

## 6. Topical Outline

**Module 1:** Estimation of crop water requirement. Logngitudinal and cross section of irrigation canals. Design of unlined channels using Lacey's and Kennedy's theories. Design of lined canals. Analysis for surface and sub-surface flow at hydraulic structures; Bligh's and Khosla's theories.

**Module 2:** Diversion headworks – weirs and barrages, design of weirs for surface and subsurface flows; consideration of hydraulic jump and scour depth, consideration of seepage forces. Design of Head and cross regulators.

**Module 3:** Cross drainage works; their necessity and types. Design considerations for cross-drainage structures. Design of transitions; design of contraction and expansion transitions. Uplift pressure on the trough, uplift pressure on trough. Inverted filter.

**Module 4:** Design of canal falls - canal falls their types. Cistern element and its design. Design of Sharda type fall, Design of straight glacis fall, Design of Montague type fall. Cross drainage works; their types and design.

**Module 5:** Design principles for gravity dams- Forces acting on gravity dams, 2-D stability analysis of concrete gravity dams and design of concrete gravity dams. Construction joints, control of cracking in concrete gravity dams.

**Module 6:** Design principles for earthen dams- Criteria for safe design of earthen dam, section of an earthen dam. Causes of failure of earthen dams. Drawing phreatic line for an earthen dam. Control of seepage through body and foundation of earthen dams. Slope stability analysis of earthen dams.

**Module 7:**Spillways; different types of spillways and energy dissipation below spillways. Hydraulic jump type stilling basin for energy dissipation. Different types of spillway crest gates.River Protection and Training Works (Revetments, Dikes, Gabions, Spurs, Bank Protective measures and Bed control structures), Design of river training and flood protection structures

#### **6. Text /Reference Books:**

1. G L Asawa, Irrigation Engineering, Wiley Eastern, Ltd, New Delhi
2. Punnia et al., Irrigation and water power engineering, Laxmi publications pvt. Ltd., New Delhi.
3. L W Mays, Water Resources Engineering, Wiley.
4. J D Zimmerman, Irrigation, John Wiley & Sons
5. Bharat Singh, Fundamentals of irrigation Engineering, Nem Chand and Bros, Roorkee

#### **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Earthquake Engineering TCE-403
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education                  Yes B. department specialization       Yes C. Students Research                  No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite                      No B. An introductory survey of knowledge represented by the department       No C. An introductory survey of a special area of knowledge                      No D. A further development of course                      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course                      No G. in your judgment does this course overlap to a considerable extent with any other course. No

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course :      Earthquake Engineering**

**2. Course No. :                  TCE- 403**

**3. Credits Hours :                3(3-0-0)**

**4. Per-requisite :                 Nil**

## **5. Syllabus /Catalogue Description**

Theory of Vibrations; Concept of inertia and damping - Types of Damping - Difference between static forces and dynamic excitation - Degrees of freedom - SDOF idealization - Equations of motion of SDOF system for mass as well as base excitation.

Free vibration of SDOF system - Response to harmonic excitation - Impulse and response to unit impulse - Duhamel integral; Multiple Degree of Freedom System; Two degree of freedom system - Normal modes of vibration - Natural frequencies - Mode shapes - Introduction to MDOF systems - Decoupling of equations of motion - Concept of mode superposition (No derivations); Elements of Seismology; Causes of Earthquake - Geological faults - Tectonic plate theory - Elastic rebound – Epicentre; Hypocentre - Primary, shear and Raleigh waves - Seismogram - Magnitude and intensity of earthquakes - Magnitude and Intensity scales - Spectral Acceleration - Information on some disastrous earthquakes; Response of Structures to Earthquake; Importance of ductility - Methods of introducing ductility into RC structures Design Methodology IS 1893, IS 13920 and IS 4326 - Codal provisions - Design as per the codes.

## 6. Text /Reference Books:

1. Introduction to Earthquake Engineering by Shunzo Okamoto.
2. Earthquake- A Primer by Bolt Bruce A.
3. Vibrations, Dynamics & Structural Systems by M. Mukhopadhyay
4. Elementary Structural Dynamics by V. K. ManickaSelvam
5. Fundamental of Reinforced Concrete by N. C. Sinha & S. K. Roy
6. Reinforced Concrete Design by Pillai and Menon
7. Dynamics of Structures by A. K. Chopra
8. IS:456, IS:1893 Part-I, IS:4326

## 7. Marks Distribution

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Hydraulic Machines and Water Power DevelopmentTCE 407
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Hydraulic Machines and Water PowerDevelopment**

**2. Course No. : TCE 407**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

**5. Syllabus /Catalogue Description**

Theory of turbo machines- different types of hydraulic turbines and their performance, Impulse and Reaction turbines, Radial flow, mixed flow and axial flow turbines, Unit quantities and specific speed of turbines, Draft tube, Different types of efficiency of turbines. Characteristics of turbines. Pumps; Reciprocating pumps, Theory and Performance of Centrifugal pumps- components and classification of centrifugal pumps, fundamental equation of centrifugal pumps, Unit quantities and specific speed, Different types of efficiency of pumps, Characteristics of pumps, Water power Development, Principles' of water power development and basic concepts of power in flowing water, general features of hydropower schemes, classification and types of water power plants, installed capacity and firm power, penstocks and Surge tanks. Hydraulic ram.

## 6. Topical Outline

**Module 1:** Theory of turbo machines- different types of hydraulic turbines and their performance, Classification of turbines, Impulse and Reaction turbines, Radial flow, mixed flow and axial flow turbines, Different types of efficiency of turbines. Unit quantities and specific speed of turbines, Pelton wheel turbine, its components, velocity triangles and design.

**Module 2:** Reaction turbines; Francis turbines. Components of Francis turbines, drawing velocity triangles, power and efficiency. Draft tube its advantage and types. Characteristics of turbines. Kaplan turbines their components and velocity triangles. Characteristics of different types of turbines.

**Module 3:** Pumps; Reciprocating pumps, Indicator diagram, Air vessels. Theory and Performance of Centrifugal pumps- components and classification of centrifugal pumps, fundamental equation of centrifugal pumps, Unit quantities and specific speed, Different types of efficiency of pumps, Characteristics of centrifugal pumps. Series and parallel connection of centrifugal pumps.

**Module 4:** Water power Development, Principles' of water power development and basic concepts of power in flowing water, general features of hydropower schemes, classification and types of water power schemes, Principal components of hydroelectric schemes, penstocks, installed capacity and firm power. Surge tanks their types and working.

## 7. Text /Reference Books:

6. Punmia et al., Irrigation and water power engineering, Laxmi publications pvt. Ltd., New Delhi.
7. Agrawal, S. K., Fluid Mechanics and Machinery, Tata McGraw-Hill publishing company limited, New Delhi
8. Dandekar, M. M. and Sharma, K. N. Water Engineering, Vikas publishing house Pvt. Ltd., New Delhi.
9. Sharma, R. K. and sharma, T. K., A Text Book of Water Power Engineering, S. Chand and Company Ltd., New Delhi.

## **8. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	<b>Geotechnical Engineering-II</b> <b>TCE-408</b>
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Out growth of instructors Research Program <b>Yes</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course. <b>No</b>

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational program of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Geotechnical Engineering-II**

**2. Course No. : TCE- 408**

**3. Credits Hours : 3(3-0-0)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

**Module 1: Type of Foundations & Shallow Foundations -**

Introduction, Type of Foundations, General requirements of foundations, Location and depth of foundation, Terminology, Bearing capacity of shallow foundations, Terzaghi's theory, Brinch Hansen theory, IS Code method, Settlement of shallow foundations, allowable bearing pressure, Proportioning of footings, Field tests SPT, DCPT and Plate load tests.

#### **Module 2: Pile Foundations**

Introduction, Types of piles, Use of piles, Selection of pile type, Load carrying capacity of piles (static and dynamic formulae), Group action of piles, Settlement of pile group. Negative skin friction of pile, Pile load tests.

#### **Module 3: Design of Retaining Walls**

Introduction, Design considerations, wall deformations, Backfill materials, Soil parameters, Stability of gravity and cantilever retaining wall.

#### **Module 4: Sheet Piles**

Introduction, Type of sheet pile walls, cantilever sheet piles in granular and cohesive soils, Anchored bulkhead in granular and cohesive soil.

#### **Module 5: Cuts and Excavations**

Braced excavations, Earth pressure against bracing in cuts, Heave of bottom in soft clays, Deep cut in sand and clays.

### **6. Text /Reference Books:**

1. Basic and Applied Soil Mechanics by Gopal Ranjan and ASR Rao
2. Principles of Foundation Engineering by BM Das
3. Theory and Practice of Foundation Engineering by N. Som
4. Foundation analysis and Design by Bowles JE

## **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Structural Analysis by Matrix methods TCE-409
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      No

		B. An introductory survey of knowledge represented by the department  C. An introductory survey of a special area of knowledge  D. A further development of course  E. An introductory survey of a special area of knowledge represented by some other department  F. a summarizing or integrated course  G. in your judgment does this course overlap to a considerable extent with any other course.
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Structural Analysis by Matrix Methods**  
**2. Course No. : TCE- 409**
- 3. Credits Hours : 3(3-0-0)**
- 4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

Analysis of truss, beam and frame structures using flexibility and stiffness methods of matrix analysis; computer applications.

## **6. Text /Reference Books:**

1. Structural analysis –a matrix approach by Pundit and Gupta.
2. Basic structural analysis by C. S. Reddy.
3. Elementary structural analysis by V. K. Manicka Selvam.
4. Fundamental of structural analysis by S. K. Roy and S. Chakraborty.
5. Theory of Structures Vol- II by Gupta and Pundit.

## **7. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Rock Engineering TCE-412
4	Catalogue Description	Attached
5	To be offered to	B.Tech. Civil Engineering students
6	Credits	3 (3-0-0)
7	Is this a New Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors <b>No</b> E. Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite: <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b>

		G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Mandatory to be implemented <i>w.e.f.</i> next semester
12	The course will not replace my existing courses	New Course
13	The course will not require additional staff over and above	Programme Core Course
14	What is the exact place of this course in the development of the educational programme of your department	Elective Course of B. Tech. Civil Engineering Department
15	Topical outline	Attached
16	Practicals	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities	Required facilities exist in the Department
19	Would the introduction of this course require additional staff	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

<b>1. Name of the course</b>	<b>: Rock Engineering</b>
<b>2. Course No.</b>	<b>: TCE-412</b>
<b>3. Credits Hours</b>	<b>: 3 (3-0-0)</b>
<b>4. Pre-requisite</b>	<b>: Nil</b>

### **5. Syllabus / Catalogue Description:**

**Module 1:** Introduction to Rock Engineering, Rock and Rock mass, difference between soil and rock, Structure of the Earth, Types of rocks, rock forming minerals and their identification.

**Module 2:** Engineering Importance and Utility of rocks, Geological description of important rocks. Classification systems of rocks, Discontinuities and defects in rock mass, types and causes of discontinuities and defects, parameters to describe discontinuities, engineering implications and importance of folds.

**Module 3:** Rock Exploration: Object, methods—direct and indirect methods, core recovery and RQD, Geophysical prospecting: seismic methods, electrical methods, resistivity methods and gravity methods, theory and interpretation of results, limitations of geophysical methods.

**Module 4:** Determination of physical and mechanical properties of rocks: sampling and specimen preparation, Point load and Brazilian tests, uniaxial compression test, *in-situ* tests: necessity, requirement, selection of test site, types and description of *in-situ* tests for deformability, shear, strength and internal stresses.

**Module 5:** Strength and failure of rocks: Strength behavior in compression, tension and shear, stress strain relationship, types of failure, Griffith's theory of fracture initiation, Failure criteria for intact and jointed rocks, influence of discontinuities, stick-slip process of rupture, anisotropy in rocks: types, reason and engineering implications of anisotropy, influence of interstitial water. Flow through intact and fissured rocks.

<b>Practical/Laboratory Work</b>	<b>: Nil</b>
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### **6. Text / Reference Books :**

1. Goodman R.E. (1989), Introduction to Rock Mechanics., 2<sup>nd</sup> Ed., John-Wiley & Sons.
2. Hoek E. and Bray J. (1981), Rock Slope Engineering. Revised 3<sup>rd</sup> Ed., Published by The Institution of Mining and Metallurgy, London.
3. Hoek E. and Brown E. T. (1980), Underground Excavations in Rock. Published by Institution of Mining and Metallurgy, London.
4. Ramamurthy T. (2014), Engineering in Rocks for Slopes, Foundations and Tunnels, 3<sup>rd</sup> Ed., Prentice Hall India Learning Private Limited.

### **7. Marks Distribution :**

I Prefinal Exam.	: 25 Marks
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II Prefinal Exam. : 25 Marks

Semester Final Exam. : 50 Marks

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Total : 100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Introduction to Finite Element Methods TCE-475
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>

11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil EngineeringDepartment
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Introduction to Finite Element Methods**

**2. Course No. : TCE- 475**

**3. Credits Hours : 3(3-0-0)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

**Contents:**

**Module 1: Introduction to Finite Element Analysis:** Introduction, Basic Concepts of Finite Element Analysis, Introduction to Elasticity, Steps in Finite Element Analysis

**Module: 2 Finite Element Formulation Techniques:** Virtual Work and Variational Principle, Galerkin Method, Finite Element Method: Displacement Approach, Stiffness Matrix and Boundary Conditions

**Module 3: Element Properties:** Natural Coordinates, Triangular Elements, Rectangular Elements, Lagrange and Serendipity Elements, Solid Elements, Isoparametric Formulation, Stiffness Matrix of Isoparametric Elements, Numerical Integration: One Dimensional, Numerical Integration: Two and Three Dimensional

**Module 4: Analysis of Frame Structures :** Stiffness of Truss Members, Analysis of Truss, Stiffness of Beam Members, Finite Element Analysis of Continuous Beam, Plane Frame Analysis, Analysis of Grid and Space Frame

**Module 5: FEM for Two and Three Dimensional Solids:** Constant Strain Triangle, Linear Strain Triangle, Rectangular Elements, Numerical Evaluation of Element Stiffness, Computation of Stresses, Geometric Nonlinearity and Static Condensation, Axisymmetric Element, Finite Element Formulation of Axisymmetric Element, Finite Element Formulation for 3 Dimensional Element

**Module 7: Additional Applications of FEM:** Finite Elements for Elastic Stability, Finite Elements in Fluid Mechanics , Dynamic Analysis

## 6. Text /Reference Books:

1. Reddy J.N., An Introduction to Finite Element Method, 3<sup>rd</sup> ed., Tata McGraw Hill, 2005.
2. Seshu P., Text Book of Finite Element Analysis, Prentice Hall, New Delhi, 2007.
3. Rao S.S., The Finite Element Method in Engineering, 3<sup>rd</sup> ed., Butterworth Heinemann, 2004.
4. Chandraputla&Belegundu, Introduction to Finite Elements in Engineering, 3<sup>rd</sup> ed., Prentice Hall, 1990.

## 7. Marks Distribution

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks

Final Exam                            50 Marks

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Total                                100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Optimization- Principles and applicationsTCE-476
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Optimization-Principles and applications**

**2. Course No. : TCE-476**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

**5. Syllabus /Catalogue Description**

Introduction to optimization, Classical optimization techniques, Linear programming, Simplex method, Integer programming, Dynamic programming, Introduction to nonlinear programming, Applications in Engineering design.

## 6. Topical Outline

**Module 1:** Introduction to optimization: Historical Development, Statement of an Optimization Problem, Classification of optimization problems.

**Module 2:** Classical optimization techniques: Single variable optimization, Multivariable optimization with no constraints, Multivariable optimization with equality constraints, Multivariable optimization with inequality constraints. Engineering applications.

**Module 3:** Standard form of a linear programming problem, Geometry of linear programming problems, Solution of a system of linear simultaneous equations, Pivotal reduction of a general system of equations, Motivation of the simplex method, Simplex Algorithm, Two phases of the simplex method. Engineering applications.

**Module 4:** Duality in linear programming, Symmetric primal-dual relations, General primal-dual relations, Dual simplex method, Sensitivity or postoptimality analysis: Changes in the right hand side constants, Changes in the cost coefficient, Addition of new variables, Changes in the constraint coefficient.

**Module 5:** Non-linear programming-one dimensional minimization methods, Dynamic programming, Multistage decision process, Definition and examples, Representation of a multistage decision process, Concept of suboptimization and the principle of optimality, Computational procedure in dynamic programming, Engineering application illustrating the method.

**Module 6:** Integer linear programming, Branch and bound method. Illustration through engineering applications.

## 7. Text /Reference Books:

1. Optimization Theory and Application" by S. S. Rao, Wiley Eastern Limited New Delhi
2. Operations Research: Principles and Practices" by Phillips D.T., Ravindran A. and Solberg J. J., Wiley New York
3. "Operation Research: An Introduction" by MacMILLAN and Taha A.T., New York

## 8. Marks Distribution

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Numerical Methods for EngineersTCE-477
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Numerical Methods for Engineers**  
**2. Course No. : TCE-477**  
**3. Credits Hours : 3 (3-0-0)**  
**4. Pre-requisite :Nil**

## **5. Syllabus /Catalogue Description**

Roots of transcendental equations, Solution of linear algebraic equations, Curve fitting; linear and polynomial regression, interpolating polynomials, Numerical differentiation and numerical Integration,

Numerical solution of ordinary differential equations, Eigen value problems and their numerical solution, Introduction to numerical solution of partial differential equations.

## 6. Topical Outline

**Module 1:** Roots of transcendental equations; Bisection method, False-position method, Newton-Raphson method, Secant method.

**Module 2:** Solution of linear algebraic equations; Gauss elimination method, Gauss Seidel method, Gauss Jordan Method, Matrix inversion, Jacobi Method, LU decomposition, Crout decomposition, Cholesky decomposition method.

**Module 3:** Curve fitting; Linear regression, Polynomial regression, Multiple linear regression, Newton's divided difference interpolating polynomials, Lagrange interpolating polynomials.

**Module 4:** Numerical integration; Trapezoidal rule, Simpson's rule, Romberg integration, Gauss quadrature, numerical differentiation, high accuracy differentiation formulas.

**Module 5:** Numerical solution of ordinary differential equations; Euler's method, Modifications and improvements of Euler's method, Runge-Kutta method, Boundary value and eigen value problems

**Module 6:** Numerical solution of partial differential equations. Finite difference and finite element methods. Solution of elliptic, parabolic and hyperbolic equations using finite difference method.

## 7. Text /Reference Books:

1. Numerical Methods for Engineers, Steven C. Chapra, Raymond P. Canale, McGraw Hill Book Company
2. Numerical Methods for Scientists and Engineers, K. SankaraRao, Phi Learning
3. Numerical Methods for Scientific and Engineering Computation, S. R. K. Iyengar, R. K. Jain, Mahinder Kumar Jain, New Age International Publishers

## 8. Marks Distribution

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Numerical Methods for EngineersTCE-477
4	Catalogue Description	Attached
5	To be offered	B.Tech, Civil Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Numerical Methods for Engineers**  
**2. Course No. : TCE-477**  
**3. Credits Hours : 3 (3-0-0)**  
**4. Pre-requisite :Nil**

## **5. Syllabus /Catalogue Description**

Roots of transcendental equations, Solution of linear algebraic equations, Curve fitting; linear and polynomial regression, interpolating polynomials, Numerical differentiation and numerical Integration,

Numerical solution of ordinary differential equations, Eigen value problems and their numerical solution, Introduction to numerical solution of partial differential equations.

## 6. Topical Outline

**Module 1:** Roots of transcendental equations; Bisection method, False-position method, Newton-Raphson method, Secant method.

**Module 2:** Solution of linear algebraic equations; Gauss elimination method, Gauss Seidel method, Gauss Jordan Method, Matrix inversion, Jacobi Method, LU decomposition, Crout decomposition, Cholesky decomposition method.

**Module 3:** Curve fitting; Linear regression, Polynomial regression, Multiple linear regression, Newton's divided difference interpolating polynomials, Lagrange interpolating polynomials.

**Module 4:** Numerical integration; Trapezoidal rule, Simpson's rule, Romberg integration, Gauss quadrature, numerical differentiation, high accuracy differentiation formulas.

**Module 5:** Numerical solution of ordinary differential equations; Euler's method, Modifications and improvements of Euler's method, Runge-Kutta method, Boundary value and eigen value problems

**Module 6:** Numerical solution of partial differential equations. Finite difference and finite element methods. Solution of elliptic, parabolic and hyperbolic equations using finite difference method.

## 7. Text /Reference Books:

4. Numerical Methods for Engineers, Steven C. Chapra, Raymond P. Canale, McGraw Hill Book Company
5. Numerical Methods for Scientists and Engineers, K. SankaraRao, Phi Learning

6. Numerical Methods for Scientific and Engineering Computation, S. R. K. Iyengar, R. K. Jain, Mahinder Kumar Jain, New Age International Publishers

### **8. Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Ground Water Engineering TCE-478
4	Catalogue Description	Attached
5	To be offered	B. Tech (Civil Engineering)
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>Yes</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented as per AICTE
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Elective Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Ground Water Engineering**

**2. Course No. : TCE- 478**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

**Module 1:** Introduction to Groundwater hydrology

**Module 2:** Well hydraulics and well construction, geo-physical explorations

**Module 3:** Groundwater quality and management of groundwater resources; Problems and perspectives regarding groundwater in India

**Module 4:** Hydrogeology: Darcy's Equation; flow characteristics; general flow equations; unsaturated flow

**Module 5:** Well Hydraulics: Steady and unsteady radial flows in aquifers; partially penetrating wells; multiple well systems; characteristic well losses; specific capacity,

**Module 6:** Surface and Subsurface investigations (Geologic methods; remote sensing; geophysical explorations; electrical resistivity and seismic refraction)

**Module 7:** Water Wells: Construction; completion, development, protection and rehabilitation of wells; Groundwater quality

**Module 8:** Groundwater Management: Basin management, investigations, conjunctive use, modeling, artificial recharge; Saline water intrusion

## **6. Text /Reference Books/Websites:**

- 1) Raghunath H M, Ground Water Hydrology.
- 2) Todd and Mays, (2011), "Ground Water Hydrology", Wiley India Edition, 3<sup>rd</sup> edition
- 3) V C Agarwal, "Ground Water Hydrology", PHI
- 4) Jaques W Delleur, Ground Water Engineering, CRC Press
- 5) Jacob Bear, Hydraulics of Ground Water
- 6) *nptel.ac.in*
- 7) <https://ocw.mit.edu>
- 8) <https://swayamprabha.gov.in>

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	20 Marks
Final Exam	40 Marks
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Total	100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	Hydraulic Structures/Irrigation Engineering TCE-479
4	Catalogue Description	Attached
5	To be offered	B. Tech (Civil Engineering)
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>Yes</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented as per AICTE
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Elective Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course Curriculum Committee and BOFT

**1. Name of the course : Hydraulic Structures/Irrigation Engineering**

**2. Course No. : TCE- 479**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

## **5. Syllabus /Catalogue Description**

**Module 1:** Introduction to Irrigation Engineering and Estimation of crop water requirement

**Module 2:** Design of lined and unlined channels

**Module 3:** Analysis for Surface and Sub-surface flow at Hydraulic Structures

**Module 4:** Design of Barrages and Weirs

**Module 5:** Design of Head and Cross Regulators

**Module 6:** Design of Canal Falls, Transitions and Cross Drainage works

**Module 7:** Design principles for Gravity and Earthen Dams

## **6. Text /Reference Books/Websites:**

- 9) B C Punmia, Irrigation Engineering, Laxmi Publications
- 10) Santosh Kumar Garg, Irrigation Engineering and Hydraulic Structures, Khanna Publishers
- 11) Basak N N , Irrigation Engineering, TATA Mc Graw-Hill
- 12) Asawa G L; Elementary Irrigation Engineering, New Age International
- 13) *nptel.ac.in*
- 14) <https://ocw.mit.edu>
- 15) <https://swayamprabha.gov.in>

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	20 Marks
Final Exam	40 Marks
<hr/>	
Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Civil Engineering
3	Title of the Course & Course No.	<b>Urban Hydrology and Hydraulics TCE-482</b>
4	Catalogue Description	Attached
5	To be offered	B. Tech (Civil Engineering)
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Civil Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>Yes</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this	Due to proposed syllabus to be mandatory

	course be offered at this present time	implemented as per AICTE
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Elective Course of B. Tech Civil Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course Curriculum Committee and BOFT

**1. Name of the course :** **Urban Hydrology and Hydraulics**

**2. Course No. :** **TCE- 482**

**3. Credits Hours :** **3 (3-0-0)**

**4. Pre-requisite :** **Nil,**

## **5. Syllabus /Catalogue Description**

**Module 1:** Introduction to Urban hydrology and hydraulics

**Module 2:** Hydraulic analysis and design of urban, highway, airport, and small rural watershed drainage problems

**Module 3:** Discussion of overland and drainage channel flows

**Module 4:** Hydraulics of storm-drain systems and culverts

**Module 5:** Determination of design flow; runoff for highways, airports, and urban areas

**Module 6:** Design of drainage gutters, channels, sewer networks, and culverts.

## **6. Text /Reference Books/Websites:**

- 16) Jaya Rami Reddy P, Hydrology, Laxmi Publications
- 17) Subramanya K, Engineering Hydrology, Mc Graw-Hill Education
- 18) Raghunath K, Principles of Hydrology, New Age International Publishers
- 19) Santosh Kumar Garg, Hydrology and Water Resources Engineering, Khanna Publishers
- 20) C S P Ojha, R Berndtsson and P Bhunya, Engineering Hydrology, Oxford.
- 21) *nptel.ac.in*
- 22) *https://ocw.mit.edu*
- 23) <https://ocw.un-ihe.org>
- 24) *https://www.integratedstormwater.eu*

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	20 Marks
Final Exam	40 Marks
<hr/>	
Total	100 Marks
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**Proposal for Curriculum  
Bachelor of Technology  
in  
Computer Engineering  
(As per AICTE Model Curriculum 2018)**



## Department of Computer Engineering

College of Technology

**G.B. Pant University of Agriculture and Technology,  
Pantnagar (Uttrakhand)-263145**

### Graduation Requirement (Computer Engineering) Batch-2018

Sl. No.	Course Code	Course Title	Hours per week			Credits	Pre- requisite	Remarks
			L	T	P			

<b>1.</b>	BPP-151	Waves and Optics and Introduction to Quantum Mechanics	3	1	2	5	NIL	New
<b>2.</b>	BPM-143	Calculus and Linear Algebra	3	1	0	4	NIL	New
<b>3.</b>	TEE-104	Basic Electrical Engineering	3	1	2	5	NIL	New
<b>4.</b>	TCE-114	Engineering Graphics & Design	1	0	2x2	3	NIL	New
<b>5.</b>	BHS-186	English	2	0	2	3	NIL	New
<b>6.</b>	BHS-188	Industrial Sociology	3	0	0	3	NIL	New
<b>7.</b>	BPC-102	Chemistry-I	3	0	3	4	NIL	New
<b>8.</b>	BPM-154	Multivariable Calculus, Transforms & Ordinary differential equations	3	1	0	4	NIL	New
<b>9.</b>	TIT-121	Programming for Problem Solving	3	0	2	4	NIL	New
<b>10.</b>	TIP-103	Workshop Practices	1	0	2x2	3	NIL	New
<b>11.</b>	BHS-286	Effective Technical Communication	3	0	0	3	NIL	New
<b>12.</b>	TID/ TSW/ TCE/ TME- 109	Environmental Science and Disaster Management	3	0	0	3	NIL	Existing
<b>13.</b>	TWP-101	Work Programme	0	0	2	1	NIL	Existing
<b>14.</b>	TEC-301	Analog Electronic Circuits	3	0	2	4	NIL	New
<b>15.</b>	TCT-201	Data structures	3	0	2	4	NIL	New
<b>16.</b>	TCT-202	Digital Electronics	3	0	2	4	NIL	New
<b>17.</b>	BPS-228	Probability and Statistics	3	1	0	4	NIL	New
<b>18.</b>	TCT-203	Theory of Computing	3	0	0	3	NIL	New
<b>19.</b>	TCT-204	Discrete Mathematics	3	0	0	3	NIL	New

<b>20.</b>	TCT-206	File Organization & Processing	2	0	2	3	NIL	New
<b>21.</b>	TCT-207	Computer Organization & Architecture	2	0	2	3	NIL	New
<b>22.</b>	TCT-208	Microprocessor	2	0	2	3	NIL	New
<b>23.</b>	TCT-209	Design & Analysis of Algorithms	3	0	2	4	NIL	New
<b>24.</b>	BHS-100	Constitution of India	1	0	0	1	NIL	New
<b>25.</b>	TCT-210	Formal Language & Automata Theory	3	0	0	3	NIL	New
<b>26.</b>	TCT-212	Computational Scientific Tool	1	0	2	2	NIL	New
<b>27.</b>	TCT-306	Computer Communication Systems	2	0	2	3	NIL	New
<b>28.</b>	TCT-301	Programming Languages	2	0	2	3	NIL	New
<b>29.</b>	TCT-302	Software Engineering	2	0	0	2	NIL	New
<b>30.</b>	TCT-303	Database Management Systems	3	0	2	4	NIL	New
<b>31.</b>	TCT-304	System programming	2	0	2	3	NIL	New
<b>32.</b>	TCT-	Professional Elective-I	3	0	0	3	NIL	New
<b>33.</b>	TCT-307	Operating Systems	3	0	2	4	NIL	New
<b>34.</b>	TCT-308	Compiler Design	3	0	2	4	NIL	New
<b>35.</b>	TCT-316	Computer Networks	3	0	2	4	NIL	New
<b>36.</b>	TCT-	Professional Elective-II	3	0	0	3	NIL	New
<b>37.</b>	TCT-309	Computer & Society	2	0	0	2	NIL	New
<b>38.</b>	As per offering Department (OE-I)	Open Elective-I	3	0	0	3	NIL	New

<b>39.</b>	TCT-390	Seminar	0	0	2	1	NIL	New
<b>40.</b>	TCT-	Professional Elective-III	3	0	0	3	NIL	New
<b>41.</b>	TCT-	Professional Elective-IV	3	0	0	3	NIL	New
<b>42.</b>	TCT-	Professional Elective-V	3	0	0	3	NIL	New
<b>43.</b>	As per offering Department (OE-II)	Open Elective-II	3	0	0	3	NIL	New
<b>44.</b>	TCT-401	Machine Learning	2	0	2	3	NIL	New
<b>45.</b>	TCT-495A	Project-I	0	0	4x2	4	NIL	New
<b>46.</b>	TCT-	Professional Elective-VI	3	0	0	3	NIL	New
<b>47.</b>	As per offering Department (OE-III)	Open Elective-III	3	0	0	3	NIL	New
<b>48.</b>	As per offering Department (OE-IV)	Open Elective-IV	3	0	0	3	NIL	New
<b>49.</b>	TCT-495B	Project-II	0	0	8x2	8	NIL	New
<b>50.</b>	TCT-191	Practical Training-I	0	0	0	2weeks	NIL	New
<b>51.</b>	TCT-291	Practical Training-II	0	0	0	2weeks	NIL	New
<b>52.</b>	TCT-391	Practical Training-III	0	0	0	4weeks	NIL	New
<b>53.</b>	TIP- 454	Principles of Management	2	0	0	2	NIL	Existing
<b>54.</b>	NSS-101	National Service Scheme	0	0	2	1	NIL	Existing
<b>55.</b>	NSS-102	National Service Scheme	0	0	0	0	NIL	Existing
<b>56.</b>	NSS-201	National Service Scheme	0	0	2	1	NIL	Existing
<b>57.</b>	NSS-202	National Service Scheme	0	0	0	0	NIL	Existing
<b>Total credits</b>							<b>165</b>	

**Note:** Those students who have not taken Hindi at the High School or equivalent level will also require to Register the course BHS-105 Elementary Hindi – 2 Credit.

### **Professional Elective Courses & Open Elective Courses for B.Tech.**

#### **Branch/Course: Computer Engineering**

		L: Lectures	T: Tutorial	P: Practical	C: Credits	R: Remarks		
Sl. No.	Type	Code	Course Title	Hours per week			C	R
				L	T	P		
1.	Elective	TCT- 411	Parallel and distributed algorithms	3	0	0	3	New
		TCT- 412	Computational Complexity	3	0	0	3	New
		TCT- 415	Information Theory and Coding	3	0	0	3	New
		TCT- 416	Quantum Computing	3	0	0	3	New
		TCT- 417	Object Oriented Programming	3	0	0	3	New
2.	Elective	TCT- 422	Advanced Computers Architecture	3	0	0	3	New
		TCT- 423	Distributed Systems	3	0	0	3	New
		TCT- 424	Embedded Systems	3	0	0	3	New
		TCT- 425	Fault Tolerant Computing	3	0	0	3	New
		TCT- 426	Real Time System	3	0	0	3	New
		TCT- 427	Ad-hoc & Sensor Networks	3	0	0	3	New
		TCT- 428	Internet of Things	3	0	0	3	New

3.	Elective	TCT- 432	Artificial Intelligence	3	0	0	3	New
		TCT- 433	Data Mining	3	0	0	3	New
		TCT- 434	Soft Computing	3	0	0	3	New
		TCT- 435	Speech and Natural Language Processing	3	0	0	3	New
		TCT- 436	Neural Networks and Deep Learning	3	0	0	3	New
4.	Elective	TCT- 461	Digital Image Processing	3	0	0	3	New
		TCT- 463	Cloud Computing	3	0	0	3	New
		TCT- 464	Human Computer Interaction	3	0	0	3	New
		TCT- 465	Optimization Techniques	3	0	0	3	New
		TCT- 466	Cryptography and Network Security	3	0	0	3	New
		TCT- 467	Computer Graphics & Animation	3	0	0	3	New
		TCT- 468	VLSI System Design	3	0	0	3	New
5.	Elective	TCT-481	Cyber Law and Ethics	3	0	0	3	New

#### **Graduation Requirement (Computer Engineering) Batch-2018**

##### **Semester Wise Distribution: First Year**

<b>Semester I (First year I-Semester)</b>				
<b>Sl.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Hours per week</b>	<b>C</b>

No.			L	T	P	
<b>1</b>	BPC-102	Chemistry-I	3	0	3	4
<b>2</b>	BPM-143	Calculus and Linear Algebra	3	1	0	4
<b>3</b>	TEE-104	Basic Electrical Engineering	3	1	2	5
<b>4</b>	TID/ TSW/ TCE/ TME-109	Introduction to Environmental Engineering and Disasters	3	0	0	3
<b>5</b>	TIT-121	Programming for Problem Solving	3	0	2	4
<b>6</b>	TWP-101	Work Programme	0	0	2	1
<b>7</b>	TIC-100	Induction Programme (2 Weeks)	-	-	-	-
<b>Total Credits</b>						<b>21</b>
<b>Semester II (First year II-Semester)</b>						
<b>1</b>	BPP-151	Waves and Optics and Introduction to Quantum Mechanics	3	1	2	5
<b>2</b>	BPM-154	Multivariable Calculus, Transforms & Ordinary differential equations	3	1	0	4
<b>3</b>	TCE-114	Engineering Graphics & Design	1	0	2x2	3
<b>4</b>	TIP-103	Workshop Practices	1	0	2x2	3
<b>5</b>	BHS-186	English	2	0	2	3
<b>6</b>	BHS-188	Industrial Sociology	3	0	0	3
<b>7</b>	TCT191	Practical Training-I (2 weeks)	-	-	-	-
<b>Total Credits</b>						<b>21</b>

**Semester Wise Distribution: Second Year**

<b>Semester III (Second year I-Semester)</b>						
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Sl. No.	Course Code	Course Title	Hours per week			C
			L	T	P	
1	TEC- 301	Analog Electronic Circuits	3	0	2	4
2	TCT-201	Data structures	3	0	2	4
3	TCT- 202	Digital Electronics	3	0	2	4
4	BPS-228	Probability and Statistics	3	1	0	4
5	TCT-203	Theory of Computing	3	0	0	3
6	TCT-204	Discrete Mathematics	3	0	0	3
7	NSS-101	National Service Scheme	0	0	2	1
<b>Total Credits</b>						<b>23</b>
<b>Semester IV (Second year II-Semester)</b>						
1	TCT-206	File Organization & Processing	2	0	2	3
2	TCT-207	Computer Organization & Architecture	2	0	2	3
3	TCT-208	Microprocessor	2	0	2	3
4	TCT-209	Design & Analysis of Algorithms	3	0	2	4
5	BHS-100	Constitution of India	1	0	0	1
6	TCT-210	Formal Language & Automata Theory	3	0	0	3
7	TCT- 212	Computational Scientific Tool	1	0	2	2
8	BHS286	Effective Technical Communication	3	0	0	3
9	NSS-102	National Service Scheme	0	0	0	0
10	TCT291	Practical Training-II (2 weeks)	-	-	-	-
<b>Total Credits</b>						<b>22</b>

**Semester Wise Distribution: Third Year**

<b>Semester V (Third year I-Semester)</b>						
<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Hours per week</b>			<b>C</b>
			<b>L</b>	<b>T</b>	<b>P</b>	
<b>1</b>	TCT-306	Computer Communication Systems	2	0	2	3
<b>2</b>	TCT-301	Programming Languages	2	0	2	3
<b>3</b>	TCT-302	Software Engineering	2	0	0	2
<b>4</b>	TCT-303	Database Management Systems	3	0	2	4
<b>5</b>	TCT-304	System programming	2	0	2	3
<b>6</b>	TCT-	Professional Elective-I	3	0	0	3
<b>7</b>	NSS-201	National Service Scheme	0	0	2	1
<b>Total Credits</b>						<b>19</b>
<b>Semester VI (Third year II-Semester)</b>						
<b>1</b>	TCT-307	Operating Systems	3	0	2	4
<b>2</b>	TCT-308	Compiler Design	3	0	2	4
<b>3</b>	TCT-316	Computer Networks	3	0	2	4
<b>4</b>	TCT-309	Computer & Society	2	0	0	2
<b>5</b>	As per offering Department (OE-I)	Open Elective-I	-	-	-	3
<b>6</b>	TCT-390	Seminar	0	0	2	1
<b>7</b>	TCT-391	Practical Training-III	0	0	0	4weeks
<b>8</b>	NSS-202	National Service Scheme	0	0	0	0
<b>Total Credits</b>						<b>18</b>

**Semester Wise Distribution: Forth Year**

<b>Semester VII (Fourth year I-Semester)</b>						
<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Hours per week</b>			<b>C</b>
			<b>L</b>	<b>T</b>	<b>P</b>	
1	TCT-	Professional Elective-II	3	0	0	3
2	TCT-	Professional Elective-III	3	0	0	3
3	TCT-	Professional Elective-IV	3	0	0	3
4	As per offering Department (OE-II)	Open Elective-II	3	0	0	3
5	TCT-401	Machine Learning	2	0	2	3
6	TCT-495A	Project-I	0	0	8	4
<b>Total Credits</b>						<b>19</b>
<b>Semester VIII (Fourth year II-Semester)</b>						
1	TCT-	Professional Elective-V	3	0	0	3
2	TCT-	Professional Elective-VI	3	0	0	3
3	As per offering Department (OE-III)	Open Elective-III	3	0	0	3
4	As per offering Department (OE-IV)	Open Elective-IV	3	0	0	3
5	TIP-454	Principles of Management	2	0	0	2
6	TCT-495B	Project-II	0	0	16	8
<b>Total Credits</b>						<b>22</b>

**Total Credits 165**

**GRADUATION REQUIREMENT FOR B.TECH. COMPUTER ENGINEERING**

**DIPLOMA (BATCH-2018)**

Sl.No.	Course No	Course Title	Credit(s)	Pre-requisite
1.	BPS-218	PROBABILITY STATISTICS & QUEING MODEL	2(2-1-0)	NIL
2.	NSS-101	N.S.S.	1(0-0-2)	NIL
3.	NSS-102	N.S.S.	0	NIL
4.	NSS-201	N.S.S.	1(0-0-2)	NIL
5.	NSS-202	N.S.S.	0	NIL
6.	TCT-200/ TEC-203	DIGITAL LOGIC& CIRCUITS	4(3-1-2)	NIL
7.	TCT-205	DATA STRUCTURES	3(3-1-0)	NIL
8.	TCT-211	MICROPROCESSOR	4(3-0-2)	NIL
9.	TCT-223	DATA PROCESSING & FILE SYSTEM	4(3-0-2)	NIL
10.	TCT-224	COMPUTATIONAL & NUMERICAL ANALYSIS	2(2-1-0)	NIL
11.	TCT-230	DISCRETE STRUCTURE	3(3-1-0)	NIL
12.	TCT-231	FORMAL LANGUAGES & AUTOMATA THEORY	3(3-1-0)	NIL
13.	TCT-232	THEORY OF COMPUTING	3(3-0-0)	NIL
14.	TCT-240	COMPUTER ORGANISATION	3(2-0-2)	NIL
15.	TCT-300	COMPUTER & SOCIETY	3(3-0-0)	NIL
16.	TCT-305	PROGRAMMING LANGUAGES	3(3-1-0)	TCT-205
17.	TCT-310	SYSTEM PROGRAMMING	4(3-0-2)	TCT-240
18.	TCT-311	MICROPROCESSOR BASED SYSTEMS	2(2-1-0)	TCT-211
19.	TCT-313	N.C.MACHINES & ROBOTICS	2(2-1-0)	NIL
20.	TCT-315	FUNDAMENTAL OF COMPUTER COMMUNICATION	4(3-1-2)	NIL

		SYSTEM		
21.	TCT-320	LANGUAGE PROCESSORS	3(3-1-0)	TCT-305
22.	TCT-321	OPERATING SYSTEMS	3(3-1-0)	NIL
23.	TCT-323	DATA BASE MANAGEMENT SYSTEMS	4(3-0-2)	NIL
24.	TCT-325	COMPUTER NETWORKS	3(3-1-0)	TCT-315
25.	TCT-330	DESIGN & ANALYSIS OF ALGORITHMS	3(3-1-0)	TCT-230 & TCT-205
26.	TCT-335	OPERATIONS RESEARCH	2(2-1-0)	NIL
27.	TCT-400	MANAGEMENT INFORMATION SYSTEMS	3(2-0-2)	NIL
28.	TCT-407	STATE OF THE ART COMPUTER	2(1-0-2)	NIL
29.	TCT-421	SOFTWARE ENGINEERING	2(2-1-0)	NIL
30.	TCT-443	COMPUTER GRAPHICS AND ANIMATION	4(3-0-2)	TCT-205
31.	TCT-471	MULTIMEDIA TECHNOLOGY	3(2-0-2)	TCT-205
32.	TCT-490 A	PROJECT A	2 CR.	NIL
33.	TCT-490 B	PROJECT B	4 CR.	NIL
34.	TCT-491	PRACTICAL TRAINING	30 DAYS	NIL
35.	TCT-492	SEMINAR	1(0-0-3)	NIL
36.	TEC-220/ TEE-150	CIRCUIT THEORY	4(3-1-2)	NIL
37.	TEC-240 / TEE-240	INSTRUMENTS & MEASUREMENTS	3(2-1-2)	NIL
38.	TEC-261	ELECTRONIC DEVICES & CIRCUITS	4(3-1-2)	TEC-220/TEE-150
39.	TEE-300 / TEC-312	CONTROL SYSTEMS	4(3-1-2)	TEC-220 / TEE-150
40.	TIP-454	PRINCIPLE OF MANAGEMENT	2(2-2-0)	NIL
41.	TWP-101	WORK PROGRAMME	1(0-0-2)	NIL
42.	TCT-	OPEN ELECTIVE - I	3(2-1-2)	As Per Elective

43.	TCT-	OPEN ELECTIVE - II	3(2-1-2)	As Per Elective
44.	TCT-	OPEN ELECTIVE - III	3(2-1-2)	As Per Elective
				<b>117 CREDITS</b>

**ELECTIVE COURSE**

1.	TCT-410	VLSI TECHNOLOGY	3(2-1-2)	TCT-240
2.	TCT-413	DIGITAL CONTROL	3(2-1-2)	TEE-300
3.	TCT-414	REAL-TIME SYSTEMS	3(2-1-2)	TCT-321
4.	TCT-420	ARTIFICIAL INTELLIGENCE	3(2-1-2)	NIL
5.	TCT-430	SIMULATION & MODELLING	3(2-1-2)	BPS-218
6.	TCT-431	COMPUTER SYSTEMS REALIBILITY	3(2-1-2)	BPS-218
7.	TCT-440	COMPUTER ARCHITECTURE	3(2-1-2)	TCT-240
8.	TCT-442	DISTRIBUTED COMPUTING	3(2-1-2)	TCT-321
9.	TCT-444	PARALLEL COMPUTING	3(2-1-2)	TCT-240
10.	TCT-446	IMAGE PROCESSING	3(2-1-2)	TCT-443
11.	TCT-447	FAULT TOLERENT COMPUTING	3(2-1-2)	TCT-240
12.	TCT-448	SATELLITE COMMUNICATION	3(2-1-2)	TCT-315
13.	TCT-449	DIGITAL SIGNAL PROCESSING	3(2-1-2)	TCT-445
14.	TCT-462	CLIENT SERVER COMPUTING	3(2-1-2)	TCT-325
15.	TCT-473	DATA MINING & WARE HOUSING	3(2-1-2)	TCT-323
16.	TCT-474	MOBILE COMPUTING	3(2-1-2)	TCT-315
17.	TCT-477	COMPUTATIONAL LINGUISTICS & HUMAN COMPUTER INTERFACE	3(2-1-2)	TCT-231
18.	TCT-479	NEURO COMPUTING	3(2-1-2)	NIL

**Note:** Those students who have not taken Hindi at the High School or equivalent level will also require to Register the course BHS-105 Elementary Hindi – 2 Credit.

**GRADUATION REQUIREMETN B.TECH.(COMPUTER ENGINEERING)**

**SEMESTER WISE DISTRIBUTION**

**(Diploma Batch-2018)**

Sl. No.	Course No.	Name of Course	LTP	Prerequisite

<b>I SEMESTER</b>				
1.	NSS-101	N.S.S.	1(0-0-2)	NIL
2.	TCT-200/ TEC-203	DIGITAL LOGIC& CIRCUITS	4(3-1-2)	NIL
3.	TCT-205	DATA STRUCTURES	3(3-1-0)	NIL
4.	TCT-230	DISCRETE STRUCTURES	3(3-1-0)	NIL
5.	TCT-231	FORMAL LANGUAGE AND AUTOMATA THEORY	3(3-2-0)	NIL
6.	TEC-220/ TEE-150	CIRCUIT THEORY	4(3-1-2)	NIL
7.	TEC-240 /TEE-240	INSTRUMENTS AND MEASUREMENTS	3(2-1-2)	NIL
8.	TWP-101	WORK PROGRAMME	1(0-0-2)	NIL
			<b>22</b>	
<b>II SEMESTER</b>				
1.	BPS-218	PROBABILITY STATISTICS & QUEING MODEL	2(2-1-0)	NIL
2.	TCT-211	MICROPROCESSOR	4(3-0-2)	NIL
3.	TCT-223	DATA PROCESSING & FILE SYSTEM	4(3-0-2)	NIL
4.	TCT-232	THEORY OF COMPUTING	3(3-0-0)	NIL
5.	TCT-240	COMPUTER ORGANISATION	3(2-0-2)	NIL
6.	TEC-261	ELECTRONIC DEVICES & CIRCUITS	4(3-1-2)	TEC-220/ TEE-150
7.	TCT-224	COMPUTATIONAL & NUMERICAL ANALYSIS	2(2-1-0)	NIL
8.	NSS-102	N.S.S.	0	NIL
			<b>22</b>	
<b>III SEMESTER</b>				
1.	TCT-305	PROGRAMMING LANGUAGES	3(3-1-0)	TCT-205
2.	TCT-310	SYSTEM PROGRAMMING	4(3-0-2)	TCT-240
3.	TCT-315	FUNDAMENTAL OF COMPUTER COMMUNICATION	4(3-1-2)	NIL

		SYSTEM		
4.	TCT-323	DATA BASE MANAGEMENT SYSTEMS	4(3-0-2)	NIL
5.	TCT-335	OPERATIONS RESEARCH	2(2-1-0)	NIL
6.	TEC-312/ TEE-300	CONTROL SYSTEMS	4(3-1-2)	TEC-220/TEE-150
7.	NSS-201	N.S.S.	1(0-0-2)	NIL
			<b>22</b>	

<b>IV SEMESTER</b>				
1.	TCT-300	COMPUTER AND SOCIETY	3(3-0-0)	NIL
2.	TCT-311	MICROPROCESSOR BASED SYSTEMS	2(2-1-0)	TCT-211
3.	TCT-313	NUMERICALLY CONTROLLED MACHINES & ROBOTICS	2(2-1-0)	NIL
4.	TCT-320	LANGUAGE PROCESSORS	3(3-1-0)	TCT-305
5.	TCT-321	OPERATING SYSTEMS	3(3-1-0)	NIL
6.	TCT-325	COMPUTER NETWORKS	3(3-1-0)	TCT-315
7.	TCT-330	DESIGN & ANALYSIS OF ALGORITHMS	3(3-1-0)	TCT-205 TCT-230
8.	TCT-491	PRACTICAL TRAINING	30 Days	NIL
9.	NSS-202	N.S.S.	0	NIL
			<b>19</b>	
<b>V SEMESTER</b>				
1.	TCT-	OPEN ELECTIVE - I	3(2-1-2)	
2.	TCT-	OPEN ELECTIVE - II	3(2-1-2)	
3.	TCT-400	MANAGEMENT INFORMATION SYSTEMS	3(2-0-2)	NIL
4.	TCT-443	COMPUTER GRAPHICS AND ANIMATION	4(3-0-2)	TCT-205
5.	TCT-490 A	PROJECT A	2(0-0-4)	NIL
6.	TCT-492	SEMINAR	1(0-0-3)	NIL
7.	TIP-454	PRINCIPLE OF MANAGEMENT	2(2-2-0)	NIL
			<b>18</b>	
<b>VI SEMESTER</b>				
1.	TCT-	OPEN ELECTIVE-III	3(2-1-2)	
2.	TCT-407	STATE OF THE ART COMPUTERS	2(1-0-2)	NIL
3.	TCT-421	SOFTWARE ENGINEERING	2(2-1-0)	NIL

4.	TCT-471	MULTIMEDIA TECHNOLOGY	3(2-0-2)	TCT-205
5.	TCT-490 B	PROJECT B	4(0-0-8)	NIL
			<b>14</b>	

**TOTAL CREDITS - 117**

**GRADUATION REQUIREMENT FOR B.TECH. COMPUTER ENGINEERING**

**B.Sc.( MATHS) (BATCH-2018)**

<b>Sl.No.</b>	<b>Course No</b>	<b>Course Title</b>	<b>Credit(s)</b>	<b>Pre-requisite</b>
1	BPS-218	PROBABILITY STATISTICS & QUEING MODEL	2(2-1-0)	NIL
2	NSS-101	N.S.S.	1(0-0-2)	NIL
3	NSS-102	N.S.S.	0	NIL
4	NSS-201	N.S.S.	1(0-0-2)	NIL
5	NSS-202	N.S.S.	0	NIL
6	TCT-200/ TEC-203	DIGITAL LOGIC& CIRCUITS	4(3-1-2)	NIL
7	TCT-205	DATA STRUCTURES	3(3-1-0)	NIL
8	TCT-211	MICROPROCESSOR	4(3-0-2)	NIL
9	TCT-223	DATA PROCESSING & FILE SYSTEM	4(3-0-2)	NIL
10	TCT-224	COMPUTATIONAL & NUMERICAL ANALYSIS	2(2-1-0)	NIL
11	TCT-230	DISCRETE STRUCTURE	3(3-1-0)	NIL
12	TCT-231	FORMAL LANGUAGES & AUTOMATA THEORY	3(3-1-0)	NIL
13	TCT-232	THEORY OF COMPUTING	3(3-0-0)	NIL
14	TCT-240	COMPUTER ORGANISATION	3(2-0-2)	NIL
15	TCT-300	COMPUTER & SOCIETY	3(3-0-0)	NIL
16	TCT-305	PROGRAMMING LANGUAGES	3(3-1-0)	TCT-205
17	TCT-310	SYSTEM PROGRAMMING	4(3-0-2)	TCT-240
18	TCT-311	MICROPROCESSOR BASED SYSTEMS	2(2-1-0)	TCT-211
19	TCT-313	N.C.MACHINES & ROBOTICS	2(2-1-0)	NIL
20	TCT-315	FUNDAMENTAL OF COMPUTER COMMUNICATION SYSTEM	4(3-1-2)	NIL
21	TCT-320	LANGUAGE PROCESSORS	3(3-1-0)	TCT-305
22	TCT-321	OPERATING SYSTEMS	3(3-1-0)	NIL
23	TCT-323	DATA BASE MANAGEMENT SYSTEMS	4(3-0-2)	NIL

24	TCT-325	COMPUTER NETWORKS	3(3-1-0)	TCT-315
25	TCT-330	DESIGN & ANALYSIS OF ALGORITHMS	3(3-1-0)	TCT-230 & TCT-205
26	TCT-335	OPERATIONS RESEARCH	2(2-1-0)	NIL
27	TCT-400	MANAGEMENT INFORMATION SYSTEMS	3(2-0-2)	NIL
28	TCT-407	STATE OF THE ART COMPUTER	2(1-0-2)	NIL
29	TCT-421	SOFTWARE ENGINEERING	2(2-1-0)	NIL
30	TCT-443	COMPUTER GRAPHICS AND ANIMATION	4(3-0-2)	TCT-205
31	TCT-471	MULTIMEDIA TECHNOLOGY	3(2-0-2)	TCT-205
32	TCT-490 A	PROJECT A	2 CR.	NIL
33	TCT-490 B	PROJECT B	4 CR.	NIL
34	TCT-491	PRACTICAL TRAINING	30 DAYS	NIL
35	TCT-492	SEMINAR	1(0-0-3)	NIL
36	TEC-220/ TEE-150	CIRCUIT THEORY	4(3-1-2)	NIL
37	TEC-240/ TEE-240	INSTRUMENTS & MEASUREMENTS	3(2-1-2)	NIL
38	TEC-261	ELECTRONIC DEVICES & CIRCUITS	4(3-1-2)	TEC-220/ TEE-150
39	TEE-300/ TEC-312	CONTROL SYSTEMS	4(3-1-2)	TEC-220 / TEE-150
40	TIP-454	PRINCIPLE OF MANAGEMENT	2(2-2-0)	NIL
41	TWP-101	WORK PROGRAMME	1(0-0-2)	NIL
42	TCT-	OPEN ELECTIVE - I	3(2-1-2)	AS PER ELECTIVE
43	TCT-	OPEN ELECTIVE - II	3(2-1-2)	
44	TCT-	OPEN ELECTIVE - III	3(2-1-2)	

45	TIP-101	WORKSHOP PRACTICE	3(1-0-6)	NIL
			<b>120 CREDITS</b>	

#### ELECTIVE COURSE

1	TCT-410	VLSI TECHNOLOGY	3(2-1-2)	TCT-240
2	TCT-413	DIGITAL CONTROL	3(2-1-2)	TEE-300
3	TCT-414	REAL-TIME SYSTEMS	3(2-1-2)	TCT-321
4	TCT-420	ARTIFICIAL INTELLIGENCE	3(2-1-2)	NIL
5	TCT-430	SIMULATION & MODELLING	3(2-1-2)	BPS-218
6	TCT-431	COMPUTER SYSTEMS REALIBILITY	3(2-1-2)	BPS-218
7	TCT-440	COMPUTER ARCHITECTURE	3(2-1-2)	TCT-240
8	TCT-442	DISTRIBUTED COMPUTING	3(2-1-2)	TCT-321
9	TCT-444	PARALLEL COMPUTING	3(2-1-2)	TCT-240
10	TCT-446	IMAGE PROCESSING	3(2-1-2)	TCT-443
11	TCT-447	FAULT TOLERENT COMPUTING	3(2-1-2)	TCT-240
12	TCT-448	SATELLITE COMMUNICATION	3(2-1-2)	TCT-315
13	TCT-449	DIGITAL SIGNAL PROCESSING	3(2-1-2)	TCT-445
14	TCT-462	CLIENT SERVER COMPUTING	3(2-1-2)	TCT-325
15	TCT-473	DATA MINING & WARE HOUSING	3(2-1-2)	TCT-323
16	TCT-474	MOBILE COMPUTING	3(2-1-2)	TCT-315
17	TCT-477	COMPUTATIONAL LINGUISTICS & HUMAN COMPUTER INTERFACE	3(2-1-2)	TCT-231
18	TCT-479	NEURO COMPUTING	3(2-1-2)	NIL

**Note:** Those students who have not taken Hindi at the High School or equivalent level will also require to

Register the course BHS-105 Elementary Hindi – 2 Credit.

**GRADUATION REQUIREMENT B.TECH.(COMPUTER ENGINEERING)**

**SEMESTER WISE DISTRIBUTION**

**B.Sc.( MATHS) (BATCH-2018)**

Sl. No.	Course No.	Name of Course	LTP	Prerequisite
<b>I SEMESTER</b>				
1	NSS-101	N.S.S.	1 (0-0-2)	NIL
2	TCT-200/ TEC-203	DIGITAL LOGIC& CIRCUITS	4(3-1-2)	NIL
3	TCT-205	DATA STRUCTURES	3(3-1-0)	NIL
4	TCT-230	DISCRETE STRUCTURES	3(3-1-0)	NIL
5	TCT-231	FORMAL LANGUAGE AND AUTOMATA THEORY	3(3-2-0)	NIL
6	TEC-220/ TEE-150	CIRCUIT THEORY	4(3-1-2)	NIL
7	TEC-240 /TEE-240	INSTRUMENTS AND MEASUREMENTS	3(2-1-2)	NIL
8	TWP-101	WORK PROGRAMME	1(0-0-2)	NIL
			<b>22</b>	
<b>II SEMESTER</b>				
1	BPS-218	PROBABILITY STATISTICS & QUEING MODEL	2(2-1-0)	NIL
2	TCT-211	MICROPROCESSOR	4(3-0-2)	NIL
3	TCT-223	DATA PROCESSING & FILE SYSTEM	4(3-0-2)	NIL
4	TIP-101	WORKSHOP PRACTICE	3(1-0-6)	NIL
5	TCT-232	THEORY OF COMPUTING	3(3-0-0)	NIL
6	TCT-240	COMPUTER ORGANISATION	3(2-0-2)	NIL
7	TEC-261	ELECTRONIC DEVICES & CIRCUITS	4(3-1-2)	TEC-220/ TEE-150

8	NSS-102	N.S.S.	0	NIL
			<b>23</b>	

**III SEMESTER**

1	TCT-305	PROGRAMMING LANGUAGES	3(3-1-0)	TCT-205
2	TCT-310	SYSTEM PROGRAMMING	4(3-0-2)	TCT-240
3	TCT-315	FUNDAMENTAL OF COMPUTER COMMUNICATION SYSTEM	4(3-1-2)	NIL
4	TCT-323	DATA BASE MANAGEMENT SYSTEMS	4(3-0-2)	NIL
5	TCT-335	OPERATIONS RESEARCH	2(2-1-0)	NIL
6	TEC-312/ TEE-300	CONTROL SYSTEMS	4(3-1-2)	TEC-220/TEE-150
7	NSS-201	N.S.S.	1 (0-0-2)	NIL
			<b>22</b>	

<b>IV SEMESTER</b>				
1	TCT-300	COMPUTER AND SOCIETY	3(3-0-0)	NIL
2	TCT-311	MICROPROCESSOR BASED SYSTEMS	2(2-1-0)	TCT-211
3	TCT-313	NUMERICALLY CONTROLLED MACHINES & ROBOTICS	2(2-1-0)	NIL
4	TCT-320	LANGUAGE PROCESSORS	3(3-1-0)	TCT-305
5	TCT-321	OPERATING SYSTEMS	3(3-1-0)	NIL
6	TCT-325	COMPUTER NETWORKS	3(3-1-0)	TCT-315
7	TCT-330	DESIGN & ANALYSIS OF ALGORITHMS	3(3-1-0)	TCT-205 TCT-230
8	TCT-491	PRACTICAL TRAINING	30 Days	NIL
9	TCT-224	COMPUTATIONAL & NUMERICAL ANALYSIS	2(2-1-0)	NIL
10	NSS-202	N.S.S.	0	NIL
			<b>21</b>	

**V SEMESTER**

1	TCT-	OPEN ELECTIVE - I	3(2-1-2)	
2	TCT-	OPEN ELECTIVE - II	3(2-1-2)	
3	TCT-400	MANAGEMENT INFORMATION SYSTEMS	3(2-0-2)	NIL
4	TCT-443	COMPUTER GRAPHICS AND ANIMATION	4(3-0-2)	TCT-205
5	TCT-490 A	PROJECT A	2(0-0-4)	NIL
6	TCT-492	SEMINAR	1(0-0-3)	NIL
7	TIP-454	PRINCIPLE OF MANAGEMENT	2(2-2-0)	NIL
			<b>18</b>	

**VI SEMESTER**

1	TCT-	OPEN ELECTIVE-III	3(2-1-2)	
2	TCT-407	STATE OF THE ART COMPUTERS	2(1-0-2)	NIL

3	TCT-421	SOFTWARE ENGINEERING	2(2-1-0)	NIL
4	TCT-471	MULTIMEDIA TECHNOLOGY	3(2-0-2)	TCT-205
5	TCT-490 B	PROJECT B	4(0-0-8)	NIL
			<b>14</b>	

**TOTAL CREDITS - 120**

### **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Waves and Optics and Introduction to Quantum Mechanics</b>  <b>BPP-151</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>5(3-1-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Engineering supporting Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	AICTE New Model Curriculum has proposed.	
	a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one?	No No Yes  Yes  Yes

h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Department of Physics, CBSH

#### CATALOGUE DESCRIPTION

Waves, Non-dispersive transverse waves, Light and Optics, Wave Optics, Lasers, Introduction to Quantum Mechanics, Solution of Wave Equation , Introduction to Solids and Semiconductors

Syllabus:

Topics
Waves : Simple harmonic motion, Mechanical and electrical simple harmonic oscillators, damped harmonic oscillator and its cases (over damping, critical damping and under damping), forced mechanical oscillator, mechanical impedances
Non-dispersive transverse waves: Transverse wave on a string, the wave equation on a string, normal modes of vibrations in a stretched string, Harmonic waves, reflection and transmission of waves at a boundary, standing waves and their Eigen frequencies
Light and Optics: Light as an electromagnetic wave, Fresnel equations (E perpendicular and parallel to the plane of incidence), Brewster's angle, total internal reflection
Wave Optics: Huygens' principle, superposition of waves and interference of light by wavefront splitting and amplitude splitting; coherence, Young's double slit experiment, interference in thin films, Newton's rings, Michelson interferometer, Farunhofer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power
Lasers: Introduction to Laser, Interaction of radiation with matter: Stimulated absorption, spontaneous, stimulated emission. Optical Pumping and Population Inversion, He-Ne laser
Introduction to Quantum Mechanics: Wave nature of Particles, Time-dependent and time-independent Schrodinger equation for wave function, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle.
Solution of Wave Equation: Properties of one-dimensional motion: discrete and continuous states; Solution of stationary-state Schrodinger equation for one dimensional problems—particle in a box, square-well potential, harmonic oscillator (qualitatively) and zero-point energy, scattering from a potential barrier and tunneling; Principle of Scanning Tunneling Microscopy, alpha- decay.
Introduction to Solids and Semiconductors: Origin of energy bands, Types of electronic materials: metals, semiconductors, and insulators. Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics).
Laboratory Topics
Experiments based on Error Analysis, Oscillations, Waves, optical phenomena like Interference, Diffraction, Quantum Mechanics and Laser.

Text/ References Books:

1. . I. G. Main, "Vibrations and waves in physics", Cambridge University Press, 1993.
2. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.
3. E. Hecht, "Optics", Pearson Education, 2008.
4. A. Ghatak, " Optics" , McGraw Hill Education, 2012.
5. O. Svelto, "Principles of Lasers", Springer Science & Business Media, 2010.
6. D. J. Griffiths, " Quantum mechanics" , Pearson Education, 2014.
7. R. Robinett, "Quantum Mechanics", OUP Oxford, 2006.
8. D. McQuarrie, "Quantum Chemistry", University Science Books, 2007.
9. D. A. Neamen, "Semiconductor Physics and Devices", Times Mirror High Education Group, Chicago, 1997.
10. E.S. Yang, "Microelectronic Devices", McGraw Hill, Singapore, 1988.
- 11.B.G. Streetman, " Solid State Electronic Devices" , Prentice Hall of India, 1995.
12. Concepts of Modern Physics by Arthur Beiser

## **PROPOSAL FOR A NEW COURSE**

- |               |                                 |
|---------------|---------------------------------|
| 1. Department | Computer Engineering Department |
| 2. College    | Technology                      |

3.	(a) Title of the course (b) No. of the Course	<b>Calculus and Linear Algebra</b>
		<b>BPM-143</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-1-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Engineering Supporting Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No

	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Department of Mathematics, CBSH

### **Syllabus /Catalogue Description**

#### **Calculus:**

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders.

#### **Sequences and series:**

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

### **Multivariable Calculus (Differentiation):**

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

### **Matrices**

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation

### **Text/Reference Books**

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson,Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
7. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Pub., 5<sup>th</sup> edition

### **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	Multivariable Calculus, Transforms & Ordinary differential equations  BPM-154
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-1-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Basic supporting Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	AICTE New Model Curriculum has proposed.	
10.	Relation to other courses:	
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes

h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Department of Mathematics, CBSH

#### CATALOGUE DESCRIPTION

Transform Calculus-1, Transform Calculus-2, Multivariable Calculus (Integration), First order ordinary differential equations, Ordinary differential equations of higher orders.

Syllabus:

Topics
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Transform Calculus-1:Polynomials–Orthogonal Polynomials – Lagrange’s, Chebysev Polynomials; Trigonometric Polynomials; Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Transform method.
Transform Calculus-2: Fourier transforms, Z-transform and Wavelet transforms: properties, methods, inverses and their applications.
Multivariable Calculus (Integration): Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss( without proof) and Stokes( without proof).
First order ordinary differential equations: Exact, linear and Bernoulli’s equations, Euler’s equations, Equations not of first degree: equations solvable for $p$ , equations solvable for $y$ , equations solvable for $x$ and Clairaut’s type.
Ordinary differential equations of higher orders: Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.
Laboratory Topics ---

Text/ References Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
6. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Pub., 5<sup>th</sup> edition

## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Data Structures</b> TCT-201
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department	No No Yes  Yes

AICTE New Model Curriculum has proposed.

g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. P.K.Mishra

#### **CATALOGUE DESCRIPTION :**

Introduction to Algorithmic Complexity, Queues, Trees, Searching and Hashing, File Structures

#### **SYLLABUS:**

<b>Topics</b>
UNIT-I Introduction: Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors. Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes, recursion, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms.
UNIT – II Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues. Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Garbage Collection and Compaction.
UNIT –III Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, path length algorithm. Huffman Algorithm. Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm.
UNIT –IV Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. Sorting: Insertion Sort, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys.
UNIT – V File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons

**Text Books:**

1. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.(2 nd ed).

2. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi, 2nd Edition.



## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Digital Electronics</b> TCT-202
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department	No No Yes  Yes

AICTE New Model Curriculum has proposed.

g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. Jalaj Sharma/ Prof. C. S. Negi

#### CATALOGUE DESCRIPTION

Fundamentals of Digital Systems and logic families, Combinational Digital Circuits, Sequential circuits and systems, A/D and D/A Converters, Semiconductor memories and Programmable logic devices.

Syllabus:

Topics
<b>Fundamentals of Digital Systems and logic families:</b> Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.
<b>Combinational Digital Circuits:</b> Boolean functions and laws of simplification, Standard and canonical representation for logic functions, conversion between forms of functions (SOP, POS), K-map representation, simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Design of combinational circuits, Multiplexer, Demultiplexer/ Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices (HEX to 7 Segment, BCD to 7 Segment), Q-M method of function minimization.
<b>Sequential circuits and systems:</b> Major types of sequential circuits, 1-bit memory, definition and example of monostable, bistable and astable devices, the circuit properties of Bistable latch, the clocked and edge triggered SR flip flop, J- K-T and D types flip flops, applications of flip flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple(Asynchronous) counters, synchronous counters, glitches, special counter IC's, applications of counters, basic synchronous sequential circuits and counters design using flip flops, state reduction and analysis.
<b>A/D and D/A Converters:</b> Digital to analog converters: Binary Weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters, quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs
<b>Semiconductor memories and Programmable logic devices:</b> Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charged coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, Complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

### Laboratory Topics

Study of digital circuits and logic gates  
Study of combinational logic circuits  
Study of sequential logic circuits  
Study of digital to analog (D/A) converters  
Study of analog to digital (A/D) converters  
Study semiconductor memories and PLD's

### Text Books:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.
3. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

### References:

1. Digital Integrated Circuits, English, Paperback, Jan M. Rabaey, Anantha Chandrakasan , Borivoje Nikolic

## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	Probability and Statistics <b>BPM-228</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-1-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Engineering Supporting Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department d) An introductory survey of special area of knowledge e) A further development of course area of knowledge f) An application of department field and area of	No No Yes Yes

AICTE New Model Curriculum has proposed.

knowledge represented by some other department		
g) A summarizing of integrated one?		Yes
h) In your opinion, does this course overlap to a considerable extent with any course?		No
		No
		No
11. What are the urgent reasons why this course should be offered at this present time:		AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)		No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?		No
14. What is the exact place of this course in the development of the educational programme of your department?		B.Tech Computer Engineering
15. Syllabus		Attached
16. Basic text for the proposed course		Attached
17. List of Supplementary readings		Attached
18. Do Classroom, Laboratory and other facilities exist?		Yes
19. Would the introduction of this course require additional staff?		No
20. Prepared by:		Department of Mathematics, CBSH

### Syllabus /Catalogue Description

#### Basic Probability

Probability spaces, conditional probability, independence; Discrete random variables,

Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

### **Continuous Probability Distributions**

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

### **Bivariate Distributions**

Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

### **Basic Statistics**

Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

### **Applied Statistics**

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

### **Small samples**

Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

### **Text / References:**

1. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 2006.
2. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall, 2003.
3. S. Ross, "A First Course in Probability", Pearson Education India, 2002.
4. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, Wiley, 1968.
5. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000.
6. T. Veerarajan, "Engineering Mathematics", Tata McGraw-Hill, New Delhi, 2010.



## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Theory of Computing</b> TCT-203
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Outgrowth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes No Yes Yes  Yes, very act under AICTE New Model Curriculum.
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department d) An introductory survey of special area of knowledge e) A further development of course area of knowledge f) An application of department field and area of	No No Yes  Yes

knowledge represented by some other department	Yes
g) A summarizing of integrated one?	No
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. Bhupesh Kumar Singh

#### **CATALOGUE DESCRIPTION & Syllabus:**

Piano's axioms and model of mathematic, Definability and derivability: concepts of model; universal consequence, Models, Translations and Interpretation:
Computable function; generating computable functions; Church Thesis.

Numbering Computable function, Universal Program, Decidable and Partially decidable Problem.
Recursive and recursively Enumerable sets, Recursive function
Basic logical concepts, Categorical Proposition and Syllogism,
Symbolic logic, Method of Deduction
Quantification Theory, Fallacies,
Curative and corrective discussion

**Text Books/ References:**

1. Davis M.: Computability and Unsolvability. Dover Publications Inc., New York, 1982.
2. Davis M and Weyukar E.: Computability, Complexity and Languages. Academic Press, New York, 1983.
3. Cutland Niegel.: Computability: An Introduction to Recursive Function Theory. CUP, Cambridge, Great Britain, 1980

## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Discrete Mathematics</b> TCT-204
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department	No No Yes  Yes

AICTE New Model Curriculum has proposed.

g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. P.K.Mishra

#### **CATALOGUE DESCRIPTION:**

Sets, Relation and Function, permutation and combination, Propositional Logic, Algebraic Structures and, Graphs and Trees

Syllabus:

Topics
Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.  Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.
Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.
Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.
Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form
Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component

and Articulation Points, Shortest distances.

#### Laboratory Topics

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#### Suggested books :

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
- Susanna S. Epp, Discrete Mathematics with Applications, 4th edition, Wadsworth Publishing Co. Inc.
2. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

#### Suggested reference books:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science”, TMG Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press.
3. Schaum’s Outlines Series, Seymour Lipschutz, Marc Lipson, Discrete Mathematics, Tata McGraw - Hill



## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>File Organization &amp; Processing</b> <b>TCT-206</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	3(2-0-2)
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department	No No Yes  Yes

The new curriculum is proposed by AICTE.

g) A summarizing or integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	To learn the recent developments and enhance the research activities in the concerned area
12. Is this course intended to replace an existing course(s)	Yes
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	This is the core course for B. Tech (Computer Engineering)
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Prof. Chetan Singh Negi/Prof. Jalaj Sharma

#### **Catalogue Description:**

Primary file organization, Sequential file organization, Direct file organization, Indexed sequential file organization, Tree structures, B-trees and derivatives, Hashing techniques for expandable files, file sorting, Applying file structures.

#### **Syllabus:**

<b>Topics</b>
Sequential file organization, binary search, interpolation search, self-organizing sequential search
Direct file organization, Hashing functions, collisions, collision resolutions, coalesced hashing, linear quotient, Brents' method
Binary tree method for collisions resolution, computed chaining, perfect hashing, Indexed sequential file organization
B-trees, B#-trees, B+-trees, Extendible hashing, Dynamic hashing, Linear hashing, file sorting techniques.
<b>Laboratory Topics</b>
Implement the sequential file organization techniques.
Implement self-organizing sequential search
Implement of direct file organization.
Implement Hashing functions.
Implement Indexed sequential file organization.
Implement Extendible hashing, Dynamic hashing, Linear hashing.
Implement file sorting techniques.

**Text Books:**

1. File Organization and Processing, Alan L. Tharp, Wiley student edition.
2. Data Processing & File Structures By E.S. Loomis, PHI.



## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Computer Organization &amp; Architecture</b> TCT-207
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(2-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department	No No Yes  Yes

AICTE New Model Curriculum has proposed.

g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Prof. P.K.Mishra

#### CATALOGUE DESCRIPTION

Functional blocks of a computer, Introduction to x86 architecture.CPU control unit design, Pipelining, Memory organization

Syllabus:

Topics
Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.
Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-andadd, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.
Introduction to x86 architecture.CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU.Memory system design: semiconductor memory technologies, memory organization. Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB
Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.
Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.
Laboratory Topics
Related topics from syllabus

**Suggested books:**

1. “Computer Organization and Design: The Hardware/Software Interface” , 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.

2. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

**Suggested reference books:**

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.



## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Microprocessor</b> TCT-208
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(2-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department	No No Yes  Yes

AICTE New Model Curriculum has proposed.

g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. Jalaj Sharma/ Prof.C. S. Negi

#### CATALOGUE DESCRIPTION

Introduction to microprocessors, building blocks/ digital devices used in microprocessor, memory devices, basic architecture of microprocessors, brief history of microprocessors, Intel 8085 microprocessor introduction, hardware, instruction set & programming, microprocessor systems, timing diagrams, interfacing memory and I/O devices, Introduction to 16 bit Intel 8086 microprocessor.

#### Syllabus:

Topics
--------

**INTRODUCTION:** Introduction to microprocessor, evolution, basic microprocessor architecture, major types of buses in microprocessor, system bus, digital devices used in microprocessors, use of bipolar and MOS devices as switching devices in microprocessors, brief history of microprocessors, memory classification, internal organization of memory including memory register/ Memory location, Basic internal structure and cells of ROM, SRAM, DRAM.

**MICROPROCESSOR HARDWARE :** Introduction to 8085 microprocessor, 8085 pin diagram, 8085 signal block diagram, detailed description of 8085 pins/ signals, internal/ functional block diagram of 8085 microprocessor with detailed description 8085 flags and interrupts.

**MICROPROCESSOR PROGRAMMING:** Basic concept of an instruction, opcode, operand, a program, instruction set, mnemonics and assembly language of a microprocessor, instruction cycle, machine cycle and T-state, programming model of 8085 microprocessor, types of 8085 instructions based on number of bytes, detailed instruction set of 8085, 8085 assembly language programming, basic concept of counters and time delays, stack operations and subroutines.

**MICROPROCESSOR SYSTEMS :** Tristate devices, unidirectional bus buffer, bidirectional bus buffer, memory map, memory read operation and instruction fetch operation in 8085, 8085 machine cycle status and control signals, data flow from memory to microprocessor and instruction decoding & execution in 8085, generating additional control signals for memory and IO devices, timing diagrams.

**MICROPROCESSOR INTERFACING :** Basic concepts in memory interfacing, memory map and address decoding, examples of interfacing 2732 EPROM, 8155 & 8755 memory section, basic concept in I/O device interfacing, block diagram of an I/O interface, interfacing output displays with examples of interfacing 8 LED output device and 7 segment LED display unit(s), interfacing input devices with example of data input from DIP switches, memory mapped I/O interfacing.

**INTRODUCTION TO 16 BIT MICROPROCESSOR INTEL 8086:** Introduction to 8086, 8086 pin diagram, internal architecture of 8086, concept of EU, BIU, instruction queue, pipelining and minimum & maximum mode in 8086, description of common, minimum and maximum mode signals of 8086.

### Laboratory Topics

Study of Microprocessor Systems

Introduction to assembly language programming

Study of 8 bit Microprocessor 8085 kit

Writing program in 8085 assembly language ,

Running assembly programs on 8085 kit and Software simulator,

Study of 16 bit Microprocessor 8086 kit

### Text Books:

1. Microprocessor Architecture, programming and application with 8085 R.S. Gaonkar, Wiley Eastern
2. Microprocessor interface programming and hardware Douglas V. Hall,Tata McGraw Hill publication.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Design &amp; Analysis of Algorithms</b> TCT-209
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of	No No Yes  Yes

AICTE New Model Curriculum has proposed.

knowledge represented by some other department	
g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Dr. Rajeev Singh

#### Syllabus:

Topics
Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion

tree method and Masters' theorem.
Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch- and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving , Bin Packing, Knap Sack TSP. Heuristics – characteristics and their application domains.
Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.
Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.
Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – PSPACE

**Text Books:**

1. "Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.

**Reference Books:**

1. Algorithm Design, 1<sup>ST</sup> Edition, Jon Kleinberg and ÉvaTardos, Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
3. Algorithms—A Creative Approach, 3<sup>RD</sup> Edition, Udi Manber, Addison-Wesley, Reading, MA.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Formal Language &amp; Automata Theory</b> TCT-210
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Outgrowth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	No
		AICTE New Model Curriculum has proposed.
10.	Relation to other courses:	
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	
	f) An application of department field and area of knowledge represented by some other department	Yes
	g) A summarizing of integrated one?	
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by :	Prof. Bhupesh Kumar Singh

#### CATALOGUE DESCRIPTION

##### Syllabus:

Formal System: Definition, Property, application

Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages.

Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata.
Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.
Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG.
Turing machines: The basic model for Turing machines (TM), Turing- recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.
Undecidability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice's theorem, undecidable problems about language

#### **Text Books:**

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.

#### **References:**

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
3. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
4. John Martin, Introduction to Languages and The Theory of Computation, Tata Mc Graw Hill.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Computational Scientific Tool</b> <b>TCT-212</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	2(1-0-2)
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Engineering supporting Course for B. Tech (Comp Engineering)
9.	General educational purpose of the course:	
a)	General Education	Yes
b)	Opportunity for student research	Yes
c)	Departmental specialization	Yes
d)	Out growth of instructor research programme past or present	Yes
e)	Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	The new curriculum is proposed by AICTE.
a)	Pre-requisite	No
b)	Is the course a pre-requisite of any course?	No
c)	An introductory survey of field knowledge represented by the department	Yes
d)	An introductory survey of special area of knowledge	
e)	A further development of course area of knowledge	Yes
f)	An application of department field and area of knowledge represented by some other department	
g)	A summarizing of integrated one?	Yes
h)	In your opinion, does this course overlap to a considerable extent with any course?	No

	No
11. What are the urgent reasons why this course should be offered at this present time:	To learn the recent developments and enhance the research activities in the concerned area
12. Is this course intended to replace an existing course(s)	Yes
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	This is the engineering supporting course for B. Tech (Computer Engineering)
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Prof. Chetan Singh Negi/ Prof. Jalaj Sharma

### Catalogue Description:

Introduction to MATLAB, Tracing a program/algorithm step-by-step, Debugging with breakpoints and print statements, Divide and conquer, Iteration , Functions, Abstraction and Encapsulation, Working with Sound and Images, Reading and Writing files, Recursion.

### Syllabus

Topics
Introduction, Programming basics, Conditionals, Nested conditionals; logical operators, Iteration: for, while, Developing algorithms; nested loops.
User-defined functions, Executing a user-defined function, 2-d Arrays—matrix, More on matrices, characters & strings, Working with Images, Characters and strings.
Intro to cell arrays, Cell arrays, working with numeric/text data (file I/O).
Laboratory Topics
Implement the Matlab basic functions.

Implement the Conditionals, Nested conditionals.

Implement logical operators.

Implement Iteration: for, while.

Implement User-defined functions.

Implement the operations over images.

Implement the file I/O functions.

#### Text Books & References:

1. Insight Through Computing: A Matlab Introduction to Computational Science and Engineering by C. F. Van Loan and K.-Y. D. Fan. SIAM Publication.



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Computer Communication System</b> <b>TCT-306</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	3(2-0-2)
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	The new curriculum is proposed by AICTE.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

	No
11. What are the urgent reasons why this course should be offered at this present time:	To learn the recent developments and enhance the research activities in the concerned area
12. Is this course intended to replace an existing course(s)	Yes
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	This is the core course for B. Tech (Computer Engineering)
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Prof. Chetan Singh Negi/ Prof. Jalaj Sharma

#### Catalogue Description:

Communication concepts, channel, signal characteristics, noise, modulation fundamentals of data communication, data rates, full duplex, synchronous communication, encoding at bit, byte and frame levels, error detection & correction, data communication sub-systems, Multiplexing including statistical multiplexing, telephone system characteristics, modems, introduction to computer networks and application, store and forward, switching ,layered architecture of communication protocols, physical and data link layer protocols, multi channel access.

#### Syllabus

Topics
COMMUNICATION CONCEPTS: Analog and digital transmissions, digital radio, channels and Shannon law, signal characteristics, causes and sources of noise, SNR
MODULATION FUNDAMENTALS OF DATA COMMUNICATION: Amplitude modulation, frequency shift

and phase shift keying, quadrature amplitude modulation, trellis coded modulation, pulse code modulation, delta modulation etc.
DATA RATES: Bps, baud, dabit, tribit etc and multi level modulation.
DIRECTIONAL CHARACTERISTICS: Simplex, half-duplex, full duplex and full duplex modes of communication.
ENCODING: Return-to-zero, non-return to zero, alternate mark inversion, Manchester encoding, decoding etc.
MULTIPLEXING: Frequency-division, time division, statistical time division multiplexing, data concentrators.
ERROR DETECTION AND CORRECTION: Block parity check, Cyclic redundancy check, forward error correction.
<b>Laboratory Topics</b>
Implement the Modulation techniques.
Implement encoding techniques
Implement Multiplexing techniques..
Implement error correction and detection techniques.

## References

1. Data Communication and Networking, Forouzen, Tata McGraw Hill.
2. Computer Networks, Andrew S. Tanenbaum, David J. Wetherall, Pearson



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Programming Languages</b> <b>TCT-301</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(2-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a considerable extent with any course?	No No Yes  Yes  Yes  Yes  No  No

AICTE New Model Curriculum has proposed.

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by	Dr. Rajeev Singh

#### **Catalogue Description:**

Programming languages, Describing syntax and semantics, Lexical and syntax analysis, Names, Binding, Type checking, scope, visibility and lifetime, Function call and return, implementation, recursive functions and activation records, Memory management, Introduction of imperative, functional, object oriented and logic programming.

#### **Syllabus:**

Topics
Programming languages: Preliminaries, history and evolution.
Describing syntax and semantics: Backus – Naur Form (BNF), Extended BNF, syntax diagrams, parse trees, ambiguity, unambiguous grammar.

Lexical and syntax analysis: Lexical analysis, parsing (top-down, bottom-up, recursive-descent, LL and LR).
Names, Binding, Type checking, scope, visibility and lifetime.
Data types, expressions, statements and semantics.
Function call and return, implementation, recursive functions and activation records.
Memory management: Heap, dynamic arrays and garbage collection.
Introduction of imperative, functional, object oriented and logic programming
Properties, syntax and comparative study of selected programming languages:  i. Procedural languages (C language)  ii. Functional languages (Scheme, Haskell)  iii. Object-oriented languages (Java, C++)  iv. Declarative languages (Prolog)  v. Latest languages (Python)
Concurrency and synchronization: Events, threads, message passing and locks.
Exception handling.

**Text Books:**

1. Programming Languages Design & Implementation by Terrance W. Pratt, PHI Pub
2. Programming Languages: Principles and Paradigms by Allen B. Tucker and Robert E. Noonan (TMH Pub)
3. Concept of Programming Language by Sebesta (Addition Wesley Pub.)
4. Programming Language by Ravi Sethi (Addition Wesley Pub.)
5. Fundamentals of Programming Language by E. Horowitz (Galgotia Pub.)



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Software Engineering</b> TCT-302
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>2(2-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Prof. P.K.Mishra

#### CATALOGUE DESCRIPTION

Introduction, Software Requirement Specifications (SRS), Software Design, Coding, Testing & Software Maintenance

Syllabus:

Topics
Introduction: Introduction to Software Engineering, Software Characteristics, Software Crisis, Software Engineering Processes, Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.
Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA), SEI-CMM Model.

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.
Coding, Testing & Software Maintenance: Top-Down and Bottom –Up programming, structured programming, Compliance with Design and Coding Standards. Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Constructive Cost Models (COCOMO)
Laboratory Topics
-

#### **Text Books:**

1. Rajib Mall, Fundamentals of Software Engineering, PHI Publication, 3rd Edition.
2. Pankaj Jalote, Software Engineering, Narosa Publication, 3rd Edition
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers, 3rd Edition.

#### **Reference Books:**

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill, 6th Edition.
2. Ian Sommerville, Software Engineering, Addison Wesley, 8th Edition.
3. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication



## PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Database Management Systems</b> TCT-303
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No

	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Dr. Rajeev Singh

#### CATALOGUE DESCRIPTION

Database system architecture, Data models , Relational query languages, Relational data base design, Query processing and optimization, Transaction processing, Database Security, Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.

#### Syllabus:

Topics
Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL),Data Manipulation Language (DML).
Data models: Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations.
Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.

Relational data base design : Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.
Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.
Storage strategies: Indices, B-trees, hashing.
Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.
Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.
Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.

**Text Books:**

1. "Database System Concepts" , 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.

**Reference Books:**

1. "Principles of Database and Knowledge – Base Systems" , Vol 1 by J. D. Ullman, Computer Science Press.
2. "Fundamentals of Database Systems" , 5th Edition by R. Elmasri and S. Navathe, Pearson Education
3. "Foundations of Databases" , Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>System Programming</b> TCT-304
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(2-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a considerable extent with any course?	No No Yes  Yes  Yes  Yes  No  No

AICTE New Model Curriculum has proposed.

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof. B.K.Singh

#### CATALOGUE DESCRIPTION

Introduction, system software -definition, components of system software, evaluation of system software, introduction to software processors, assembly language & machine language- 8086 languages- a review, Assemblers, Macros, Macroprocessors, Introduction to compilers, loaders & linkage Editors, introduction to operating system, virtual memory concept.

#### Syllabus:

Topics
INTRODUCTION: System software definition, components of system software, evaluation of system software, model of computer system.
INTRODUCTION TO SOFTWARE PROCESSOR: Translators & software processors.

ASSEMBLY LANGUAGE & MACHINE LANGUAGE: A review of IBM 360/370 assembly language and 8086 assembly language.
ASSEMBLERS: Overview of Assembly process. Designs of Two pass assemblers. Single pass assemblers for IBM PC, Macros & Macro processor, Table management, Sorting.
COMPILERS, LOADERS & LINKAGE EDITORS: An Introduction to Compilers, Loaders and Linkage Editors, Loader Schemes - Compile & Go loaders, General loader schemes, Absolute loaders, Relocating loaders, Direct linking loaders, Other loader schemes. Binders, linking loaders, overlays. Dynamic binders, design of absolute loader, design of direct linking loader, Sub routine linkages.
OPERATING SYSTEM: Introduction, Batch processing, Multi programming, time sharing system and design concepts of Operating system.
Laboratory Topics
Related practical aspects from Syllabus

Text Books and References:

- 1. System Programming by John J Donovan McGraw Hill Int
- 2. System Programming & operating system by DM Dhamdhere Tata McGraw Hill
- 3. System Programming by Beck(Wiley)

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Operating Systems</b> TCT-307
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department d) An introductory survey of special area of	No No Yes

AICTE New Model Curriculum has proposed.

knowledge

e) A further development of course area of knowledge	Yes
f) An application of department field and area of knowledge represented by some other department	
g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S.D. Samantaray

**CATALOGUE DESCRIPTION:**

Historical perspectives, Batch processing, Time sharing components of an operating system. Review of device drivers, Basic system calls interrupt mechanism, concurrent processes, mutual exclusion, Synchronization; Process management, Handling deadlocks, Processor scheduling, switching, synchronizing. Memory Management, swapping, segmentation, paging, virtual memory, page replacement and space allocation policies, segmented paging, dynamic linking. Catching of

secondary storage information, I/O scheduling policies, Terminal I/O handling. Data Management, directory structure, Basic file systems, gaining access to files, case studies.

Syllabus:

Topics
Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.
Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching, Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads, Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.
Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc.
Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.
Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition– Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).
I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms. File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods

(contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance. Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

#### Laboratory Topics

Practical aspects from Module1 to Module6

#### Text books:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

#### References:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Compiler Design</b> <b>TCT-308</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof. B.K. Singh

#### CATALOGUE DESCRIPTION

Lexical analyzer, design of assemblers, two pass assembler location counter, symbol definition, symbol table, manipulation, expression parser expression evaluation machine code generation bootstrapping, absolute loader, relocation, relocating loader, linker, link editor, dynamic loader, dynamic linker debugger segments, multiple location counters, macros-macro pre-processor, macro assembler, introduction to compilation, recursive descent parsers, code generation for assignment Statements, expression, conditional statements etc.

#### Syllabus:

Topics
INTRODUCTION: Translators & compiler, cousin of compilers, boot strapping, compiler writing tools, phases of compilers.
LEXICAL ANALYZER: The role of lexical analyzer regular expression finite automata, implementation of Lexical analyzer from DFA, scanning & token generation; Buffer management of Lexical analyzer, various desired features of lexical analyzer.

**PARSING:** Syntactic specification of programming languages, context free grammar, capabilities of context free grammar, Basic Parsing technique- shift reduce, operator Precedence top down, predictive passing, LR parsing.

**ASSEMBLER:** Design of Assembler-statement of problem, data structure format of databases Algorithm, look for modularity. Loaders-design of absolute loader-statement of problem, data structure format of databases, Algorithm. Macros-features of macro facility, macro instruction argument, conditional macro expansion. Implementation-two pass algorithm, single pass algorithm, Implementation within an assembler.

**SYMBOL TABLE:** Symbol, contents of symbol table data structure representation of scope information, implementation, simple list self-organizing list, hash table run time storage administration - case of FORTRAN, ALGOL

**CODE GENERATION & OPTIMIZATION:** Syntax directed translation, Intermediate code- Quadruple, Triple, Translation of statements assignment, Boolean Expression & arithmetic expression. Principle services of optimization, loop optimization, loop invariant computation, Induction value elimination. Problems in code generation, machine model, a simple code generator.

**Laboratory Topics**

Related practical topics from syllabus

Text Books and References:

1. Compilers Design Aho, Ullmann, Sethi, Addison Wesley Pub.
2. Compiler Construction DM Dhamdhere TMH Pub.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Computer Networks</b> TCT-316
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4(3-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a	No No Yes  Yes  Yes

AICTE New Model Curriculum has proposed.

considerable extent with any course?

No

No

No

11. What are the urgent reasons why this course should be offered at this present time? AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s) No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department? No
14. What is the exact place of this course in the development of the educational programme of your department? B.Tech Computer Engineering
15. Syllabus Attached
16. Basic text for the proposed course Attached
17. List of Supplementary readings Attached
18. Do Classroom, Laboratory and other facilities exist? Yes
19. Would the introduction of this course require additional staff? No
20. Prepared by Dr. Rajeev Singh

#### CATALOGUE DESCRIPTION

Data communication Components, Data Link Layer and Medium Access Sub Layer, Network Layer, Transport Layer, Application Layer.

#### Syllabus:

Topics
Data communication Components: Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA
Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.
Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.
Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography
Laboratory Topics
Related practical aspects from syllabus

**Text Books:**

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw- Hill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.

**Reference Books:**

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Computer &amp; Society</b> <b>TCT-309</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>2(2-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a considerable extent with any course?	No No Yes  Yes  Yes  Yes  No  No

AICTE New Model Curriculum has proposed.

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by	Dr. Rajeev Singh

#### CATALOGUE DESCRIPTION

Introduction, Threats & Ethics, Security, Public Key Infrastructure, Intellectual property and copyright issues, Cyber Laws and IT ACT, Current Issues

#### Syllabus:

Topics
Introduction: Overview and Introduction of Computer and Society, history, design and governance of the Internet, social impacts of computing technology, ICT for sustainable development, ICT productivity and cost benefit analyses, penetration & interaction of computers with other technological branches.
Threats & Ethics: Types of attacks and threats, Computer ethics in society and related issues like privacy, sharing, hacking, identity theft, Denial of Service, Botnet, spam, phishing, and spyware etc.
Security: Introduction of public & private cryptography, authentication & access control, Traditional Ciphers, modern security ciphers like 3DES, AES etc.
Public Key Infrastructure: Diffie Hellman Key exchange, RSA, concept of digital signatures and digital

certificates, application and use of digital signatures.
Intellectual property and copyright issues: About Intellectual property, Infringement, misappropriation and enforcement, Meaning of copyright, Trademark, Right of Publicity, Trade Secrets, Right of Privacy, Patents, Design rights.
Cyber Laws and IT ACT
Current Issues: Current issues like electronic voting, digital content distribution, environmental hazards, side effects on health, social networking etc.

**Text Books:**

1. Cryptography and Network Security (5th edition) Book by William Stallings
2. Cryptography and Network Security (4th edition) Book by Behrouz A Forouzan
3. Cyber Laws, IT ACT 2000 and 2008 Govt. of India

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Seminar</b>  TCT390
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(0-0-6)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof.S.D. Samantaray

#### CATALOGUE DESCRIPTION

Project work seminar

Syllabus: -As per the area of interest.

Text Books and References:

Concerned Research Journal and papers

#### PROPOSAL FOR A NEW COURSE

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Practical Training-I</b> <b>TCT191</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>2 weeks</b>
7.	Is this a new course	Yes

8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
a)	General Education	Yes
b)	Opportunity for student research	Yes
c)	Departmental specialization	Yes
d)	Out growth of instructor research programme past or present	Yes
e)	Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
		AICTE New Model Curriculum has proposed.
10.	Relation to other courses:	
a)	Pre-requisite	No
b)	Is the course a pre-requisite of any course?	No
c)	An introductory survey of field knowledge represented by the department	Yes
d)	An introductory survey of special area of knowledge	
e)	A further development of course area of knowledge	Yes
f)	An application of department field and area of knowledge represented by some other department	
g)	A summarizing of integrated one?	Yes
h)	In your opinion, does this course overlap to a considerable extent with any course?	No
		No
		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached

18. Do Classroom, Laboratory and other facilities exist? Yes
19. Would the introduction of this course require additional staff? No
20. Prepared by: Prof.S.D. Samantaray

CATALOGUE DESCRIPTION

As per the concerned Industry/Organization/Institute

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Practical Training-II</b> <b>TCT291</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>2 weeks</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof.S.D. Samantaray

#### CATALOGUE DESCRIPTION

As per the concerned Industry/Organization/Institute

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Practical Training-III</b> <b>TCT391</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>4 weeks</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof.S.D. Samantaray

#### CATALOGUE DESCRIPTION

As per the concerned Industry/Organization/Institute

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Machine Learning</b> <b>TCT-401</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(2-0-2)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof. B.K. Singh

#### CATALOGUE DESCRIPTION

Introduction to learning theory, Learning Models, Machine Learning Paradigms, Applications of machine learning.

#### Syllabus:

Topics
Introduction to learning theory: Statistical pattern recognition, Regularization, supervised learning, unsupervised learning, learning theory, reinforcement learning and adaptive control. Linear regression; SSE; gradient descent; closed form; normal equations; features.
Learning Models: Overfitting and complexity, training, validation, test data, Classification problems; decision boundaries; nearest neighbor methods, probability and classification, Bayes optimal decisions, Naive Bayes and Gaussian class-conditional distribution, Linear classifiers, Bayes' Rule and Naive Bayes Model, Logistic regression, online gradient descent

Machine Learning Paradigms: Neural Networks, Decision tree, PCA, naive Bayes and multinomial models clustering and latent space models, VC-dimension, structural risk minimization; margin methods and support vector machines (SVM), Ensemble Learning

Applications of machine learning.

Laboratory Topics

Related practical aspects from syllabus

Text Books and References:

1. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
2. Christopher Bishop. Pattern Recognition and Machine Learning. 2e.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Project-I</b> <b>TCT-495A</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>6(0-0-12)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department d) An introductory survey of special area of	No No Yes

AICTE New Model Curriculum has proposed.

knowledge

e) A further development of course area of knowledge	Yes
f) An application of department field and area of knowledge represented by some other department	
g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S.D. Samantaray

CATALOGUE DESCRIPTION

Project work

Syllabus: -

As per the area of interest.

Text Books and References:

Concerned Research Journal and papers.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Project-II</b> <b>TCT-495B</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>6(0-0-12)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge e) A further development of course area of knowledge	No No Yes

AICTE New Model Curriculum has proposed.

f) An application of department field and area of knowledge represented by some other department	Yes
g) A summarizing of integrated one?	
h) In your opinion, does this course overlap to a considerable extent with any course?	Yes
	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S. D. Samantaray

#### CATALOGUE DESCRIPTION

Project work

Syllabus: -

As per the area of interest.

**Text Books and References:**

Concerned Research Journal and papers

## PROPOSAL FOR A NEW COURSE

- |    |  |  |
|----|--|--|
| 1. | Department                                       | Computer Engineering Department                              |
| 2. | College  | Technology   |
| 3. | (a) Title of the course<br>(b) No. of the Course | <b>Parallel and Distributed Algorithms</b><br><b>TCT-411</b> |
| 4. | Catalogue Description                            | Attached   |
| 5. | To be offered                                    | Once in a year   |
| 6. | Credits  | <b>3(3-0-0)</b>  |
| 7. | Is this a new course                             | Yes  |

8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
a)	General Education	Yes
b)	Opportunity for student research	Yes
c)	Departmental specialization	Yes
d)	Out growth of instructor research programme past or present	Yes
e)	Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
		AICTE New Model Curriculum has proposed.
10.	Relation to other courses:	
a)	Pre-requisite	No
b)	Is the course a pre-requisite of any course?	No
c)	An introductory survey of field knowledge represented by the department	Yes
d)	An introductory survey of special area of knowledge	
e)	A further development of course area of knowledge	Yes
f)	An application of department field and area of knowledge represented by some other department	
g)	A summarizing of integrated one?	Yes
h)	In your opinion, does this course overlap to a considerable extent with any course?	No
		No
		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached

18. Do Classroom, Laboratory and other facilities exist? Yes
19. Would the introduction of this course require additional staff? No
20. Prepared by Prof. P.K.Mishra

### CATALOGUE DESCRIPTION

Introduction to parallel and distributed algos, Sequential model, parallel computational models, Performance Measures of Parallel Algorithms, Parallel Sorting Networks, Graph Algorithms

Syllabus:

Topics
Sequential model, need of alternative model, parallel computational models:PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one.
Performance Measures of Parallel Algorithms: speed-up and efficiency of PA, Cost- optimality, An example of illustrate Costoptimal algorithms- such as summation, Min/Max on various models.
Parallel Sorting Networks: Merging Algorithms onCREW/EREW/MCC, Parallel Sorting Networks/EREW/MCC/, linear array.
Parallel Searching Algorithm: Kth element, Kth element in X+Y on 8 PRAM, Parallel Matrix Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.
Graph Algorithms : Connected Graphs, search and traversal, Combinatorial Algorithms-Permutation, Combinations, Derrangements.
<b>Laboratory Topics</b>
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### Textbooks:

1. M.J. Quinn, "Designing Efficient Algorithms for Parallel Computer", McGrawHill.
2. S.G. Akl, "Design and Analysis of Parallel Algorithms".



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Computational Complexity</b> <b>TCT-412</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	3(3-0-0)
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	The new curriculum is proposed by AICTE.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	To learn the recent developments and enhance the research activities in the concerned area
12.	Is this course intended to replace an existing course(s)	Yes
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	This is the elective course for B. Tech (Computer Engineering)
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by	Prof. Chetan Singh Negi

#### Catalogue Description:

Computational Models, Problems, computability, Algorithms, Resources, Complexity, Complexity classes, Reduction and completeness, Randomized computation, Parallel Computation, Logarithmic and Polynomial space.

#### Syllabus

Topics
Computational Models (machine models, logic); Problems, computability, Algorithms, Resources, and Complexity; Turing machines (time and space bounds, nondeterminism).
Logic (Boolean logic, circuits, first and second order logic); Complexity classes (hierarchy theorem, reachability, P, NP, Co-NP).
Reduction and completeness; Randomized computation; Approximability; Cryptography and protocols.
Parallel Computation; Polynomial Hierarchy; Logarithmic space; Polynomial space; Exponential time and space.

Laboratory Topics
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## References

1. Christos H. Papadimitriou, Computational Complexity, Addison-Wesley Longman.
2. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
3. John E. Hopcroft and Jeffrey D. Ullman, Introduction to Automata, Languages and Computation, Addison-Wesley, 1979.
4. J. Balcazar, J. Diaz, and J. Gabarro, Structural Complexity, Volumes I and II, Springer.



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Information Theory and Coding</b> <b>TCT-415</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof. Jalaj Sharma/ Prof. C. S. Negi

#### CATALOGUE DESCRIPTION

Information Theory, Text, Audio and Speech Source Coding, Image and Video Source Coding, Block Codes ECC, Convolutional codes ECC

Syllabus:

Topics
Information Theory: Information – Entropy, Information rate, classification of codes, Kraft McMillan inequality, Source coding theorem, Shannon-Fano coding, Huffman coding, Extended Huffman coding - Joint and conditional entropies, Mutual information - Discrete memory less channels – BSC (Binary Symmetric Channel), BEC (Binary Erasure Channel) – Channel capacity, Shannon limit.
Text, Audio and Speech Source Coding: Text: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm, Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I, II, III, Dolby AC3, Dolby Digital, Speech – Channel Vocoder, Linear Predictive Coding
Image and Video Source Coding: Image and Video Formats – GIF, TIFF, SIF, CIF, QCIF, Image compression – READ, JPEG, Video Compression – Principles-I,B,P frames, Motion estimation, Motion

compensation, H.261, MPEG standard.
Block Codes ECC: Definitions and Principles – Hamming weight, Hamming distance, Minimum distance decoding – Single parity codes, Hamming codes, Repetition codes – Linear block codes, Cyclic codes – Syndrome calculation, Encoder and decoder – CRC
Convolutional codes ECC: Convolutional codes – code tree, trellis, state diagram, Encoding – Decoding – Sequential search and Viterbi algorithm, Principle of Turbo coding.
Laboratory Topics
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Text Books:

1. R Bose, “Information Theory, Coding and Cryptography”, TMH 2007
2. Fred Halsall, “Multimedia Communications: Applications, Networks, Protocols and Standards”, Perason Education Asia, 2002

References:

1. K Sayood, “Introduction to Data Compression” 3/e, Elsevier 2006
2. S Gravano, “Introduction to Error Control Codes”, Oxford University Press 2007
3. Amitabha Bhattacharya, “Digital Communication”, TMH 2006

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Quantum Computing</b> <b>TCT-416</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department	No No Yes  Yes

AICTE New Model Curriculum has proposed.

g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. Jalaj Sharma/ Prof. C.S.Negi

#### CATALOGUE DESCRIPTION

Introduction to Quantum Computation, Background Mathematics and Physics, Quantum Circuits, Quantum Information and Cryptography, Quantum Algorithms, Noise and error correction.

Syllabus:

Topics
Introduction to Quantum Computation: Quantum bits, Bloch sphere representation of a qubit, multiple qubits.

Background Mathematics and Physics: Hilber space, Probabilities and measurements, entanglement, density operators and correlation, basics of quantum mechanics, Measurements in bases other than computational basis.
Quantum Circuits: single qubit gates, multiple qubit gates, design of quantum circuits.
Quantum Information and Cryptography: Comparison between classical and quantum information theory. Bell states. Quantum teleportation. Quantum Cryptography, no cloning theorem.
Quantum Algorithms: Classical computation on quantum computers. Relationship between quantum and classical complexity classes. Deutsch's algorithm, Deutsch-Jozsa algorithm, Shor factorization, Grover search.
Noise and error correction: Graph states and codes, Quantum error correction, fault-tolerant computation.
Laboratory Topics
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Text Books:

1. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge University Press.
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol. I: Basic Concepts, Vol II: Basic Tools and Special Topics, World Scientific
3. Pittenger A. O., An Introduction to Quantum Computing Algorithms

References:

1. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol. I: Basic Concepts, Vol II: Basic Tools and Special Topics, World Scientific



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Object Oriented Programming</b> <b>TCT-417</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	The new curriculum is proposed by AICTE.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	To learn the recent developments and enhance the research activities in the concerned area
12.	Is this course intended to replace an existing course(s)	Yes
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	This is the elective course for B. Tech (Computer Engineering)
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by	Prof. Jalaj Sharma/ Prof. C. S. Negi

#### Catalogue Description:

Fundamental concepts of object oriented programming, Object design implementation, Object oriented analysis, modeling and design, Structural modeling, Behavioral/Functional modeling, Dynamic modeling, Distributed object model, and Object oriented database systems.

#### Syllabus

Topics
Fundamental concepts of object oriented programming: Introduction to the principles of object-oriented programming (classes, objects, messages, encapsulation, inheritance, polymorphism, exception handling, and object-oriented containers).
Object design implementation in a programming language, e.g., C++ or Java.
Object oriented analysis, modeling and design: UML may be introduced. Use cases, use case driven analysis.
Structural modeling classes, relationships, interfaces, class diagrams, and object diagrams, in UML.
Behavioral/Functional modeling use case diagrams, sequence diagrams, in UML.

Dynamic modeling: State charts.
Architectural modeling, Analysis patterns, and Design patterns.
Distributed object model: CORBA and COM / DCOM.
Object oriented database systems: Object oriented data model, query languages, storage organization and indexing techniques; object relational databases.
Laboratory Topics
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### **Text Books & References:**

1. Bertrand Meyer, Object Oriented Software Construction, Prentice-Hall.
2. Grady Booch, Object Oriented Analysis and Design, Addison-Wesley.
3. Grady Booch, James Rumbaugh and Ivar Jacobson, Unified Modeling Language Guide, Addison-Wesley.
4. Rumbaugh James Michael blahawillium permerlani, Fredrick, eddy and Willium Lorensen, "Object Oriented modeling and Design" PHI.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Advanced Computer Architecture</b> <b>TCT-422</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by :	Prof. P.K.Mishra

#### CATALOGUE DESCRIPTION

Fundamentals of Computer Design, Instruction-Level Parallelism and Its Exploitation, Limits on Instruction-Level Parallelism, Multiprocessors and Thread-Level Parallelism, Memory-Hierarchy Design, Interconnection Networks, Pipelining: Basic and Intermediate Concepts

#### Syllabus:

Topics
Fundamentals of Computer Design
Instruction-Level Parallelism and Its Exploitation
Limits on Instruction-Level Parallelism
Multiprocessors and Thread-Level Parallelism

Memory-Hierarchy Design
Interconnection Networks
Pipelining: Basic and Intermediate Concepts
Laboratory Topics
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**Text Books & References:**

1. Advance Computer Architecture by Kai Hwang



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	a. Title of the course b. No. of the Course	<b>Distributed Systems</b> <b>TCT-423</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  i. General Education i. Opportunity for student research i. Departmental specialization /. Out growth of instructor research programme past or present . Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge  represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one?	No No Yes  Yes No No

AICTE New Model Curriculum has proposed.

h) In your opinion, does this course overlap to a considerable extent with any course?	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S.D Samantaray

#### **CATALOGUE DESCRIPTION:**

Motivation, Topology, Communication, System Type, File system, Modes of Computation, Event Ordering, Synchronization, Deadlock Handling, Robustness, Reaching Agreement Election Algorithms etc.

#### **Syllabus:**

Topics
THE TREND TO DISTRIBUTED PROCESSING: Meaning of distributed processing/computing, Local Vs remote distribution, Distributed data and categories of data distribution. Centralization Vs de centralization.
TYPES OF DISTRIBUTED SYSTEMS: Horizontal Vs vertical distribution, Function distribution Vs. system distribution, Hierarchical distributed processing, Non cooperative system, cooperating systems
PRIVATE NETWORKS, PUBLIC NETWORKS AND INTRODUCTION TO DISTRIBUTED ALGORITHMS: Parallelism and

distribution, Basic Elements; Processes, Communication paths, Features of distributed algorithms, Classifying distributed algorithms
ELECTION AND MUTUAL EXCLUSION ALGORITHMS: Ricart and Agrawala/Suzuki Kasami Algorithms, Messages and time stamping, Algorithm for regenerating the token, Various Elective Algorithms
ALGORITHMS FOR DETECTION AND RESOLUTION OF DEADLOCK: Problem of deadlock, Characterization of deadlock situation, Distribution of a centralized algorithm: Lomet's algorithms, The Rosenkrantz, Stearns and Lewis Algor., Algorithms for detection deadlocks, Deadlocks due to communications : algorithm of chandy, Misra and Haas
ALGORITHMS FOR DETECTING TERMINATION: Problem of termination, Termination and Deadlock, Use of diffusing computation:, algorithm of dikstra and scholtein, Termination on a ring : algorithm of Dijkstra, feijen and van Gasteren, Use of time stamping-Rana's Algorithm
PROTOCOLS FOR DATA TRANSFER: Introduction, Protocols for the implementations of CSP : Silberschatz's protocol Bernstein's protocol, Methods of or scribble broadcasting of Messages: The problem, context of the problem
MANAGEMENT OF DISTRIBUTED DATA: Nature and Distribution of data Consistency of duplicated data, Detection of mutual in consistency : algorithm of Parker et.al., Maintaining mutual consistency, Initializing a new site, Distribution of control algorithms, Construction of a total ordering, Distributed tonicity.
PROBLEMS OF GAINING CONSENSUS IN THE PRESENCE OF UNCERTAINTIES (OR HOW TO AVOID BYZANTINE QUARRELS): The problem of consensus, The lamport, shostak, and Pease alga., Solutions using signed messages, Broad casting in a less connected system, The babaoglu and Drummed algor.
Laboratory Topics
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### **Text Books:**

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Embedded Systems</b> <b>TCT-424</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge e) A further development of course area of knowledge f) An application of department field and area of	No No Yes  Yes

AICTE New Model Curriculum has proposed.

knowledge represented by some other department

g) A summarizing of integrated one?	Yes
h) In your opinion, does this course overlap to a considerable extent with any course?	No
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. In this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. Jalaj Sharma/ Prof. C.S. Negi

#### CATALOGUE DESCRIPTION

Introduction to Embedded Systems, Memory and Input Management, Embedded Systems Processes, Operating Systems for Embedded Systems, Embedded System Hardware, Embedded System Software.

#### Syllabus:

Topics
Introduction: Introduction to Embedded Systems, Challenges of Embedded Systems, Embedded system

design process, Embedded System processors & Micro controllers, ARM, PIC architecture
Memory and Input Management: Common memory types, Memory hierarchy, Cache Memory, Memory system mechanisms, Memory and I/O devices and interfacing, Interrupts handling.
Embedded Systems Processes: Multiple tasks and processes, Context switching, Scheduling policies, Inter process communication mechanisms, Performance issues.
Operating Systems for Embedded Systems: Introduction to operating systems for embedded systems with examples, Real Time Operating Systems - Introduction to RTOS, Process management & memory management in RTOS along with Real time scheduling.
Embedded System Hardware: Introduction to hardware devices/ development boards used as embedded system hardware, Introduction and examples of embedded systems hardware boards Arduino Uno, Raspberry Pi, 8051 or similar boards.
Embedded System Software: Programming embedded systems in assembly and C, Meeting real time constraints, Arduino Uno based systems programming, Embedded C Programming, Introduction to Arduino Uno, Raspberry Pi, 8051 or similar hardware based systems programming
Laboratory Topics
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Text Books:

1. Computers as Components: Principles of Embedded Computing System Design, Wayne Wolf, 2<sup>nd</sup> Edition, Morgan Kaufmann Publishers
2. Embedded System Design: A Unified Hardware Software Approach, Frank Vahid and Tony Givargis
3. Michael J. Pont, "Embedded C", Pearson Education , 2007

References:

1. Peter Marwedel, Embedded System Design, Kluwer Pub. 2004



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	a. Title of the course b. No. of the Course	<b>Fault Tolerant Computing</b> <b>TCT-425</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  i. General Education i. Opportunity for student research i. Departmental specialization i. Out growth of instructor research programme past or present i. Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a considerable extent with any course?	No No Yes  Yes  Yes  Yes  No  No

AICTE New Model Curriculum has proposed.

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof. S.D Samantaray

#### CATALOGUE DESCRIPTION

Introduction, fault diagnosis of digital systems, The use of error-correcting codes in fault-tolerant computer-design, Reliability modeling and analysis of Ultra-reliable fault-tolerant computers.

#### Syllabus:

Topics
Introduction to Fault Tolerant Computing, Fault diagnosis of digital system; Problems and concepts of Design For testability (DFT).
Fault modeling and Fault-simulation to evaluate the fault coverage of test vectors Redundancy Techniques/nor line like Structural Time Information and Software Redundancy.
Principles & practice of fault tolerance in software and distributed systems. System model- Error, Failure, faults Software Fault Tolerance Byzantine Agreement Fail Stop Processors Stable storage.
Reliable and Atomic broadcasting Process Resiliency, Data Resiliency & Recovery commit protocols

Reliability Modeling & Performance Evaluation Crash recovery in data bases Voting methods.

Laboratory Topics

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**Text Books & References:**

1. Fault Tolerant computing by Pankaj Jalote Kluwer PBI
2. Fault Tolerant Computing Theory & Technique D.K. Prahan (Editor)  
Prentice Hall,
3. Design and Analy. of Fault Tolerant Digital Sys. N.J. 1986 Barry  
Johnson Addison
4. Fault Tolerance in Distributed sys., Wesley 1989 P. Jalote, Prentice Hall  
Ivc. 1994.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	a. Title of the course b. No. of the Course	<b>Real Time System</b> <b>TCT-426</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes

10. Relation to other courses:	
a) Pre-requisite	No
b) Is the course a pre-requisite of any course?	No
c) An introductory survey of field knowledge represented by the department	Yes
d) An introductory survey of special area of knowledge	Yes
h) A further development of course area of knowledge	
i) An application of department field and area of knowledge represented by some other department	Yes
j) A summarizing of integrated one?	No
h) In your opinion, does this course overlap to a considerable extent with any course?	
	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S.D Samantaray

**CATALOGUE DESCRIPTION**

Introduction, Nature of real-time operations, Difficulties encountered in real time systems, applications, Timesharing and Multiple-user systems.

Syllabus:

Topics
Characteristics of a Real time system, Producing timely output, Keeping a record of the past, Handling concurrent input processing, Competing and cooperating processes, Coping with failures, Providing a reliable service.
Defining the special requirements of a real time system, Defining the system outputs, Defining the system inputs.
Problems of real time processing & their solution, The situation so far Single process system Multi process system Speed and how it is achieved, Producing a resilient system.
Producing a reliable system, Keeping historical record Operating system support. Real time operating system (RTOS), Languages for real time systems(CORAL, RTL/2, Ada), Real Time software Development techniques.
Laboratory Topics
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**REFERENCE BOOKS**

1. Real Time System C.M. Krishna (McGraw Hill Pub.)
2. Real Time System Leri & Agarwal (McGraw Hill Pub.)
3. Real Time System : Specification, Validation & Analysis Mathi Joseph (PHI Pub.)

## PROPOSAL FOR A NEW COURSE

- |    |  |   |
|----|--|---|
| 1. | Department                                       | Computer Engineering Department                     |
| 2. | College  | Technology  |
| 3. | (a) Title of the course<br>(b) No. of the Course | <b>Ad hoc and Sensor Networks</b><br><b>TCT-427</b> |
| 4. | Catalogue Description                            | Attached  |
| 5. | To be offered                                    | Once in a year                                      |
| 6. | Credits  | <b>3(3-0-0)</b>                                     |

7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
a)	General Education	Yes
b)	Opportunity for student research	Yes
c)	Departmental specialization	Yes
d)	Out growth of instructor research programme past or present	Yes
e)	Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
		AICTE New Model Curriculum has proposed.
10.	Relation to other courses:	
a)	Pre-requisite	No
b)	Is the course a pre-requisite of any course?	No
c)	An introductory survey of field knowledge represented by the department	Yes
d)	An introductory survey of special area of knowledge	
e)	A further development of course area of knowledge	Yes
f)	An application of department field and area of knowledge represented by some other department	
g)	A summarizing of integrated one?	Yes
h)	In your opinion, does this course overlap to a considerable extent with any course?	No
		No
		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached

17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Dr. Rajeev Singh

## CATALOGUE DESCRIPTION

Introduction to Ad Hoc Wireless Networks, Routing in MANETs, MANET communication, Basics of Wireless Sensors and Applications, WSN Technology, WSN Routing.

### Syllabus:

Topics
Introduction to Ad Hoc Wireless Networks: Characteristics of MANETs, Applications of MANETs, Challenges, Self-organizing behavior, Co-operation, Energy Management in Ad Hoc Wireless Networks, QoS in MANETs.
Routing in MANETs: MAC layer protocols, Routing in MANETs, Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Multicast routing, Other Routing Protocols.
MANET communication: Mobility model, Transport layer, Data Transmission in MANETs, Opportunistic Mobile Networks.
MANET Security: Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.
Basics of Wireless Sensors and Applications: Sensing and Communication Range, Structure of sensor nodes, The Mica Mote, Design Issues, Energy consumption, Clustering of Sensors, Applications, WSN Security, Types of WSN: Mobile Sensor Networks, Underwater WSN etc.
WSN Technology: TinyOS, Technologies for WSNs-ZigBee technology, Ultrawide bandwidth technology, Bluetooth technology, Comparison among technologies.
WSN Routing: Classification of WSNs, MAC layer, High-level application layer support, Coverage, Topology management, Congestion control, Routing protocols.

### Text Books:

1. C S. Ram Murthy, B. S. Manoj (2005), "Ad Hoc Wireless Networks: Architectures and Protocols", Second Edition, Prentice Hall of India.

2. R. Hekmat (2006), "Ad hoc Networks: Fundamental Properties and Network Topologies", First Edition, Springer.
3. B. Tavli and W. Heinzelman (2006), "Mobile Ad Hoc Networks: Energy Efficient Real Time Data Communications", First Edition, Springer.
4. G. Anastasi, E. Ancillotti, R. Bernasconi, and E. S. Biagioli (2008) "Multi Hop Ad Hoc Networks from Theory to Reality", Nova Science Publishers.

### **Reference Books:**

1. 'Wireless Sensor Networks – Principles and Practice. Pei I-Iu. Xiaojun Cao. CRC Press. Taylor & Francis Group, 2010
2. Ad Hoc and Sensor Networks – Theory and Applications. Carlos Corderio Dharma P. Aggarwal. World Scientific Publications/ Cambridge University Press, March 2006
3. Wireless Sensor Networks: An Information Processing Approach. Feng Ziao. Leonidas Guibas. Elsevier Science imprint, Morgan Kauffman Publishers.
4. Wireless Ad hoc Mobile Wireless Networks – Principles. Protocols and Applications. Subir Kurnar Sarkar. et al., Auerbach Publications. Taylor & Francis Group, 2008.

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Internet of Things</b> <b>TCT-428</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a considerable extent with any course?	No No Yes  Yes  Yes  Yes  No  No

AICTE New Model Curriculum has proposed.

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by	Dr. Rajeev Singh

#### CATALOGUE DESCRIPTION

Introduction to IoT, Elements of IoT, Communication and Connectivity Technologies, Concerns and Future Trends, Programming for IoT.

#### Syllabus:

Topics
Introduction to IoT: Basics of IoT, Evolution of IoT, IoT and related terms, Business Scope, MANETs and their relation to IoT
Elements of IoT: Basic Architecture of an IoT Application Sensors & Actuators, Edge Networking (WSN), Gateways, IoT Communication Model, WPAN, LPWA, 6LoWPAN, ZigBee.
Communication and Connectivity Technologies: Big Data Analytics, Data Visualization, IoT Platforms
Concerns and Future Trends: Different Players of IoT, Security Concerns and Challenges, Future Trends, Standards
Programming for IoT: The Arduino Platform and C Programming The Raspberry Pi Platform and Python

**Text Books:**

1. Phuong Vo.T.H, Martin Czygan, Getting Started with Python Data Analysis, PACKT Publishing
2. Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, O'Reilly Media
3. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
4. Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
5. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann
6. Internet of Things with Python, Gaston C. Hillar, Packt Open Source



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	a. Title of the course b. No. of the Course	<b>Artificial Intelligence</b> <b>TCT-432</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	
	f) An application of department field and area of knowledge represented by some other department	Yes
	g) A summarizing of integrated one?	No
	h) In your opinion, does this course overlap to a	No

considerable extent with any course?	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S.D Samantaray

#### CATALOGUE DESCRIPTION:

Introduction, State space search, game tree search, architecture of artificial intelligence systems, production systems, knowledge representation, predicate calculus, structural/causal networks, deduction, truth maintenance, case study from any of natural language processing, question answering, vision, expert system etc.

#### Syllabus:

Topics
WHAT IS ARTIFICIAL INTELLIGENCE: The Computer and the Brain; Theories of Intelligence, Detecting and Measuring Intelligence, What makes a computer program intelligent ? The AI problems; What is an AI technique ?
PROBLEMS, PROBLEM SPACES AND SEARCH: Defining the problem as a state space search. Production systems and its characteristics Issues in the design of search programs
KNOWLEDGE REPRESENTATION: Knowledge Representation Issues Representation and Mappings Approaches to knowledge Representation Issues in knowledge Representation Structural/ Causal

networks
Using Predicate Logic: Representing simple Facts in Logic Representing Instance and ISa Relationships Computable functions and predicates Resolution Natural Deduction
Representing Knowledge using Rules: Procedural versus declarative knowledge Logic Programming Forward versus Backward reasoning Matching
EXPERT SYSTEMS AND KNOWLEDGE ENGINEERING: Representing and using domain knowledge Expert system shells Knowledge Acquisition Case studies
HEURISTIC SEARCH TECHNIQUES: Search Applications Basic search Algorithms The " British Museum "Procedure Generate and Test Depth first Search Breadth first search Uniform cost search Hill climbing Best first search The A* Algorithm
GAME PLAYING: MINMAX and Game Trees Cutting of search with static Evaluations  ALPHA-BETA PRUNING Analysis of Alpha-Beta Pruning Alternatives to Alpha-Beta Pruning Enhancements to the Alpha-Beta Algorithm Quiescence search Iterative deepening Killer Move Heuristics

#### Text Books:

1. Artificial Intelligence : Elaine Rich, Kerin Knight, Tata McGraw Hill
2. Principles of Artificial Intelligence : Nills J Nillson; Narosa Publ.
3. Artificial Intelligence Winston: Addition Wesley
4. Introduction to Artificial Intelligence Charniak and Mcdermott Addition wesley



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	a. Title of the course b. No. of the Course	<b>Data Mining</b> <b>TCT-433</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge  represented by the department  d) An introductory survey of special area of knowledge e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a	No No Yes Yes Yes No No

AICTE New Model Curriculum has proposed.

considerable extent with any course?	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S.D Samantaray

#### CATALOGUE DESCRIPTION:

Introduction, Data Mining, Association Rules, Clustering Techniques, Decision Trees, WEB Mining, Temporal and Spatial Data Mining, Other Techniques.

#### Syllabus:

Topics
Introduction: Data Warehousing: Multidimensional Data Model, OLAP operations, Ware house schema Data Ware housing architecture, Ware house server, Metadata, OLAP Engine.
Data Mining (DM) Introduction : Data Mining (DM) Definitions, KDD vs Data Mining, DBMS vs DM, DM Techniques Issues and challenges in DM, DM application areas – Case Studies.

Association Rules : Methods to discover Association Rules, A Priori Algorithm, ParTCTion Algorithm , Pioneer- Search Algorithm, Dynamic Item set counting Algorithm, FP-tree Growth Algorithm Incremental Algorithm Border Algorithm, Generalized Association rule.

Clustering Techniques : Introduction, Clustering Paradigms, ParTCTioning Algorithm, K-Medoid Algorithm, CLARA, CLARANS Hierarchical Clustering, DBSCAN, BIRCH, CURE, Categorical Clustering Algorithms, STIRR, ROCK, CACTUS.

Decision Trees : Introduction, Tree Construction principle, Best Split, Spitting Indices, Splitting Criteria, Decision Tree construction Algorithms, CART, ID3 C4.5, CHAID, Decision Tree Construction with Presorting, Rain Forest, Approximate Methods, CLOUDS, BOAT, Pruning Technique, Integration of Prunning and construction.

WEB Mining : Introduction, Web content mining, Web structure Mining, Web Usage Mining, Text mining, Unstructured Text, Episode Rule. Discovery for Texts, Hierarchy of categories Text clustering.

Temporal and Spatial Data Mining : Introduction, Temporal Association Rules, Sequence Mining, GSP Algorithm, SPADE, SPIRIT, WUM, Episode Discovery, Event Prediction Problem, Time-Series Analysis, Spatial Mining, Spatial Mining Tasks, Spatial Clustering, Spatial Trends.

Other Techniques : Neural Network (NN) Learning in NN, Unsupervised Learning, Data Mining NN, Genetic Algorithms, Rough Sets, Support Vector Machines.

#### **Text and Reference Books:**

1. Data Mining: Concepts and Techniques by Jiawei Han David Hand Heikki Mannila
2. Data Mining: The Textbook by C Aggarwal Charu
3. Data Mining Techniques by Arun K Pujari
4. Data Mining by Vikram Pudi P. Radha Krishna
5. Principal of Data Mining by David Hand, Heikki Mannila, Padhraic Smyth

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Soft Computing</b> <b>TCT-434</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. B. K. Singh

#### CATALOGUE DESCRIPTION

Introduction, Neural Networks, Fuzzy Systems, Genetic Algorithm, Hybrid Systems, GA based Backpropagation Networks, Fuzzy Backpropagation Networks.

#### Syllabus:

Topics
Introduction: What is Soft Computing? Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing.
Neural Networks: What is Neural Network, Learning rules and various activation functions, Single layer Perceptrons , Back Propagation networks, Architecture of Back propagation (BP)
Networks, Backpropagation Learning, Variation of Standard Back propagation Neural Network,

Introduction to Associative Memory, Adaptive Resonance theory and Self Organizing Map, Recent Applications.
Fuzzy Systems: Fuzzy Set theory, Fuzzy versus Crisp set, Fuzzy Relation, Fuzzification, Minmax Composition, Defuzzification Method, Fuzzy Logic, Fuzzy Rule based systems, Predicate logic, Fuzzy Decision Making, Fuzzy Control Systems, Fuzzy Classification.
Genetic Algorithm: History of Genetic Algorithms (GA), Working Principle, Various Encoding methods, Fitness function, GA Operators- Reproduction, Crossover, Mutation, Convergence of GA, Bit wise operation in GA, Multi-level Optimization.
Hybrid Systems: Sequential Hybrid Systems, Auxiliary Hybrid Systems, Embedded Hybrid Systems, Neuro-Fuzzy Hybrid Systems, Neuro-Genetic Hybrid Systems, Fuzzy-Genetic Hybrid Systems.
GA based Backpropagation Networks: GA based Weight Determination, K - factor determination in Columns.
Backpropagation Networks: LR type Fuzzy numbers, Fuzzy Neuron, Fuzzy BP Architecture, Learning in Fuzzy BP, Application of Fuzzy BP Networks.
<b>Laboratory Topics</b>
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Text Books and References:

1. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S.Rajasekaran, G. A. Vijayalakshmi, PHI.
2. Genetic Algorithms: Search and Optimization, E. Goldberg.
3. Neuro-Fuzzy Systems, Chin Teng Lin, C. S. George Lee, PHI.
4. Build\_Neural\_Network\_With\_MS\_Excel\_sample by Joe choong



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	a. Title of the course b. No. of the Course	<b>Speech and Natural Language Processing</b> <b>TCT-435</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  i. General Education i. Opportunity for student research i. Departmental specialization /. Out growth of instructor research programme past or present . Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department d) An introductory survey of special area of knowledge e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department h) A summarizing of integrated one?	No No Yes Yes Yes No

AICTE New Model Curriculum has proposed.

h) In your opinion, does this course overlap to a considerable extent with any course?	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S.D Samantaray

#### CATALOGUE DESCRIPTION

Introduction, Hidden Markov and Maximum Entropy Models, Phonetics, Speech Synthesis, Automatic Speech Recognition, Computational Phonology, Computational Semantics, Lexical Semantics, Computational Lexical Semantics, Computational Discourse, Information Extraction Question Answering and Summarization Dialog and Conversational Agents, Machine Translation, Part Of Speech Tagging and Sequence Labeling, Syntactic parsing, Semantic Analysis, Information Extraction (IE), Machine Translation (MT).

#### Syllabus:

Topics
Introduction  Regular Expressions and Automata, Words and Transducers, N-grams, Part-of-Speech Tagging, bigram and trigram HMM part-of-speech tagging, Viterbi decoding and deleted interpolation smoothing.

unknown word modeling and part-of-speech tagging,
<p><b>Hidden Markov and Maximum Entropy Models</b></p> <p>Hidden Markov Models, including Forward, Viterbi, and EM. Max Ent models, linear regression, logistic regression, MEMM and the Viterbi intuition</p>
Phonetics, Speech Synthesis, Automatic Speech Recognition: Introduction to articulatory and acoustic phonetics for speech processing, as well as foundational tools like the ARPAbet, avefile formats, phonetic dictionaries, and PRAAT, HMM-based speech recognition, including extraction of MFCC features, Gaussian Mixture Model acoustic models, and embedded training.
Computational Phonology: Introduction to computational phonology, including phonological and morphological learning, finite-state models, OT, and Stochastic OT Introduction- Human languages, models, ambiguity, processing paradigms; Phases in natural language processing, applications. Text representation in computers, encoding schemes. Linguistics resources- Introduction to corpus, elements in balanced corpus, Tree Bank, Prop Bank, Word Net, Verb Net etc. Management of linguistic data with the help of GATE, NLTK. Syntactic Parsing, Statistical Parsing, Features and Unification, Language and Complexity, Representation of Meaning, Model-theoretic semantics for meaning representations, Description Logics and their role as a basis for OWL and its role in the Semantic Web.
Computational Semantics, compositional approaches to semantic analysis at the sentence level, semantic grammars
Lexical Semantics : Basics of lexical semantics, including sense relations, semantic roles, and primitive decomposition.
Computational Lexical Semantics : Computing with word meanings. word sense disambiguation, computing relations between words (similarity, hyponymy, etc.), and semantic role labeling.
Computational Discourse, Information Extraction Question Answering and Summarization Dialog and Conversational Agents, Machine Translation
NLP tasks in syntax, semantics, and pragmatics. Applications such as information extraction, question answering, and machine translation. The problem of ambiguity. The role of machine learning. Brief history of the field. The role of language models. Simple N-gram models. Estimating parameters and smoothing. Evaluating language models.
<p><b>Part Of Speech Tagging and Sequence Labeling</b></p> <p>Lexical syntax. Hidden Markov Models (Forward and Viterbi algorithms and EM training).</p>
<p><b>Syntactic parsing</b></p> <p>Grammar formalisms and treebanks. Efficient parsing for context-free grammars (CFGs). Statistical parsing and probabilistic CFGs (PCFGs). Lexicalized PCFGs. Neural shift-reduce dependency parsing</p>
<p><b>Semantic Analysis</b></p> <p>Lexical semantics and word-sense disambiguation. Compositional semantics. Semantic Role Labeling and Semantic Parsing.</p>
<p><b>Information Extraction (IE)</b></p> <p>Named entity recognition and relation extraction. IE using sequence labeling.</p>

<b>Machine Translation (MT)</b>
Basic issues in MT. Statistical translation, word alignment, phrase-based translation, and synchronous grammars.
<b>Laboratory Topics</b>
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*Textbook:*

1. Daniel Jurafsky and James H Martin. *Speech and Language Processing, 2e*, Pearson Education, 2009

*Reference Books:*

1. James A.. *Natural language Understanding 2e*, Pearson Education, 1994
2. Bharati A., Sangal R., Chaitanya V.. *Natural language processing: a Paninian perspective*, PHI, 2000
3. Siddiqui T., Tiwary U. S.. *Natural language processing and Information retrieval*, OUP, 2008
4. Partha Niyogi , *The Computational Nature of Language Learning and Evolution* Prentice- Hall of India Private Limited, New Delhi



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Neural Networks and Deep Learning</b> <b>TCT-436</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a considerable extent with any course?	No No Yes  Yes  Yes  No

AICTE New Model Curriculum has proposed.

	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. B. K. Singh

#### CATALOGUE DESCRIPTION

Definitions and history of neural networks, Neuro architectures, Traditional neural networks, learning rules, Recurrent Networks and Back Propagation, associative memories, Deep Learning & Neocognitron, Deep Convolutional Neural Networks, feature extraction, Deep Belief Networks, Restricted Boltzman Machines, Autoencoders, Training of Deep Neural Networks, Applications and examples.

#### Syllabus:

Topics
Definitions and history of neural networks, Neuro architectures as necessary building blocks for the DL techniques
Traditional neural networks, learning rules Recurrent Networks and Back Propagation, associative

memories
Deep Learning & Neocognitron, Deep Convolutional Neural Networks, feature extraction, Deep Belief Networks, Restricted Boltzman Machines, Autoencoders.
Training of Deep Neural Networks, Applications and examples
Laboratory Topics
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Text Books and References:

1. Li Deng, Dong Yu, Deep Learning, Methods and Applications, Foundations

and Trends in Signal Processing

2. Simon Haykin, "Neural Networks: A Comprehensive Foundation", any edition of the "Neural Networks and Learning Machines" (Nov, 2008), Publisher: Prentice Hall;



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Digital Image Processing</b> <b>TCT-461</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	The new curriculum is proposed by AICTE.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

	No
11. What are the urgent reasons why this course should be offered at this present time:	To learn the recent developments and enhance the research activities in the concerned area
12. Is this course intended to replace an existing course(s)	Yes
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	This is the elective course for B. Tech (Computer Engineering)
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Prof. Chetan Singh Negi/ Prof. Jalaj Sharma

#### Catalogue Description:

Digital Image Fundamentals, Image enhancement, Image restoration and segmentation, Morphological Image Processing

#### Syllabus:

Topics
Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization.
Some Basic Relationships between Pixels, Linear and Nonlinear Operations, Basic Gray Level Transformations, Histogram Processing.
Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters Detection of Discontinuities.

Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Dilation and Erosion, Opening and Closing, Extensions to Gray-Scale Images.

**Laboratory Topics**

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**Text Books & References:**

1. Digital Image Processing - R.C.Gonzalez, Richard E. Woods
2. Digital Image Processing Using Matlab- R.C.Gonzalez, Richard E. Woods, Steven L. Eddins



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Cloud Computing</b> <b>TCT-463</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12.	In this course intended to replace an existing course(s)	No
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by:	Prof. P.K.Mishra

#### CATALOGUE DESCRIPTION

Introduction, Principles of Parallel and Distributed Computing, Virtualization, Cloud Computing Architecture, Aneka: Cloud Application Platform, Concurrent Computing: Thread Programming, High-Throughput Computing: Task Programming, Data Intensive Computing: Map-Reduce Programming, Cloud Platforms in Industry, Cloud Applications

Syllabus:

Topics
Introduction
Principles of Parallel and Distributed Computing
Virtualization

Cloud Computing Architecture ,Aneka: Cloud Application Platform
Concurrent Computing: Thread Programming
High-Throughput Computing: Task Programming
Data Intensive Computing: Map-Reduce Programming
Cloud Platforms in Industry
Cloud Applications
Advanced Topics in Cloud Computing
Laboratory Topics
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**Reference Book:**

- 1.Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2
- 2.Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer.



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	a. Title of the course b. No. of the Course	<b>Human Computer Interaction</b> <b>TCT- 464</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Core Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	i. General Education	Yes
	i. Opportunity for student research	Yes
	i. Departmental specialization	Yes
	/. Out growth of instructor research programme past or present	Yes
	/. Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	AICTE New Model Curriculum has proposed.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge	Yes
	represented by the department	
	e) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	No
	h) A summarizing of integrated one?	
	h) In your opinion, does this course overlap to a	

considerable extent with any course?	No
	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. S.D Samantaray

#### CATALOGUE DESCRIPTION

#### OBJECTIVES:

- To learn the principles and fundamentals of human computer interaction (HCI)
- To analyze HCI theories, as they relate to collaborative or social software.
- To Establish target users, functional requirements, and interface requirements for a given computer application.
- To understand user interface design principles and apply them to designing an interface.
- To learn user interface designs through usability inspection and user models
- To know the applications of multimedia on HCI.

Syllabus:

Topics
<b>DESIGN PROCESS:</b> Humans – Information process – Computer – Information Process – Differences and Similarities between them – Need for Interaction – Models – Ergonomics – Style – Context – Paradigms

– Designing of Interactive systems – Usability – Paradigm shift – Interaction design basics – Design Process – Scenarios – Users need –Complexity of design

**DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS:** Software Process – Usability engineering – Issue based Information systems – Iterative design practices – Design rules – maximum usability – Principles – Standards and guidelines – design patterns – Programming Tools – Windowing systems – Interaction tool kit – User Interface management system – Evaluation techniques – evaluation design – Evaluating implementations – Observational Methods

**MODELS:** Universal design principles – Multimodal systems – User Support – Presentation and Implementation Issues – types – requirements – approaches – Cognitive model – Hierarchical model – Linguistic model – physical and device models – Sociotechnical models – Communication and Collaboration models – Task models – Task analysis and design

**EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI:** Basic Design structure – Single independent variable – multiple independent variable – factorial design – split-plot design – random errors – experimental procedure – Statistical analysis – T tests Analysis of Variance test – Regression – Chi-Square test – Survey – Probabilistic sampling – Non-probabilistic sampling – developing survey questions

**THEORIES:** Dialogue notations and design – Dialogue need – dialogue design notations – Graphical – Textual representing dialogue – formal descriptions – Dialogue analysis – System models – Interaction models – relationship with dialogue – Formalisms – Formal notations – Interstitial behavior – Virtual reality – Modeling rich interaction – Status Event analysis – Properties – Rich contexts – Sensor-based systems – Groupware – Applications – Ubiquitous computing – Virtual reality

#### Laboratory Topics

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#### REFERENCES:

1. Human Computer Interaction, 3rd Edition Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale Prentice Hall, 2004.
2. Research Methods in Human-Computer Interaction , Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, Wiley, 2010.
3. Ben Shneiderman and Catherine Plaisant Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition, pp. 672, ISBN 0-321-53735-1, March 2009), Reading, MA: Addison-Wesley Publishing Co.

## PROPOSAL FOR A NEW COURSE

1. Department Computer Engineering Department
2. College Technology
3. (a) Title of the course Optimization Techniques  
(b) No. of the Course TCT-465

4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
		The new curriculum is proposed by AICTE.
10.	Relation to other courses:	
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No
		No
11.	What are the urgent reasons why this course should be offered at this present time:	To learn the recent developments and enhance the research activities in the concerned area
12.	Is this course intended to replace an existing course(s)	Yes
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No

14.	What is the exact place of this course in the development of the educational programme of your department?	This is the elective course for B. Tech (Computer Engineering)
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by	Prof. Chetan Singh Negi/ Prof. Jalaj Sharma

#### **Catalogue Description:**

Latest state of the art optimization algorithms in the concerned area are to be covered.

#### **Syllabus**

Topics
Optimization Introduction, Mathematical Modeling.
Unconstrained Optimization, Discrete Optimization.
Genetic Algorithms, Constrained Optimization.
Robust Optimization, Dynamic Optimization.
Laboratory Topics
-

#### **Text Books & References:**

1. Gen, M. and R. Cheng, Genetic Algorithms and Engineering Optimization, Wiley.
2. Edgar, T.F., Himmelblau, D.M., and L.S. Lasdon, Optimization of Chemical Processes, McGraw Hill.
3. Luenberger and Ye, Linear and Nonlinear Programming Third Edition, Springer, 2008.
4. Fletcher R., Practical Methods of Optimization Volumes 1,2, John Wiley.



## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Cryptography and Network Security</b> <b>TCT-466</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a considerable extent with any course?	No No Yes  Yes  Yes  Yes  No  No

AICTE New Model Curriculum has proposed.

	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by	Dr. Rajeev Singh

**Syllabus:**

Information security and Symmetric Ciphers: Introduction: History, What is Information Security; Characteristics of Information; Information Security Model; Components of an Information Security; Aspects of Information security: Security attacks, Security Mechanism, and Security Services (X.800), Model for Network Security. Classical Encryption Techniques: Historical background, symmetric cipher model, Substitution techniques, Transposition techniques, steganography. Block ciphers and DES: Block cipher principles, Data encryption standard, strength of DES, differential and cryptanalysis, block cipher design principles, block cipher mode of operation. Confidentiality Using Symmetric Ciphers: Placement of encryption function, traffic confidentiality, key distribution, random number generation.
Public key Encryption and Hash Functions: Introduction to Number Theory: Prime numbers, Fermat's and Euler's theorem, discrete logarithm Public Key Cryptography: Public-Key Cryptography Principles, RSA, Key Management: Diffi-Hellman key exchange. Message Authentication and Hash Functions: Authentication requirements, Authentication Functions, Message Authentication codes, Hash Functions, SHA-1, MD5. Digital Signatures: Digital signatures, Authentication protocols, Digital Signature standard
Network Security Applications: Authentication Applications: Kerberos Motivation, X.509 authentication service Electronic Mail Security: PGP: PGP Notation, PGP Operational Description, , S/MIME IP Security: IP Security Overview, IP Security Architecture, Authentication Header Web Security: Web Security Threats, Web Traffic Security Approaches, Overview of Secure Socket Layer and Transport Layer Security, Overview of Secure Electronic Transaction.
Intruders and Viruses: Intruders: Intruders, Intrusion Techniques, Password Protection, Password Selection Strategies, Intrusion Detection, Malicious Programs Malicious Programs, Nature of Viruses, Types of Viruses,

**Text Books:**

1. "Cryptography and Network Security, Principles and Practice" Author William Stallings

**Reference Books:**

1. Computer Networks, Author: A. S. Tanenbaum, Publisher: Prentice Hall
2. Cryptography, Theory and Practice, Author: D. Stinson, Publisher: CRC Press
3. Cryptography and Network Security, Author: Atul Kahate, Publisher: McGraw Hill

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>Computer Graphics &amp; Animation</b> <b>TCT-467</b>
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:	
	a) General Education	Yes
	b) Opportunity for student research	Yes
	c) Departmental specialization	Yes
	d) Out growth of instructor research programme past or present	Yes
	e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
10.	Relation to other courses:	The new curriculum is proposed by AICTE.
	a) Pre-requisite	No
	b) Is the course a pre-requisite of any course?	No
	c) An introductory survey of field knowledge represented by the department	Yes
	d) An introductory survey of special area of knowledge	Yes
	e) A further development of course area of knowledge	Yes
	f) An application of department field and area of knowledge represented by some other department	
	g) A summarizing of integrated one?	Yes
	h) In your opinion, does this course overlap to a considerable extent with any course?	No
		No

		No
11.	What are the urgent reasons why this course should be offered at this present time:	To learn the recent developments and enhance the research activities in the concerned area
12.	Is this course intended to replace an existing course(s)	Yes
13.	Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14.	What is the exact place of this course in the development of the educational programme of your department?	This is the elective course for B. Tech (Computer Engineering)
15.	Syllabus	Attached
16.	Basic text for the proposed course	Attached
17.	List of Supplementary readings	Attached
18.	Do Classroom, Laboratory and other facilities exist?	Yes
19.	Would the introduction of this course require additional staff?	No
20.	Prepared by	Prof. Chetan Singh Negi/ Prof. Jalaj Sharma

#### Catalogue Description:

#### CATALOGUE DESCRIPTION

Introduction, two dimensional transformations, clipping, Windowing, Geometric models and picture structure, three dimensional graphics, curves and surfaces transformations, perspective hidden-surface elimination.

#### Syllabus

Topics
INTRODUCTION: State of the art trends, dimensionality and coordinate systems, continuous and discrete graphics, points plotting, line drawing, vector graphics, vector refresh display etc.
2-D TRANSFORMATIONS: Representation of a point as a column vector and row-vector and matrix notations, affine transformations, composing, homogeneous transformations etc.
WINDOWING AND CLIPPING: Window and view port, transformation from picture plane to screen coordinates, clipping, scissoring, cohen-sutherland algorithm etc.

GEOMETRIC MODELS: Global, local, view, picture plane and screen coordinate systems, displaying a geometrical model, instance transformations.
PICTURE STRUCTURE: Defining symbols by procedures, boxing, structured display files.
3-D GRAPHICS: Wire frame models, introduction to projections 3-D affine transformations, perspective transformation, two approaches to hidden surface elimination.
Laboratory Topics
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**Text Books & References:**

1. Principles of Interactive Computer Graphics Sproul, Newmann McGraw Hill\
2. Procedure Elements of Computer Graphics Rogers, McGraw Hill
3. Computer Graphics C –Version” Donald Hearn,MPalinBecker

## **PROPOSAL FOR A NEW COURSE**

1.	Department	Computer Engineering Department
2.	College	Technology
3.	(a) Title of the course (b) No. of the Course	<b>VLSI System Design</b> TCT-468
4.	Catalogue Description	Attached
5.	To be offered	Once in a year
6.	Credits	<b>3(3-0-0)</b>
7.	Is this a new course	Yes
8.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
9.	General educational purpose of the course:  a) General Education b) Opportunity for student research c) Departmental specialization d) Out growth of instructor research programme past or present e) Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes Yes Yes Yes Yes
10.	Relation to other courses:  a) Pre-requisite b) Is the course a pre-requisite of any course? c) An introductory survey of field knowledge represented by the department  d) An introductory survey of special area of knowledge  e) A further development of course area of knowledge f) An application of department field and area of knowledge represented by some other department  g) A summarizing of integrated one? h) In your opinion, does this course overlap to a considerable extent with any course?	No No Yes  Yes  Yes  Yes  No  No

AICTE New Model Curriculum has proposed.

	No
11. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
12. Is this course intended to replace an existing course(s)	No
13. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
14. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
15. Syllabus	Attached
16. Basic text for the proposed course	Attached
17. List of Supplementary readings	Attached
18. Do Classroom, Laboratory and other facilities exist?	Yes
19. Would the introduction of this course require additional staff?	No
20. Prepared by:	Prof. Jalaj Sharma/ Prof. Chetan Singh Negi

#### CATALOGUE DESCRIPTION

Introduction to VLSI systems, Integrated Circuits technologies and basic electrical properties, VLSI Design Methodology, VLSI Design Flow, VLSI System Design, VLSI Technology Based Devices Design, Overview of VLSI Programming tool, simulation and Synthesis.

#### Syllabus:

Introduction: Introduction to VLSI systems, Introduction and Evolution of Integrated Circuits technologies - MOS, PMOS, NMOS, CMOS & BiCMOS technologies, Integrated Resistors and Capacitors, Basic electrical properties of Bipolar MOS, CMOS and BiMOS.
VLSI Design Methodology: Introduction to HDLs, VHDL constructs and codes for combinational and sequential circuits, MOS Layers, Stick Diagrams, Design Rules and Layout.
VLSI Design Flow: Design entry - Schematic, FSM & HDL, different modeling styles in VHDL, Data types and objects, Dataflow, Behavioral and Structural Modeling, Synthesis and Simulation.
VLSI System Design: CMOS Design - Rules for wires, Contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, GATE Level Design - Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Fan-in and fan-out, Choice of layers.

VLSI Technology Based Devices Design: Design of Shifters – Adders - ALUs – Multipliers - Parity generators – Comparators - Counters, Semiconductor IC Design - PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approaches.

Overview of VLSI Programming tool, simulation and Synthesis: Introduction to VHDL programming, VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools, Test Principles.

Laboratory Topics

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Text Books:

1. Kamran Eshraghian, Eshraghian Dougles and A. Pucknell “Essentials of VLSI circuits and systems” PHI.
2. Weste and Eshraghian “Principles of CMOS VLSI Design”, Pearson Education.

References:

1. John P. Uyemura “Chip Design for Submicron VLSI: CMOS Layout & Simulation” Thomson Learning Publication.
2. John .P. Uyemura “ Introduction to VLSI Circuits and Systems” JohnWiley.
3. John M. Rabaey “Digital Integrated Circuits” PHI
4. Wayne Wolf,”Modern VLSI Design” Pearson Education, 3rd Edition.

## **PROPOSAL FOR A NEW COURSE**

21.	Department	Computer Engineering Department
22.	College	Technology
23.	(a) Title of the course (b) No. of the Course	<b>Cyber Law and Ethics</b> <b>TCT-481</b>
24.	Catalogue Description	Attached
25.	To be offered	Once in a year
26.	Credits	<b>3(3-0-0)</b>
27.	Is this a new course	Yes
28.	Curricular purpose of the course	Elective Course for B. Tech (Computer Engineering)
29.	General educational purpose of the course:	
a)	General Education	Yes
b)	Opportunity for student research	Yes
c)	Departmental specialization	Yes
d)	Out growth of instructor research programme past or present	Yes
e)	Why should the educational purpose of the course not be achieved by modification of a course now being given? Please specify	Yes
30.	Relation to other courses:	AICTE New Model Curriculum has proposed.
a)	Pre-requisite	No
b)	Is the course a pre-requisite of any course?	No
c)	An introductory survey of field knowledge represented by the department	Yes
d)	An introductory survey of special area of knowledge	
e)	A further development of course area of knowledge	Yes
f)	An application of department field and area of knowledge represented by some other department	
g)	A summarizing of integrated one?	Yes
h)	In your opinion, does this course overlap to a considerable extent with any course?	No
		No

	No
31. What are the urgent reasons why this course should be offered at this present time:	AICTE New Model Curriculum has proposed
32. Is this course intended to replace an existing course(s)	No
33. Would the introduction of this course well require staff over and above the sanctioned staff of the department?	No
34. What is the exact place of this course in the development of the educational programme of your department?	B.Tech Computer Engineering
35. Syllabus	Attached
36. Basic text for the proposed course	Attached
37. List of Supplementary readings	Attached
38. Do Classroom, Laboratory and other facilities exist?	Yes
39. Would the introduction of this course require additional staff?	No
40. Prepared by:	Prof. S. D. Samantaray

Catalogue & Syllabus Description:

Computers and its Impact in Society , Overview of Computer and Web Technology , Need for Cyber Law , Cyber Jurisprudence at International and Indian Level
Cyber Law - International Perspectives, Asia-Pacific Economic Cooperation (APEC), Organization for Economic Co-operation and Development (OECD),World Bank, Commonwealth of Nations
Constitutional & Human Rights Issues in Cyberspace , Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace – Access to Internet , Right to Privacy , Right to Data Protection
Cyber Crimes & Legal Framework , Cyber Crimes against Individuals, Institution and State, Hacking , Digital Forgery ,Cyber Stalking/Harassment ,Cyber Pornography, Identity Theft & Fraud, Cyber terrorism, Cyber Defamation ,Different offences under IT Act, 2000
Cyber Torts , Cyber Defamation ,Different Types of Civil Wrongs under the IT Act, 2000
Intellectual Property Issues in Cyber Space, Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issues
Dispute Resolution in Cyberspace 1. Concept of Jurisdiction 2. Indian Context of Jurisdiction and IT Act, 2000. 3. International Law and Jurisdictional Issues in Cyberspace. 4. Dispute Resolutions
Course Overview, Introduction to Computer Ethics, Ethical Concepts and Ethical Theories, Professional

Text/ References Books:

1. Chris Reed & John Angel, Computer Law, OUP, New York, (2007).
2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi, (2012).
3. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New Delhi, (2004)
4. Jonthan Rosenoer, Cyber Law, Springer, New York, (1997).
5. Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)
6. S. R. Bhansali, Information Technology Act, 2000, University Book House Pvt. Ltd., Jaipur (2003).
7. Vasu Deva, Cyber Crimes and Law Enforcement, Commonwealth Publishers, New Delhi, (2003).

# Proposal for Curriculum Bachelor of Technology

in

## Electrical Engineering

(As per AICTE Model Curriculum 2018)



**Department of Electrical Engineering**  
**College of Technology**  
**G.B. Pant University of Agriculture and Technology,**  
**Pantnagar (Uttarakhand)-263145**

**Year-wise Graduation Requirement**

**Batch 2018 (Electrical Engg.)**

Sl. No.	Course No.	Course Title	Credit/ Contact Hours	Pre-requisite
<b>Basic Sciences and Other Department courses</b>				
1.	BPP-198	Semiconductor Physics	5(3-1-2)/6	Nil
2.	BPM-142	Calculus and Differential Equations	5(4-1-0)/5	Nil
3.	BPC-102	Chemistry-I	4 (3-0-2) /5	Nil
4.	TIP-103	Workshop Practices	3(1-0-2x2)/5	Nil
5.	TID/ TSW/	Introduction to Environmental Engineering and	3(3-0-0)/3	Nil

	TCE/TME-109	Disaster Management		
6.	TCE-114	Engineering Graphics and Design	3(1-0-4)/5	Nil
7.	TIT-121	Programming for Problem Solving	4(3-0-2) /5	Nil
8.	BHS-186	English	3(2-0-2)/4	Nil
9.	BHS-188	Industrial Sociology	3(3-0-0)/3	Nil
10.	TIC-100	Induction Programme	2 Weeks	Nil
11.	TEE-104	Basic Electrical Engineering	5(3-1-2)/6	Nil
12.	BPM-152	Linear Algebra, Transform Calculus and Numerical Methods	4(3-1-0)/4	Nil
13.	TCT-202	Digital Electronics	4(3-0-2)/5	Nil
14.	TME-221	Engineering Mechanics	4(3-1-0)/4	Nil
15.	TEC-209	Signals and Systems	3(2-1-0)/3	Nil
16.	BPS-228	Probability and Statistics	3(3-1-0)/4	Nil
17.	BHS-286	Effective Technical Communication	3(3-0-0)/3	Nil
18.	BHS-387	Soft Skills	3(3-0-0)/3	Nil
19.	TEC-216	Analog and Digital Communication	3(3-0-0)/3	Nil

#### Professional Courses

20.	TEE-201	Electrical Circuit Analysis	4(3-1-0)/4	Nil
21.	TEE-202	Analog Electronics	4(3-0-2)/5	Nil
22.	TEE-203	Measurements and Instrumentation	3(2-0-2)/4	Nil
23.	TEE-206	Electrical Machines I	3(2-1-0)/3	Nil
24.	TEE-207	Electromagnetic Fields	4(3-1-0)/4	Nil
25.	TEE-208	Microprocessors	4(3-0-2)/5	Nil
26.	TEE-209	Network Analysis and Synthesis	3(2-1-0)/3	Nil
27.	TEE-311	Power Electronics	4(3-0-2)/5	Nil
28.	TEE-312	Electrical machines II	4(2-1-2)/5	Nil
29.	TEE-314	Power Systems I	3(2-1-0)/3	Nil

30.	TEE-315	Electrical Materials	3(3-0-0)/3	Nil
31.	TEE-316	Control System I	4(3-0-2)/5	Nil
32.	TEE-317	Software Tools for Electrical Engineering Application	1(0-0-2)/2	Nil
33.	TEE-318	Power Systems II	3(3-0-0)/3	Nil
34.	TEE-319	Electrical machines III	5(3-1-2)/6	Nil
35.	TEE-320	Control System II	2(2-0-0)/2	Nil
36.	TEE-410	Power System III	4(3-0-2)/5	Nil
37.	TEE-411	Renewable Energy Systems	3(3-0-0 )/3	Nil
38.	TEE-	Programme Elective 1	3 Credit	Nil
39.	TEE-	Programme Elective 2	3 Credit	Nil
40.	TEE-	Programme Elective 3	3 Credit	Nil
41.	TEE-	Programme Elective 4	3 Credit	Nil
42.	TEE-	Programme Elective 5	3 Credit	Nil
43.	TEE-	Programme Elective 6	3 Credit	Nil
44.		Open Elective 1	3 Credit	Nil
45.		Open Elective 2	3 Credit	Nil
46.		Open Elective 3	3 Credit	Nil
47.		Open Elective 4	3 Credit	Nil

**Internship/ Seminar/ Projects and others.**

48.	TEE-191	Practical Training I	02 Weeks	Nil
49.	TEE-291	Practical Training II	02 Weeks	Nil
50.	TEE-391	Practical Training III	04 Weeks	Nil
51.	TEE-494	Seminar	1(0-0-2)/2	Nil
52.	TEE-495 A	Project I	4(0-0-4x2)/8	Nil
53.	TEE-495 B	Project II	8(0-0-8x2)/16	Nil
54.	TWP-101	Work Programme	1(0-0-2)/2	Nil

55.	NSS-101	N.S.S.	1 Credit	Nil
56.	NSS-102	N.S.S.	0 Credit	Nil
57.	NSS-201	N.S.S.	1 Credit	Nil
58.	NSS-202	N.S.S.	0 Credit	Nil
		<b>Total Credits</b>	<b>172</b>	

**Note:** Those students who have not taken Hindi at the High School or equivalent level will also require to

Register the course BHS-105 Elementary Hindi – 2 Credit



**Semester Wise Distribution**

**First Year:**

<b>Sl. No.</b>	<b>Course No.</b>	<b>Course Title</b>	<b>Credit &amp; Contact Hours</b>	<b>Pre-requisite</b>
		<b>I semester</b>		
1.	BPP-198	Semiconductor Physics	5(3-1-2)/6	Nil
2.	BPM-142	Calculus and Differential Equations	5(4-1-0)/5	Nil
3.	TCE-114	Engineering Graphics and Design	3(1-0-4)/5	Nil
4.	TID/ TSW/ TCE/TME-109	Introduction to Environmental Engineering and Disaster Management	3(3-0-0)/3	Nil
5.	BHS-186	English	3(2-0-2)/4	Nil
6.	TIP-103	Workshop Practices	3(1-0-2x2)/5	Nil
7.	TIC-100	Induction Programme (2 Weeks)		Nil
		<b>II semester</b>		
1.	BPC-102	Chemistry I	4(3-0-2) /5	Nil
2.	BPM-152	Linear Algebra, Transform Calculus and Numerical Methods	4(3-1-0)/4	Nil
3.	TEE-104	Basic Electrical Engineering	5(3-1-2) /6	Nil
4.	BHS-188	Industrial Sociology	3(3-0-0)/3	Nil
5.	TIT-121	Programming for Problem Solving	4(3-0-2) /5	Nil
6.	TWP-101	Work Programme	1(0-0-2)/2	Nil
7.	TEE-191	Practical Training I	02 Weeks	Nil
		<b>Total Credits</b>	<b>22+21=43</b>	



**Second Year:**

<b>Sl. No.</b>	<b>Course No.</b>	<b>Course Title</b>	<b>Credit &amp; Contact Hours</b>	<b>Pre-requisite</b>
		<b>I semester</b>		
1.	TEE-201	Electrical Circuit Analysis	4(3-1-0)/4	Nil
2.	TEE-203	Measurements and Instrumentation	3(2-0-2)/4	Nil
3.	TEE-207	Electromagnetic Fields	4(3-1-0)/4	Nil
4.	TME-221	Engineering Mechanics	4(3-1-0)/4	Nil
5.	TEC-209	Signals and Systems	3(2-1-0)/3	Nil
6.	BHS-286	Effective Technical Communication	3(3-0-0)/3	Nil
7.	NSS-101	N.S.S.	1 Credit	Nil
		<b>II semester</b>		
1.	TEE-202	Analog Electronics	4(3-0-2)/5	Nil
2.	TCT-202	Digital Electronics	4(3-0-2)/5	Nil
3.	TEE-206	Electrical Machines I	3(2-1-0)/3	Nil
4.	TEE-208	Microprocessors	4(3-0-2)/5	Nil
5.	TEE-209	Network analysis and synthesis	3(2-1-0)/3	Nil
6.	TEE-317	Software Tools for Electrical Engg Application	1(0-0-2)/2	Nil
7.	BHS-387	Soft Skills	3(3-0-0)/3	Nil
8.	NSS-102	N.S.S.	0 Credit	Nil
9.	TEE-291	Practical Training II	02 Weeks	Nil
	<b>Total Credits</b>		<b>22+22=44</b>	



**Third Year:**

<b>Sl. No.</b>	<b>Course No.</b>	<b>Course Title</b>	<b>Credit &amp; Contact Hours</b>	<b>Pre-requisite</b>
		<b>I semester</b>		
1.	TEE-314	Power Systems I	3(2-1-0)/3	Nil
2.	TEE-316	Control System I	4(3-0-2)/5	Nil
3.	TEE-311	Power Electronics	4(3-0-2)/5	Nil
4.	TEE-312	Electrical machines II	4(2-1-2)/5	Nil
5.	TEE-315	Elect. Materials	3(3-0-0)/3	Nil
6.	BPS-228	Probability and Statistics	3(3-1-0)/4	Nil
7.	NSS-201	N.S.S.	1 Credit	Nil
		<b>II semester</b>		
1.	TEE-318	Power Systems II	3(3-0-0)/3	Nil
2.	TEC-216	Analog and Digital Communication	3(3-0-0)/3	Nil
3.	TEE-319	Electrical machines III	5(3-1-2)/6	Nil
4.		Open Elective 1	3 Credit	Nil
5.	TEE-	Programme Elective 1	3 Credit	Nil
6.	TEE-	Programme Elective 2	3 Credit	Nil
7.	TEE-320	Control System II	2(2-0-0)/2	Nil
8.	NSS-202	N.S.S.	0 Credit	Nil
9.	TEE-391	Practical Training III	04 Weeks	Nil
		<b>Total Credits</b>	<b>22+22=44</b>	

**Fourth Year:**

<b>Sl. No.</b>	<b>Course No.</b>	<b>Course Title</b>	<b>Credit &amp; Contact Hours</b>	<b>Pre-requisite</b>
		<b>I semester</b>		
1.	TEE-	Programme Elective 3	3 Credit	Nil

2.	TEE-	Programme Elective 4	3 Credit	Nil
3.	TEE-411	Renewable Energy Systems	3(3-0-0 )/3	Nil
4.	TEE-410	Power System III	4(3-0-2)/5	Nil
5.	TEE-495 A	Project Stage I	4(0-0-4x2)/8	Nil
6.		Open Elective 2	3 Credit	Nil
7.	TEE-494	Seminar	1(0-0-2)/2	Nil
		<b>II semester</b>		
1.	TEE-	Programme Elective 5	3 Credit	Nil
2.	TEE-	Programme Elective 6	3 Credit	Nil
3.		Open Elective 3	3 Credit	Nil
4.		Open Elective 4	3 Credit	Nil
5.	TEE-495 B	Project Stage II	8(0-0-8x2)/16	Nil
6.				
		<b>Total Credits</b>	<b>21+20=41</b>	

**TOTAL CREDITS = 172**

#### ELECTIVE COURSES

Sl. No.	Course No.	Course Title	L-T-P	Credits
1	TEE-401	Soft Computing and Its Engineering Applications	3-0-0	3
2	TEE-402	Renewable Energy: Concepts and Practices	3-0-0	3
3	TEE-403	Utilization of Electrical Energy,	3-0-0	3
4	TEE-404	Concepts of Electrical Power System	3-0-0	3
5	TEE-429	Electrical Drives	2-1-0	3
6	TEE-430	Digital Control System	3-0-0	3

7	TEE-440	Line Commutated and Active Rectifiers	3-0-0	3
8	TEE-442	Artificial Neural Networks and Fuzzy Systems for Electrical Engineers,	2-0-2	3
9	TEE-443	Power Quality & FACTS	3-0-0	3
10	TEE-444	Electrical Machine Design	3-0-0	3
11	TEE-445	Power System Protection	3-0-0	3
12	TEE-446	HVDC Transmission Systems	3-0-0	3
13	TEE-447	Electrical Energy Conservation and Auditing	3-0-0	3
14	TEE-448	Industrial Electrical Systems	3-0-0	3
15	TEE-449	Power System Dynamics and Control	3-0-0	3
16	TEE-450	High Voltage Engineering	3-0-0	3
17	TEE-451	Advance Electric Drives	3-0-0	3
18	TEE-452	Digital Signal Processing	3-0-0	3
19	TEE-453	Electrical and Hybrid Vehicles	3-0-0	3
20	TEE-454	Electromagnetic waves	3-0-0	3

**Note: Elective Courses at Sl. No. 1 to 4 are for students of other branches except Electrical Engineering.**

# COURSE DETAILS

## **PROPOSAL FOR A NEW COURSE**

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Basic Electrical Engineering TEE-104</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>5(3-1-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give theoretical and practical knowledge in the field of Electrical circuits and Electrical Machines to the students.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>

10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>No it is a New Course</b>	
13	The courses will not require additional staff over and above	<b>Basic Science Course</b>	
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. Engg.)</b>	
15	Topical outline : Lecture	<b>Provided</b>	
16	Practical:	<b>Provided</b>	
17	Text Book and Supplementary readings	<b>Provided</b>	
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>	
19	Would the introduction of this courses required additional staff:	<b>No</b>	
20	Sequence of action	<b>Proposed by AICTE for implementation</b>	
21	Approved by	<b>Course Curriculum Committee and BOFT</b>	

**1. Name of the course : Basic Electrical Engineering**

**2. Course No. : TEE-104**

**3. Credits Hours : 5 (3-1-2)**

**4. Per-requisite : NIL**

## **5. Syllabus /Catalogue Description**

### **Module 1: DC Circuits (9 hours)**

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin, Norton Theorems and Maximum power.

### **Module 2: AC Circuits (9 hours)**

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections.

### **Module 3: Transformers (9 hours)**

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, voltage regulation and efficiency.

### **Module 4: Induction Machines (9 hours)**

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor, Single-phase induction motor.

### **Module 5: Electrical Installations (6 hours)**

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing, Elementary calculations for energy consumption.

## **6. Text /Reference Books:**

1. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
2. T. K. Nagsarkar and M. S. Sukhija, "Basic Electrical Engineering", Oxford University Press, 2017.
3. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
4. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson 2010.

## **7. List of Laboratory Experiments/Demonstrations: As per syllabus**

## **8. Marks Distribution**

I Pre final Exam	
II Pre final Exam	As per University Academic Regulations
Lab Final Exam	
Final Exam	
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Electrical Circuit Analysis, TEE-201</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>4(3-1-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the analysis of electrical circuits as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	Is this course intended to replace an existing course(s)?	<b>Yes</b>	

13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Electrical Circuit Analysis**

**2. Course No.** : **TEE-201**

**3. Credits Hours** : **4(3-1-0)**

**4. Per-requisite** : **NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Basic Concepts and Kirchhoff's Laws (8 Hours)**

Circuit analysis-an overview, Comparison between circuit theory and electromagnetic field theory, Voltage and current, properties of the ideal basic circuit elements, classification of the ideal basic circuit elements, voltage and current sources, independent and dependent sources, voltage-current relationship for the ideal basic circuit elements, source transformation, power and energy, Kirchhoff's Voltage Law (KVL), Kirchhoff's Current Law (KCL), voltage and current divider circuits, equivalent resistance computation, star-delta equivalent circuits, Mesh analysis using matrices for resistive circuits having independent voltage sources only, Node analysis using matrices for resistive circuits having independent current sources only, Analysis of circuits using supernode and supermesh, Node

analysis of resistive circuits having dependent sources, Mesh analysis of resistive circuits having dependent sources.

### **Module 2: Network Theorems (8 Hours)**

Superposition theorem, Thevenin theorem, Norton theorem, Maximum power transfer theorem, Reciprocity theorem, Compensation theorem. (All theorems for dc resistive circuits only.)

### **Module 3: Solution of First and Second order networks (8 Hours)**

Solution of first and second order differential equations for Series and parallel R-L, R-C, RLC circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response.

### **Module 4: Sinusoidal steady state analysis (8 Hours)**

Representation of sine function as rotating phasor, Phasor diagrams, Impedances and admittances, AC circuit analysis, Effective or RMS values, Concept of power in AC circuits: instantaneous power, average power / real power / active power, reactive power, apparent power, power factor, power triangle, and complex power, Maximum power transfer theorem for AC circuits, Series and parallel resonance, Bandwidth and quality factor.

### **Module 5: Three-Phase Circuits and Magnetically Coupled Circuits (8 Hours)**

Overview of three-phase circuits, Star and delta connected circuits, analysis of balanced three phase circuits, Power calculation of three phase circuits, Measurement of average power in three phase circuits, Mutually coupled circuits, Dot convention in coupled circuits.

### **6. Text /Reference Books:**

1. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
2. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.
3. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999.

### **7. Marks Distribution:** As per University Academic Regulations



**PROPOSAL FOR A NEW COURSE**

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Analog Electronics</b> <b>TEE-202</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>4(3-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the analog electronic circuits as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>Yes</b>
		F. a summarizing or integrated course	<b>No</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	

12	The course will not replace my existing courses	<b>No it is a New Course</b>
13	The courses will not require additional staff over and above	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Analog Electronics**

**2. Course No.** : **TEE-202**

**3. Credits Hours** : **4 (3-0-2)**

**4. Per-requisite** : **NIL**

### **5. Syllabus /Catalogue Description**

#### **Module 1: Transport phenomena in semiconductors :( 2 Hours)**

Mobility and Conductivity, Intrinsic and extrinsic semiconductors, Hall Effect, Generation and Recombination of charges, injected minority carrier charge.

#### **Module 2: Diode circuits (4 Hours)**

P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, Zener diodes, clamping and clipping circuits.

#### **Module 3: BJT circuits (8 Hours)**

Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: small-signal model, biasing circuits, current mirror; common-emitter, common-base and common collector amplifiers;

Small signal equivalent circuits, high-frequency equivalent circuits

#### **Module 4: MOSFET circuits (8 Hours)**

MOSFET structure and I-V characteristics.

MOSFET as a switch. MOSFET as an amplifier: small-signal model and biasing circuits, common-source, common-gate and common-drain amplifiers; small signal equivalent circuits- gain, input and output impedances, transconductance, high frequency equivalent circuit.

#### **Module 5: Differential, multi-stage and operational amplifiers (8 Hours)**

Differential amplifier; power amplifier; direct coupled multi-stage amplifier;, ideal op-amp, non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product).

#### **Module 6: Applications of op-amp (6 Hours)**

Idealized analysis of op-amp circuits. Inverting and non-inverting amplifier, differential amplifier, instrumentation amplifier, integrator, active filter, voltage regulator, oscillators (Wein bridge and phase shift).Schmitt trigger, Sample and hold circuits, Zero Crossing Detector, Precision rectifier, peak detector

#### **6. Text /Reference Books:**

1. Integrated Electronics by Millman & Halkias
2. Electronic Devices and Circuit Theory by Boylestad

#### **7. List of Laboratory Experiments/Demonstrations: As per syllabus**

#### **8. Marks Distribution**

I Pre final Exam

II Pre final Exam

As per University Academic Regulations

Lab Final Exam

Final Exam

Total

100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Measurements and Instrumentation</b> <b>TEE-203</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>3(2-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the Measurements and Instrumentation as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>No</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	

12	The course will not replace my existing courses	<b>Yes</b>
13	The courses will not require additional staff over and above	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Measurements and Instrumentation**

**2. Course No. : TEE-203**

**3. Credits Hours : 3 (2-0-2)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Introduction to units, standards & errors (6 hours)**

Introduction to units and standards, Errors and their types, Statistical analysis applied to measurements, Mean standard deviation, concepts in measurements: True value, accuracy, precision, resolution, drift, hysteresis, dead band, sensitivity.

##### **Module 2: Current and voltage measurement (6 hours)**

Types of analog ammeters and voltmeters, errors in ammeters and voltmeters, PMMC and MI instruments, construction and principle of operation, range extension of PMMC instruments,

advantages and disadvantages. Instrument transformers: CT, PT, Ratio and phase angle errors, design considerations, characteristics, testing methods.

### **Module 3: Measurement of R, L and C (6 hours)**

Measurement of R: Classification of resistances, measurement of medium high and low resistances, Earth resistance and localization of cable faults. A.C. bridges for measurement of L and C: general equation for bridges, Maxwell's Hays Anderson, Owen's, De-Sauty's bridge, Schering Bridge

### **Module 4: Measurement of Energy, phase & frequency (6 hours)**

Measurement of Energy, Phase and power factor: Induction type energy meters, construction, working, torque equations, errors and compensation, Introduction to digital energy meters, Introduction to phase frequency and PF measurement.

### **Module 5: Sensors and transducers (6 hours)**

Displacement measurement, pressure, temp, torque, strain, flow speed and position measurement.

### **Module 6: Digital instruments and CRO (6 hours)**

Digital multi-meters, clamp-on meters, meggers, CRO and Its applications: Introduction to the front panel switches and control, Measurement of Phase and frequency using lissajous patterns, Introduction to probes and their applications.

## **6. Text /Reference Books:**

- (i) Electrical Measurements & Measuring Instruments- Golding & Widdis.**
- (ii) Instrumentation Devices & Systems- Rangan, Mani & Sharma**
- (iii) Electrical & Electronic Measurements & Instrumentation**
- (iv) Instrument Transducers- Hermann K P Neubert**

## **7. List of Laboratory Experiments/Demonstrations: As per syllabus**

## **8. Marks Distribution**

I Pre final Exam

II Pre final Exam

As per University Academic Regulations

Lab Final Exam

Final Exam

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Total

100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>
2	Department	<b>Electrical Engineering</b>
3	Title of the Course & Course No.	<b>Electrical Machines I TEE-206</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Electrical Engineering</b>
6	Credits	<b>3(2-1-0)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>As per AICTE</b>
9	General educational purpose	A. General Education <b>No</b> B. department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>
13	The courses will not require additional	<b>Yes</b>

	staff over and above	
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>No</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Electrical Machines I**

**2. Course No. : TEE-206**

**3. Credits Hours : 3(2-1-0)**

**4. Per-requisite : Nil**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Magnetic fields and magnetic circuits (4 Hours)**

Review of magnetic circuits - MMF, flux, reluctance, inductance; review of Ampere Law and Biot Savart Law; Visualization of magnetic fields produced by a bar magnet and a current carrying coil - through air and through a combination of iron and air; influence of highly permeable materials on the magnetic flux lines.

##### **Module 2: Single-Phase Transformer (7 Hours)**

Basic Principle of Transformer, Construction details of Transformer( shell type and core type), Performance and Operation of Single- Phase Transformer( ideal and real transformers) (i) under no load (ii) under load conditions, Equivalent Circuit of a Single-Phase Transformer, Determination of Equivalent Circuits Parameters of Single-Phase Transformer (i) open circuit test (ii) short circuit tests.

### **Module 3: Voltage regulation & efficiency (5 Hours)**

Voltage Regulation of Transformers (i) derivation of voltage regulation (ii) condition for maximum voltage regulation (iii) variation of voltage regulation with load power factor, Transformer Efficiency (i) condition for maximum efficiency (ii) separation of hysteresis and eddy current losses (iii) all day efficiency (iv) sumpner's test.

### **Module 4: Parallel Operation of Single-Phase Transformer& Auto transformer(4 Hours)**

Transformer Polarity and polarity test, Parallel Operation of Single-Phase Transformers, Auto-Transformer (a) Basic Configuration (b) Advantages/Disadvantages of Auto-transformer over Conventional Two-winding.

### **Module 5: Three-Phase Transformer (8 Hours)**

Three-phase Transformers Connections, Three-phase Transformer construction, Transformer Vectors Groups, Grounding Transformers Parallel Operation of Three-Phase Transformers, Open-delta Connection (V-V Connection or V Connection), Three-phase to Two-phase conversion (Scott Connection), Three-phase to Multi-phase Transformer Connections, Harmonics in Transformers, Tap-changing transformers - No-load and on-load tap-changing of transformers.

### **6. Text /Reference Books:**

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
5. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

### **7. Marks Distribution:** As per University Academic Regulations

## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Electromagnetic Fields</b> <b>TEE-207</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>4(3-1-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the electrostatic – magnetostatic fields and waves as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	

12	The course will not replace my existing courses	<b>Yes</b>
13	The courses will not require additional staff over and above	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Electromagnetic Fields**

**2. Course No. : TEE-207**

**3. Credits Hours : 4 (3-1-0)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Review of Vector Calculus (6 hours)**

Vector algebra- addition, subtraction,

Components of vectors, scalar and vector multiplications, triple products, three orthogonal coordinate systems (rectangular, cylindrical and spherical). Vector calculus differentiation, partial differentiation, integration, vector operator Del, gradient, divergence and curl; integral theorems of vectors, Conversion of a vector from one coordinate system to another.

## **Module 2: Static Electric Field (6 Hours)**

Coulomb's law, Electric field intensity, Electrical field due to point charges. Line, Surface and Volume charge distributions. Gauss law and its applications. Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.

## **Module 3: Conductors, Dielectrics and Capacitance (6 Hours)**

Current and current density, Ohms Law in Point form, Continuity of current, Boundary conditions of perfect dielectric materials. Permittivity of dielectric materials, Capacitance, Capacitance of a two wire line, Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation, Application of Laplace's and Poisson's equations.

## **Module 4: Static Magnetic Fields (6 Hours)**

Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors.

## **Module 5: Magnetic Forces, Materials and Inductance (6 Hours)**

Force on a moving charge, Force on a differential current element, Force between differential current elements, Nature of magnetic materials, Magnetization and permeability, Magnetic boundary conditions, Magnetic circuits, inductances and mutual inductances.

## **Module 6: Time Varying Fields and Maxwell's Equations (6 Hours)**

Faraday's law for Electromagnetic induction, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations, Motional Electromotive forces, Boundary Conditions.

## **Module 7: Electromagnetic Waves (6 Hours)**

Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Wave equation in Phasor form, Plane waves in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors, Skin effect. Poynting theorem.

### **6. Text /Reference Books:**

1. Kraus, J.D. "Electromagnetics", 1973, MGH.
2. William, H. Hayt, "Engineering Electromagnetics, MGH".

3. Jordon, E.C., and Balman, K.G., "Electromagnetic waves and Radiating systems".

**7 List of Laboratory Experiments/Demonstrations: NIL**

**8. Marks Distribution**

As per University Academic Regulations

## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Microprocessors</b> <b>TEE-208</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>4(3-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the microprocessors as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>Yes</b>
		F. a summarizing or integrated course	<b>No</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing	<b>Yes</b>	

	courses	
13	The courses will not require additional staff over and above	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Microprocessors**

**2. Course No. : TEE-208**

**3. Credits Hours : 4 (3-0-2)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Fundamentals of Microprocessors: (7 Hours)**

Fundamentals of Microprocessor Architecture. 8-bit Micro processor and Microcontroller architecture, Comparison of microprocessor and microcontrollers, Overview of the 8051 family.

##### **Module 2 : The 8085 Architecture ( 8 Hours)**

Internal Block Diagram, address, Data and control bus, registers, Stack and Stack Pointer, Program Counter, I/O ports, Memory structures, Timing diagrams and Execution Cycles.

### **Module 3: Instruction Set and Programming (8 Hours)**

Addressing modes: Introduction, Instruction syntax, Data types, Immediate addressing, Register addressing, Direct addressing, Indirect addressing, Relative addressing, Indexed addressing, Bit inherent addressing, bit direct addressing. 8051 Instruction set, Instruction timings. Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction. Assembly language programs, C language programs. Assemblers and compilers. Programming and debugging tools.

### **Module4: Memory and I/O Interfacing (6 Hours):**

Concepts of interfacing of memory and peripheral devices, Block diagram and operation of 8155 and 8255, ADC, DAC, timers, counters, memory devices.

### **Module 5: Applications (06 Hours)**

LED and keyboard interfacing. Stepper motor interfacing, application of microprocessor in power system.

### **6. Text /Reference Books:**

- S. Gaonkar, „, Microprocessor Architecture: Programming and Applications with the 8085”
- K. J. Ayala, “ 8051 Microcontroller”
- D. V. Hall, “Microprocessors & Interfacing”, McGraw Hill Higher Education

### **7. List of Laboratory Experiments/Demonstrations: As per syllabus**

### **8. Marks Distribution**

I Pre final Exam

II Pre final Exam As per University Academic Regulations

Lab Final Exam

Final Exam

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Total

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100 Marks



## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>
2	Department	<b>Electrical Engineering</b>
3	Title of the Course & Course No.	<b>Network Analysis and Synthesis, TEE-209</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Electrical Engineering</b>
6	Credits	<b>3(2-1-0)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>To provide better understanding about the analysis and synthesis of electrical networks as per AICTE model curriculum</b>
9	General educational purpose	A. General Education
		B. Department specialization
		C. Students Research
		D. Outgrowth of instructors Research Programme
10	Relation to other courses	A. Pre-requisite
		B. An introductory survey of knowledge represented by the department
		C. An introductory survey of a special area of knowledge
		D. A further development of course
		E. An introductory survey of a special area of knowledge represented by some other department
		F. A summarizing or integrated course
		G. In your judgment does this course overlap to a considerable extent with any other course.
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	Is this course intended to replace an existing course(s)?	<b>Yes</b>

13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Network Analysis and Synthesis**

**2. Course No.** : **TEE-209**

**3. Credits Hours** : **3(2-1-0)**

**4. Per-requisite** : **NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Electrical Circuit Analysis Using Laplace Transforms (6 Hours)**

Review of Laplace Transform and inverse Laplace transform, Analysis of electrical circuits using Laplace Transform for standard inputs, Analysis of transformed networks with initial conditions.

##### **Module 2: Network Functions (6 Hours)**

Terminal pairs or ports, Concept of network functions in network analysis and synthesis, Driving-point immittance functions for one-port networks, Driving-point immittance functions and transfer functions

for two-port networks, Impulse response, Convolution integral and its application in the determination of response to any arbitrary excitation using impulse response, Poles and Zeros.

### **Module 3: Two-Port Network Parameters (6 Hours)**

Relationship of two port variables, Two-port parameters: open-circuit impedance parameters, short-circuit admittance parameters, transmission parameters, inverse transmission parameters, hybrid parameters, and inverse hybrid parameters, Equivalent circuits in terms of two-port parameters, Interconnections of two port networks, Interrelationships between parameters, Conditions of reciprocity and symmetry in terms of two-port parameters, Input and output impedances in terms of two-port parameters, Short-circuit and open-circuit impedances, Image impedances, Characteristic impedance.

### **Module 4: Network Graphs (6 Hours)**

Basic Terminology of Network Topology, Types of Graphs, Subgraphs, Tree and Co-tree, Twigs and links, Cut-sets and Tie-sets, Matrices associated with network graphs: Incidence matrix, Cut-set matrix, Tie-set matrix, KCL and KVL equations using network graphs, Concept of duality and dual networks.

### **Module 5: Network Synthesis (6 Hours)**

Elements of realizability theory, Stability, Hurwitz polynomials, Positive-real functions, Elementary synthesis procedures and concept of removal of poles, Use of partial fraction expansion in synthesis of the networks in Foster forms, Use of continued fraction expansion in synthesis of the networks in Cauer forms, Properties of L-C driving-point immittance functions, Synthesis of L-C driving-point immittance functions, Properties of R-C driving-point impedance functions or R-L driving-point admittance functions, Synthesis of R-C driving-point impedance functions and R-L driving-point admittance functions, Properties of R-C driving-point admittance functions or R-L driving-point impedance functions, Synthesis of R-C driving-point admittance functions and R-L driving-point impedance functions.

### **6. Text /Reference Books:**

1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
2. D. Roy Choudhury, "Networks and Systems", New Age International Publications, 1998.
3. F.F. Kuo, "Network Analysis and Synthesis".
4. M. E. Van Valkenburg, "Introduction to Modern Network Synthesis", John Wiley & Sons, 1966

### **7. Marks Distribution:** As per University Academic Regulations

## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Power Electronics</b> <b>TEE-311</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>4(3-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the Power Electronics Devices and circuits as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>Yes</b>
		F. a summarizing or integrated course	<b>No</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	

12	The course will not replace my existing courses	<b>Yes</b>
13	The courses will not require additional staff over and above	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Power Electronics**

**2. Course No. : TEE-311**

**3. Credits Hours : 4 (3-0-2)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Power switching devices (8Hours)**

Power semiconductor devices: Diode, Thyristor, GTO, Triac, power transistor, MOSFET, IGBT, I-V Characteristics; Firing circuit for thyristor; Voltage and current commutation of a thyristor; Gate drive circuits for MOSFET and IGBT.

##### **Module 2: Thyristor rectifiers (7Hours)**

Single-phase half-wave and full-wave rectifiers, Single-phase full-bridge thyristor rectifier with R-load and highly inductive load; Three-phase full-bridge thyristor rectifier with R-load and highly inductive load; Input current wave shape and power factor.

### **Module 3: DC-DC buck converter (5Hours)**

Elementary chopper with an active switch and diode, concepts of duty ratio and average voltage, power circuit of a buck converter, analysis and waveforms at steady state, duty ratio control of output voltage.

### **Module 4: DC-DC boost converter (5Hours)**

Power circuit of a boost converter, analysis and waveforms at steady state, relation between duty ratio and average output voltage.

### **Module 5: Single-phase voltage source inverter (10Hours)**

Power circuit of single-phase voltage source inverter, switch states and instantaneous output voltage, square wave operation of the inverter, concept of average voltage over a switching cycle, bipolar sinusoidal modulation and unipolar sinusoidal modulation, modulation index and output voltage

### **Module 6: Three-phase voltage source inverter (8Hours)**

Power circuit of a three-phase voltage source inverter, switch states, instantaneous output Voltages.

### **Module 7: AC regulators, controlled reactors, switched mode power supply**

## **6. Text /Reference Books:**

**16.**Singh & Khanchandani, " Power electronics"

**17.** M. H. Rashid, " Power electronics: circuits, devices, and applications"

**18.** N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design",

## **7. List of Laboratory Experiments/Demonstrations: As per syllabus**

## **8. Marks Distribution**

I Pre final Exam

II Pre final Exam

Lab Final Exam

As per University Academic Regulations

Final Exam

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Total

100 Marks  
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>
2	Department	<b>Electrical Engineering</b>
3	Title of the Course & Course No.	<b>Electrical Machines II</b> <b>TEE-312</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Electrical Engineering</b>
6	Credits	<b>4(2-1-2)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>As per AICTE</b>
9	General educational purpose	A. General Education B. department specialization C. Students Research D. Outgrowth of instructors Research Programme
10	Relation to other courses	A. Pre-requisite B. An introductory survey of knowledge represented by the department C. An introductory survey of a special area of knowledge D. A further development of course E. An introductory survey of a special area of knowledge represented by some other department F. a summarizing or integrated course G. in your judgment does this course overlap to a considerable extent with any other course.
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>

13	The courses will not require additional staff over and above	<b>Yes</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Yes</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Electrical Machines II**

**2. Course No.** : **TEE 312**

**3. Credits Hours** : **4(2-1-2)**

**4. Per-requisite** : **Nil**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Basic Concepts of Electrical Machines (4 Hours)**

Electromechanical Energy Conversion, Energy Balance During Electromechanical Energy conversion, Force and Torque in Electromechanical Systems, Doubly excited and Singly excited Electromechanical Systems, General Concepts of Rotating Machine , Physical Concept of Torque production in Electrical Machines,

##### **Module 2: AC Armature winding (5 Hours)**

Winding of AC Machines, Distribution factor & pitch factor, Integral and fractional slot winding, MMF of Distributed AC Winding Materials Used in Electrical Machines

##### **Module 3: Theory, Construction, Operation & Performance of 3-ph. Induction Motors (9 Hours)**

Basic Principle of Electromagnetic Induction, Generation of Rotating Magnetic Field, Constructional Details, Applications of Induction Motors, Rotor Induced EMF, Power flow in an Induction Motor, Equivalent Circuit of an Induction Motor, Analysis of Induction Motor Equivalent Circuit Determination of Equivalent Circuit Parameters of a 3-phase Induction Motor Tests on Induction Motors as per Indian Standards, Induction Motor Performance Characteristics

#### **Module 4: Starting, Speed Control, and Braking of Three-phase Induction Motors (4 Hours)**

Starting of Three-phase Induction Motor, Speed Control of Three-phase Induction Motor, Electric Braking Induction Motors, Abnormal Operating Conditions in Three-phase Induction Motors, Induction Motor Dynamics, Double cage & deep bar rotor, self-excited Induction generator, Standard Classification of Squirrel Cage Motors

#### **Module 5: Single-phase Induction Motors (6 Hours)**

Pulsating field & double revolving field theory, Two-phase Induction Motor, Starting methods of Single-phase Induction Motor, Equivalent Circuit of an Single-phase Induction Motor, Power flow in an Single-phase Induction Motor, Condition for maximum starting torque, Determination of Equivalent Circuit Parameters of a Single -phase

Induction Motor by laboratory tests

#### **6. Text /Reference Books:**

1. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
4. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
5. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.
6. P. C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 2007.

#### **7. List of Laboratory Experiments/Demonstrations:** As per syllabus.

#### **8. Marks Distribution:** As per University Academic Regulations

## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Power System I</b> <b>TEE-314</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>3(2-1-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>As per AICTE</b>	
9	General educational purpose	A. General Education B. department specialization C. Students Research D. Outgrowth of instructors Research Programme	Yes Yes Yes No
10	Relation to other courses	A. Pre-requisite B. An introductory survey of knowledge represented by the department C. An introductory survey of a special area of knowledge D. A further development of course E. An introductory survey of a special area of knowledge represented by some other department F. a summarizing or integrated course G. in your judgment does this course overlap to a considerable extent with any other course.	Nil No Yes Yes No No No
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>Course will replace mostly replace the existing EPTD course</b>	

13	The courses will not require additional staff over and above	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Power System I**

**2. Course No. : TEE-314**

**3. Credits Hours : 3 (2-1-0)**

**4. Per-requisite : NIL**

### **5. Syllabus /Catalogue Description**

#### **Module 1: Basic Concepts (5 hours)**

Evolution of Power Systems and Present-Day Scenario. Structure of a power system: Bulk Power Grids and Micro-grids. Generation: Conventional and Renewable Energy Sources. Distributed Energy Resources. Energy Storage. Transmission and Distribution Systems: Line diagrams, transmission and distribution voltage levels and topologies (meshed and radial systems). Review of Three-phase systems. Analysis of simple three-phase circuits. Power Transfer in AC circuits and Reactive Power. Brief description of power system elements: Synchronous machine, transformer, transmission line, Bus-bar, Circuit breakers and isolator, substations.

#### **Module 2: Overhead Transmission Lines parameters (12 Hours)**

Conductor materials, Types of conductors, calculation of resistance, review of Inductance and ampere circuital law flux linkages and magnetic field, Inductance of single phase two wire system, flux linkages and inductance of single phase, composite conductors, concept of DMD/GMR and application for

calculating inductance, bundled conductors, Transposition of transmission lines, Inductance of three phase (symmetrical & asymmetrical lines assuming transposition), inductance of bundled conductors, inductance of double circuit transmission lines. Review of capacitance and electrostatic field, capacitance of single phase two wire system, potential difference between two conductors in a group of conductors, capacitance of three phase (symmetrical & asymmetrical lines assuming transposition), Capacitance of bundled conductors, Capacitance of double circuit transmission lines. Effect of earth on the transmission line capacitance. Performance of Transmission lines: Classifications and modelling of transmission lines. Calculation of voltage regulation, efficiency, ABCD parameters of short , medium and long transmission lines. characteristic impedance and surge impedance loading. Skin effect, proximity effect and Ferranti effect. Line load ability

### **Module 3: Overhead Line insulators and corona phenomena (8 hrs)**

Overhead line insulators: materials and types of overhead line insulators, potential distribution over a string of suspension insulators. String efficiency. Methods of equalizing the potentials. Corona phenomena, electrical stress at conductor surface and critical disruptive voltage, visual critical disruptive voltage, effect of surface, temperature, pressure on critical disruptive voltage, power loss due to corona, factors affecting the corona loss. Advantages and disadvantages of corona.

### **Module 4: Underground cables (5 hrs)**

General construction and types of cables. Insulation resistance. Electric stress distribution. Capacitance of 1-core and 3-core cables. Introduction to oil filled and gas filled E.H.V. cables. comparison of overhead lines and underground cables. dielectric loss and heating of cables. Basic step in cable laying.

### **Module 5: Introduction to EHV& HVDC Transmission Systems (6 Hours)**

Need of EHV and HVDC transmission, advantages and disadvantages of EHV & HVDC. Comparison of EHV & HVDC. Types of HVDC. Brief description of different converters and components of HVDC systems.

### **Module 6: Distribution system: (6 Hours)**

Classification of distribution system, voltage drop calculation of DC radial, ring distribution fed with concentrated load, distributed load and mixed load feeder with one end and both ends. Voltage drop calculation of AC radial system. Kelvins law.

### **6. Text /Reference Books:**

1. Element of Power System Analysis - W.D. Stevenson.
2. Electric Energy System Theory - O.I. Elgerd.

**7. List of Laboratory Experiments/Demonstrations: NIL**

**8. Marks Distribution**

I Pre final Exam

II Pre final Exam

Lab Final Exam

Final Exam As per University Academic Regulations

----- Total 100 Marks -----



## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Electrical Materials</b> <b>TEE-315</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To understand the concept of various types of Engineering materials.</b>	
9	General educational purpose	A. General Education	No
		B. department specialization	Yes
		C. Students Research	Yes
		D. Outgrowth of instructors Research Programme	No
10	Relation to other courses	A. Pre-requisite	Nil
		B. An introductory survey of knowledge represented by the department	No
		C. An introductory survey of a special area of knowledge	Yes
		D. A further development of course	No
		E. An introductory survey of a special area of knowledge represented by some other department	No
		F. a summarizing or integrated course	No
		G. in your judgment does this course overlap to a considerable extent with any other course.	No
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing	<b>Yes</b>	

	courses	
13	The courses will not require additional staff over and above	<b>Not required</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engineering Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>N/A</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Electrical Materials**

**2. Course No. : TEE-315**

**3. Credits Hours : 3(3-0-0)**

**4. Per-requisite : Nil**

### **5. Syllabus /Catalogue Description**

#### **Module1: Dielectric Materials (6 Hours)**

Insulator for electrical and electronic applications, Dielectric gases, Liquid insulating materials, solid insulation materials. Films, Insulating materials for electrical devices, Insulating measurements (Electric Strength of Liquids). Effect of Electric Fields on Insulators: Results of field theory; Electronic, Ionic and orientation polarization in static fields, Ferro electricity; Complex dielectric constant and lossy dielectrics; Ferroelectric energy conversion.

#### **Module2:Metals, Semiconductors, and Insulators (6 Hours)**

Band theory of solids, Kronig-Penny model. Distinction between metals, semiconductors, and insulators. Free-electron model of electrons, Effect of electric field on metals; impurities in metals. Intrinsic semiconductors and insulators, Extrinsic semiconductors, Photoconductivity, excitons, and luminescence, Hall Effect and its applications, Special semiconductors.

## **Module3: Magnetic materials and properties (6 Hours)**

Magnetic dipole moment and magnetization, Diamagnetism, Paramagnetism, Ferromagnetism, Domain-Wall motion, Anti ferromagnetism. Ferrimagnetism and ferrites, Cooling by adiabatic demagnetization.

## **Module4: Conductive Materials (6 Hours)**

Conductor materials, Carbon and Graphite (Carbon brushes), Fuses, Superconductivity - Operation, applications.

## **6. Text /Reference Books:**

1. Properties of Electrical Engineering Materials - G.C. Jain
  2. A course in Electrical Engineering Materials - S.P. Seth & P.V. Gupta
  3. Electrical Engineering materials - A.J. Dekker.

## **7. Marks Distribution**

I	Pre final Exam
II	Pre final Exam
	Lab Final Exam
Final Exam	As per University Academic Regulations
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Total	100 Marks



## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Control System I TEE-316</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>4(3-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give theoretical and practical knowledge in the field of Control System to the students.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>Yes</b>	

13	The courses will not require additional staff over and above	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B.Tech. Electrical Engg.</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course : Control System I**  
**2. Course No. : TEE-316**  
**3. Credits Hours : 4(3-0-2)**  
**4. Per-requisite : Nil**

### **5. Syllabus /Catalogue Description**

#### **Module 1: Introduction to control problem (10 hours)**

Industrial Control examples, Mathematical models of physical systems, Review of Laplace transform, Transfer function models of linear time-invariant systems, Feedback Control: Open-Loop and Closed-loop systems with examples, Benefits of Feedback, Effect of disturbance, Block diagram algebra, Signal Flow Graphs.

#### **Module 2: Time Response Analysis (10 hours)**

Standard test signals, Time response of first and second order systems, Transient response, Design specifications for second-order systems based on the time-response, Steady state response, Steady state errors, Concept of Stability, Routh-Hurwitz Criteria, Relative Stability analysis, Root-Locus technique, Construction of Root-loci, Effects of addition of poles and zeros.

#### **Module 3: Frequency-response analysis (10 hours)**

Relationship between time and frequency response, Frequency response specifications, Polar plots, Bode plots, All pass and minimum phase systems, Experimental determination of transfer functions, Nyquist stability criterion. Relative stability– gain and phase margin.

#### **Module 4: State variable Analysis (10 hours)**

Concepts of state variables, State space models, Diagonalization of State Matrix, state transition matrix, Solution of state equations, Eigen values and Stability Analysis, Transfer matrix, Concept of controllability and observability.

## **Module 5: Controllers and Compensation (5 hours)**

Industrial control actions, Proportional, Derivative and Integral controllers, Effects of Derivative and Integral Control on time response, Compensation techniques: Lead, Lag and Lag-lead Compensation.

## **6. Text /Reference Books:**

- 1. Automatic Control System - B.C. Kuo
  - 2. Modern Control Engineering - K. Ogata
  - 3. Control System Engineering - I. J. Nagrath & M. Gopal

## **7. List of Laboratory Experiments/Demonstrations: As per syllabus**

## **8. Marks Distribution**

I	Pre final Exam
II	Pre final Exam
	Lab Final Exam
Final Exam	As per University Academic Regulations
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Software Tools for Electrical Engineering Applications, TEE-317</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>1(0-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide basic knowledge of various software tools used for Electrical Engineering applications and to make the students familiar with handling of these software tools</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>Yes</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>No</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>Yes</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	

12	Is this course intended to replace an existing course(s)?	<b>Yes</b>
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>No lecture in this course</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Modernization of software and hardware facilities in PC Lab of the department would be required</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Software Tools for Electrical Engineering Applications**

**2. Course No. : TEE-317**

**3. Credits Hours : 1(0-0-2)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

#### **Software Tools for Electrical Engineering Applications**

This course will consist of laboratory classes on following software tools:

1. MATLAB
2. PSPICE
3. LABVIEW
4. QUICKFIELD

#### **List of Experiments:**

**Module 1:** To understand MATLAB programming:

- a. To get acquainted with matrix as a basic data element and elementary matrix operations
- b. To get acquainted with script m-files, functions, and function m-files
- c. To get acquainted with control structures
- d. To get acquainted with elementary graphics.

**Module 2:** To understand circuit simulation using PSPICE:

- a. To get acquainted with basics of PSPICE, simulation steps, control statements, and component values
- b. To get acquainted with DC sweep analysis and dependent sources
- c. To get acquainted with AC sweep analysis
- d. To get acquainted with Transient analysis

**Module 3:** To understand the basics of LabVIEW:

- a. To get acquainted with front panel and block diagram, controls, and indicators
- b. To get acquainted with for loop, while loop, case, sequence, structure, formula node, array, and graphs
- c. To get acquainted with file I/O
- d. To get acquainted with basics of data acquisition.

**Module 4:** To understand the basics of QUICKFIELD:

- a. To get acquainted with GUI of QUICKFIELD software and Electrostatics analysis
- b. To get acquainted with DC Magnetics analysis
- c. To get acquainted with DC Conduction analysis
- d. To get acquainted with AC Conduction analysis

**6. Text /Reference Books:**

1. Rudra Pratap, "Getting Started with MATLAB: A Quick Introduction for Scientists & Engineers", Oxford, 2010
2. Sanjay Gupta, Joseph John, "Virtual Instrumentation Using Labview", McGraw Higher Ed., 2010
3. Muhammad H. Rashid, "SPICE for Circuits and Electronics Using PSPICE", Prentice Hall, 1995
4. Eugene Mazin, Simon Dubitsky, Vadimir Podnos, Alex Lyubimtsev, "Quickfield 6.3 User's Guide" Create space Independent Pub., 2017

**7. Marks Distribution**

I Pre final Exam

II Pre final Exam

Lab Final Exam

Final Exam

As per University Academic Regulations

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Total

100 Marks  
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Power System II</b> <b>TEE-318</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes, As per AICTE reforms</b>	
8	Curricular purpose of the course	<b>As per AICTE</b>	
9	General educational purpose	A. General Education B. department specialization C. Students Research D. Outgrowth of instructors Research Programme	Yes Yes Yes No
10	Relation to other courses	A. Pre-requisite B. An introductory survey of knowledge represented by the department C. An introductory survey of a special area of knowledge D. A further development of course E. An introductory survey of a special area of knowledge represented by some other department F. a summarizing or integrated course G. in your judgment does this course overlap to a considerable extent with any other course.	Nil No Yes Yes No No No
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>Course will replace mostly replace the existing TEE-373(EPSO ) course</b>	

13	The courses will not require additional staff over and above	<b>No, as whole graduation requirement is being revised as per AICTE</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Power System II**

**2. Course No. : TEE-318**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

#### **5. Syllabus / Catalogue Description:**

##### **Module 1: Electrical power generation: (4 hours)**

Sources of electrical power generation. Hydro, thermal and nuclear power generation, Advantages disadvantages, methods.

##### **Module 2: Power Flow Analysis (8 hours)**

Review of complex power. Bus classification. Formation of Bus Admittance Matrix. Real and reactive power balance equations at a node. Load and Generator specifications. Application of numerical methods for solution of nonlinear algebraic equations – Gauss Seidel, Newton-Raphson and fast decoupled methods for the solution of the power flow equations. Computational Issues in Large-scale Power Systems.

### **Module 3: Load frequency control (7 hours)**

Turbines and Speed-Governors, Frequency dependence of loads, Droop Control and Power Sharing. Automatic Generation Control. Generation and absorption of reactive power by various components of a Power System. Excitation System Control in synchronous generators, Automatic Voltage Regulators. ALFC

### **Module:4 Reactive power control and FACT (8 hours)**

Voltage Control: Methods of voltage control: series and shunt capacitors, tap changing transformers, synchronous motors etc. Power factor correction: calculation of shunt capacitance for power factor correction. FACTS and Transmission line Compensation: FACT controllers (series, Shunt and combined), Series and Shunt Compensators, load ability, understanding of voltage stability.

### **Module 5: Monitoring and Emergency Control (7 hours)**

Overview of Energy Control Centre Functions: SCADA systems. State-estimation. System Security Assessment. Normal, Alert, Emergency, Extremis states of a Power System. Contingency Analysis. Preventive control and emergency control.

### **Module 6: Power System Economics and Management (8 hours)**

Basic Pricing Principles: Generator Cost Curves, Utility Functions, Power Exchanges, SpotPricing. Electricity Market Models (Vertically Integrated, Purchasing Agency, Whole-sale competition, Retail Competition), Demand Side-management, Transmission and Distributions charges, Ancillary Services. Regulatory framework, load curve and load duration curve, load factor, connected load, diversity factor, utilization factor and others terms. Load forecasting and tariff. Operational strategy to meet demand. Optimum scheduling of steam power plant for lossless and lossy transmission system. Penalty factor.

### **6. Text /Reference Books:**

1. Element of Power System Analysis - W.D. Stevenson.
2. Electric Energy System Theory - O.I. Elgerd.
3. Power system Analysis and Design – B.R. Gupta
4. Electrical Power system- C.L. Wadhawa

### **7. Marks Distribution**

As per university regulation



## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>
2	Department	<b>Electrical Engineering</b>
3	Title of the Course & Course No.	<b>Electrical Machines III</b> <b>TEE-319</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Electrical Engineering</b>
6	Credits	<b>5(3-1-2)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>As per AICTE</b>
9	General educational purpose	A. General Education B. department specialization C. Students Research D. Outgrowth of instructors Research Programme
10	Relation to other courses	A. Pre-requisite B. An introductory survey of knowledge represented by the department C. An introductory survey of a special area of knowledge D. A further development of course E. An introductory survey of a special area of knowledge represented by some other department F. a summarizing or integrated course G. in your judgment does this course overlap to a considerable extent with any other course.
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>

13	The courses will not require additional staff over and above	<b>Yes</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Yes</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Electrical Machines III**

**2. Course No.** : **TEE-319**

**3. Credits Hours** : **5(3-1-2)**

**4. Per-requisite** : **Nil**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Theory, Construction, and Operation of DC Machines (8 Hours)**

Basic Principles, Fundamentals of DC Generator, Fundamentals of DC Motor, Constructional Features of DC Machine , Armature Winding in DC Machine, Commutation Process, Armature Reaction , Methods of Compensating the Effects of Armature Reaction, Energy Conversion in DC Machine, Circuit Model of DC Machines

##### **Module 2: Operation control & testing of DC machines (8 Hours)**

Excitation in DC Machines, Operating Characteristics of DC Generators, Parallel Operation of DC Generators, Operating Characteristics of DC Motors, Starting of DC Motors, Speed Control of DC Motors, Braking of DC Motors, Losses and Efficiency of DC Machines, Testing of DC Machines, Applications of DC Motor & Generator

### **Module 3: Construction, Principle, and Operation of Synchronous Generators (10 Hours)**

Principle Of Operation for Generation of AC supply, Constructional Features of Synchronous Machines, Excitation Systems Used in Rotor Field, Space Distribution of Magnetic Flux, EMF Generation in an Alternator, Phasor Diagram and Equivalent Circuit of an Alternator , Tests for Determination of Synchronous Impedance( Reactance), Determination of Voltage Regulation of an Alternator, Effect of Load Power Factor on Armature Reaction and Terminal Voltage of an Alternator, Power Angle Characteristics of Cylindrical Rotor Alternators, Analysis of Cylindrical Rotor Alternator Considering Armature Resistance, Salient Pole Synchronous Machines and its Two Reaction Model, Power Angle Characteristics of Salient Pole Rotor Alternators

### **Module 4: Parallel Operation and Stability of Alternators (8 Hours)**

Advantages of Parallel Operation of Alternators, Synchronization of Alternators and its Conditions, Methods of Synchronization, Sharing of Load Between Alternators Connected in Parallel, Synchronizing Power During Parallel Operation of Two Alternators, Effect of Change in Mechanical Power Input to The Prime Mover of Alternators Operating in Parallel, Effect of Change in Excitation Given to The Field of Alternators Operating in Parallel, Operation of Alternators Connected to Infinite Busbar, Synchronizing Power and Synchronizing Torque Developed in an Alternator , Connected to Infinite Busbar, Stability of Alternators, Short Circuits Transients in Synchronous Machine, Capability Curve of Alternators, Losses and Efficiency of Synchronous Machine, Application of Synchronous Generators

### **Module 5: Synchronous Motors (8 Hours)**

Constructional Features of Synchronous Motors, Operating Principle of Synchronous Motors, Starting of Synchronous Motors, Equivalent Circuit of Synchronous Motors, Phasor Diagram of Synchronous Motors, Power flow in Synchronous Motors, Expression for Power in Synchronous Motors, Operating Curves of Synchronous Motors, Pull-out Test of Synchronous Motors, Hunting in Synchronous Motors, Synchronous Condenser, Application of Synchronous Motors

### **6. Text /Reference Books:**

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
4. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
5. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.
6. P. C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons,

## **7. List of Laboratory Experiments/Demonstrations: As per syllabus.**

## **8. Marks Distribution**

I	Pre final Exam
II	Pre final Exam
Lab	Final Exam
Final Exam	As per University Academic Regulations
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Total	100 Marks



## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Control System II TEE-320</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>2(2-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give theoretical and practical knowledge in the field of Control System to the students.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>Yes</b>	

13	The courses will not require additional staff over and above	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B.Tech. Electrical Engg.</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course : Control System II**  
**2. Course No. : TEE-320**  
**3. Credits Hours : 2(2-0-0)**  
**4. Per-requisite : Nil**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Closed-loop frequency response (5 hours)**

Concepts of Closed-loop frequency response, Constant M-circles, Constant N-circles, Nicholas chart, closed loop frequency response for unity and non-unity feed-back systems.

##### **Module 2: Discrete-time systems (8 hours)**

Introduction to discrete-time systems, Sampling process, Review of z-transforms, Difference Equations, Hold circuit, Sampling Theorem, Pulse transfer functions, State-space models of linear discrete-time systems. Stability of linear discrete-time systems.

##### **Module3: Non linear Control (5 hours)**

Introduction to Nonlinear system–Basic concepts, Types of non-linearities, phenomenon exhibited, Limit cycles, Describing Functions for major non-linearities, stability analysis.

#### **Module 4: Liapunov Method (5 hours)**

Basic definitions, Stability in the sense of Liapunov, Positive definite functions, Sylvester's criterion, Liapunov theorems, Stability analysis.

#### **Module 5: Optimal Control (5 hours)**

Quadratic Optimal Control Systems, Parameter optimization problem, Quadratic optimal control problems, Solution of Riccati Equation, State feedback control, Output feedback control.

#### **6. Text /Reference Books:**

1. Automatic Control Systems - B.C. Kuo
2. Modern Control Engineering K. Ogata
3. Control System Engineering I.J. Nagrath & M. Gopal

#### **7. List of Laboratory Experiments/Demonstrations: NIL**

#### **8. Marks Distribution**

I Pre final Exam

II Pre final Exam

Lab Final Exam

Final Exam As per University Academic Regulations

----- Total 100 Marks -----



## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Power System III</b> <b>TEE-410</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>4(3-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>As per AICTE</b>	
9	General educational purpose	A. General Education	Yes
		B. department specialization	Yes
		C. Students Research	Yes
		D. Outgrowth of instructors Research Programme	No
10	Relation to other courses	A. Pre-requisite	Nil
		B. An introductory survey of knowledge represented by the department	No
		C. An introductory survey of a special area of knowledge	Yes
		D. A further development of course	No
		E. An introductory survey of a special area of knowledge represented by some other department	No
		F. a summarizing or integrated course	No
		G. in your judgment does this course overlap to a considerable extent with any other course.	No
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>Course mostly replace the existing TEE-470 and TEE-471 courses</b>	

13	The courses will not require additional staff over and above	<b>No, as whole graduation requirement is being revised as per AICTE</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech Electrical Engg. Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>Attached</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Power System III**

**2. Course No. : TEE-410**

**3. Credits Hours : 4 (3-0-2)**

**4. Per-requisite : Nil**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Transmission line transients and travelling waves (7 hours)**

Generation of Over-voltages: Lightning and Switching Surges/over voltages in the power system. Propagation of Surges. Travelling-wave Equations and Voltages produced by travelling surges. Bewley Diagram.

##### **Module 2: Insulation coordination and protection from over voltage transients: (7 hours)**

Volt time characteristics, methods of over voltage protection: ground wires, Rod gap, Horn gap, lightning arresters

##### **Module 3: Symmetrical Components and Fault Analysis (10 hours)**

Method of Symmetrical Components (positive, negative and zero sequences). Sequence impedance and, sequence line diagram on per unit base. Balanced and Unbalanced Faults, Representation of

generators, lines and transformers in sequence networks, Computation of Fault Currents, neutral Grounding.

#### **Module 4: Stability Constraints in synchronous grids (8 hours)**

Swing Equations of a synchronous machine connected to an infinite bus. Power angle curve. Description of the phenomena of loss of synchronism in a single-machine infinite bus system following a disturbance like a three-phase fault. Analysis using numerical integration of swing equations (using methods like Forward Euler, Runge-Kutta 4th order methods), as well as the Equal Area Criterion. Impact of stability constraints on Power System Operation. Effect of generation rescheduling and series compensation of transmission lines on stability.

#### **Module 5 Switchgear and Protection Systems (10 hours)**

Types of Circuit Breakers. Attributes of Protection schemes, Back-up Protection. Protection schemes (Over-current, directional, distance protection, differential protection) and their application.

#### **6. Text /Reference Books:**

1. Element of Power System Analysis - W.D. Stevenson.
2. Power system Analysis and Design – B.R. Gupta
3. Electrical Power system- C.L. Wadhawa
4. Power system protection and switchgear – Badri Ram

#### **7. List of Laboratory Experiments/Demonstrations: NIL**

#### **8. Marks Distribution:** As per University Academic Regulations

## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>
2	Department	<b>Electrical Engineering</b>
3	Title of the Course & Course No.	<b>Renewable Energy Systems, TEE-411</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B. Tech, Electrical Engineering</b>
6	Credits	<b>3(3-0-0)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>To provide better understanding about the renewable energy resources like wind-solar etc. as per AICTE model curriculum</b>
9	General educational purpose	A. General Education <b>No</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>Yes</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	Is this course intended to replace an existing course(s)?	<b>No</b>

13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Renewable Energy Systems**

**2. Course No. : TEE-411**

**3. Credits Hours : 3(3-0-0)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

#### **Module 1: Overview of Renewable Energy Sources and Electricity Act (6 Hours)**

Importance of Renewable Energy Sources such as Solar, Wind, Biomass, tidal and Geothermal, Comparison and Indian and Global statistics of Conventional and Renewable Energy,

#### **Module 2: Solar Power: (16 Hours)**

Introduction, Solar Radiation: solar radiation spectra, solar geometry, Earth Sun angles, observer Sun angles, solar day length, Estimation of solar energy availability. Solar Photovoltaic (PV) Technologies, V-I

characteristics of a PV cell, PV module, array, Power Electronic Converters for Solar Systems, Maximum Power Point Tracking (MPPT), Balance of Solar PV system, PV system design and applications

### **Module 3: Wind Power: (10 Hours)**

History of wind power, Wind physics, Betz limit, Tip speed ratio, stall and pitch control, Wind speed and power-cumulative distribution functions. Review of wind turbine technologies, Fixed and Variable speed wind turbines, Wind Energy Conversion Systems, Overview of grid code technical requirements, Hybrid operations of solar PV and wind systems.

### **Module 4: Solar thermal power generation: (3 Hours)**

Technologies, Parabolic trough, central receivers, parabolic dish, Fresnel, solar pond, elementary analysis.

### **Module 5: Biomass Energy (5 Hours)**

Biomass Resources, Photosynthesis Process, Biomass Resources, their Composition and Fuel Properties, Biomass Energy Programme in India, Biomass Conversion Technologies, Biomass Gasification, Biomass Liquefaction, Energy Farming,

### **6. Text /Reference Books:**

1. Non-Conventional Energy Resources: G. D. Rai, Khanna Publishers
2. Non-Conventional Energy Resources: B. H. Khan, Mc Graw Hill Education
3. Solar Photo Voltaics Fundamentals, Technologies and Applications, C. S. Solanki PHI
4. T. Ackermann, "Wind Power in Power Systems", John Wiley and Sons Ltd., 2005.
5. H. Siegfried and R. Waddington, "Grid integration of wind energy conversion systems" John Wiley and Sons Ltd., 2006.

### **7. Marks Distribution**

I Pre final Exam

II Pre final Exam

Lab Final Exam

Final Exam

As per University Academic Regulations

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Total

100 Marks

**ELECTIVE COURSES**

Sl. No	Course No.	Course Title	L-T-P	Credits
1	TEE-401	Soft Computing and Its Engineering Applications	3-0-0	3
2	TEE-402	Renewable Energy: Concepts and Practices	3-0-0	3
3	TEE-403	Utilization of Electrical Energy,	3-0-0	3
4	TEE-404	Concepts of Electrical Power System	3-0-0	3
5	TEE-429	Electrical Drives	2-1-0	3
6	TEE-430	Digital Control System	3-0-0	3
7	TEE-440	Line Commutated and Active Rectifiers	3-0-0	3
8	TEE-442	Artificial Neural Networks and Fuzzy Systems for Electrical Engineers,	2-0-2	3
9	TEE-443	Power Quality & FACTS	3-0-0	3
10	TEE-444	Electrical Machine Design	3-0-0	3
11	TEE-445	Power System Protection	3-0-0	3
12	TEE-446	HVDC Transmission Systems	3-0-0	3
13	TEE-447	Electrical Energy Conservation and Auditing	3-0-0	3
14	TEE-448	Industrial Electrical Systems	3-0-0	3
15	TEE-449	Power System Dynamics and Control	3-0-0	3
16	TEE-450	High Voltage Engineering	3-0-0	3
17	TEE-451	Advance Electric Drives	3-0-0	3
18	TEE-452	Digital Signal Processing	3-0-0	3
19	TEE-453	Electrical and Hybrid Vehicles	3-0-0	3
20	TEE-454	Electromagnetic waves	3-0-0	3

**Note: Elective Courses at Sl. No. 1 to 4 are for students of other branches except Electrical Engineering.**



**PROPOSAL FOR A NEW COURSE**

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Soft Computing and Its Engineering Applications, TEE-401</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech. (All branches except Electrical Engg.)</b>	
6	Credits	<b>3(2-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide basic understanding of various soft computing techniques</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>Yes</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>This course covers the emerging areas which are useful for all engineering students</b>	

12	Is this course intended to replace an existing course(s)?	<b>No</b>
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Open Elective Course of B. Tech., All Branches Except Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed along with AICTE model curriculum</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :                   Soft Computing and Its Engineering Applications**

**2. Course No.                               :           TEE-401**

**3. Credits Hours                           :           3(2-0-2)**

**4. Per-requisite                           :           NIL**

#### **5. Syllabus /Catalogue Description**

#### **Module 1: Introduction (6 Hours)**

Concept of computing systems, Characteristics of Soft computing, Difference between hard and soft computing, Requirement of soft computing, Major areas of soft computing, Applications of soft computing, Introduction to Gradient-ascent / Gradient-descent optimization, Introduction to soft computing based techniques for optimization, Sum-square error (SSE), Mean-square error (MSE), Introduction to curve-fitting, Curve fitting by minimizing SSE or MSE using Gradient-descent method, Computer versus brain, Biological neurons, Biological and artificial neural networks, Introduction of fuzzy logic.

## **Module 2: Feed-Forward Neural Networks (10 Hours)**

Neuron models: Concepts of aggregation and activation, McCulloch-Pitts model, Rosenblatt's perceptron model, Sigma-pi neuron model, Multiplicative neuron model, Generalized-mean neuron model, Integrate-and-fire neuron model, Spiking neuron model; Multiple nodes and layers: Different architectures of neural networks, Multilayer feed-forward networks. Training of feed-forward neural networks: Finding the minimum of a function, Gradient descent optimization, Gradient descent on an error, The delta rule, Backpropagation for multilayer feed-forward neural networks, Local versus global minima, The stopping criterion, Momentum term, Generalization and overtraining. Principal components analysis: Curse of dimensionality, dimensionality reduction. Independent component analysis: concepts of independence, Bell-Sejnowski algorithm, applications of blind source separation.

## **Module 3: Fuzzy Logic and Fuzzy Sets (6 Hours)**

Overview of fuzzy logic: a historical perspective, the utility of fuzzy systems, limitations of fuzzy systems, imprecision, statistical and random processes, uncertainty and information. Classical sets and fuzzy sets: fuzzy sets and membership, chance versus fuzziness, sets as points in hypercubes, operations on crisp sets, properties of crisp sets, mapping of crisp sets to functions, fuzzy set operations, properties of fuzzy sets.

## **Module 4: Fuzzy Relations, Fuzzification, Defuzzification, and Fuzzy Control (7 Hours)**

Classical relations and fuzzy relations: cardinality of crisp relations, operations on crisp relations, properties of crisp relations, composition, cardinality of fuzzy relations, operations on fuzzy relations, properties of fuzzy relations, fuzzy Cartesian product and composition, crisp tolerance and equivalence relations, fuzzy tolerance and equivalence relations. Fuzzification and Defuzzification: properties of membership functions, features of the membership function, various forms of membership functions, development of membership functions, rule-base and inference, center-of-gravity method for de-fuzzification. Fuzzy control schemes, comparison between conventional and fuzzy control, introduction to Mamdani and Takagi-Sugeno type fuzzy controllers.

## **Module 5: Genetic Algorithm (GA) & Particle Swarm Optimization (PSO) (8 Hours)**

Introduction to genetic algorithm (GA): mapping objective functions to fitness forms, reproduction, crossover, and mutation. Illustrative examples of maximization of simple functions using genetic algorithm. Introduction to Particle Swarm Optimization (PSO), Algorithm of PSO, Illustrative examples of maximization of simple functions using PSO. Introduction to Bacterial Foraging Optimization (BFO) & Ant Colony Optimization (ACO).

## **6. Text /Reference Books:**

1. Fuzzy Logic with Engineering Applications Timothy Ross
2. Neural Networks: A Comprehensive Foundation Simon Haykin
3. Fuzzy Sets and Fuzzy Logic G. J. Klir and B. Yuon
4. Introduction to Artificial Neural Systems J. M. Zurada
5. Neural Network Design Hagan, Demuth & Beale
6. Genetic Algorithm D. E. Goldberg
7. Soft Computing: Fundamentals and Applications D. K. Pratihar

## **7. List of Laboratory Experiments/Demonstrations:**

1. To make a MATLAB program for optimization of a given function  $f(x)$  using Gradient-Ascent method.
2. To make a MATLAB program for finding the equation of a straight line that fits a given set of points in two-dimensional space using Gradient-Descent method.
3. To make a MATLAB program to train a multilayer feed-forward neural networks using backpropagation algorithm for XOR data.
4. To make a MATLAB program to train a multilayer feed-forward neural networks using backpropagation algorithm for a given UCI benchmark data.
5. To solve tipping problem of Fuzzy-Logic Toolbox of MATLAB.
6. To make a MATLAB program for optimization of a given function  $f(x)$  using Genetic Algorithm.
7. To make MATLAB programs and SIMULINK models for implementation of Fuzzy controllers.

8. To make MATLAB programs and SIMULINK models for implementation of Neural Network Control Systems.
  
9. To make a MATLAB program for optimization of a given function  $f(x)$  using PSO.
  
10. To make a MATLAB program for optimization of a given function  $f(x)$  using BFO.

## **7. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab Final Exam	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	<b>Technology</b>
2	Department	<b>Electrical Engineering</b>
3	Title of the Course & Course No.	<b>Renewable Energy: Concepts and Practices, TEE-402</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B.Tech. (All branches except Electrical Engg.)</b>
6	Credits	<b>3(3-0-0)</b>
7	Is this a new Course	<b>Yes</b>

8	Curricular purpose of the course	<b>To provide basic understanding of renewable energy.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>Yes</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>This course covers the emerging areas which are useful for all engineering students</b>	
12	Is this course intended to replace an existing course(s)?	<b>No</b>	
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>	
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Open Elective Course of B. Tech., All Branches Except Electrical Engineering</b>	
15	Topical outline : Lecture	<b>Attached</b>	
16	Practical:	<b>No practical class</b>	
17	Text Book and Supplementary readings	<b>Attached</b>	

18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed along with AICTE model curriculum</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Renewable Energy: Concepts and Practises**

**2. Course No : TEE-402**

**3. Credit Hours : 3 (3-0-0)**

**4. Pre-Requisites : NIL**

#### **5. Syllabus/Catalogue Description**

**Module 1: Overview of Renewable Energy Sources and Energy Conservation (6 Hours)** Introduction to the concept of renewable energy, various renewable energy sources- their national and international scenario: Solar power, Wind power, Biomass, Ocean energy, and Geo-Thermal energy, Basic formulas for power output from these renewable sources and their onsite assessment and forecasting, Principles of Energy Conservation, Salient features of Energy Conservation Act.

#### **Module 2. Introduction to Wind Energy: (6 Hours)**

Origin and nature of winds, Wind data, Introduction to types/ classes of wind generators their layouts & description, Various components of wind generators, Chronological technology developments in wind generators, Layout of wind farms and their operational practises.

#### **Module 3. Solar power Plants and Solar thermal/ heating systems (12 Hours)**

Basic concept of Solar radiation and its measurement, General layout of grid connected and off-grid solar power plants, various components of the solar power plants: like PV cell, PV module and array and Power converters, Grid connected operation and islanded operation of solar power plants, Basic concepts of solar heating, various types of solar heat concentrators and solar heating systems like solar boilers, cookers, solar dryers etc., their use and limitations.

#### **Module 4: Biomass and other types of renewable energy sources (10 Hours)**

Types of biomass and comparison their properties, suitability of biomass for energy production, Machines for bio-mass conversion like liquefiers and gasifiers, General layout of a biomass plant, limitations of biomass based plants, layout of tidal and geo-thermal plants, fuel cells, their layout and components.

#### **Module 5: Hybrid renewable energy systems and Green Buildings (6 Hours)**

Introduction to wind, solar, fuel cell and diesel based hybrid energy systems, Concepts of green buildings, Components of green buildings such as materials, water, light and air management techniques, benefits of green buildings, codes and standards in India.

#### **6. Text /Reference Books:**

1. Non-Conventional Energy Resources: G. D. Rai, Khanna Publishers
2. Non-Conventional Energy Resources: B. H. Khan, Mc Graw Hill Education
3. Non Conventional energy sources-G.D. Rai T. Ackerman:" Wind power in power system" John-wiley & sons limited-2005
4. Mukund R Patel: "Wind and solar power" John-Wiley

#### **7. Marks Distribution**

I Pre final Exam

II Pre final Exam

Lab Final Exam

Final Exam                          As per University Academic Regulations

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Total                                  100 Marks  
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Utilization of Electrical Energy, TEE-403</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech. (All branches except Electrical Engg.)</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide basic understanding of electrical energy utilization.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>Yes</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>This course covers the emerging areas which are useful for all engineering students</b>	
12	Is this course intended to replace an	<b>No</b>	

	existing course(s)?	
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Open Elective Course of B. Tech., All Branches Except Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed along with AICTE model curriculum</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Utilization of Electrical Energy**

**2. Course No : TEE-403**

**3. Credit Hours : 3 (3-0-0)**

**4. Pre-Requisites : NIL**

#### **5. Syllabus/Catalogue Description**

##### **Module 1: Electric Heating: (8 Hours )**

Advantages of electric heating, , classification of electric heating, modes of heat transfer, Materials for heating element, design of heating element, quality of good heating element, causes of failure of heating element, Resistance heating, Arc heating, induction heating, dielectric heating, advantages and use of dielectric heating. Type of furnaces, temperature control of furnaces.

##### **Module 2. Electric Welding: (8 Hours)**

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Electric Welding and its classification, advantages and disadvantages of electric welding, different types of Resistance welding , different types of arc welding, electric supply for arc welding, choice of welding time, welding electrodes and other equipments.

### **Module 3. Illumination: (9 Hours)**

Nature of light, definitions related to illumination, basic laws of illumination, Rousseen's construction for determination of luminous flux, light sources and their characteristics, light production by excitation and ionization, incandescence and fluorescence, filament lamp, halogen lamp, discharge lamp, fluorescent lamp, incandescent lamp, arc lamps, LED light and their applications.

Light Control: Direct, diffused and mixed reflection, reflection factor, transmission factor, refractors, lighting fittings, street lighting, exterior lighting and interior lighting. Methods of lighting calculations.

### **Module 4: Electric Traction: (9 Hours)**

Electric traction, general features, track electrification, review of traction motors and control, transmission of power from motor to driving wheel, mechanics of train movement, speed time curves, tractive effort for acceleration and propulsion, power and energy output from driving axles, Train resistances, adhesive weight and coefficient of adhesion. Distribution system for tramways and railways, track arrangements, collector gears and auxiliary equipment, diesel-electric equipment, electric transmission system, comparative features of AC and DC traction, prevailing AC and DC traction systems.

### **Module 5: Refrigeration , air conditioning and Electrolysis: (8 Hours)**

Principle of refrigeration, refrigerant, vapour compression refrigeration cycle, Electric circuit, application of refrigeration, air conditioning, Electric circuits, room air conditional,

Electrolytic Process: Basic principle of electro-deposition, application of electrolysis, electric supply for electrolytic process.

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### **6. Text /Reference Books:**

1. Generation Distribution and utilization of electrical Energy: C.L. Wadhawa
  2. Generation and Utilization of Electrical Energy: S. Sivangaraju, M.B. Reddy & D. Srilatha.
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### **7. Marks Distribution**

I Pre final Exam

II Pre final Exam

Lab Final Exam

Final Exam	As per University Academic Regulations
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Concepts of Electrical Power System, TEE-404</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech. (All branches except Electrical Engg.)</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide basic understanding of electrical power system</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>Yes</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>This course covers the emerging areas which are useful for all engineering students</b>	
12	Is this course intended to replace an	<b>No</b>	

	existing course(s)?	
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Open Elective Course of B. Tech., All Branches Except Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed along with AICTE model curriculum</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Concepts of Electrical Power System**

**2. Course No. : TEE-404**

**3. Credits Hours : 3(3-0-0)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module-1: Introduction (6 Hours)**

History of Electrical Power, Relationship between Electric Utilities, Customers and Regulatory Authorities in Indian Context, Basic concepts of Thermal, Hydro, Nuclear, Renewable Energy Sources (Wind, Solar), Brief introduction of Operation and Layout structure of these sources.

##### **Module-2: Transmission system (8Hours)**

Introduction to basic concepts of AC (1Ph & 3 Ph) /DC Systems, Overview of Electrical Power System Transmission System Operation, Transmission Voltage Levels, HVDC Transmission

##### **Module-3: Transmission system design (10 Hours)**

Transmission Line support structures and their construction, Tower and Pole Foundations, Transmission Line Conductors, Cables, Conductor Tension, Ruling Span, Calculations of conductor Sag and Tension

**Module-4: Components of power system (10 Hours)**

Utility load Classifications, Utility Factor, Distribution System Layout, Voltage Levels, Overview of Distribution Transformer, Circuit Breakers, Reclosers, Sectionalizers, Fuses, Protection against lightning, Disconnect switches, Metering Equipment,

**Module-5: Substation (8 Hours)**

Distribution Substations Substation Layout Criteria, Construction methods, Modern Trends in distribution Substations, Voltage Regulation, Types of Faults, Substation Grounding

**6. Text /Reference Books:**

1. Power System Analysis Hadi Saadat TMH Publication
2. Electrical Power Distribution and Transmission, Luces M. Faulkenberry, Walter Coffer, Pearson Education
3. Electrical Power System Subir Ray, EEE Publications
4. Power System Analysis, J J Grainger, W D Stevenson,Jr.
5. Fundamentals of Power System Protection Y.G.Paithankar, S.R.Bhide

**7. List of Laboratory Experiments/Demonstrations: Nil**

**8. Marks Distribution:** As per University Academic Regulations



## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Electric Drives TEE-429</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>3(2-1-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give theoretical knowledge in the field of Electric Drives to the students.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>No</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>No it is a New Course</b>	

13	The courses will not require additional staff over and above	<b>no</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag.)</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Electric Drive**

**2. Course No. : TEE-429**

**3. Credits Hours : 3(2-1-0)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: DC motor characteristics (5 hours)**

Review of emf and torque equations of DC machine, review of torque-speed characteristics of separately excited dc motor, change in torque-speed curve with armature voltage, example load torque-speed characteristics, operating point, armature voltage control for varying motor speed, flux weakening for high speed operation.

##### **Module 2: Chopper fed DC drive (5 hours)**

Review of dc chopper and duty ratio control, chopper fed dc motor for speed control, steady state operation of a chopper fed drive, armature current waveform and ripple, calculation of losses in dc motor and chopper, efficiency of dc drive, smooth starting.

##### **Module 3: Multi-quadrant DC drive (6 hours)**

Review of motoring and generating modes operation of a separately excited dc machine, four quadrant operation of dc machine; single-quadrant, two-quadrant and four-quadrant choppers; steady-state operation of multi-quadrant chopper fed dc drive, regenerative braking.

#### **Module 4: Closed-loop control of DC Drive (6 hours)**

Control structure of DC drive, inner current loop and outer speed loop, dynamic model of dc motor – dynamic equations and transfer functions, modelling of chopper as gain with switching delay, plant transfer function, for controller design, current controller specification and design, speed controller specification and design.

#### **Module 5: Induction motor characteristics (6 hours)**

Review of induction motor equivalent circuit and torque-speed characteristic, variation of torque-speed curve with (i) applied voltage, (ii) applied frequency and (iii) applied voltage and frequency, typical torque-speed curves of fan and pump loads, operating point, constant flux operation, flux weakening operation.

#### **Module 6: Scalar control or constant V/f control of induction motor (6 hours)**

Review of three-phase voltage source inverter, generation of three-phase PWM signals, sinusoidal modulation, space vector theory, conventional space vector modulation; constant V/f control of induction motor, steady-state performance analysis based on equivalent circuit, speed drop with loading, slip regulation.

#### **Module 7: Control of slip ring induction motor (6 hours)**

Impact of rotor resistance of the induction motor torque-speed curve, operation of slip-ring induction motor with external rotor resistance, starting torque, power electronic based rotor side control of slip ring motor, slip power recovery.

#### **6. Text /Reference Books:**

1. G. K. Dubey, "Power Semiconductor Controlled Drives", Prentice Hall, 1989.
2. R. Krishnan, "Electric Motor Drives: Modelling, Analysis and Control", Prentice Hall, 2001.
3. G. K. Dubey, "Fundamentals of Electrical Drives", CRC Press, 2002.
4. W. Leonhard, "Control of Electric Drives", Springer Science & Business Media, 2001.

#### **7. Marks Distribution:** As per University Academic Regulations

**PROPOSAL FOR A NEW COURSE**

1	College	<b>Technology</b>
2	Department	<b>Electrical Engineering</b>
3	Title of the Course & Course No.	<b>Digital Control System TEE-430</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B.Tech, Electrical Engineering</b>
6	Credits	<b>3(3-0-0)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>To provide better understanding about the Digital Control Systems as per AICTE model curriculum</b>
9	General educational purpose	A. General Education B. Department specialization C. Students Research D. Outgrowth of instructors Research Programme
10	Relation to other courses	A. Pre-requisite B. An introductory survey of knowledge represented by the department C. An introductory survey of a special area of knowledge D. A further development of course E. An introductory survey of a special area of knowledge represented by some other department F. A summarizing or integrated course G. In your judgment does this course overlap to a considerable extent with any other course.
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	Is this course intended to replace an	<b>No</b>

	existing course(s)?	
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Digital Control System**

**2. Course No.** : **TEE-430**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Discrete Representation of Continuous Systems (6 hours)**

Basics of Digital Control Systems, Discrete representation of continuous systems. Sample and hold circuit. Mathematical Modelling of sample and hold circuit. Effects of Sampling and Quantization. Choice of sampling frequency.ZOH equivalent.

##### **Module 2: Discrete System Analysis (6 hours)**

Z-Transform and Inverse Z Transform for analyzing discrete time systems. Pulse Transfer function. Pulse transfer function of closed loop systems. Mapping from s-plane to z plane. Solution of Discrete time systems. Time response of discrete time system.

### **Module 3: Stability of Discrete Time System (4 hours)**

Stability analysis by Jury test. Stability analysis using bilinear transformation. Design of digital control system with dead beat response. Practical issues with dead beat response design.

### **Module 4: State Space Approach for discrete time systems (10 hours)**

State space models of discrete systems, State space analysis. Lyapunov Stability. Controllability, reachability, Reconstructibility and observability analysis. Effect of pole zero cancellation on the controllability & observability.

### **Module 5: Design of Digital Control System (8 hours)**

Design of Discrete PID Controller, Design of discrete state feedback controller. Design of set point tracker. Design of Discrete Observer for LTI System. Design of Discrete compensator.

### **Module 6: Discrete output feedback control (8 hours)**

Design of discrete output feedback control. Fast output sampling (FOS) and periodic output feedback controller design for discrete time systems.

## **6. Text /Reference Books:**

1. K. Ogata, "Digital Control Engineering", Prentice Hall, Englewood Cliffs, 1995.
2. M. Gopal, "Digital Control Engineering", Wiley Eastern, 1988.
3. G. F. Franklin, J. D. Powell and M. L. Workman, "Digital Control of Dynamic Systems", Addison-Wesley, 1998.
7. B.C. Kuo, "Digital Control System", Holt, Rinehart and Winston, 1980.

## **7. Marks Distribution**

**II Pre final Exam**

**Assignment**

**Final Exam**

**Total**

**100 Marks**

**PROPOSAL FOR A NEW COURSE**

1	College	College of Technology	
2	Department	Electrical Engineering	
3	Title of the Course & Course No.	<b>Line-Commutated and Active PWM Rectifiers, TEE-440</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give knowledge in the field of Line-Commutated and Active PWM Rectifiers.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>No it is a New Course</b>	

13	The courses will not require additional staff over and above	<b>Professional Elective Courses</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. )</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course : Line-Commutated and Active PWM Rectifiers**  
**2. Course No. : TEE-440**  
**3. Credits Hours : 3 (3-0-0)**  
**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Diode rectifiers with passive filtering (6 Hours)**

Half-wave diode rectifier with RL and RC loads; 1-phase full-wave diode rectifier with L, C and LC filter; 3-phase diode rectifier with L, C and LC filter; continuous and discontinuous conduction, input current wave shape, effect of source inductance; commutation overlap.

##### **Module 2: Thyristor rectifiers with passive filtering (6 Hours)**

Half-wave thyristor rectifier with RL and RC loads; 1-phase thyristor rectifier with L and LC filter; 3-phase thyristor rectifier with L and LC filter; continuous and discontinuous conduction, input current wave shape.

##### **Module 3: Multi-Pulse converter (6 Lectures)**

Review of transformer phase shifting, generation of 6-phase ac voltage from 3-phase ac, 6pulse converter and 12-pulse converters with inductive loads, steady state analysis, commutation overlap, notches during commutation.

#### **Module 4: Single-phase ac-dc single-switch boost converter (6 Hours)**

Review of dc-dc boost converter, power circuit of single-switch ac-dc converter, steady state analysis, unity power factor operation, closed-loop control structure.

#### **Module 5: Ac-dc bidirectional boost converter (6 Hours)**

Review of 1-phase inverter and 3-phase inverter, power circuits of 1-phase and 3-phase ac-dc boost converter, steady state analysis, operation at leading, lagging and unity power factors. Rectification and regenerating modes. Phasor diagrams, closed-loop control structure.

#### **Module 6: Isolated single-phase ac-dc fly-back converter (10 Hours)**

Dc-dc fly-back converter, output voltage as a function of duty ratio and transformer turns ratio. Power circuit of ac-dc fly-back converter, steady state analysis, unity power factor operation, closed loop control structure.

#### **6. Text /Reference Books:**

1. G. De, "Principles of Thyristorised Converters", Oxford & IBH Publishing Co, 1988.
2. J.G. Kassakian, M. F. Schlecht and G. C. Verghese, "Principles of Power Electronics", AddisonWesley, 1991.
3. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.
4. N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.
5. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media, 2001.

#### **7. Marks Distribution:** As per University Academic Regulations



## PROPOSAL FOR A NEW COURSE

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Artificial Neural Networks and Fuzzy Systems for Electrical Engineers, TEE-442</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B. Tech, Electrical Engineering</b>	
6	Credits	<b>3(2-0-2)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide basic understanding of Artificial Neural Networks and Fuzzy Systems</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>Yes</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>This course covers the emerging areas which are useful in the field of Electrical Engg.</b>	

12	Is this course intended to replace an existing course(s)?	<b>No</b>
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Program Elective Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed along with AICTE model curriculum</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** Artificial Neural Networks and Fuzzy Systems for Electrical Engineers

**2. Course No.** : TEE-442

**3. Credits Hours** : 3(2-0-2)

**4. Per-requisite** : NIL

#### **5. Syllabus /Catalogue Description**

#### **Module 1: Feed-Forward Neural Networks (10 Hours)**

Overview of neural networks: Computer versus brain, Real and artificial neural networks, Engineering Applications of ANN; Neuron models: Concepts of aggregation and activation, McCulloch-Pitts model, Rosenblatt's perceptron model; Multiple nodes and layers: Different architectures of neural networks, Multilayer feed-forward networks. Training of feed-forward neural networks: Finding the minimum of a function, Gradient descent optimization, Gradient descent on an error, The delta rule, Backpropagation for multilayer feed-forward neural networks, Local versus global minima, The stopping criterion, Momentum term, Generalization and overtraining.

## **Module 2: Hopfield Neural Network, PCA & ICA (6 Hours)**

Hopfield neural network: The nature of associative memory, Neural networks and associative memory, A physical analogy with memory, The Hopfield network, Finding the weights, Storage capacity, The analogue Hopfield model. Principal Components Analysis (PCA): Curse of dimensionality, dimensionality reduction. Independent Component Analysis (ICA): concepts of independence, Bell-Sejnowski algorithm, applications of blind source separation.

## **Module 3: Fuzzy Logic and Fuzzy Sets (6 Hours)**

Overview of fuzzy logic: a historical perspective, the utility of fuzzy systems, limitations of fuzzy systems, imprecision, statistical and random processes, uncertainty and information. Classical sets and fuzzy sets: fuzzy sets and membership, chance versus fuzziness, sets as points in hypercubes, operations on crisp sets, properties of crisp sets, mapping of crisp sets to functions, fuzzy set operations, properties of fuzzy sets.

## **Module 4: Fuzzy Relations, Fuzzification, and Defuzzification: (6 Hours)**

Classical relations and fuzzy relations: cardinality of crisp relations, operations on crisp relations, properties of crisp relations, composition, cardinality of fuzzy relations, operations on fuzzy relations, properties of fuzzy relations, fuzzy Cartesian product and composition, crisp tolerance and equivalence relations, fuzzy tolerance and equivalence relations. Fuzzification and Defuzzification: properties of membership functions, features of the membership function, various forms of membership functions, development of membership functions, rule-base and inference, center-of-gravity method for de-fuzzification.

## **Module 5: Fuzzy Control Systems & Introduction to Genetic Algorithm (6 Hours)**

Fuzzy control schemes, comparison between conventional and fuzzy control, introduction to Mamdani and Takagi-Sugeno type fuzzy controllers. Introduction to genetic algorithm: mapping objective functions to fitness forms, reproduction, crossover and mutation.

### **6. Text /Reference Books:**

1. Fuzzy Logic with Engineering Applications Timothy Ross
2. Neural Networks: A Comprehensive Foundation Simon Haykin

3.	Fuzzy Sets and Fuzzy Logic	G. J. Klir and B. Yuon
4.	Introduction to Artificial Neural Systems	J. M. Zurada
5.	Neural Network Design	Hagan, Demuth & Beale
6.	Genetic Algorithm	D. E. Goldberg

#### **7. List of Laboratory Experiments/Demonstrations:**

1. To make a MATLAB program for optimization of a given function  $f(x)$  using Gradient-Ascent method.
2. To make a MATLAB program for finding the equation of a straight line that fits a given set of points in two-dimensional space using Gradient-Descent method.
3. To make a MATLAB program to train a multilayer feed-forward neural networks using backpropagation algorithm for XOR data.
4. To make a MATLAB program to train a multilayer feed-forward neural networks using backpropagation algorithm for a given UCI benchmark data.
5. To implement Principal Components Analysis (PCA) in MATLAB.
6. To implement Bell-Sejnowski algorithm for Independent Component Analysis (ICA) in MATLAB.
7. To solve tipping problem of Fuzzy-Logic Toolbox of MATLAB.
8. To make a MATLAB program for optimization of a given function  $f(x)$  using Genetic Algorithm.
9. To make MATLAB programs for load forecasting using ANN and ANFIS.
10. To make MATLAB programs and SIMULINK models for implementation of Fuzzy controllers and ANN based controllers.

#### **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks

Lab Final Exam

20 Marks

Final Exam

50 Marks

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Total

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100 Marks

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**PROPOSAL FOR A NEW COURSE**

1	College	College of Technology	
2	Department	Electrical Engineering	
3	Title of the Course & Course No.	Power Quality and FACTS, TEE-443	
4	Catalogue Description	Attached	
5	To be offered	B.Tech, Electrical Engineering	
6	Credits	3(3-0-0)	
7	Is this a new Course	Yes	
8	Curricular purpose of the course	To give knowledge about Power Quality enhancement and FACTS devices.	
9	General educational purpose	A. General Education	Yes
		B. department specialization	No
		C. Students Research	No
		D. Outgrowth of instructors Research Programme	No
10	Relation to other courses	A. Pre-requisite	Nil
		B. An introductory survey of knowledge represented by the department	Yes
		C. An introductory survey of a special area of knowledge	No
		D. A further development of course	Yes
		E. An introductory survey of a special area of knowledge represented by some other department	No
		F. a summarizing or integrated course	Yes
		G. in your judgment does this course overlap to a considerable extent with any other course.	No
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>No it is a New Course</b>	
13	The courses will not require additional	<b>Professional Elective Courses</b>	

	staff over and above	
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. )</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course : Power Quality and FACTS**  
**2. Course No. : TEE-443**  
**3. Credits Hours : 3 (3-0-0)**  
**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

**Module 1: Transmission Lines and Series/Shunt Reactive Power Compensation (4 hours)** Basics of AC Transmission. Analysis of uncompensated AC transmission lines. Passive Reactive Power Compensation. Shunt and series compensation at the mid-point of an AC line. Comparison of Series and Shunt Compensation.

#### **Module 2: Thyristor-based Flexible AC Transmission Controllers (FACTS) (6 hours)**

Description and Characteristics of Thyristor-based FACTS devices: Static VAR Compensator (SVC), Thyristor Controlled Series Capacitor (TCSC), Thyristor Controlled Braking Resistor and Single Pole Single Throw (SPST) Switch. Configurations/ Modes of Operation, Harmonics and control of SVC and TCSC. Fault Current Limiter.

### **Module 3: Voltage Source Converter based (FACTS) controllers (8 hours)**

Voltage Source Converters (VSC): Six Pulse VSC, Multi-pulse and Multi-level Converters, Pulse-Width Modulation for VSCs. Selective Harmonic Elimination, Sinusoidal PWM and Space Vector Modulation. STATCOM: Principle of Operation, Reactive Power Control: Type I and Type II controllers, Static Synchronous Series Compensator (SSSC) and Unified Power Flow Controller (UPFC): Principle of Operation and Control. Working principle of Interphase Power Flow Controller. Other Devices: GTO Controlled Series Compensator. Fault Current Limiter.

### **Module 4: Application of FACTS (4 hours)**

Application of FACTS devices for power-flow control and stability improvement. Simulation example of power swing damping in a single-machine infinite bus system using a TCSC. Simulation example of voltage regulation of transmission mid-point voltage using a STATCOM.

### **Module 5: Power Quality Problems in Distribution Systems (4 hours)**

Power Quality problems in distribution systems: Transient and Steady state variations in voltage and frequency. Unbalance, Sags, Swells, Interruptions, Wave-form Distortions: harmonics, noise, notching, dc-offsets, fluctuations. Flicker and its measurement. Tolerance of Equipment: CBEMA curve.

### **Module 6: DSTATCOM (8 hours)**

Reactive Power Compensation, Harmonics and Unbalance mitigation in Distribution Systems using DSTATCOM and Shunt Active Filters. Synchronous Reference Frame Extraction of Reference Currents. Current Control Techniques in for DSTATCOM.

### **Module 7: Dynamic Voltage Restorer and Unified Power Quality Conditioner (6 hours)**

Voltage Sag/Swell mitigation: Dynamic Voltage Restorer – Working Principle and Control Strategies. Series Active Filtering. Unified Power Quality Conditioner (UPQC): Working Principle. Capabilities and Control Strategies.

### **6. Text /Reference Books:**

1. N. G. Hingorani and L. Gyugyi, "Understanding FACTS: Concepts and Technology of

FACTS Systems”, Wiley-IEEE Press, 1999.

2. K. R. Padiyar, “FACTS Controllers in Power Transmission and Distribution”, New Age

International (P) Ltd. 2007.

3. T. J. E. Miller, “Reactive Power Control in Electric Systems”, John Wiley and Sons, New

York, 1983.

4. R. C. Dugan, “Electrical Power Systems Quality”, McGraw Hill Education, 2012.

5. G. T. Heydt, “Electric Power Quality”, Stars in a Circle Publications, 1991

## **7. Marks Distribution**

I Pre final Exam	As per University Academic Regulations
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II Pre final Exam	
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Final Exam	
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Electrical Machine Design</b> <b>TEE-444</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To understand the concept of basic design of Transformer and Rotating machines.</b>	
9	General educational purpose	A. General Education	No
		B. department specialization	Yes
		C. Students Research	Yes
		D. Outgrowth of instructors Research Programme	No
10	Relation to other courses	A. Pre-requisite	Nil
		B. An introductory survey of knowledge represented by the department	Yes
		C. An introductory survey of a special area of knowledge	Yes
		D. A further development of course	No
		E. An introductory survey of a special area of knowledge represented by some other department	NO
		F. a summarizing or integrated course	NO
		G. in your judgment does this course overlap to a considerable extent with any other course.	NO
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	

12	The course will not replace my existing courses	<b>No it is a New Course</b>
13	The courses will not require additional staff over and above	<b>Not required</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Professional Elective Course of B. Tech Electrical Engineering Department</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>N/A</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Electrical Machine Design**

**2. Course No.** : **TEE-444**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **Nil**

#### **5. Syllabus /Catalogue Description**

**Module 1:** Introduction Major considerations in electrical machine design, electrical engineering materials, space factor, choice of specific electrical and magnetic loadings, thermal considerations, heat flow, temperature rise, rating of machines.

**Module 2:** Transformers Sizing of a transformer, main dimensions, kVA output for single- and three-phase transformers, window space factor, overall dimensions, operating characteristics, regulation, no load current, temperature rise in transformers, design of cooling tank, methods for cooling of transformers.

**Module 3:** Induction Motors Sizing of induction motor, main dimensions, length of air gap, rules for selecting rotor slots of squirrel cage machines, design of rotor bars & slots, design of end rings, design of wound rotor, magnetic leakage calculations, leakage reactance of poly-phase machines.

**Module 4:** Synchronous Machines Sizing of a synchronous machine, main dimensions, design of salient pole machines, short circuit ratio, shape of pole face, armature design, armature parameters, estimation of air gap length, design of rotor, design of damper winding, determination of full load field mmf, design of field winding

**Module 5:** Computer aided Design (CAD): Limitations (assumptions) of traditional designs, need for CAD analysis, synthesis and hybrid methods, design optimization methods, variables, constraints and objective function, problem formulation. Introduction to FEM based machine design.

#### **6. Text /Reference Books:**

1. A. K. Sawhney, "A Course in Electrical Machine Design", Dhanpat Rai and Sons.
2. M.G. Say, "Theory & Performance & Design of A.C. Machines", ELBS London.
3. S. K. Sen, "Principles of Electrical Machine Design with computer programmes", Oxford and IBH Publishing.

#### **7. Marks Distribution**

I Pre final Exam	As per University Academic Regulations
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II Pre final Exam	
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Assignment	
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Final Exam	
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Power System Protection TEE-445</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give knowledge in the field of Power System Protection.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>No it is a New Course</b>	

13	The courses will not require additional staff over and above	<b>Professional Elective Courses</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. )</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course : Power System Protection**  
**2. Course No. : TEE-445**  
**3. Credits Hours : 3 (3-0-0)**  
**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Introduction and Components of a Protection System (4 hours)**

Principles of Power System Protection, Relays, Instrument transformers, Circuit Breakers

##### **Module 2: Faults and Over-Current Protection (8 hours)**

Review of Fault Analysis, Sequence Networks. Introduction to Over-current Protection and over-current relay co-ordination.

##### **Module 3: Equipment Protection Schemes (8 hours)**

Directional, Distance, Differential protection. Transformer and Generator protection. Bus bar Protection, Bus Bar arrangement schemes.

#### **Module 4: Digital Protection (8 hours)**

Computer-aided protection, Fourier analysis and estimation of Phasors from DFT. Sampling, aliasing issues.

#### **Module 5: Modeling and Simulation of Protection Schemes (8 hours)**

CT/PT modeling and standards, Simulation of transients using Electro-Magnetic Transients(EMT) programs. Relay Testing.

#### **Module 6: System Protection (4 hours)**

Effect of Power Swings on Distance Relaying. System Protection Schemes. Under-frequency, under-voltage and df/dt relays, Out-of-step protection, Synchro-phasors, Phasor Measurement Units and Wide-Area Measurement Systems (WAMS). Application of WAMS for improving protection systems.

#### **6. Text /Reference Books:**

1. J. L. Blackburn, "Protective Relaying: Principles and Applications", Marcel Dekker, New York, 1987.
2. Y. G.Paithankar and S. R. Bhide, "Fundamentals of power system protection", Prentice Hall, India, 2010.
3. A. G. Phadke and J. S. Thorp, "Computer Relaying for Power Systems", John Wiley & Sons, 1988.
4. A. G. Phadke and J. S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer, 2008.
5. D. Reimert, "Protective Relaying for Power Generation Systems", Taylor and Francis, 2006.

#### **7. Marks Distribution**

I Pre final Exam                                  As per University Academic Regulations

II Pre final Exam

Final Exam

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Total

100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>HVDC Transmission Systems. TEE-446</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give knowledge in the field of HVDC Transmission Systems.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>No it is a New Course</b>	

13	The courses will not require additional staff over and above	<b>Professional Elective Courses</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. )</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : HVDC Transmission Systems**

**2. Course No. : TEE-446**

**3. Credits Hours : 3 (3-0-0)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: DC Transmission Technology (4 hours)**

Comparison of AC and dc Transmission (Economics, Technical Performance and Reliability).Application of DC Transmission. Types of HVDC Systems. Components of a HVDC system. Line Commutated Converter and Voltage Source Converter based systems.

##### **Module 2: Analysis of Line Commutated and Voltage Source Converters (10 hours)**

Line Commutated Converters (LCCs): Six pulse converter, Analysis neglecting commutation overlap, harmonics, Twelve Pulse Converters. Inverter Operation. Effect of Commutation Overlap. Expressions for average dc voltage, AC current and reactive power absorbed by the converters. Effect of Commutation Failure, Misfire and Current Extinction in LCC links. Voltage Source Converters (VSCs): Two and Three-level VSCs. PWM schemes: Selective Harmonic Elimination, Sinusoidal Pulse Width Modulation. Analysis of a six pulse converter. Equations in the rotating frame. Real and Reactive power control using a VSC.

### **Module 3: Control of HVdc Converters: (10 hours)**

Principles of Link Control in a LCC HVdc system. Control Hierarchy, Firing Angle Controls– Phase-Locked Loop, Current and Extinction Angle Control, Starting and Stopping of a Link. Higher level Controllers Power control, Frequency Control, Stability Controllers. Reactive Power Control. Principles of Link Control in a VSC HVdc system: Power flow and dc Voltage Control. Reactive Power Control/ AC voltage regulation.

### **Module 3: Components of HVdc systems: (8 hours)**

Smoothing Reactors, Reactive Power Sources and Filters in LCC HVdc systems DC line: Corona Effects. Insulators, Transient Over-voltages. dc line faults in LCC systems. dc line faults in VSC systems. dc breakers. Monopolar Operation. Ground Electrodes.

### **Module 4: Stability Enhancement using HVdc Control (4 hours)**

Basic Concepts: Power System Angular, Voltage and Frequency Stability. Power Modulation: basic principles – synchronous and asynchronous links. Voltage Stability Problem in AC/dc systems.

### **Module 5: MTDC Links (4 hours)**

Multi-Terminal and Multi-Infeed Systems. Series and Parallel MTDC systems using LCCs. MTDC systems using VSCs. Modern Trends in HVDC Technology. Introduction to Modular Multi-level Converters.

### **6. Text /Reference Books:**

1. K. R. Padiyar, "HVDC Power Transmission Systems", New Age International Publishers, 2011.
2. J. Arrillaga, "High Voltage Direct Current Transmission", Peter Peregrinus Ltd., 1983.
3. E. W. Kimbark, "Direct Current Transmission", Vol.1, Wiley-Interscience, 1971.

### **7. Marks Distribution:** As per University Academic Regulations

## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>
2	Department	<b>Electrical Engineering</b>
3	Title of the Course & Course No.	<b>Electrical Energy Conservation and Auditing TEE-447</b>
4	Catalogue Description	<b>Attached</b>
5	To be offered	<b>B.Tech, Electrical Engineering</b>
6	Credits	<b>3(3-0-0)</b>
7	Is this a new Course	<b>Yes</b>
8	Curricular purpose of the course	<b>To give knowledge in the field of Electrical Energy Conservation and Auditing.</b>
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>No</b> C. Students Research <b>No</b> D. Outgrowth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>Yes</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>Yes</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>Yes</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>
12	The course will not replace my existing courses	<b>No it is a New Course</b>

13	The courses will not require additional staff over and above	<b>Professional Elective Courses</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. )</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course :** Electrical Energy Conservation and Auditing  
**2. Course No. :** TEE-447  
**3. Credits Hours :** 3 (3-0-0)  
**4. Per-requisite :** NIL

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Energy Scenario (6 Hours)**

Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energy strategy for the future, air pollution, climate change. Energy Conservation Act-2001 and its features.

##### **Module 2: Basics of Energy and its various forms (7 Hours)**

Electricity tariff, load management and maximum demand control, power factor improvement, selection & location of capacitors, Thermal Basics-fuels, thermal energy contents of fuel, temperature & pressure, heat capacity, sensible and latent heat, evaporation, condensation, steam, moist air and humidity & heat transfer, units and conversion.

##### **Module 3: Energy Management & Audit (6 Hours)**

Definition, energy audit, need, types of energy audit. Energy management (audit) approach understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel& energy substitution, energy audit instruments. Material and Energy balance: Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

#### **Module 4: Energy Efficiency in Electrical Systems (7 Hours)**

Electrical system: Electricity billing, electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, distribution and transformer losses. Electric motors: Types, losses in induction motors, motor efficiency, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors.

#### **Module 5: Energy Efficiency in Industrial Systems (8 Hours)**

Compressed Air System: Types of air compressors, compressor efficiency, efficient compressor operation, Compressed air system components, capacity assessment, leakage test, factors affecting the performance and savings opportunities in HVAC, Fans and blowers: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Pumps and Pumping System: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Cooling Tower: Types and performance evaluation, efficient system operation, flow control strategies and energy saving opportunities, assessment of cooling towers.

#### **Module 6: Energy Efficient Technologies in Electrical Systems (8Hours)**

Maximum demand controllers, automatic power factor controllers, energy efficient motors, soft starters with energy saver, variable speed drives, energy efficient transformers, electronic ballast, occupancy sensors, energy efficient lighting controls, energy saving potential of each technology.

#### **6. Text /Reference Books:**

1. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online)
2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-3, Electrical Utilities (available online)
3. S. C. Tripathy, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991.
4. Success stories of Energy Conservation by BEE, New Delhi ([www.bee-india.org](http://www.bee-india.org))

## **7. Marks Distribution**

I Pre final Exam	As per University Academic Regulations
II Pre final Exam	
Final Exam	
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Total	100 Marks
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**PROPOSAL FOR A NEW COURSE**

1	College	College of Technology
2	Department	Electrical Engineering
3	Title of the Course & Course No.	Industrial Electrical Systems, TEE-448
4	Catalogue Description	Attached
5	To be offered	B.Tech, Electrical Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give knowledge in the field of Industrial Electrical Systems to the students.
9	General educational purpose	A. General Education
		B. department specialization
		C. Students Research
		D. Outgrowth of instructors Research Programme
10	Relation to other courses	A. Pre-requisite
		B. An introductory survey of knowledge represented by the department
		C. An introductory survey of a special area of knowledge
		D. A further development of course
		E. An introductory survey of a special area of knowledge represented by some other department
		F. a summarizing or integrated course
		G. in your judgment does this course overlap to a considerable extent with any other course.
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus of AICTE to be mandatory implemented
12	The course will not replace my existing courses	No it is a New Course
13	The courses will not require additional	Professional Elective Courses

	staff over and above	
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. )</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Industrial Electrical Systems**  
**2. Course No.** : **TEE-448**  
**3. Credits Hours** : **3 (3-0-0)**

**4. Per-requisite :** **NIL**

### **5. Syllabus /Catalogue Description**

#### **Module 1: Electrical System Components (8 Hours)**

LT system wiring components, selection of cables, wires, switches, distribution box, metering system, Tariff structure, protection components- Fuse, MCB, MCCB, ELCB, inverse current characteristics, symbols, single line diagram (SLD) of a wiring system, Contactor, Isolator, Relays, MPCB, Electric shock and Electrical safety practices

#### **Module 2: Residential and Commercial Electrical Systems (8 Hours)**

Types of residential and commercial wiring systems, general rules and guidelines for installation, load calculation and sizing of wire, rating of main switch, distribution board and protection devices, earthing system calculations, requirements of commercial installation, deciding lighting scheme and number of lamps, earthing of commercial installation, selection and sizing of components.

#### **Module 3: Illumination Systems (6 Hours)**

Understanding various terms regarding light, lumen, intensity, candle power, lamp efficiency, specific consumption, glare, space to height ratio, waste light factor, depreciation factor, various illumination schemes, Incandescent lamps and modern luminaries like CFL, LED and their operation, energy saving in illumination systems, design of a lighting scheme for residential and commercial premises, flood lighting.

#### **Module 4: Industrial Electrical Systems I (8 Hours)**

HT connection, industrial substation, Transformer selection, Industrial loads, motors, starting of motors, SLD, Cable and Switchgear selection, Lightning Protection, Earthing design, Power factor correction – KVAR calculations, type of compensation, Introduction to PCC, MCC panels. Specifications of LT Breakers, MCB and other LT panel components.

#### **Module 5: Industrial Electrical Systems II (6 Hours)**

DG Systems, UPS System, Electrical Systems for the elevators, Battery banks, Sizing the DG, UPS and Battery Banks, Selection of UPS and Battery Banks.

#### **Module 6: Industrial Electrical System Automation (6 Hours)**

Study of basic PLC, Role of in automation, advantages of process automation, PLC based control system design, Panel Metering and Introduction to SCADA system for distribution automation.

#### **6. Text /Reference Books:**

2. S. L. Uppal and G. C. Garg, "Electrical Wiring, Estimating & Costing", Khanna publishers, 2008.
3. K. B. Raina, "Electrical Design, Estimating & Costing", New age International, 2007.
4. S. Singh and R. D. Singh, "Electrical estimating and costing", Dhanpat Rai and Co., 1997.
5. Website for IS Standards.
6. H. Joshi, "Residential Commercial and Industrial Systems", McGraw Hill Education, 2008.

#### **7. Marks Distribution:** As per University Academic Regulations

**PROPOSAL FOR A NEW COURSE**

1	College	College of Technology	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Power System Dynamics and Control TEE-449</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the Power System Dynamics and Control as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>No</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>No</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	

12	Is this course intended to replace an existing course(s)?	<b>No</b>
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Power System Dynamics and Control**

**2. Course No.** : **TEE-449**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Introduction to Power System Operations (3 hours)**

Introduction to power system stability. Power System Operations and Control. Stability problems in Power System. Impact on Power System Operations and control.

**Module 2 : Analysis of Linear Dynamical System and Numerical Methods (5 hours)** Analysis of dynamical System, Concept of Equilibrium, Small and Large Disturbance Stability. Modal Analysis of

Linear System. Analysis using Numerical Integration Techniques. Issues in Modeling: Slow and Fast Transients, Stiff System.

### **Module 3 : Modeling of Synchronous Machines and Associated Controllers (12 hours)**

Modeling of synchronous machine: Physical Characteristics. Rotor position dependent model. D-Q Transformation. Model with Standard Parameters. Steady State Analysis of Synchronous Machine. Short Circuit Transient Analysis of a Synchronous Machine. Synchronization of Synchronous Machine to an Infinite Bus. Modeling of Excitation and Prime Mover Systems. Physical Characteristics and Models. Excitation System Control. Automatic Voltage Regulator. Prime Mover Control Systems. Speed Governors.

### **Module 4 : Modeling of other Power System Components (10 hours)**

Modeling of Transmission Lines and Loads. Transmission Line Physical Characteristics. Transmission Line Modeling. Load Models - induction machine model. Frequency and Voltage Dependence of Loads. Other Subsystems – HVDC and FACTS controllers, Wind Energy Systems.

### **Module 5 : Stability Analysis (11 hours)**

Angular stability analysis in Single Machine Infinite Bus System. Angular Stability in multi machine systems – Intra-plant, Local and Inter-area modes. Frequency Stability: Centre of Inertia Motion. Load Sharing: Governor droop. Single Machine Load Bus System: Voltage Stability. Introduction to Torsional Oscillations and the SSR phenomenon. Stability Analysis Tools: Transient Stability Programs, Small Signal Analysis Programs.

### **Module 6 : Enhancing System Stability (4 hours)**

Planning Measures. Stabilizing Controllers (Power System Stabilizers). Operational Measures- Preventive Control. Emergency Control.

### **6. Text /Reference Books:**

1. K.R. Padiyar, "Power System Dynamics, Stability and Control", B. S. Publications, 2002.
2. P. Kundur, "Power System Stability and Control", McGraw Hill, 1995.
3. P. Sauer and M. A. Pai, "Power System Dynamics and Stability", Prentice Hall, 1997.

### **7. Marks Distribution:** As per University Academic Regulations



## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>High Voltage Engineering, TEE-450</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give knowledge in the field of High Voltage Engineering to the students.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>No it is a New Course</b>	

13	The courses will not require additional staff over and above	<b>Professional Elective Courses</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. )</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : High Voltage Engineering**

**2. Course No. : TEE-450**

**3. Credits Hours : 3 (3-0-0)**

**4. Per-requisite : NIL**

### **5. Syllabus /Catalogue Description**

#### **Module 1: Breakdown in Gases (8 Hours)**

Ionization processes and de-ionization processes, Types of Discharge, Gases as insulating materials, Breakdown in Uniform gap, non-uniform gaps, Townsend's theory, Streamer mechanism, Corona discharge

#### **Module 2: Breakdown in liquid and solid Insulating materials (7 Hours)**

Breakdown in pure and commercial liquids, Solid dielectrics and composite dielectrics, intrinsic breakdown, electromechanical breakdown and thermal breakdown, Partial discharge, applications of insulating materials.

#### **Module 3: Generation of High Voltages (7 Hours)**

Generation of high voltages, generation of high D. C. and A.C. voltages, generation of impulse voltages, generation of impulse currents, tripping and control of impulse generators.

#### **Module 4: Measurements of High Voltages and Currents (7 Hours)**

Peak voltage, impulse voltage and high direct current measurement method, cathode ray oscilloscopes for impulse voltage and current measurement, measurement of dielectric constant and loss factor, partial discharge measurements.

#### **Module 5: Lightning and Switching Over-voltages (7 Hours)**

Charge formation in clouds, Stepped leader, Dart leader, Lightning Surges. Switching overvoltages, Protection against over-voltages, Surge diverters, Surge modifiers.

#### **Module 6: High Voltage Testing of Electrical Apparatus and High Voltage Laboratories (7 Hours)**

Various standards for HV Testing of electrical apparatus, IS, IEC standards, Testing of insulators and bushings, testing of isolators and circuit breakers, testing of cables, power transformers and some high voltage equipment, High voltage laboratory layout, indoor and outdoor laboratories, testing facility requirements, safety precautions in H. V. Labs.

#### **6. Text /Reference Books:**

1. M. S. Naidu and V. Kamaraju, "High Voltage Engineering", McGraw Hill Education, 2013.
2. C. L. Wadhwa, "High Voltage Engineering", New Age International Publishers, 2007.
3. D. V. Razevig (Translated by Dr. M. P. Chourasia), "High Voltage Engineering Fundamentals", Khanna Publishers, 1993.
4. E. Kuffel, W. S. Zaengl and J. Kuffel, "High Voltage Engineering Fundamentals", Newnes Publication, 2000.
5. R. Arora and W. Mosch "High Voltage and Electrical Insulation Engineering", John Wiley & Sons, 2011.
6. Various IS standards for HV Laboratory Techniques and Testing

#### **7. Marks Distribution:As per University Academic Regulations**

**PROPOSAL FOR A NEW COURSE**

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Advanced Electric Drive, TEE-451</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the Advanced Electric Drive as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>No</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>No</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	Is this course intended to replace an	<b>No</b>	

	existing course(s)?	
13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course : Advanced Electric Drives**

**2. Course No. : TEE-451**

**3. Credits Hours : 3(3-0-0)**

**4. Per-requisite : NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Power Converters for AC drives (10 hours)**

PWM control of inverter, selected harmonic elimination, space vector modulation, current control of VSI, three level inverter, Different topologies, SVM for 3 level inverter, Diode rectifier with boost chopper, PWM converter as line side rectifier, current fed inverters with self-commutated devices. Control of CSI, H bridge as a 4-Q drive.

## **Module 2: Induction motor drives (10 hours)**

Different transformations and reference frame theory, modeling of induction machines, voltage fed inverter control-v/f control, vector control, direct torque and flux control(DTC).

## **Module 3: Synchronous motor drives (6 hours)**

Modeling of synchronous machines, open loop v/f control, vector control, direct torque control, CSI fed synchronous motor drives.

## **Module 4: Permanent magnet motor drives (6 hours)**

Introduction to various PM motors, BLDC and PMSM drive configuration, comparison, block diagrams, Speed and torque control in BLDC and PMSM.

## **Module 5: Switched reluctance motor drives (6 hours)**

Evolution of switched reluctance motors, various topologies for SRM drives, comparison, Closed loop speed and torque control of SRM.

## **Module 6: DSP based motion control (6 hours)**

Use of DSPs in motion control, various DSPs available, realization of some basic blocks in DSP for implementation of DSP based motion control.

## **6. Text /Reference Books:**

1. R. K. Shevgaonkar, "Electromagnetic Waves", Tata McGraw Hill, 2005.
2. D. K. Cheng, " Field and Wave Electromagnetics", Addison-Wesley, 1989.
3. M. N.O. Sadiku, "Elements of Electromagnetics", Oxford University Press, 2007.
4. C. A. Balanis, "Advanced Engineering Electromagnetics", John Wiley & Sons, 2012.
5. C. A. Balanis, " Antenna Theory: Analysis and Design", John Wiley & Sons, 2005.

## **7. Marks Distribution**

I Pre final Exam	As per University Academic Regulations
II Pre final Exam	
Assignment	
Final Exam	
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Total	100 Marks
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**PROPOSAL FOR A NEW COURSE**

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Digital Signal Processing TEE-452</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the Digital Signal Processing as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>No</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>No</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	Is this course intended to replace an existing course(s)?	<b>No</b>	
13	Would the introduction of this course require staff over and above the	<b>No</b>	

	sanctioned staff of the department?	
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Digital Signal Processing**

**2. Course No.** : **TEE-452**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

### **5. Syllabus /Catalogue Description**

#### **Module 1: Discrete-time signals and systems (6 hours)**

Discrete time signals and systems: Sequences; representation of signals on orthogonal basis; Representation of discrete systems using difference equations, Sampling and reconstruction of signals - aliasing; Sampling theorem and Nyquist rate.

#### **Module 2: Z-transform (6 hours)**

z-Transform, Region of Convergence, Analysis of Linear Shift Invariant systems using z-transform, Properties of z-transform for causal signals, Interpretation of stability in z-domain, Inverse z-transforms.

#### **Module 2: Discrete Fourier Transform (10 hours)**

Frequency Domain Analysis, Discrete Fourier Transform (DFT), Properties of DFT,

Convolution of signals, Fast Fourier Transform Algorithm, Parseval's Identity, Implementation of Discrete Time Systems.

### **Module 3:Design of Digital filters (12 hours)**

Design of FIR Digital filters: Window method, Park-McClellan's method. Design of IIR Digital Filters: Butterworth, Chebyshev and Elliptic Approximations; Low-pass, Band-pass Band-stop and High-pass filters. Effect of finite register length in FIR filter design. Parametric and non-parametric spectral estimation. Introduction to multi-rate signal processing.

### **Module 4: Applications of Digital Signal Processing (6 hours)**

Correlation Functions and Power Spectra, Stationary Processes, Optimal filtering using ARMA Model, Linear Mean-Square Estimation, Wiener Filter.

### **6. Text /Reference Books:**

1. S. K. Mitra, "Digital Signal Processing: A computer based approach", McGraw Hill, 2011.
2. A.V. Oppenheim and R. W. Schafer, "Discrete Time Signal Processing", Prentice Hall, 1989.
3. J. G. Proakis and D.G. Manolakis, "Digital Signal Processing: Principles, Algorithms And Applications", Prentice Hall, 1997.
4. L. R. Rabiner and B. Gold, "Theory and Application of Digital Signal Processing", Prentice Hall, 1992.
5. J. R. Johnson, "Introduction to Digital Signal Processing", Prentice Hall, 1992.
6. D. J. DeFatta, J. G. Lucas and W. S. Hodgkiss, "Digital Signal Processing", John Wiley & Sons, 1988.

### **7. Marks Distribution:** As per University Academic Regulations

## PROPOSAL FOR A NEW COURSE

1	College	<b>College of Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Electrical and Hybrid Vehicles TEE-453</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To give theoretical and practical knowledge in the field of Electric Vehicles.</b>	
9	General educational purpose	A. General Education	<b>Yes</b>
		B. department specialization	<b>No</b>
		C. Students Research	<b>No</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>Yes</b>
		C. An introductory survey of a special area of knowledge	<b>No</b>
		D. A further development of course	<b>Yes</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. a summarizing or integrated course	<b>Yes</b>
		G. in your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	The course will not replace my existing courses	<b>No it is a New Course</b>	

13	The courses will not require additional staff over and above	<b>Professional Elective Courses</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of all B. Tech streams except B.Tech. (Ag. )</b>
15	Topical outline : Lecture	<b>Provided</b>
16	Practical:	<b>Provided</b>
17	Text Book and Supplementary readings	<b>Provided</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

- 1. Name of the course : Electrical and Hybrid Vehicles**  
**2. Course No. : TEE-453**  
**3. Credits Hours : 3 (3-0-0)**  
**4. Per-requisite : NIL**

### **5. Syllabus /Catalogue Description**

#### **Module 1: Introduction (10 hours)**

Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, and mathematical models to describe vehicle performance. Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

#### **Module 3: Electric Trains (10 hours)**

Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis. Electric Propulsion unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

#### **Module 4: Energy Storage (10 hours)**

Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. Sizing the drive system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology, Communications, supporting subsystems

#### **Module 5: Energy Management Strategies (9 hours)**

Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies, implementation issues of energy management strategies.

Case Studies: Design of a Hybrid Electric Vehicle (HEV), Design of a Battery Electric Vehicle (BEV).

#### **6. Text /Reference Books:**

1. C. Mi, M. A. Masrur and D. W. Gao, "Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives", John Wiley & Sons, 2011.
2. S. Onori, L. Serrao and G. Rizzoni, "Hybrid Electric Vehicles: Energy Management Strategies", Springer, 2015.
3. M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design", CRC Press, 2004.
4. T. Denton, "Electric and Hybrid Vehicles", Routledge, 2016.

#### **7. Marks Distribution:**As per University Academic Regulations

**PROPOSAL FOR A NEW COURSE**

1	College	<b>Technology</b>	
2	Department	<b>Electrical Engineering</b>	
3	Title of the Course & Course No.	<b>Electromagnetic waves, TEE-454</b>	
4	Catalogue Description	<b>Attached</b>	
5	To be offered	<b>B.Tech, Electrical Engineering</b>	
6	Credits	<b>3(3-0-0)</b>	
7	Is this a new Course	<b>Yes</b>	
8	Curricular purpose of the course	<b>To provide better understanding about the Electromagnetic waves as per AICTE model curriculum</b>	
9	General educational purpose	A. General Education	<b>No</b>
		B. Department specialization	<b>Yes</b>
		C. Students Research	<b>Yes</b>
		D. Outgrowth of instructors Research Programme	<b>No</b>
10	Relation to other courses	A. Pre-requisite	<b>Nil</b>
		B. An introductory survey of knowledge represented by the department	<b>No</b>
		C. An introductory survey of a special area of knowledge	<b>Yes</b>
		D. A further development of course	<b>No</b>
		E. An introductory survey of a special area of knowledge represented by some other department	<b>No</b>
		F. A summarizing or integrated course	<b>No</b>
		G. In your judgment does this course overlap to a considerable extent with any other course.	<b>No</b>
11	What are the urgent reasons why this course be offered at this present time	<b>Due to proposed syllabus of AICTE to be mandatory implemented</b>	
12	Is this course intended to replace an existing course(s)?	<b>No</b>	

13	Would the introduction of this course require staff over and above the sanctioned staff of the department?	<b>No</b>
14	What is the exact place of this courses in the development of the educational programme of your department	<b>Core Course of B. Tech., Electrical Engineering</b>
15	Topical outline : Lecture	<b>Attached</b>
16	Practical:	<b>No practical class</b>
17	Text Book and Supplementary readings	<b>Attached</b>
18	Classroom, Laboratory and other facilities:	<b>Required facilities exist</b>
19	Would the introduction of this courses required additional staff:	<b>No</b>
20	Sequence of action	<b>Proposed by AICTE for implementation</b>
21	Approved by	<b>Course Curriculum Committee and BOFT</b>

**1. Name of the course :** **Electromagnetic Waves**

**2. Course No.** : **TEE-454**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

#### **5. Syllabus /Catalogue Description**

##### **Module 1: Transmission Lines (6 hours)**

Introduction, Concept of distributed elements, Equations of voltage and current, Standing waves and impedance transformation, Lossless and low-loss transmission lines, Power transfer on a transmission line, Analysis of transmission line in terms of admittances, Transmission line calculations with the help of Smith chart, Applications of transmission line,

Impedance matching using transmission lines.

##### **Module 2: Maxwell's Equations (6 hours)**

Basic quantities of Electromagnetics, Basic laws of Electromagnetics: Gauss's law, Ampere's Circuital law, Faraday's law of Electromagnetic induction. Maxwell's equations, Surface charge and surface current, Boundary conditions at media interface.

### **Module 3: Uniform Plane Wave (7 hours)**

Homogeneous unbound medium, Wave equation for time harmonic fields, Solution of the wave equation, Uniform plane wave, Wave polarization, Wave propagation in conducting medium, Phase velocity of a wave, Power flow and Poynting vector.

### **Module 4: Plane Waves at Media Interface (7 hours)**

Plane wave in arbitrary direction, Plane wave at dielectric interface, Reflection and refraction of waves at dielectric interface, Total internal reflection, Wave polarization at media interface, Brewster angle, Fields and power flow at media interface, Lossy media interface, Reflection from conducting boundary.

### **Module 5: Waveguides (7 hours)**

Parallel plane waveguide: Transverse Electric (TE) mode, transverse Magnetic(TM) mode, Cut-off frequency, Phase velocity and dispersion. Transverse Electromagnetic (TEM) mode, Analysis of waveguide-general approach, Rectangular waveguides.

### **Module 6: Antennas (7 hours)**

Radiation parameters of antenna, Potential functions, Solution for potential functions, Radiations from Hertz dipole, Near field, Far field, Total power radiated by a dipole, Radiation resistance and radiation pattern of Hertz dipole, Hertz dipole in receiving mode.

### **6. Text /Reference Books:**

1. R. K. Shevgaonkar, "Electromagnetic Waves", Tata McGraw Hill, 2005.
2. D. K. Cheng, " Field and Wave Electromagnet ics", Addison-Wesley, 1989.
3. M. N.O. Sadiku, "Elements of Electromagnetics", Oxford University Press, 2007.
4. C. A. Balanis, "Advanced Engineering Electromagnetics", John Wiley & Sons, 2012.
5. C. A. Balanis, " Antenna Theory: Analysis and Design", John Wiley & Sons, 2005.

### **7. Marks Distribution:** As per University Academic Regulations

***GRADUATION  
REQUIREMENTS  
FOR  
B. TECH.  
*in*  
ELECTRONICS &  
COMMUNICATION  
ENGINEERING  
(Regular)***

# **Batch 2018 (2018-19)**

**GRADUATION REQUIREMENTS FOR B. TECH. in  
ELECTRONICS & COMMUNICATION ENGINEERING (Regular)**  
**Batch 2018 (2018-19)**

Sl. No.	Course No.	Course Title	Credit			
			Cr	L	T	P

<b>First Year Courses (Basic Sciences, Social Science, Humanities, Engineering Sciences)</b>						
1.	BPP-198	Semiconductor Physics	<b>5</b>	3	1	2
2.	BPM-142	Calculus and Differential Equations	<b>5</b>	4	1	0
3.	TEE-104	Basic Electrical Engineering	<b>5</b>	3	1	2
4.	TCE-114	Engineering Graphics & Design	<b>3</b>	1	0	2x2
5.	TWP-101	Work Programme	<b>1</b>	0	0	2
6.	BPC-102	Chemistry –I	<b>4</b>	3	0	3
7.	BPM-152	Linear Algebra, Transform Calculus and Numerical Methods	<b>4</b>	3	1	0
8.	TIT-121	Programming for Problem Solving	<b>4</b>	3	0	2
9.	TIP-103	Workshop Practices	<b>3</b>	1	0	2x2
10.	BHS-186	English	<b>3</b>	2	0	2
11.	BPS-228	Probability & Statistics	<b>4</b>	3	1	0
12.	TID/TSW/TCE/TME-109	Environmental Engineering and Disaster Management	<b>3</b>	3	0	0
13.	TCE-206	Engineering Mechanics	<b>4</b>	3	1	0
14.	BHS-188	Industrial Sociology	<b>3</b>	3	0	0
15.	BHS-100	Constitution of India	<b>0</b>	1	0	0
16.	TEC-191	Practical Training-I (2 weeks)	<b>0</b>			
17.	TIC-100	Induction Programme ( <b>2 Weeks</b> )				
		<b>TOTAL</b>	<b>51</b>	36	6	21
<b>Professional Courses</b>						
18.	TEC-205	Electronic Devices	<b>4</b>	3	1	0
19.	TEC-206	Electronic Devices Lab	<b>1</b>	0	0	2

20.	TEC-207	Digital System Design	<b>4</b>	3	1	0
21.	TEC-208	Digital System Design Lab	<b>1</b>	0	0	2
22.	TEC-209	Signals and Systems	<b>4</b>	3	1	0
23	TEC-210	Network Theory	<b>3</b>	3	0	0
24.	NSS-101	National Service Scheme (NSS)	<b>1</b>	0	0	4
25.	TEC-211	Electromagnetic Waves	<b>4</b>	3	1	0
26.	TEC-214	Analog Communication Systems	<b>4</b>	3	1	0
27.	TEC-215	Analog Circuits	<b>3</b>	3	0	0
28.	TEC-216	Analog Circuits Lab	<b>1</b>	0	0	2
29.	TEC-217	Microcontrollers	<b>2</b>	2	0	0
30.	TEC-218	Microcontrollers Lab	<b>1</b>	0	0	2
31.	TEC-219	Antenna and Propagation	<b>4</b>	3	1	0
32.	TEC-291	Practical Training-II (2 weeks)	<b>0</b>			
33.	NSS-102	National Service Scheme (NSS)	<b>0</b>	0	0	4
34.	TEC-305	Digital Communication Systems	<b>4</b>	3	1	0
35.	TEC-306	Communication Systems Lab	<b>1</b>	0	0	2
36.	TEC-307	Computer Architecture	<b>3</b>	3	0	0
37.	TEC-308	Digital Signal Processing	<b>4</b>	3	1	0
38.	TEC-309	Control Systems	<b>4</b>	3	1	0
39.	TEC-314	Simulation Software	<b>3</b>	1	0	2x2
40.	TEC-315	Electronic Measurement Lab	<b>1</b>	0	0	2
41.	TEC-316	Electronic Design workshop	<b>2</b>	0	0	2x2
42.	TEC-317	Digital Signal Processing Lab	<b>1</b>	0	0	2
43.	TEC-319	Microwave Theory and Techniques	<b>3</b>	3	0	0
44.	TEC-322	Microwave Lab	<b>1</b>	0	0	2
45.		OE-1**	<b>3</b>	3	0	0
46.	NSS-201	National Service Scheme (NSS)	<b>1</b>	0	0	4

47.	TEC-391	Practical Training-III (4 weeks)	<b>0</b>			
48.	TEC-321	CMOS Design	<b>3</b>	3	0	0
49.		OE-2**	<b>3</b>	3	0	0
50.	NSS-202	National Service Scheme (NSS)	<b>0</b>	0	0	4
51.	TEC-*	Program Elective -1	<b>3</b>	3	0	0
52.	TEC-*	Program Elective -2	<b>3</b>	3	0	0
53.	TEC-*	Program Elective -3	<b>3</b>	3	0	0
54.		OE-3**	<b>3</b>	3	0	0
55.	TEC-495A	Project-I	<b>4</b>	0	0	8
56.	TIP-454	Principles of Management	<b>2</b>	2	0	0
57.	TEC-492	Seminar	<b>1</b>	0	0	2
58.	TEC-*	Program Elective -4	<b>3</b>	3	0	0
59.	TEC-429	Computer Network	<b>3</b>	3	0	0
60.	TEC-430	IC Fabrication Technology	<b>3</b>	3	0	0
61.	TEC-*	Program Elective -5	<b>3</b>	3	0	0
62.	TEC-*	Program Elective -6	<b>3</b>	3	0	0
63.		OE-4**	<b>3</b>	3	0	0
64.	TEC-495B	Project-II	<b>8</b>	0	0	16
		<b>Total Core Credits</b>	<b>119</b>	82	0	64
		<b>Total Credits including First Year Courses</b>	<b>170</b>	<b>118</b>	<b>16</b>	<b>85</b>

TEC-\*: (Program Elective Course) Course to be selected from the list of Program Electives

OE\*\*: (Open Elective Course) Open Elective from other technical and/or emerging subjects

**Note: Semester-wise interchange in the course curriculum may be done as per availability of experts and Lab facilities.**

**Total Credit Hours : 170 Total Contact Hours: 219**

### Program Elective Courses (TEC-\*)

Sl. No.	Course No.	Course Title	Credit			
			Cr	L	T	P
1	TEC-320	Information Theory and Coding	<b>3</b>	3	0	0
2	TEC-323	Neural Processing and Systems	<b>3</b>	3	0	0
3	TEC-324	Mixed Signal Design	<b>3</b>	3	0	0
4	TEC-325	Embedded systems	<b>3</b>	3	0	0
5	TEC-431	Fiber Optic Communications	<b>3</b>	3	0	0
6	TEC-432	Mobile Communication and Networks	<b>3</b>	3	0	0
7	TEC-433	Satellite Communication	<b>3</b>	3	0	0
8	TEC-434	High Speed Electronics	<b>3</b>	3	0	0
9	TEC-435	Digital Image & Video Processing	<b>3</b>	3	0	0
10	TEC-436	Wireless Sensor Networks	<b>3</b>	3	0	0
11	TEC-437	Error correcting codes	<b>3</b>	3	0	0
12	TEC-438	Artificial Intelligence	<b>3</b>	3	0	0
13	TEC-439	Speech and Audio Processing	<b>3</b>	3	0	0
14	TEC-444	Synthesis of Digital Systems	<b>3</b>	3	0	0

**GRADUATION REQUIREMENTS FOR B. TECH. in  
ELECTRONICS & COMMUNICATION ENGINEERING (Regular)  
Batch 2018 (2018-19)  
Semester-wise structure of curriculum**

**Semester I (First year)**

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs./wk.	Credits
1	BPP-198	Semiconductor Physics	3	1	2	5	5
2	BPM-142	Calculus and Differential Equation	4	1	0	5	5
3	TEE-104	Basic Electrical Engineering	3	1	2	6	5
4	TCE-114	Engineering Graphics & Design	1	0	2x2	5	3
5	TWP-101	Work Programme	0	0	2	2	1
6	TID/ TSW/ TCE/ TME-109	Environmental Engineering and Disaster Management	3	0	0	3	3
7	TIC-100	Induction Programme (2 Weeks)					
<b>Total</b>						<b>26</b>	<b>22</b>

### Semester II (First year)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs./wk.	Credits
1	BPC-102	Chemistry –I	3	0	3	6	4
2	BPM-152	Linear Algebra, Transform Calculus and Numerical Methods	3	1	0	4	4
3	TIT-121	Programming for Problem Solving	3	0	2	5	4
4	TIP-103	Workshop Practices	1	0	2x2	5	3
5	BHS-186	English	2	0	2	4	3
6	BHS-188	Industrial Sociology	3	0	0	3	3
7	TEC-191	Practical Training-I (2 weeks)					0
<b>Total</b>						<b>27</b>	<b>21</b>

### Semester III (Second year)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs./wk.	Credits
1	TEC-205	Electronic Devices	3	1	0	4	4
2	TEC-206	Electronics Devices Lab	0	0	2	2	1
3	TEC-207	Digital System Design	3	1	0	4	4
4	TEC-208	Digital System Design Lab	0	0	2	2	1
5	TEC-209	Signals and Systems	3	1	0	4	4

<b>6</b>	TEC-210	Network Theory	3	0	0	3	<b>3</b>
<b>7</b>	TEC-211	Electromagnetic Waves	3	1	0	4	<b>4</b>
<b>8</b>	NSS-101	NSS	0	0	4	4	<b>1</b>
<b>9</b>	BHS-100	Constitution of India					<b>0</b>
		<b>TOTAL</b>			<b>27</b>		<b>22</b>

#### Semester IV (Second year)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs./wk.	Credits
<b>1</b>	TEC-214	Analog Communication Systems	3	1	0	4	<b>4</b>
<b>2</b>	TEC-215	Analog Circuits	3	0	0	3	<b>3</b>
<b>3</b>	TEC-216	Analog Circuits Lab	0	0	2	2	<b>1</b>
<b>4</b>	TEC-217	Microcontrollers	2	0	0	2	<b>2</b>
<b>5</b>	TEC-218	Microcontrollers Lab	0	0	2	1	<b>1</b>
<b>6</b>	TEC-219	Antennas and Propagation	3	1	0	4	<b>4</b>
<b>7</b>	TCE-206	Engineering Mechanics	3	1	0	4	<b>4</b>
<b>8</b>	BPS-228	Probability & Statistics	3	1	0	4	<b>4</b>
<b>9</b>	NSS-102	NSS	0	0	4	4	<b>0</b>
<b>10</b>	TEC-291	Practical Training –II (2 weeks)					<b>0</b>
		<b>TOTAL</b>			<b>28</b>		<b>23</b>

#### Semester V (Third year)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs./wk.	Credits
<b>1</b>	TEC-305	Digital Communication Systems	3	1	0	4	<b>4</b>
<b>2</b>	TEC-306	Communication Systems Lab	0	0	2	2	<b>1</b>
<b>3</b>	TEC-307	Computer Architecture	3	0	0	3	<b>3</b>
<b>4</b>	TEC-308	Digital Signal Processing	3	1	0	4	<b>4</b>
<b>5</b>	TEC-319	Microwave Theory and Techniques	3	0	0	3	<b>3</b>
<b>6</b>	TEC-322	Microwave Lab	0	0	2	2	<b>1</b>
<b>7</b>	TEC-*	Program Elective – 1	3	0	0	3	<b>3</b>
<b>8</b>		OE-1**	3	0	0	3	<b>3</b>
<b>9</b>	NSS-201	NSS	0	0	4	4	<b>1</b>
		<b>TOTAL</b>			<b>28</b>		<b>23</b>

\* 23 credits includes 1 credit of NSS

#### Semester VI (Third year)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs./wk.	Credits

<b>1</b>	TEC-309	Control Systems	3	1	0	4	<b>4</b>
<b>2</b>	TEC-314	Simulation Software	1	0	2x2	5	<b>3</b>
<b>3</b>	TEC-315	Electronic Measurement Lab	0	0	2	2	<b>1</b>
<b>4</b>	TEC-316	Electronic Design workshop	0	0	2x2	4	<b>2</b>
<b>5</b>	TEC-317	Digital Signal Processing Lab	0	0	2	2	<b>1</b>
<b>6</b>	TEC-321	CMOS Design	3	0	0	3	<b>3</b>
<b>7</b>	TEC-*	Program Elective – 2	3	0	0	3	<b>3</b>
<b>8</b>		OE-2**	3	0	0	3	<b>3</b>
<b>9</b>	NSS-202	NSS	0	0	4	4	<b>0</b>
<b>10</b>	TEC-391	Practical Training –III (4 weeks)					<b>0</b>
					<b>TOTAL</b>	<b>30</b>	<b>20</b>

### Semester VII (Fourth year)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs./wk.	Credits
<b>1</b>	TEC-429	Computer Network	3	0	0	3	<b>3</b>
<b>2</b>	TEC-430	IC Fabrication Technology	3	0	0	3	<b>3</b>
<b>3</b>	TEC-*	Program Elective -3	3	0	0	3	<b>3</b>
<b>4</b>	TEC-*	Program Elective -4	3	0	0	3	<b>3</b>
<b>5</b>	TIP-454	Principles of Management	2	0	0	2	<b>2</b>
<b>6</b>		OE-3**	3	0	0	3	<b>3</b>
<b>7</b>	TEC-495A	Project-I	0	0	8	8	<b>4</b>
					<b>TOTAL</b>	<b>25</b>	<b>21</b>

### Semester VIII (Fourth year)

Sr. No	Course code	Course Title	L	T	P	Contact Hrs./Wk.	Credits
1	TEC-*	Program Elective -5	3	0	0	3	<b>3</b>
2	TEC-*	Program Elective -6	3	0	0	3	<b>3</b>
3		OE-4**	3	0	0	3	<b>3</b>
4	TEC-492	Seminar	0	0	3	3	<b>1</b>
5	TEC-495B	Project-II	0	0	16	16	<b>8</b>
					<b>Total</b>	<b>28</b>	<b>18</b>

TEC-\*: (Program Elective Course) Course to be selected from the list of Program Electives

OE\*\*: (Open Elective Course) Open Elective from other technical and/or emerging subjects

**Note:** Semester-wise interchange in course curriculum may be done as per the availability of experts and Lab facilities.

**Total Credit Hours : 170**

**Total Contact Hour : 219**

**PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	TIC-100 Induction Programme
4	Catalogue Description	The Induction Programme as prescribed by AICTE shall run for 15 Days starting from the date of Registration in the first semester. The students shall be inducted as per programme decided by the college.
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	0
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide the knowledge of the environment of the university and college as well as to enhance the academic, extracurricular and other management capabilities.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>No</b> C. Students Research <b>No</b> D. Outgrowth of instructors Research Program <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Essential induction programme of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA
16	Practical	NA
17	Text Book and Supplementary readings	NA
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students

21	Approved by	Course curriculum committee and BOFT
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- 1. Name of the course** : **Induction Programme**
- 2. Course No.** : **TIC- 100**
- 3. Credits Hours** : **NIL**
- 4. Per-requisite** : **NIL**

**5. Guidelines:**

The objective of Induction Programme is to blend the fresh students admitted in the B Tech Programmes in to the existing environment of the college and the University. The students are informed about the academic procedures followed in the university and about the academic rule. The environmental information like hostel life, existing facilities in the university and other students' related activities are discussed with the fresh students. This will help the students to easily and softly accept the environment of the college and university that will help them to improve their academic and managerial skills.

**6. No evaluation is there.**



## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Practical Training-I TEC-191
4	Catalogue Description	The first year student shall undergo basic knowledge of electrical and electronic components.
5	To be offered	B.Tech, I Year, Electronics & Communication Engineering
6	Credits	0
7	Is this a new Course	Yes
8	Curricular purpose of the course	To let the students which new devices, gadgets etc are being come in the field of electronics & Communication engineering. Also students shall have some basic knowledge of the components and their working.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA
16	Practical	NA
17	Text Book and Supplementary readings	NA
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by Dept. and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Practical Training-I**

**2. Course No. : TEC-191**

**3. Credits Hours** : **0**

**4. Per-requisite** : **NIL**

**5. Guidelines:**

- ❖ The Students shall undergo training on his/her choice near their residence for gaining knowledge about what new gadgets and latest technologies are coming in the market.
- ❖ The students shall also learn about the basic electrical and electronic components.
- ❖ The duration of the training shall be **2 weeks**.
- ❖ The evaluation will be based on the report and presentation submitted by the students in the following semester.

**6. Marks Distribution**

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

The evaluation of the course shall result grades in terms of **Satisfactory and Unsatisfactory**.



## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Electronic Devices TEC-205
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Electronics and devices to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course :** **Electronic Devices**  
**2. Course No. :** **TEC- 205**

**3. Credits Hours** : **4(3-1-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Introduction to Semiconductor Physics: Review of Quantum Mechanics, Electrons in periodic Lattices, E-k diagrams. Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity; sheet resistance, design of resistors

Generation and recombination of carriers; Poisson and continuity equation P-N junction characteristics, I-V characteristics, and small signal switching models; Avalanche breakdown, Zener diode, Schottky diode

Bipolar Junction Transistor, I-V characteristics, Ebers-Moll Model, MOS capacitor, C-V characteristics, MOSFET, I-V characteristics, and small signal models of MOS transistor, LED, photodiode and solar cell;

Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography, etching, chemical vapor deposition, sputtering, twin-tub CMOS process.

**6. Text /Reference Books:**

**19.** G. Streetman, and S. K. Banerjee, "Solid State Electronic Devices," 7th edition, Pearson, 2014.

**20.** D. Neamen , D. Biswas "Semiconductor Physics and Devices," McGraw-Hill Education

**21.** S. M. Sze and K. N. Kwok, "Physics of Semiconductor Devices," 3rd edition, John Wiley & Sons, 2006.

**22.** C.T. Sah, "Fundamentals of solid state electronics," World Scientific Publishing Co. Inc, 1991.

- 23.** Y. Tsividis and M. Colin, "Operation and Modeling of the MOS Transistor," Oxford University Press, 2011.

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Electronics Devices Lab TEC-206
4	Catalogue Description	List of Experiments attached
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	1(0-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide the practical knowledge in the field of Electronics system components and circuit and their design to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Electronics Devices Lab**  
**2. Course No. : TEC-202**

**3. Credits Hours** : **1(0-0-2)**

**4. Per-requisite** : **NIL**

## **5. List of Experiments**

1. Study of CRO operation and its measurements.
2. Study the I-V characteristics PN junction diode and derive of mathematical model.
3. Study the I-V characteristics and breakdown phenomenon of Zener diode.
4. Study the I-V characteristics and metal semiconductor phenomenon of Schottky diode.
5. Plot of input and output characteristics of CE, CB and CC configuration of BJT.
6. C-V characteristics of MOSFET.
7. Plot of MOSFET I-V Characteristics: Drain and Transfer characteristics, and determination of mathematical model.
8. Study of photo diode and solar cell characteristics.

## **6. Reference Books**

- Schilling & Below: Electronic Circuits - Discrete and Integrated, McGraw Hill Pub.
- Millman & Halkias : Integrated Electronics, McGraw Hill Publication
- Boylestad & Nashlesky : Electronic Devices & Circuit Theory, PHI

## **7. Marks Distribution**

Practical Exam Internal Evaluation                            100 Marks



## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Digital System Design TEC-207
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Digital Electronics and system design to the students.
9	General educational purpose	A. General Education <b>Yes</b>  B. department specialization <b>Yes</b>  C. Students Research <b>No</b>  D. Out growth of instructors  Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b>  B. An introductory survey of knowledge represented by the department <b>No</b>  C. An introductory survey of a special area of knowledge <b>No</b>  D. A further development of course <b>No</b>  E. An introductory survey of a special area of knowledge represented by some other department <b>No</b>  F. a summarizing or integrated course <b>No</b>  G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course

13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg.
15	Topical outline : a) Lecture;	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course** : **Digital System Design**  
**2. Course No.** : **TEC-207**  
**3. Credits Hours** : **4(3-1-0)**  
**4. Per-requisite** : **NIL**

#### **5. Syllabus /Catalogue Description**

Number systems ; number system conversion, Binary, Octal and Hexadecimal representation and their conversion, BCD, ASCII, EBDIC, Gray codes and their conversion, Signed binary numbers representation with 1's and 2's complement methods, Binary arithmetic.

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Karnaugh maps up to 6 variables, Binary codes, Code Conversion.

MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display, Half and Full Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter and ALU.

Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits like Pulse train generator, Pseudo-Random Binary Sequence generator, Clock generation

Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Concept of Programmable logic devices like FPGA, Logic implementation using Programmable Devices.

## **6. Text/Reference Books:**

1. Digital Logic Design, Morris Mano, PHI, 8th edition, 2012
2. R.P. Jain, "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2009.
3. Thomas L. Floyd, "Digital Fundamentals", Pearson, 11<sup>th</sup> edition, 2015
4. W.H. Gothmann, "Digital Electronics- An introduction to theory and practice", PHI, 2nd edition , 2006.

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Digital System Design Lab TEC-208
4	Catalogue Description	List of Experiments attached
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	1(0-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide the practical knowledge of digital system components and their design to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department    No F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course.    No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Digital System Design Lab**

**2. Course No.** : **TEC-208**

**3. Credits Hours** : **1(0-0-2)**

**4. Per-requisite** : **NIL**

### **5. List of Experiments**

1. Logic verification of logic gates and getting familiar with various ICs of different logic families.
2. Implementation and logic verification of Boolean Logic Functions using logic gates and combinational circuits.
3. Study and configure of various digital circuits such as adder, subtractor, decoder, encoder, code converters.
4. Study and configurations of multiplexer and de-multiplexer circuits.
5. Study and configure of flip-flop, registers and counters using digital ICs.
6. Implementation and simulation of digital logic circuits using HDL.
7. Illustrative examples of HDL program using FPGA or CPLD boards.
8. Simulation of various logic families in EDA tools and measurement of digital logic gate specifications such as propagation delay, noise margin, fan in and fan out, and power dissipation

### **6. Reference Books**

- Digital Logic and computer Design By- M Mano, PHI
- Digital fundamentals By – J Floyd Pearson
- Digital Logic By M. Leach

### **7. Marks Distribution**

Practical Exam Internal Evaluation

100 Marks



## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Signals and Systems TEC-209
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of different types of signals and systems in the field of Electronics and communication to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                            No D. Out growth of instructors Research Programme                            No
10	Relation to other courses	A. Pre-requisite                                 Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course            No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course        No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Signals and Systems**

**2. Course No. : TEC-209**

**3. Credits Hours : 4(3-1-0)**

**4. Per-requisite : NIL**

**5. Syllabus /Catalogue Description**

Signals and systems as seen in everyday life and in various branches of engineering and science.

Energy and power signals, continuous and discrete time signals, continuous and discrete amplitude signals.

System properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, realizability.

Linear shift-invariant (LSI) systems, impulse response and step response, convolution, input-output behavior with aperiodic convergent inputs. Characterization of causality and stability of linear shift-invariant systems. System representation through differential equations and difference equations.

Periodic and semi-periodic inputs to an LSI system, the notion of a frequency response and its relation to the impulse response, Fourier series representation, the Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality. The Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval's Theorem. The idea of signal space and orthogonal bases,

The Laplace Transform, notion of Eigen functions of LSI systems, a basis of Eigen functions, region of convergence, poles and zeros of system, Laplace domain analysis, solution to differential equations and system behavior.

The z-Transform for discrete time signals and systems- Eigen functions, region of convergence, z-domain analysis.

State-space analysis and multi-input, multi-output representation. The state-transition matrix and its role, The Sampling Theorem and its implications- Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold, and so on. Aliasing and its effects. Relation between continuous and discrete time systems.

## 6. Text/Reference books:

24. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall, 1983.
25. R.F. Ziener, W.H. Tranter and D.R. Fannin, "Signals and Systems - Continuous and Discrete", 4th edition, Prentice Hall, 1998.
26. Papoulis, "Circuits and Systems: A Modern Approach", HRW, 1980.
27. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press, c1998.
28. Douglas K. Lindner, "Introduction to Signals and Systems", McGraw Hill International Edition: c1999.
29. Simon Haykin, Barry van Veen, "Signals and Systems", John Wiley and Sons (Asia) Private Limited.
30. Robert A. Gabel, Richard A. Roberts, "Signals and Linear Systems", John Wiley and Sons, 1995.
31. M. J. Roberts, "Signals and Systems - Analysis using Transform methods and MATLAB", TMH, 2003.
32. J. Nagrath, S. N. Sharan, R. Ranjan, S. Kumar, "Signals and Systems", TMH New Delhi, 2001.
33. Ashok Ambardar, "Analog and Digital Signal Processing", 2nd Edition, Brooks/ Cole Publishing Company (An international Thomson Publishing Company), 1999.

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Network Theory TEC-210
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of circuit and network analysis to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Network Theory**

- 2. Course No.** : **TEC-210**
- 3. Credits Hours** : **3(3-0-0)**
- 4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

Node and Mesh Analysis, matrix approach of network containing voltage and current sources, and reactances, source transformation and duality. Network theorems: Superposition, reciprocity, Thevenin's, Norton's, Maximum power Transfer, compensation and Tallegen's theorem as applied to AC. circuits. Trigonometric and exponential Fourier series: Discrete spectra and symmetry of waveform, steady state response of a network to non-sinusoidal periodic inputs, power factor, effective values, Fourier transform and continuous spectra, three phase unbalanced circuit and power calculation.

Laplace transforms and properties: Partial fractions, singularity functions, waveform synthesis, analysis of RC, RL, and RLC networks with and without initial conditions with Laplace transforms evaluation of initial conditions.

Transient behavior, concept of complex frequency, Driving points and transfer functions poles and zeros of immittance function, their properties, sinusoidal response from pole-zero locations, convolution theorem and Two four port network and interconnections, Behaviors of series and parallel resonant circuits, Introduction to band pass, low pass, high pass and band reject filters.

## **6. Text/Reference Books**

Van, Valkenburg; "Network analysis"; Prentice hall of India, 2000

Sudhakar, A., Shyam Mohan, S. P.; "Circuits and Network"; Tata McGraw-Hill New Delhi, 1994

A William Hayt, "Engineering Circuit Analysis" 8th Edition, McGraw-Hill Education

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Electromagnetic Waves TEC-211
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Electromagnetics and its applications to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Electromagnetic Waves**

**2. Course No. : TEC-211**

**3. Credits Hours : 4(3-1-0)**

**5. Syllabus /Catalogue Description**

Transmission Lines- Equations of Voltage and Current on TX line, Propagation constant and characteristic impedance, and reflection coefficient and VSWR, Impedance Transformation on Loss-less and Low loss Transmission line, Power transfer on TX line, Smith Chart, Admittance Smith Chart, Applications of transmission lines: Impedance Matching, use transmission line sections as circuit elements.

Maxwell's Equations- Basics of Vectors, Vector calculus, Basic laws of Electromagnetics, Maxwell's Equations, Boundary conditions at Media Interface.

Uniform Plane Wave- Uniform plane wave, Propagation of wave, Wave polarization, Poincare's Sphere, Wave propagation in conducting medium, phase and group velocity, Power flow and Poynting vector, Surface current and power loss in a conductor

Plane Waves at a Media Interface- Plane wave in arbitrary direction, Reflection and refraction at dielectric interface, Total internal reflection, wave polarization at media interface, Reflection from a conducting boundary.

Wave propagation in parallel plane waveguide, Analysis of waveguide general approach, Rectangular waveguide, Modal propagation in rectangular waveguide, Surface currents on the waveguide walls, Field visualization, Attenuation in waveguide.

Radiation: Solution for potential function, Radiation from the Hertz dipole, Power radiated by hertz dipole, Radiation Parameters of antenna, receiving antenna, Monopole and Dipole antenna,

**6.Text/Reference Books:**

R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill India, 2005

E.C. Jordan & K.G. Balmain, Electromagnetic waves & Radiating Systems, Prentice Hall, India

Narayana Rao, N: Engineering Electromagnetics, 3rd ed., Prentice Hall, 1997.

David Cheng, Electromagnetics, Prentice Hall

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Analog Communication Systems TEC-214
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of analog and digital communication techniques to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Analog Communication Systems**

**2. Course No. : TEC-214**

**3. Credits Hours** : **4(3-1-0)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

Review of signals and systems, Frequency domain representation of signals, Needs of Modulation, Classification.

Principles of Amplitude Modulation Systems- DSB, SSB and VSB modulations. Modulators and Demodulators

Angle Modulation, Representation of FM and PM signals, Spectral characteristics of angle modulated signals. Modulators and Demodulators

Random Variables and Processes; Basics Theory of Noise analysis; Noise in amplitude modulation systems, Noise in Frequency modulation systems.

Pre-emphasis and De-emphasis, Threshold effect in angle modulation.

## **6.Text/Reference Books:**

Haykin S., "Communications Systems", John Wiley and Sons, 2001.

B. P. Lathi, Modern Digital and Analog Communication Systems, Oxford University Press

Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education, 2002.

Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.

Wozencraft J. M. and Jacobs I. M., ``Principles of Communication Engineering", John Wiley, 1965.

## **7. Marks Distribution**

I Pre final Exam                    20 Marks

II Pre final Exam                    20 Marks

Assignments 10 Marks

Final Exam 50 Marks

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Total 100 Marks  
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Analog Circuits TEC-215
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of analog circuits and their analysis techniques to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Analog Circuits**

- 2. Course No.** : **TEC-215**

- 3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Diode Circuits, Amplifier models: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier. Biasing schemes for BJT and FET amplifiers, bias stability, various configurations (such as CE/CS, CB(CG, CC/CD) and their features, small signal analysis, low frequency transistor models, estimation of voltage gain, input resistance, output resistance etc., design procedure for particular specifications, low frequency analysis of multistage amplifiers.

High frequency transistor models, frequency response of single stage and multistage amplifiers, cascode amplifier. Various classes of operation (Class A, B, AB, C etc.), their power efficiency and linearity issues. Feedback topologies: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., calculation with practical circuits, concept of stability, gain margin and phase margin.

Oscillators: Review of the basic concept, Barkhausen criterion, RC oscillators (phase shift, Wien bridge etc.), LC oscillators (Hartley, Colpitt, Clapp etc.), non-sinusoidal oscillators.

Current mirror: Basic topology and its variants, V-I characteristics, output resistance and minimum sustainable voltage (V<sub>ON</sub>), maximum usable load. Differential amplifier: Basic structure and principle of operation, calculation of differential gain, common mode gain, CMRR and ICMR. OP-AMP design: design of differential amplifier for a given specification, design of gain stages and output stages, compensation.

OP-AMP applications: review of inverting and non-inverting amplifiers, integrator and differentiator, summing amplifier, precision rectifier, Schmitt trigger and its applications. Active filters: Low pass, high pass, band pass and band stop, design guidelines.

Digital-to-analog converters (DAC): Weighted resistor, R-2R ladder, resistor string etc. Analog- to-digital converters (ADC): Single slope, dual slope, successive approximation, flash etc. Switched capacitor circuits: Basic concept, practical configurations, application in amplifier, integrator, ADC etc.

**6.Text/Reference Books:**

J.V. Wait, L.P. Huelsman and G.A. Korn, Introduction to Operational Amplifier theory and applications, McGraw Hill, 1992.

J. Millman and A. Grabel, Microelectronics, 2nd edition, McGraw Hill, 1988.

P. Horowitz and W. Hill, The Art of Electronics, 2nd edition, Cambridge University Press, 1989.

Paul R. Gray and Robert G.Meyer, Analysis and Design of Analog Integrated Circuits, John Wiley, 3<sup>rd</sup> Edition

**7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Analog Circuits Lab TEC-216
4	Catalogue Description	List of Experiments attached
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	1(0-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To impart practical knowledge of analog electronic components and circuits to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                          Yes C. Students Research                                  No D. Out growth of instructors Research Programme                          No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                          No C. An introductory survey of a special area of knowledge                                  No D. A further development of course                          No E. An introductory survey of a special area of knowledge represented by some other department                          No F. a summarizing or integrated course                          No G. in your judgment does this course overlap to a considerable extent with any other course.                          No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : **Analog Circuits Lab**  
**2. Course No.** : **TEC-216**

**3. Credits Hours** : **1(0-0-2)**

**4. Per-requisite** : **NIL**

## **5. List of Experiments**

1. Verification of Half wave and full wave rectification circuits using Diodes.
2. Op-amp parameter measurement: input bias current, input offset current, Input offset voltage, slew rate of op-amp 741.
3. Design of inverting and non-inverting amplifier using op-amp for a specific gain and observe input output waveforms.
4. Design and test active integrator and differentiator circuits for given Frequency. Apply different input signals & observe the output waveform
5. Design and test Schmitt trigger circuit for given hysteresis. Measure the hysteresis voltage.
6. Design and test of square wave or triangular wave generator using Op-amp for given frequency.
7. Design and test of various active LP, HP, Band Pass filter of second order Butterworth.
8. Design and test RC phase shift or Wein bridge oscillator using op-amp.

## **6. Reference Books**

- Schilling & Below: Electronic Circuits - Discrete and Integrated, McGraw Hill Pub.
- Millman & Halkias : Integrated Electronics, McGraw Hill Publication
- Boylestad & Nashlesky : Electronic Devices & Circuit Theory, PHI

## **7. Marks Distribution**

Practical Exam Internal Evaluation                    100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Microcontrollers TEC-217
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	2(2-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of microcontrollers and its applications to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Microcontrollers**

**2. Course No. : TEC-217**

**3. Credits Hours : 2(2-0-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Overview of microcomputer systems and their building blocks, memory interfacing, concepts of interrupts and Direct Memory Access, instruction sets of microprocessors (with examples of 8085 and 8086);

Interfacing with peripherals - timer, serial I/O, parallel I/O, A/D and D/A converters; Arithmetic Coprocessors; System level interfacing design;

Concepts of virtual memory, Cache memory, Advanced coprocessor Architectures- 286, 486, Pentium; Microcontrollers: 8051 systems,

Introduction to RISC processors; ARM microcontrollers interface designs.

**6.Text/Reference Books:**

- R. S. Gaonkar, Microprocessor Architecture: Programming and Applications with the 8085/8080A, Penram International Publishing, 1996
- D A Patterson and J H Hennessy, "Computer Organization and Design The hardware and software interface. Morgan Kaufman Publishers.
- Douglas Hall, Microprocessors Interfacing, Tata McGraw Hill, 1991.
  
- Kenneth J. Ayala, The 8051 Microcontroller, Penram International Publishing, 1996.

**7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks

Total

100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Microcontroller Lab TEC-218
4	Catalogue Description	List of Experiments attached
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	1(0-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To impart practical knowledge of microcontrollers along with circuit design and their application in real life to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                            No D. Out growth of instructors Research Programme                            No
10	Relation to other courses	A. Pre-requisite                                 Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                    No D. A further development of course            No E. An introductory survey of a special area of knowledge represented by some other department    No F. a summarizing or integrated course        No G. in your judgment does this course overlap to a considerable extent with any other course.    No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Microcontroller Lab**

**2. Course No.** : **TEC-218**

**3. Credits Hours** : **1(0-0-2)**

**4. Per-requisite** : **NIL**

### **5. List of Experiments**

- ❖ Familiarization of 8085 Microprocessor, 8086 Microprocessor and 8051 Microcontroller kits
- ❖ Design of timing clock using 8085 microprocessor
- ❖ 16 Bit Mathematical and Logical operations Using Arithmetic Operation of 8086 Microprocessor.
- ❖ Data block transfer without Overlap
- ❖ Code Conversion –Decimal To Hexadecimal 8 Code Conversion –Hexadecimal To Decimal
- ❖ String Manipulations, Sorting And Searching- Ascending & Descending
- ❖ Implementation of industrial applications such as Traffic Light Control, Stepper Motor Controller using 8051 microcontroller kit
- ❖ Interfacing Analog -To -Digital Converter and Digital - To – Analog Converter using 8051 microcontroller kit

### **6. Reference Books**

- R. S. Gaonkar, Microprocessor Architecture: Programming and Applications with the 8085/8080A, Penram International Publishing, 1996
- D A Patterson and J H Hennessy, "Computer Organization and Design The hardware and software interface. Morgan Kaufman Publishers.
- Douglas Hall, Microprocessors Interfacing, Tata McGraw Hill, 1991.
- Kenneth J. Ayala, The 8051 Microcontroller, Penram International Publishing, 1996.

### **7. Marks Distribution**

Practical Exam Internal Evaluation

100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Antennas and Propagation TEC-219
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Antenna and Propagation to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Antennas and Propagation**

**2. Course No. : TEC-219**

**3. Credits Hours** : **4(3-1-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Fundamental Concepts- Physical concept of radiation, Radiation pattern, near-and far-field regions, reciprocity, directivity and gain, effective aperture, polarization, input impedance, efficiency, Friis transmission equation, radiation integrals and auxiliary potential functions.

Radiation from Wires and Loops- Infinitesimal dipole, finite-length dipole, linear elements near conductors, dipoles for mobile communication, small circular loop.

Aperture and Reflector Antennas- Huygens' principle, radiation from rectangular and circular apertures, design considerations, Babinet's principle, Radiation from sectoral and pyramidal horns, design concepts, prime-focus parabolic reflector and cassegrain antennas.

Broadband Antennas- Log-periodic and Yagi-Uda antennas, frequency independent antennas, broadcast antennas.

Micro strip Antennas- Basic characteristics of micro strip antennas, feeding methods, methods of analysis, design of rectangular and circular patch antennas.

Antenna Arrays- Analysis of uniformly spaced arrays with uniform and non-uniform excitation amplitudes, extension to planar arrays, and synthesis of antenna arrays using Schelkunoff polynomial method, Woodward-Lawson method.

Basic Concepts of Smart Antennas- Concept and benefits of smart antennas, fixed weight beam forming basics, Adaptive beam forming.

Different modes of Radio Wave propagation used in current practice.

**6.Text/Reference Books:**

**34.** J.D. Kraus, Antennas, McGraw Hill, 1988.

**35.** C.A. Balanis, Antenna Theory - Analysis and Design, John Wiley, 1982.

**36.** R.E. Collin, Antennas and Radio Wave Propagation, McGraw Hill, 1985.

**37.** R.C. Johnson and H. Jasik, Antenna Engineering Handbook, McGraw ill, 1984.

**38.** I.J. Bahl and P. Bhartia, Micro Strip Antennas, Artech House, 1980.

**39.** R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill, 2005

**40.** R.E. Crompton, Adaptive Antennas, John Wiley

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks

## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Practical Training-II TEC-291
4	Catalogue Description	The first year student shall undergo basic knowledge of electrical and electronic components along with the design of small software and/or hardware projects.
5	To be offered	B.Tech, II Year, Electronics & Communication Engineering
6	Credits	0
7	Is this a new Course	Yes
8	Curricular purpose of the course	To let the students which new devices, gadgets etc are being come in the field of electronics & Communication engineering. Also students shall have some basic knowledge of the components and their working.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA
16	Practical	NA
17	Text Book and Supplementary readings	NA
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by Deptt and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : **Practical Training-II**

**2. Course No.** : **TEC-291**

**3. Credits Hours** : **0**

**4. Per-requisite** : **NIL**

**5. Guidelines:**

- ❖ The Students shall undergo training on his/her choice near their residence/ company for gaining knowledge about what new gadgets and latest technologies are coming in the market.
- ❖ Also they shall learn the software skills and /or hardware projects using basic components.
- ❖ The students shall also learn about how the latest technologies work.
- ❖ The duration of the training shall be of **2 weeks**.
- ❖ The evaluation will be based on the report and presentation submitted by the students in the following semester.

**6. Internal Evaluation** on the basis of understanding the project by the students, presentation, usefulness and documentation.

The evaluation of the course shall result grades in terms of **Satisfactory and Unsatisfactory**.

## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Digital Communication Systems TEC-305
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of digital communication techniques to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course : Digital Communication Systems  
2. Course No. : TEC-305  
3. Credits Hours : 4(3-1-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Pulse modulation. Sampling process. Pulse code modulation (PCM), Differential pulse code modulation (DPCM). Delta modulation (DM), Adaptive Delta Modulation (ADM),

Noise considerations in PCM, Time Division multiplexing, Digital Multiplexers.

Baseband Pulse Transmission- Inter symbol Interference and Nyquist criterion. Pass band Digital Modulation schemes- Phase Shift Keying, Frequency Shift Keying, Quadrature Amplitude Modulation, Continuous Phase Modulation and Minimum Shift Keying.

Elements of Detection Theory, Optimum detection of signals in noise, Coherent communication with waveforms- Probability of Error evaluations.

Digital Modulation tradeoffs. Optimum demodulation of digital signals over band-limited channels- Maximum likelihood sequence detection (Viterbi receiver). Equalization Techniques. Synchronization and Carrier Recovery for Digital modulation.

**6.Text/Reference Books:**

Haykin S., "Communications Systems", John Wiley and Sons, 2001.

B. P. Lathi, Modern Digital and Analog Communication Systems, Oxford University Press

Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education, 2002.

Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.

Wozencraft J. M. and Jacobs I. M., ``Principles of Communication Engineering", John Wiley, 1965.

Barry J. R., Lee E. A. and Messerschmitt D. G., ``Digital Communication", Kluwer Academic Publishers, 2004.

Proakis J.G., ``Digital Communications", 4th Edition, McGraw Hill, 2000.

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## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Communication Systems Lab TEC-306
4	Catalogue Description	List of Experiments attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	1(0-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To impart practical knowledge of analog and digital communication systems to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : **Communication Systems Lab**  
**2. Course No.** : **TEC-306**

**3. Credits Hours** : **1(0-0-2)**

**4. Per-requisite** : **NIL**

## **5. List of Experiments**

- ❖ Study of Modulation Process.
- ❖ Study of generation of DSB Amplitude modulation.
- ❖ Study of generation of SSB Amplitude modulation.
- ❖ Study of Pulse Amplitude Modulation.
- ❖ Study of Pulse Width Modulation.
- ❖ Study of Pulse Position Modulation.
- ❖ Study Pulse Code Modulation (PCM) and demodulation on and observe the waveforms.
- ❖ Study of Amplitude Shift Keying (ASK) Modulator and Demodulator.
- ❖ Study of Phase Shift Keying (PSK) Modulator and Demodulator
- ❖ Study of Frequency Shift Keying (FSK) Modulator and Demodulator

## **6. Reference Books:**

- Communication Systems By S. Haykin
- Modern Analog & Digital Comm. Systems By- B. P. Lathi
- Communication Systems: Analog and Digital By Singh & Sapre

## **7. Marks Distribution**

Practical Internal Exam Evaluation

100 Marks



## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Computer Architecture TEC-307
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Computer architecture to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course :** Computer Architecture

**2. Course No. :** TEC-307

**3. Credits Hours :** 3(3-0-0)

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Basic Structure of Computers, Functional units, software, performance issues software, machine instructions and programs, Types of instructions, Instruction sets: Instruction formats, Assembly language, Stacks, Ques, Subroutines.

Processor organization, Information representation, number formats.

Multiplication & division, ALU design, Floating Point arithmetic, IEEE 754 floating point formats

Control Design, Instruction sequencing, Interpretation, Hard wired control - Design methods, and CPU control unit. Micro-programmed Control - Basic concepts, minimizing microinstruction size, multiplier control unit. Micro-programmed computers - CPU control unit

Memory organization, device characteristics, RAM, ROM, Memory management, Concept of Cache & associative memories, Virtual memory.

System organization, Input - Output systems, Interrupt, DMA, Standard I/O interfaces

Concept of parallel processing, Pipelining, Forms of parallel processing, interconnect network

**6.Text/Reference Books:**

V. Carl Hammacher, "Computer Organization", Fifth Edition.

A. S. Tanenbaum, "Structured Computer Organization", PHI, Third edition

Y. Chu, "Computer Organization and Microprogramming", II, Englewood Chiffs, N.J., Prentice Hall Edition

M. M. Mano, "Computer System Architecture", Edition

C.W. Gear, "Computer Organization and Programming", McGraw Hill, N.V. Edition Hayes J.P, "Computer Architecture and Organization", PHI, Second edition

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Digital Signal Processing TEC-308
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Digital Signal Processing to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Digital Signal Processing**

**2. Course No.** : **TEC-308**

**3. Credits Hours** : **4(3-1-0)**

**4. Per-requisite** : **NIL**

### **5. Syllabus /Catalogue Description**

Discrete time signals: Sequences; representation of signals on orthogonal basis; Sampling and reconstruction of signals; Discrete systems attributes, Z-Transform, Analysis of LSI systems, frequency analysis, Inverse Systems, Discrete Fourier Transform (DFT), Fast Fourier Transform Algorithm, Implementation of Discrete Time Systems

Design of FIR Digital filters: Window method, Park-McClellan's method. Design of IIR Digital Filters: Butterworth, Chebyshev and Elliptic Approximations; Low-pass, Band-pass, Band-stop and High pass filters.

Effect of finite register length in FIR filter design. Parametric and non-parametric spectral estimation. Introduction to multirate signal processing. Application of DSP.

### **6.Text/Reference Books:**

S.K.Mitra, Digital Signal Processing: A computer based approach.TMH

A.V. Oppenheim and Schafer, Discrete Time Signal Processing, Prentice Hall, 1989.

John G. Proakis and D.G. Manolakis, Digital Signal Processing: Principles, Algorithms And Applications, Prentice Hall, 1997.

L.R. Rabiner and B. Gold, Theory and Application of Digital Signal Processing, Prentice Hall, 1992.

J. R. Johnson, Introduction to Digital Signal Processing, Prentice Hall, 1992.

D. J. DeFatta, J. G. Lucas and W. S. Hodgkiss, Digital Signal Processing, John Wiley, 1988.

### **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Control Systems TEC-309
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(3-1-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Control Systems to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Control Systems**

<b>2. Course No.</b>	<b>:</b>	<b>TEC-309</b>
<b>3. Credits Hours</b>	<b>:</b>	<b>4(3-1-0)</b>
<b>4. Per-requisite</b>	<b>:</b>	<b>NIL</b>

### **5. Syllabus /Catalogue Description**

Introduction to control problem- Industrial Control examples. Transfer function. System with dead-time. System response. Closed-loop systems. Block diagram and signal flow graph analysis.

Feedback control systems- Stability, steady-state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness. proportional, integral and derivative systems. Feed-forward and multi-loop control configurations, stability concept, relative stability, Routh stability criterion.

Time response of second-order systems, steady-state errors and error constants. Performance specifications in time-domain. Root locus method of design. Lead and lag compensation.

Frequency-response analysis- Polar plots, Bode plot, stability in frequency domain, Nyquist plots. Nyquist stability criterion. Performance specifications in frequency-domain. Frequency-domain methods of design, Compensation & their realization in time & frequency domain. Lead and Lag compensation. Op-amp based and digital implementation of compensators. Tuning of process controllers. State variable formulation and solution.

State variable Analysis- Concepts of state, state variable, state model, state models for linear continuous time functions, diagonalization of transfer function, solution of state equations, concept of controllability & observability.

Nonlinear system – Basic concept & analysis.

### **6.Text/Reference Books:**

Gopal. M., “Control Systems: Principles and Design”, Tata McGraw-Hill, 1997.

Kuo, B.C., “Automatic Control System”, Prentice Hall, sixth edition, 1993.

Ogata, K., “Modern Control Engineering”, Prentice Hall, second edition, 1991.

Nagrath & Gopal, “Modern Control Engineering”, New Age International, New Delhi

### **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Simulation Software TEC-314
4	Catalogue Description	Laboratory based course for understanding of latest computer software in E&CE
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	3(1-0-2x2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide practical knowledge of different approaches to hardware circuits design
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical	NA
17	Text Book and Supplementary readings	NA
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by Deptt and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Simulation Software**

<b>2. Course No.</b>	<b>:</b>	<b>TEC-314</b>
<b>3. Credits Hours</b>	<b>:</b>	<b>3(1-0-2x2)</b>
<b>4. Per-requisite</b>	<b>:</b>	<b>NIL</b>

### **5. Guidelines:**

- ❖ The Lab shall consist of hands on practice on the simulation and design software available in the department.
- ❖ The students shall work on different software in the form of package.
- ❖ The available software are MATLAB, IE3D, HFSS, VLSI Design, CADANCE, Code Composer Studio etc.
- ❖ The basic knowledge about each of the above software will be given the students.
- ❖ The evaluation will be based on the software projects and their results at the end of the semester.

### **6. Marks Distribution**

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Electronic Measurement Lab TEC-315
4	Catalogue Description	List of Experiments attached
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	1(0-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide practical knowledge of different measurement devices and applications
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                            No D. Out growth of instructors Research Programme                            No
10	Relation to other courses	A. Pre-requisite                                Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                    No D. A further development of course            No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Electronic Measurement Lab**

**2. Course No.** : **TEC-315**

**3. Credits Hours** : **1(0-0-2)**

**4. Per-requisite** : **NIL**

## **5. List of Experiments**

- ❖ Designing DC bridge for Resistance Measurement (Quarter, Half and Full bridge)
- ❖ Designing AC bridge Circuit for capacitance measurement
- ❖ Designing signal Conditioning circuit for Pressure Measurement
- ❖ Designing signal Conditioning circuit for Temperature Measurement
- ❖ Designing signal Conditioning circuit for Torque Measurement
- ❖ Designing signal Conditioning circuit for Strain Measurement
- ❖ Experimental study for the characteristics of ADC and DAC
- ❖ Error compensation study using Numerical analysis using MATLAB (regression)

## **6. Reference Books**

- Digital Instrumentation by Rangan Sharma and Mani

## **7. Marks Distribution**

Practical Exam Internal Evaluation	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Electronic Design Workshop TEC-316
4	Catalogue Description	Laboratory based course for design of mini project
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	2(0-0-2x2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide practical knowledge of different approaches to hardware circuits design
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical	NA
17	Text Book and Supplementary readings	NA
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Electronic Design Workshop**

**2. Course No. : TEC-316**

**3. Credits Hours** : **2(0-0-2x2)**

#### **4. Per-requisite : NIL**

## **5. Guidelines:**

- ❖ The mini-project is a team activity having 3-4 students in a team. This is electronic product design work with a focus on electronic circuit design.
  - ❖ The mini project may be a complete hardware or a combination of hardware and software. The software part in mini project should be less than 50% of the total work.
  - ❖ Mini Project should cater to a small system required in laboratory or real life.
  - ❖ It should encompass components, devices, analog or digital ICs, micro controller with which functional familiarity is introduced.
  - ❖ After interactions with course coordinator and based on comprehensive literature survey/ need analysis, the student shall identify the title and define the aim and objectives of mini-project.
  - ❖ Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and submit the proposal within first week of the semester.
  - ❖ The student is expected to exert on design, development and testing of the proposed work as per the schedule.
  - ❖ Art work and Layout should be made using CAD based PCB simulation software. Due considerations should be given for power requirement of the system, mechanical aspects for enclosure and control panel design.
  - ❖ Completed mini project and documentation in the form of mini project report is to be submitted at the end of semester.

## **6. Marks Distribution**

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

Total 100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Digital Signal Processing Lab TEC-317
4	Catalogue Description	List of Experiments attached
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	1(0-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide practical knowledge of different digital signal processors and the design of systems for different applications
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department    No F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course.            No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**2. Course No.** : **TEC-317**

**3. Credits Hours** : **1(0-0-2)**

**4. Per-requisite** : **NIL**

## **5. List of Experiments**

- ❖ Study of TI DSP Kits (Speedy-33, TMS320C5416DSK and TMS320C6711DSK)
- ❖ Study of different communication modules
- ❖ DTMF Generator
- ❖ Different Types of Modulators
- ❖ Random Number generator
- ❖ Design of FIR filters
- ❖ Design of IIR filters
- ❖ Speech processing on TI 6711 kit
- ❖ Mathematical operations on TI kits
- ❖ Mathematical operations on signals through TI kits
- ❖ Real time applications on TI kits (Speech and image)

## **6. Reference Books**

- Oppenheim A.V., Schafer R.W. & Buck J.R., Discrete- Time signal Processing Prentice Hall Signal Processing Series, Pearson Education
- Mitra S.K., Digital Signal Processing: A Computer Based Approach, Tata McGraw Hill
- Proakis T.G. & Manolakkis D.G., Digital Signal Processing- Principles, Algorithms and Applications, Prentice Hall of India Pvt. Ltd.

## **7. Marks Distribution**

Practical Internal Exam Evaluation	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Microwave Theory and Techniques TEC-319
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Microwave Theory and Techniques to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Microwave Theory and Techniques**

**2. Course No.** : **TEC-319**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

### **5. Syllabus /Catalogue Description**

Introduction to Microwaves-History of Microwaves, Microwave Frequency bands; Applications of Microwaves: Civil and Military, Medical, EMI/ EMC.

Mathematical Model of Microwave Transmission-Concept of Mode, Features of TEM, TE and TM Modes, Losses associated with microwave transmission, Concept of Impedance in Microwave transmission.

Analysis of RF and Microwave Transmission Lines- Coaxial line, Rectangular waveguide, Circular waveguide, Strip line, Micro strip line.

Microwave Network Analysis- Equivalent voltages and currents for non-TEM lines, Network parameters for microwave circuits, Scattering Parameters.

Passive and Active Microwave Devices- Microwave passive components: Directional Coupler, Power Divider, Magic Tee, Attenuator, Resonator. Microwave active components: Diodes, Transistors, Oscillators, Mixers. Microwave Semiconductor Devices: Gunn Diodes, IMPATT diodes, Schottky Barrier diodes, PIN diodes. Microwave Tubes: Klystron, TWT, Magnetron.

Microwave Design Principles- Impedance transformation, Impedance Matching, Microwave Filter Design, RF and Microwave Amplifier Design, Microwave Power Amplifier Design, Low Noise Amplifier Design, Microwave Mixer Design, Microwave Oscillator Design. Microwave Antennas- Antenna parameters, Antenna for ground based systems, Antennas for airborne and satellite borne systems, Planar Antennas.

Microwave Measurements- Power, Frequency and impedance measurement at microwave frequency, Network Analyzer and measurement of scattering parameters, Spectrum Analyzer and measurement of spectrum of a microwave signal, Noise at microwave frequency and measurement of noise figure. Measurement of Microwave antenna parameters.

Microwave Systems- Radar, Terrestrial and Satellite Communication, Radio Aids to Navigation, RFID, GPS. Modern Trends in Microwaves Engineering- Effect of Microwaves on human body, Medical and Civil applications of microwaves, Electromagnetic interference and Electromagnetic Compatibility (EMI & EMC), Monolithic Microwave ICs, RFMEMS for microwave components, Microwave Imaging.

### **6.Text/Reference Books:**

**41.** S.Y. Liao, *Microwave Devices and Circuits*

**42.** R.E. Collins, *Microwave Circuits*, McGraw Hill

**43.** K.C. Gupta and I.J. Bahl, *Microwave Circuits*, Artech house

### **7. Marks Distribution**

I Pre final Exam	20 Marks
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II Pre final Exam	20 Marks
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Assignments	10 Marks
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Final Exam

50 Marks

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Total

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100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Information Theory and Coding TEC-320
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Information Theory and Coding to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Elective Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Information Theory and Coding**

**2. Course No.** : **TEC-320**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

Basics of information theory, entropy for discrete ensembles; Shannon's noiseless coding theorem; Encoding of discrete sources.

Markov sources; Shannon's noisy coding theorem and converse for discrete channels; Calculation of channel capacity and bounds for discrete channels; Application to continuous channels.

Techniques of coding and decoding; Huffman codes and uniquely detectable codes; Cyclic codes, convolutional arithmetic codes.

## **6.Text/Reference Books:**

N. Abramson, Information and Coding, McGraw Hill, 1963.

M. Mansurpur, Introduction to Information Theory, McGraw Hill, 1987.

R.B. Ash, Information Theory, Prentice Hall, 1970.

Shu Lin and D.J. Costello Jr., Error Control Coding, Prentice Hall, 1983.

**44.**

## **7. Marks Distribution**

I Pre final Exam                    20 Marks

II Pre final Exam                    20 Marks

Assignments                        10 Marks

Final Exam                        50 Marks

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Total

100 Marks

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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	CMOS Design TEC-321
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of CMOS Design to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : **CMOS Design**

**2. Course No.** : **TEC-321**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

1. Review of MOS transistor models, Non-ideal behavior of the MOS Transistor. Transistor as a switch.
2. CMOS Inverter characteristics, Delay: RC Delay model, linear delay model, logical path efforts. Power calculation  
Integrated Circuit Layout: Design Rules, stick diagram, parasitic extraction.
3. Combinational Circuit Design: CMOS logic families including static, transmission gate, dynamic and dual rail logic. Delay calculation with logical path efforts.
4. Sequential Circuit Design: Static and dynamic circuits. Design of latches and Flip-flops.
5. Memories and array structures: MOS-ROM, SRAM cell, volatile memory

## **6.Text/Reference Books:**

- Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic, “Digital Integrated Circuits: A Design Perspective,” Prentice Hall India, 2003.
- Sung-Mo Kang, Yusuf Liblebici, “CMOS Digital Integrated Circuits,” Tata McGraw Hill, 2003.
- N.H.E. Weste and D.M. Harris, CMOS VLSI design: A Circuits and Systems Perspective, 4th Edition, Pearson Education India, 2011.
- R. Jacob Baker, “CMOS Mixed-Signal Circuit Design,” Wiley India Pvt.Ltd,2009.
- Ivan Sutherland, R. Sproull and D. Harris, “Logical Effort: Designing Fast CMOS Circuits”, Morgan Kaufmann,1999.

## **7. Marks Distribution**

I Pre final Exam	20 Marks
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II Pre final Exam	20 Marks
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Assignment	10 Marks
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Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Microwave Lab TEC-322
4	Catalogue Description	List of Experiments attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	1(0-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide practical knowledge of electromagnetic principles and the wave properties to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                            No D. Out growth of instructors Research Programme                            No
10	Relation to other courses	A. Pre-requisite                                 Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                    No D. A further development of course            No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Microwave Lab**

**2. Course No.** : **TEC-322**

**3. Credits Hours** : **1(0-0-2)**

**4. Per-requisite** : **NIL**

## **5. List of Experiments**

- ❖ Study of Microwave Components and Strip Components
- ❖ Measurement of Frequency and Wavelength
- ❖ Measurement of SWR and Impedance
- ❖ Measurement of Attenuation
- ❖ Characteristics of Directional Coupler
- ❖ Measurement of Microwave Power
- ❖ Measurement of Phase Shift
- ❖ Radiation Characteristics of Antennas
- ❖ Measurement of Scattering Parameters

## **6. Reference Books**

- Liao S.Y., "Microwave Devices and Circuits," Prentice- Hall of India, Private Limited, 1997
- Collin, R.E., "Foundation for Microwave Engineering," McGraw Hill (International Edition), 1996
- Pozar D. M., "Microwave Engineering," John Wiley.
- "Microwave Semiconductor Devices – S. K. Roy & M. Mitra"

## **7. Marks Distribution**

Practical Exam Internal Evaluation                    100 Marks



## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Neural Processing and Systems TEC-323
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Neural Processing and System development approach to the students.
9	General educational purpose	A. General Education                          Yes B. Department specialization                   Yes C. Students Research                           No D. Out growth of instructors Research Programme                          No
10	Relation to other courses	A. Pre-requisite                                 Nil B. An introductory survey of knowledge represented by the department                          No C. An introductory survey of a special area of knowledge    No D. A further development of course                          No E. An introductory survey of a special area of knowledge represented by some other department    No F. a summarizing or integrated course                          No G. in your judgment does this course overlap to a considerable extent with any other course.                          No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	No, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Neural Processing and Systems**

**2. Course No. : TEC-323**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

1. Basics of Neuroscience and its Modeling: Human brain anatomy, neural physiology, neuron models, network architectures.
2. AI and NN: Knowledge representation and Intelligence. NN as intelligent systems
3. Learning Process: learning paradigms, learning rules, learning tasks.
4. Perceptron: Definition, linear separability, perceptron learning algorithms,
5. Multilayer Perceptron: Architecture, back propagation algorithm, heuristics for improving performance.
6. Principal Component Analysis: Self Organization, PCA as a statistical tool, Hebbian based PCA
7. Self Organizing Maps: Basic feature mapping models, SOM architecture and algorithms, Learning vector quantization
8. Advances in neural processing systems: Radial-Basis function networks, Support vector machines, Committee machines, ART networks.

**6.Text/Reference Books:**

Haykin, S., Neural Networks: A Comprehensive foundation, Pearson Education

Bose, N.K., and Liang, P., Neural Network Fundamentals with Graphs, Algorithms, and Applications, Tata McGraw Hill

Bishop, C.M., Neural Networks for Pattern Recognition, Oxford University Press.

**7. Marks Distribution**

I Pre final Exam                    20 Marks

II Pre final Exam                    20 Marks

Assignments                        10 Marks

Final Exam                        50 Marks

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Total                                100 Marks  
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Mixed Signal Design TEC-324
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Mixed Signal Design to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	No, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : **Mixed Signal Design**

**2. Course No.** : **TEC-324**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

Analog and discrete-time signal processing, introduction to sampling theory; Analog continuous-time filters: passive and active filters; Basics of analog discrete-time filters and Z-transform.

Switched-capacitor filters- Non idealities in switched-capacitor filters; Switched-capacitor filter architectures; Switched-capacitor filter applications.

Basics of data converters; Successive approximation ADCs, Dual slope ADCs, Flash ADCs, Pipeline ADCs, Hybrid ADC structures, High-resolution ADCs, DACs.

Mixed-signal layout, Interconnects and data transmission; Voltage-mode signaling and data transmission; Current-mode signaling and data transmission.

Introduction to frequency synthesizers and synchronization; Basics of PLL, Analog PLLs; Digital PLLs; DLLs.

## **6.Text/Reference Books:**

- 45.** R. Jacob Baker, CMOS mixed-signal circuit design, Wiley India, IEEE press, reprint 2008.
- 46.** Behzad Razavi , Design of analog CMOS integrated circuits, McGraw-Hill, 2003.
- 47.** R. Jacob Baker, CMOS circuit design, layout and simulation, Revised second edition, IEEE press, 2008.
- 48.** Rudy V. dePlassche, CMOS Integrated ADCs and DACs, Springer, Indian edition, 2005.
- 49.** Arthur B. Williams, Electronic Filter Design Handbook, McGraw-Hill, 1981.
- 50.** R. Schauman, Design of analog filters by, Prentice-Hall 1990 (or newer additions).
- 51.** M. Burns et al., An introduction to mixed-signal IC test and measurement by, Oxford University press, first Indian edition, 2008.

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## **7. Marks Distribution**

I Pre final Exam	20 Marks
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II Pre final Exam	20 Marks
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Assignments	10 Marks
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Final Exam

50 Marks

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Total

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100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Embedded Systems TEC-325
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Embedded Systems to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Embedded Systems**

**2. Course No. : TEC-325**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

The concept of embedded systems design, Embedded microcontroller cores, embedded memories. Examples of embedded systems, Technological aspects of embedded systems: interfacing between analog and digital blocks, signal conditioning, digital signal processing. sub- system interfacing, interfacing with external systems, user interfacing. Design tradeoffs due to process compatibility, thermal considerations, etc., Software aspects of embedded systems: real time programming languages and operating systems for embedded systems.

## **6.Text/Reference Books:**

**52.** J.W. Valvano, "Embedded Microcomputer System: Real Time Interfacing", Brooks/Cole, 2000.

**53.** Jack Ganssle, "The Art of Designing Embedded Systems", Newness, 1999.

**54.** V.K. Madisetti, "VLSI Digital Signal Processing", IEEE Press (NY, USA), 1995.

**55.** David Simon, "An Embedded Software Primer", Addison Wesley, 2000.

**56.** K.J. Ayala, "The 8051 Microcontroller: Architecture, Programming, and Applications", Penram Intl, 1996.

## **7. Marks Distribution**

I Pre final Exam	20 Marks
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II Pre final Exam	20 Marks
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Assignments	10 Marks
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Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Computer Networks TEC-429
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Computer Network to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Computer Networks**

**2. Course No. : TEC-429**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Introduction to computer networks and the Internet: Application layer: Principles of network applications, The Web and Hyper Text Transfer Protocol, File transfer, Electronic mail, Domain name system, Peer-to-Peer file sharing, Socket programming, Layering concepts.

Switching in networks: Classification and requirements of switches, a generic switch, Circuit Switching, Time-division switching, Space-division switching, Crossbar switch and evaluation of blocking probability, 2-stage, 3-stage and n-stage networks, Packet switching, Blocking in packet switches, Three generations of packet switches, switch fabric, Buffering, Multicasting, Statistical

Multiplexing. Transport layer: Connectionless transport - User Datagram Protocol, Connection-oriented transport – Transmission Control Protocol, Remote Procedure Call.

Transport layer: Connectionless transport - User Datagram Protocol, Connection-oriented transport – Transmission Control Protocol, Remote Procedure Call.

Congestion Control and Resource Allocation: Issues in Resource Allocation, Queuing Disciplines,

TCP congestion Control, Congestion Avoidance Mechanisms and Quality of Service.

Network layer: Virtual circuit and Datagram networks, Router, Internet Protocol, Routing algorithms, Broadcast and Multicast routing

Link layer: ALOHA, Multiple access protocols, IEEE 802 standards, Local Area Networks, addressing, Ethernet, Hubs, Switches.

**6.Text Reference books:**

J.F. Kurose and K. W. Ross, “Computer Networking – A top down approach featuring the Internet”, Pearson Education, 5th Edition

L. Peterson and B. Davie, “Computer Networks – A Systems Approach” Elsevier Morgan Kaufmann Publisher, 5th Edition.

T. Viswanathan, “Telecommunication Switching System and Networks”, Prentice Hall

S. Keshav, “An Engineering Approach to Computer Networking”, Pearson Education

B. A. Forouzan, “Data Communications and Networking”, Tata McGraw Hill, 4th Edition

Andrew Tanenbaum, “Computer networks”, Prentice Hall

D. Comer, "Computer Networks and Internet/TCP-IP", Prentice Hall

William Stallings, "Data and computer communications", Prentice Hall

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	IC Fabrication Technology TEC-430
4	Catalogue Description	Attached
5	To be offered	B.Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide the basic knowledge of Integrated Circuit fabrication methods and techniques to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                 Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                         No D. A further development of course            Yes E. An introductory survey of a special area of knowledge represented by some other department    No F. a summarizing or integrated course        No G. in your judgment does this course overlap to a considerable extent with any other course.    No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is a new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : IC Fabrication Technology**

**2. Course No. : TEC-430**

**3. Credits Hours** : **3(3-0-0)**

**4. Pre-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

**Introduction to IC fabrication:** Device scaling and Moore's law, basic device fabrication methods, alloy junction and planar process.

Crystal growth: Czochralski techniques, Characterization methods and wafer specifications, defects in Si. Semiconductor manufacturing and cleaning.

**Oxidation:** Surface passivation using oxidation. Deal-Grove model, oxide characterization, types of oxidation and their kinematics, thin oxide growth models, stacking faults, oxidation systems.

**Diffusion and ion-implantation:** Solutions of diffusion equation, diffusion systems, ion implantation technology, ion implant distributions, implantation damage and annealing, transient enhanced diffusion and rapid thermal processing.

**Etching and thin film deposition:** Wet etching, selectivity, isotropy and etch bias, common wet etchants, orientation dependent etching effects

Introduction to plasma technology, plasma etch mechanisms, selectivity and profile control plasma etch chemistries for various films, plasma etch systems.

Thermodynamics of vapour phase growth, MOCVD, MBE, CVD, reaction rate and mass transport limited depositions, APCVD/LPVD, equipments and applications of CVD, PECVD, and PVD.

**Lithography:** Optical lithography contact/proximity and projection printing, resolution and depth of focus, resist processing methods and resolution enhancement, advanced lithography techniques for nano scale patterning, immersion, EUV, electron-, X-ray lithography

**6. Reference Books**

- Plummer, J.D., Deal, M.D. and Griffin, P.B., "Silicon VLSI Technology: Fundamentals, Practice and Modeling", 3rd Ed., 2000
- Sze, S.M., "VLSI Technology", 4th Ed., Tata McGraw-Hill.1999
- Gandhi, S. K., "VLSI Fabrication Principles: Silicon and Gallium Arsenide", John Wiley and Sons. 2003
- Campbell, S.A., "The Science and Engineering of Microelectronic Fabrication", 4<sup>th</sup> Ed., 1996

**7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	10 Marks

Final Exam

50 Marks

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Total

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100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Fiber Optic Communications TEC-431
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Fiber Optic Communications to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Yes, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Fiber Optic Communications**

**2. Course No.** : **TEC-431**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

### **5. Syllabus /Catalogue Description**

Introduction to vector nature of light, propagation of light, propagation of light in a cylindrical dielectric rod, Ray model, wave model.

Different types of optical fibers, Modal analysis of a step index fiber.

Signal degradation on optical fiber due to dispersion and attenuation. Fabrication of fibers and measurement techniques like, OTDR.

Optical sources - LEDs and Lasers, Photo-detectors - pin-diodes, APDs, detector responsively, noise, optical receivers. Optical link design - BER calculation, quantum limit, power penalties.

Optical switches - coupled mode analysis of directional couplers, electro-optics switches.

Optical amplifiers - EDFA, Raman amplifier.

WDM and DWDM systems. Principles of WDM networks.

Nonlinear effects in fiber optic links. Concept of self-phase modulation, group velocity dispersion and soliton based communication.

### **6.Text/Reference Books**

**57.** J. Keiser, Fibre Optic communication, McGraw-Hill, 5th Ed. 2013 (Indian Edition).

**58.** T. Tamir, Integrated optics, (Topics in Applied Physics Vol.7), Springer-Verlag, 1975.

**59.** J. Gowar, Optical communication systems, Prentice Hall India, 1987.

**60.** S.E. Miller and A.G. Chynoweth, eds., Optical fibres telecommunications, Academic Press, 1979.

**61.** G. Agrawal, Nonlinear fibre optics, Academic Press, 2nd Ed. 1994.

**62.** G. Agrawal, Fiber optic Communication Systems, John Wiley and sons, New York, 1997

**63.** F.C. Allard, Fiber Optics Handbook for engineers and scientists, McGraw Hill, New York (1990).

### **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Mobile Communication and Networks TEC-432
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Mobile Communication and Networks to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Yes, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course :** **Mobile Communication and Networks**

**2. Course No. :** **TEC-432**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Cellular concepts- Cell structure, frequency reuse, cell splitting, channel assignment, handoff, interference, capacity, power control; Wireless Standards: Overview of 2G and 3G cellular standards.

Signal propagation-Propagation mechanism- reflection, refraction, diffraction and scattering, large scale signal propagation and lognormal shadowing. Fading channels-Multipath and small scale fading- Doppler shift, statistical multipath channel models, narrowband and wideband fading models, power delay profile, average and RMS delay spread, coherence bandwidth and coherence time, flat and frequency selective fading, slow and fast fading, average fade duration and level crossing rate.

Capacity of flat and frequency selective channels. Antennas- Antennas for mobile terminal-monopole antennas, PIFA, base station antennas and arrays.

Multiple access schemes-FDMA, TDMA, CDMA and SDMA. Modulation schemes- BPSK, QPSK and variants, QAM, MSK and GMSK, multicarrier modulation, OFDM.

Receiver structure- Diversity receivers- selection and MRC receivers, RAKE receiver, equalization: linear-ZFE and adaptive, DFE. Transmit diversity-Altamonte scheme.

MIMO and space time signal processing, spatial multiplexing, diversity/multiplexing tradeoff. Performance measures- Outage, average SNR, average symbol/bit error rate. System examples- GSM, EDGE, GPRS, IS-95, CDMA 2000 and WCDMA.

**6.Text/Reference Books:**

**64.** WCY Lee, Mobile Cellular Telecommunications Systems, McGraw Hill, 1990.

**65.** WCY Lee, Mobile Communications Design Fundamentals, Prentice Hall, 1993.

**66.** Raymond Steele, Mobile Radio Communications, IEEE Press, New York, 1992.

**67.** AJ Viterbi, CDMA: Principles of Spread Spectrum Communications, Addison Wesley, 1995.

**68.** VK Garg & JE Wilkes, Wireless & Personal Communication Systems, Prentice Hall, 1996.

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Satellite Communication TEC-433
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Satellite Communication to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                          No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                          No C. An introductory survey of a special area of knowledge    No D. A further development of course                          No E. An introductory survey of a special area of knowledge represented by some other department                          No F. a summarizing or integrated course                          No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Satellite Communication**

**2. Course No. : TEC-433**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

Introduction to Satellite Communication: Principles and architecture of satellite Communication, Brief history of Satellite systems, advantages, disadvantages, applications and frequency bands used for satellite communication.

Orbital Mechanics: Orbital equations, Kepler's laws, Apogee and Perigee for an elliptical orbit, evaluation of velocity, orbital period, angular velocity etc. of a satellite, concepts of Solar day and Sidereal day.

Satellite sub-systems: Study of Architecture and Roles of various sub-systems of a satellite system such as Telemetry, tracking, command and monitoring (TTC & M), Attitude and orbit control system (AOCS), Communication sub-system, power sub-systems etc.

Typical Phenomena in Satellite Communication: Solar Eclipse on satellite, its effects, remedies for Eclipse, Sun Transit Outage phenomena, its effects and remedies, Doppler frequency shift phenomena and expression for Doppler shift.

Satellite link budget

Flux density and received signal power equations, Calculation of System noise temperature for satellite receiver, noise power calculation, Drafting of satellite link budget and C/N ratio calculations in clear air and rainy conditions.

Modulation and Multiple Access Schemes: Various modulation schemes used in satellite communication, Meaning of Multiple Access, Multiple access schemes based on time, frequency, and code sharing namely TDMA, FDMA and CDMA.

## **6.Text /Reference Books:**

**69.** Timothy Pratt Charles W. Bostian, Jeremy E. Allnutt: Satellite Communications: Wiley India. 2nd edition 2002

**70.** Tri T. Ha: Digital Satellite Communications: Tata McGraw Hill, 2009

**71.** Dennis Roddy: Satellite Communication: 4th Edition, McGraw Hill,2009

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total 100 Marks

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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	High Speed Electronics TEC-434
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Satellite Communication to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Yes, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : High Speed Electronics**

**2. Course No.** : **TEC-434**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

### **5. Syllabus /Catalogue Description**

Transmission line theory (basics) crosstalk and non-ideal effects; signal integrity: impact of packages, vias, traces, connectors; non-ideal return current paths, high frequency power delivery, methodologies for design of high speed buses; radiated emissions and minimizing system noise; Noise Analysis: Sources, Noise Figure, Gain compression, Harmonic distortion, Inter-modulation, Cross-modulation, Dynamic range Devices: Passive and active, Lumped passive devices (models), Active (models, low v/s high frequency)

RF Amplifier Design, Stability, Low Noise Amplifiers, Broadband Amplifiers (and Distributed) Power Amplifiers, Class A, B, AB and C, D E Integrated circuit realizations, Cross-over distortion Efficiency RF power output stages

Mixers –Up conversion Down conversion, Conversion gain and spurious response .Oscillators Principles.PLL Transceiver architectures

Printed Circuit Board Anatomy, CAD tools for PCB design, Standard fabrication, Micro via Boards. Board Assembly: Surface Mount Technology, Through Hole Technology, Process Control and Design challenges.

### **6.Text/Reference Books:**

- 72.** Stephen H. Hall, Garrett W. Hall, James A. McCall “High-Speed Digital System Design: A Handbook of Interconnect Theory and Design Practices”, August 2000, Wiley-IEEE Press
- 73.** Thomas H. Lee, “The Design of CMOS Radio-Frequency Integrated Circuits”, Cambridge University Press, 2004.
- 74.** Behzad Razavi, “RF Microelectronics”, Prentice-Hall 1998.
- 75.** Guillermo Gonzalez, “Microwave Transistor Amplifiers”, 2nd Edition, Prentice Hall.
- 76.** Kai Chang, “RF and Microwave Wireless systems”, Wiley.
- 77.** R.G. Kaduskar and V.B.Baru, Electronic Product design, Wiley India, 2011

### **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks

Assignments 10 Marks

Final Exam 50 Marks

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Total 100 Marks  
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Digital Image & Video Processing TEC-435
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Digital Image & Video Processing to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Yes, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Digital Image & Video Processing**

**2. Course No. : TEC-435**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

Digital Image Fundamentals-Elements of visual perception, image sensing and acquisition, image sampling and quantization, basic relationships between pixels – neighborhood, adjacency, connectivity, distance measures.

Image Enhancements and Filtering-Gray level transformations, histogram equalization and specifications, pixel-domain smoothing filters – linear and order-statistics, pixel-domain sharpening filters – first and second derivative, two-dimensional DFT and its inverse, frequency domain filters – low-pass and high-pass.

Color Image Processing-Color models-RGB, YUV, HSI; Color transformations– formulation, color complements, color slicing, tone and color corrections; Color image smoothing and sharpening; Color Segmentation.

Image Segmentation- Detection of discontinuities, edge linking and boundary detection, thresholding – global and adaptive, region-based segmentation.

Wavelets and Multi-resolution image processing- Uncertainty principles of Fourier Transform, Time-frequency localization, continuous wavelet transforms, wavelet bases and multi-resolution analysis, wavelets and Sub-band filter banks, wavelet packets.

Image Compression-Redundancy-inter-pixel and psycho-visual; Lossless compression – predictive, entropy; Lossy compression- predictive and transform coding; Discrete Cosine Transform; Still image compression standards – JPEG and JPEG-2000.

Fundamentals of Video Coding- Inter-frame redundancy, motion estimation techniques – full-search, fast search strategies, forward and backward motion prediction, frame classification – I, P and B; Video sequence hierarchy – Group of pictures, frames, slices, macro-blocks and blocks; Elements of a video encoder and decoder; Video coding standards – MPEG and H.26X.

Video Segmentation- Temporal segmentation–shot boundary detection, hard-cuts and soft-cuts; spatial segmentation – motion-based; Video object detection and tracking.

**6.Text/Reference Books:**

**78.** R.C. Gonzalez and R.E. Woods, Digital Image Processing, Second Edition, Pearson Education 3rd edition 2008

**79.** Anil Kumar Jain, Fundamentals of Digital Image Processing, Prentice Hall of India.2nd edition 2004

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Wireless Sensor Networks TEC-436
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Wireless Sensor Networks to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Yes, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Wireless Sensor Networks**

**2. Course No.** : **TEC-436**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

### **5. Syllabus /Catalogue Description**

Introduction to Sensor Networks, unique constraints and challenges, Advantage of Sensor Networks, Applications of Sensor Networks, Types of wireless sensor networks

Mobile Ad-hoc Networks (MANETs) and Wireless Sensor Networks, Enabling technologies for Wireless Sensor Networks. Issues and challenges in wireless sensor networks

Routing protocols, MAC protocols: Classification of MAC Protocols, S-MAC Protocol, B-MAC protocol, IEEE 802.15.4 standard and ZigBee,

Dissemination protocol for large sensor network, Data dissemination, data gathering, and data fusion; Quality of a sensor network; Real-time traffic support and security protocols.

Design Principles for WSNs, Gateway Concepts Need for gateway, WSN to Internet Communication, and Internet to WSN Communication.

Single-node architecture, Hardware components & design constraints,

Operating systems and execution environments, introduction to Tiny OS and nesC.

### **6.Text/Reference Books:**

Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory And Practice", By John Wiley & Sons Publications, 2011

Sabrie Solomon, "Sensors Handbook" by McGraw Hill publication. 2009

Feng Zhao, Leonidas Guibas, "Wireless Sensor Networks", Elsevier Publications, 2004

Kazem Sohrby, Daniel Minoli, "Wireless Sensor Networks": Technology, Protocols and Applications, Wiley-Inter science

Philip Levis, And David Gay "Tiny OS Programming" by Cambridge University Press 2009

### **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Error Correcting Codes TEC-437
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3 (3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Error Correcting Codes to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Yes, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Error Correcting Codes**

**2. Course No.** : **TEC-437**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

Linear block codes: Systematic linear codes and optimum decoding for the binary symmetric channel; Generator and Parity Check matrices, Syndrome decoding on symmetric channels; Hamming codes; Weight enumerators and the McWilliams identities; Perfect codes, Introduction to finite fields and finite rings; factorization of ( $X^{n-1}$ ) over a finite field; Cyclic Codes. BCH codes; Idempotents and Mattson-Solomon polynomials; Reed-Solomon codes, Justesen codes, MDS codes, Alterant, Goppa and generalized BCH codes; Spectral properties of cyclic codes. ; Decoding of BCH codes: Berlekamp's decoding algorithm, Massey's minimum shift register synthesis technique and its relation to Berlekamp's algorithm. A fast Berlekamp-Massey algorithm. Convolution codes; Wozencraft's sequential decoding algorithm, Fann's algorithm and other sequential decoding algorithms; Viterbi decoding algorithm.

## **6.Text/Reference Books:**

**81.** F.J. McWilliams and N.J.A. Sloane, The theory of error correcting codes, 1977.

**82.** R.E. Balahut, Theory and practice of error control codes, Addison Wesley, 1983.

## **7. Marks Distribution**

I Pre final Exam                    20 Marks

II Pre final Exam                    20 Marks

Assignments                        10 Marks

Final Exam                        50 Marks

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Total

100 Marks

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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Artificial Intelligence TEC-438
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Artificial Intelligence to the students.
9	General educational purpose	A. General Education                          Yes B. Department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course                No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Yes, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Artificial Intelligence**

**2. Course No. : TEC- 438**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

### **5. Syllabus /Catalogue Description**

**Fundamental Concepts:** Agents, environments, general model; Problem solving techniques.

**Search Techniques:** Uninformed search, heuristic search, adversarial search and game trees; Solution of constraint satisfaction problems using search.

**Knowledge Representation:** Propositional and predicate calculus, semantics for predicate calculus, inference rules, unification, semantic networks, conceptual graphs, structured representation, frames, scripts.

**Bayesian Reasoning:** Bayesian networks, dynamic Bayesian networks.

**Planning:** State-space search, planning graphs.

**Learning:** Inductive learning, decision tree learning.

**Advanced Topics:** Role of knowledge in language understanding, stages of language analysis, parsing using context free grammars, transition network parser, Chomsky hierarchy and context sensitive grammars, rule based expert systems, neural networks, genetic algorithms.

### **6.Text/Reference Books:**

Russell, S. and Norvig, P., "Artificial Intelligence: A Modern Approach", Pearson Education.

Rich, E. and Knight, K., "Artificial Intelligence", Tata McGraw-Hill.

Padhy, N. P., "Artificial Intelligence", Oxford University Press.

### **7. Marks Distribution**

I Pre final Exam                    20 Marks

II Pre final Exam                    20 Marks

Assignments                        10 Marks

Final Exam

50 Marks

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Total

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100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Speech and Audio Processing TEC-439
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge of Speech and Audio Processing to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                            No D. Out growth of instructors Research Programme                            No
10	Relation to other courses	A. Pre-requisite                                Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                    No D. A further development of course            No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Yes, Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Speech and Audio Processing**

**2. Course No.** : **TEC-439**

**3. Credits Hours** : **3(3-0-0)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

Introduction- Speech production and modeling - Human Auditory System; General structure of speech coders; Classification of speech coding techniques – parametric, waveform and hybrid; Requirements of speech codecs –quality, coding delays, robustness.

Speech Signal Processing- Pitch-period estimation, all-pole and all-zero filters, convolution; Power spectral density, periodogram, autoregressive model, autocorrelation estimation.

Linear Prediction of Speech- Basic concepts of linear prediction; Linear Prediction Analysis of non-stationary signals –prediction gain, examples; Levinson-Durbin algorithm; Long term and short-term linear prediction models; Moving average prediction.

Speech Quantization- Scalar quantization–uniform quantizer, optimum quantizer, logarithmic quantizer, adaptive quantizer, differential quantizers; Vector quantization – distortion measures, codebook design, codebook types.

Scalar Quantization of LPC- Spectral distortion measures, Quantization based on reflection coefficient and log area ratio, bit allocation; Line spectral frequency – LPC to LSF conversions, quantization based on LSF.

Linear Prediction Coding- LPC model of speech production; Structures of LPC encoders and decoders; Voicing detection; Limitations of the LPC model.

Code Excited Linear Prediction-CELP speech production model; Analysis-by-synthesis; Generic CELP encoders and decoders; Excitation codebook search – state-save method, zero-input zero-state method; CELP based on adaptive codebook, Adaptive Codebook search; Low Delay CELP and algebraic CELP.

Speech Coding Standards-An overview of ITU-T G.726, G.728 and G.729 standards

## **6. Text/Reference Books:**

“Digital Speech” by A. M. Kondoz, Second Edition.

“Speech Coding Algorithms: Foundation and Evolution of Standardized Coders”, W.C. Chu, Wiley Inter science.

**83.**

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignments	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Synthesis of Digital Systems TEC-444
4	Catalogue Description	Attached
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide the basic knowledge of Integrated Circuit fabrication methods and techniques to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>Yes</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is a new course

13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Elective Course of B. Tech E&C Engg. Department
15	Topical outline : a) Lecture;	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course :      Synthesis of Digital Systems**

**2. Course No. :      TEC-444**

**3. Credits Hours :      3(3-0-0)**

**4. Per-requisite :      TEC-digital system design**

### **5. Syllabus /Catalogue Description**

- I.     Introduction to EDA Tools and design Methodologies
- II.    Hardware modeling principles and hardware description using the HDL
- III.   Behavioral synthesis: scheduling, allocation, and binding.  
Register-transfer level synthesis, retiming and Finite State Machine encoding.
- IV.    Logic synthesis: combinational logic optimization, FPGA synthesis and technology mapping  
Control synthesis: State machine and Micro-programmed control
- V.     Layout synthesis: placement and routing

## **6. Reference Books:**

1. Synthesis and Optimization of Digital Circuits, Giovanni Micheli, McGraw-Hill Intl., 1994
2. The Synthesis Approach to Digital System Design, Ed. By Petra Michel, Ulrich Lauther& Peter Duzy, Kluwer Academic Publishers, 1992
3. High-Level Synthesis: Introduction to Chip and System Design, D. Gajski, N. Dutt, A. Wu and S. Lin, Kluwer Academic Publishers, 1992
4. VHDL: Analysis and Modelling of Digital Systems Z. Navabi, McGraw-Hill Intl. Editions, 1998

## **7. Marks Distribution**

I Pre final Exam	20 Marks
II Pre final Exam	20 Marks
Assignment	10 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Project-I, TEC-495A
4	Catalogue Description	Laboratory based course for design of Major project
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	4(0-0-8)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide practical knowledge of different approaches to hardware circuits design
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Outgrowth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical	NA
17	Text Book and Supplementary readings	NA
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Project-I**

**2. Course No. : TEC- 495A**

**3. Credits Hours** : **4(0-0-8)**

#### **4. Per-requisite : NIL**

## **5. Guidelines:**

The object of Project Work I is to enable the student to take up investigative study in the broad field of Electronics & Communication Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment to normally include;

Survey and study of published literature on the assigned topic;

Working out a preliminary Approach to the Problem relating to the assigned topic; Conducting preliminary Analysis/Modeling/Simulation/Experiment/Design/Feasibility; Preparing a Written Report on the Study conducted for presentation to the Department; Final Seminar, as oral Presentation before a departmental committee.

## **6. Marks Distribution**

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

Total 100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Project-II, TEC-495B
4	Catalogue Description	Laboratory based course for design of Major project
5	To be offered	B. Tech, Electronics & Communication Engineering
6	Credits	8(0-0-16)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide practical knowledge of different approaches to hardware circuits design
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                            No D. Out growth of instructors Research Programme                            No
10	Relation to other courses	A. Pre-requisite                                Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                    No D. A further development of course            No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech E&CE Students
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Program Core Course of B. Tech Electronics & Communication Engineering
15	Topical outline : a) Lecture;	NA (Lab Based Course)
16	Practical	NA
17	Text Book and Supplementary readings	NA
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Project-II**

**2. Course No.** : **TEC- 495B**

**3. Credits Hours** : **8(0-0-16)**

**4. Per-requisite** : **Nil**

**5. Guidelines:**

The object of Project Work II & Dissertation is to enable the student to extend further the investigative study taken up under EC P1, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:

In depth study of the topic assigned in the light of the Report prepared under EC P1; Review and finalization of the Approach to the Problem relating to the assigned topic; Preparing an Action Plan for conducting the investigation, including team work; Detailed Analysis/Modeling/Simulation/Design/Problem Solving/Experiment as needed; Final development of product/process, testing, results, conclusions and future directions; Preparing a paper for Conference presentation/Publication in Journals, if possible; Preparing a Dissertation in the standard format for being evaluated by the Department.

Final Seminar Presentation before a Departmental Committee.

**6. Marks Distribution**

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

----- Total 100 Marks -----

**List of Courses to be Offered to Other Branch Students**

<b>Sl No.</b>	<b>Course Number</b>	<b>Course Title</b>	<b>Credit Hrs</b>	<b>Credit Breakup</b>
1	TEC-227	Basic Electronic Engineering	4	3-0-2
2	TEC-301	Analog Electronic Circuits	4	3-0-2
3	TEC-302	Digital Electronics	4	3-0-2

### **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Basic Electronic Engineering TEC-227
4	Catalogue Description	Attached
5	To be offered	B. Tech, Mechanical Engineering, Civil Engineering
6	Credits	4(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To provide the theoretical knowledge of Electronics, components, circuits and communication.
9	General educational purpose	A. General Education                          Yes B. department specialization                   Yes C. Students Research                           No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                Nil B. An introductory survey of knowledge represented by the department                   No C. An introductory survey of a special area of knowledge                                   No D. A further development of course           No E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course                                   No

		G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per AICTE guidelines curriculum to be applied to B. Tech ME
12	The course will not replace my existing courses	The course will not replace existing course, as it is new course
13	The courses will not require additional staff over and above	Yes
14	What is the exact place of this courses in the development of the educational programme of your department	Engg Science Course of B. Tech Mechanical Engineering
15	Topical outline : a) Lecture;	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Developed by AICTE and applicable to the B Tech Students
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course** : **Basic Electronic Engineering**  
**2. Course No.** : **TEC-227**  
**3. Credits Hours** : **4(3-0-2)**  
**4. Per-requisite** : **NIL**

## 5. Syllabus /Catalogue Description

**Semiconductor Devices and Applications:** Introduction to P-N junction Diode and V-I characteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator. Regulated power supply IC based on 78XX and 79XX series, Introduction to BJT, its input-output and transfer characteristics, BJT as a single stage CE amplifier, frequency response and bandwidth.

**Operational amplifier and its applications:** Introduction to operational amplifiers, Op-amp input modes and parameters, Op-amp in open loop configuration, op-amp with negative feedback, study of practical op-amp IC 741, inverting and non-inverting amplifier applications: summing and difference amplifier, unity gain buffer, comparator, integrator and differentiator.

**Timing Circuits and Oscillators:** RC-timing circuits, IC 555 and its applications as astable and mono-stable multi-vibrators, positive feedback, Barkhausen's criteria for oscillation, R-C phase shift and Wein bridge oscillator.

**Digital Electronics Fundamentals** :Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K-map, Logic ICs, half and full adder/subtractor, multiplexers, de-multiplexers, flip-flops, shift registers, counters, Block diagram of microprocessor/microcontroller and their applications.

**Electronic Communication Systems:** The elements of communication system, IEEE frequency spectrum, Transmission media: wired and wireless, need of modulation, AM and FM modulation schemes, Mobile communication systems: cellular concept and block diagram of GSM system.

#### **6. Text /Reference Books:**

**84.** Floyd ,” Electronic Devices” Pearson Education 9<sup>th</sup> edition, 2012.

**85.** R.P. Jain , “Modern Digital Electronics”, Tata Mc Graw Hill, 3<sup>rd</sup> Edition, 2007.

**86.** Frenzel, “Communication Electronics: Principles and Applications”, Tata Mc Graw Hill, 3<sup>rd</sup> Edition, 2001

#### **7. Marks Distribution**

##### **Marks Distribution**

I Pre final Exam	25 Marks
II Pre final Exam	25 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Analog Electronic Circuit TEC-301
4	Catalogue Description	Attached
5	To be offered	B. Tech, Information Theory, Computer Engineering and Electrical Engineering
6	Credits	4(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Electronics and devices to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Nil B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Analog Electronic Circuit**

**2. Course No. : TEC-301**

**3. Credits Hours** : **4(3-0-2)**

**4. Per-requisite** : **NIL**

## **5. Syllabus /Catalogue Description**

### **Module 1: Diode circuits (4 Hours)**

P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, Zener diodes, clamping and clipping circuits.

### **Module 2: BJT circuits (8 Hours)**

Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: small-signal model, biasing circuits, current mirror; common-emitter, common-base and common-collector amplifiers; Small signal equivalent circuits, high-frequency equivalent circuits

### **Module 3: MOSFET circuits (8 Hours)**

MOSFET structure and I-V characteristics. MOSFET as a switch. MOSFET as an amplifier: small-signal model and biasing circuits, common-source, common-gate and common-drain amplifiers; small signal equivalent circuits - gain, input and output impedances, transconductance, high frequency equivalent circuit.

### **Module 4: Differential, multi-stage and operational amplifiers (8 Hours)**

Differential amplifier; power amplifier; direct coupled multi-stage amplifier; internal structure of an operational amplifier, ideal op-amp, non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product)

### **Module 5: Linear applications of op-amp (8 Hours)**

Idealized analysis of op-amp circuits. Inverting and non-inverting amplifier, differential amplifier, instrumentation amplifier, integrator, active filter, P, PI and PID controllers and lead/lag compensator using an op-amp, voltage regulator, oscillators (Wein bridge and phase shift).

Analog to Digital Conversion.

### **Module 6: Nonlinear applications of op-amp (6 Hours)**

Hysteretic Comparator, Zero Crossing Detector, Square-wave and triangular-wave generators.

Precision rectifier, peak detector. Monoshot.

#### **6. Text/References:**

- 87.** A. S. Sedra and K. C. Smith, “Microelectronic Circuits”, New York, Oxford University Press, 1998.
- 88.** J. V. Wait, L. P. Huelsman and G. A. Korn, “Introduction to Operational Amplifier theory and applications”, McGraw Hill U. S., 1992.
- 89.** J. Millman and A. Grabel, “Microelectronics”, McGraw Hill Education, 1988.
- 90.** P. Horowitz and W. Hill, “The Art of Electronics”, Cambridge University Press, 1989.
- 91.** P. R. Gray, R. G. Meyer and S. Lewis, “Analysis and Design of Analog Integrated Circuits”, John Wiley & Sons, 2001.

#### **92. 7.List Of Experiments:**

1. Study the I-V characteristics PN junction diode and derive of mathematical model.
2. Study the I-V characteristics and breakdown phenomenon of Zener diode.
3. Verification of Half wave and full wave rectification circuits using Diodes.

4. Plot of input and output characteristics of CE, CB and CC configuration of BJT.
5. Plot of MOSFET I-V Characteristics: Drain and Transfer characteristics, and determination of mathematical model.
6. Op-amp parameter measurement: input bias current, input offset current, Input offset voltage, slew rate of op-amp 741.
7. Design of inverting and non-inverting amplifier using op-amp for a specific gain and observe input output waveforms.
8. Design and test active integrator and differentiator circuits for given Frequency. Apply different input signals & observe the output waveform
9. Design and test Schmitt trigger circuit for given hysteresis. Measure the hysteresis voltage.
- 10.** Design and test of square wave or triangular wave generator using Op-amp for given frequency.

## 7. Marks Distribution

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Electronics & Communication Engineering
3	Title of the Course & Course No.	Digital Electronics TEC-302
4	Catalogue Description	Attached
5	To be offered	B. Tech, Information Technology, Computer Engineering and Electrical Engineering
6	Credits	4(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Electronics and devices to the students.
9	General educational purpose	A. General Education                          Yes B. department specialization                    Yes C. Students Research                              No D. Out growth of instructors Research Programme                              No
10	Relation to other courses	A. Pre-requisite                                  Nil B. An introductory survey of knowledge represented by the department                    No C. An introductory survey of a special area of knowledge                                      No D. A further development of course               No E. An introductory survey of a special area of knowledge represented by some other department    No F. a summarizing or integrated course            No G. in your judgment does this course overlap to a considerable extent with any other course.    No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech E&C Engg. Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Digital Electronics**

**2. Course No. : TEC-302**

**3. Credits Hours** : **4(3-0-2)**

**4. Per-requisite** : **NIL**

**5. Syllabus /Catalogue Description**

**Module 1: Fundamentals of Digital Systems and logic families**

Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.

**Module 2: Combinational Digital Circuits**

Standard representation for logic functions, K-map representation, simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serialadder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.

**Module 3: Sequential circuits and systems**

A 1-bit memory, the circuit properties of Bi-stable latch, the clocked SR flip flop, J- K-T And D types flip flops, applications of flip flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple(Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

**Module 4: A/D and D/A Converters**

Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs

**Module 5: Semiconductor memories and Programmable logic devices.** Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly

used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

## **6.Text/References:**

- 93.** R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
- 94.** M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.
- 95.** A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

**96.**

**97.**

**98.**

## **99. 7. List Of Experiments:**

1. Logic verification of logic gates and getting familiar with various ICs of different logic families.
2. Implementation and logic verification of Boolean Logic Functions using logic gates and combinational circuits.
3. Study and configure of various digital circuits such as adder, subtractor, decoder, encoder, code converters.
4. Study and configurations of multiplexer and de-multiplexer circuits.
5. Study and configure of flip-flop, registers and counters using digital ICs.
6. Transfer characteristics of ADC and DAC.
7. Illustrative examples of HDL program using FPGA or CPLD boards.
8. Illustrative examples of Accessing RAM and ROM.

## **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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**Proposal for Curriculum**

**Bachelor of Technology**

**in**

**Industrial and production**

**engineering Engineering**

**(As per AICTE Model Curriculum**

**2018)**



**Department of Industrial and production engineering  
Engineering**

**College of Technology**

**G.B. Pant University of Agriculture and Technology,  
Pantnagar (Uttarakhand)-263145**

**DETAILED 4 YEAR**

# **CURRICULUM CONTENTS**

## **UNDERGRADUATE DEGREE IN ENGINEERING AND TECHNOLOGY**

### **BRANCH: INDUSTRIAL AND PRODUCTION ENGINEERING**

#### **COURSE PROPOSALS**

**B.TECH INDUSTRIAL AND PRODUCTION ENGINEERING ENGG**  
**COURSE CURRICULUM AS PER AICTE**

**Structure of B.Tech. (Industrial and Production Engineering) Program**

Si. NO.	Category	Suggested credit hours by AICTE	Proposed credit hours by IPED
1	Humanities and Social Sciences including Management Courses(HSMC)	12*	14
2	Basic Sciences Courses(BSC)	25*	27
3	Engineering Sciences Courses(ESC)	24*	31
4	Professional Core Courses (PCC)	48*	51
5	Professional Elective Courses (PEC)	18*	18
6	Open Electives (OEC)	18*	12
7	Project, Seminar, and Internship in industry	15*	13
8	Mandatory Courses (MC)	Non credits	
<b>Total</b>		<b>160*</b>	<b>169</b>

*\*Minor variation is allowed as per need of the respective disciplines.*

SI. No.	Course No.	Name of the Course	Pre-requisite	Credits (L-T-P)
<b>(A) CORE PROGRAMME</b>				
<b>1. Humanities and Social Sciences including Management Courses(HSMC)</b>				
1	BHS-186	English	Nil	3(2-0-2)
2	BHS-286	Effective Technical Communication	Nil	3(3-0-0)
3	BHS-401	Values and Ethics for Engineers	Nil	2 (1-0-2)
4	TWP-101	Work Program	Nil	1(0-0-2)
5	NSS-101	N.S.S	Nil	1(0-0-4)
6	NSS-102	N.S.S	Nil	0(0-0-4)
7	NSS-201	N.S.S	Nil	1(0-0-4)
8	NSS-202	N.S.S	Nil	0(0-0-4)
9	BHS-188	Industrial sociology	Nil	3(3-0-0)
<b>Total</b>				<b>14</b>
<b>2. Basic Sciences Courses(BSC)</b>				
1	BPM-143	Calculus and linear Algebra	Nil	4(3-1-0)
2	BPM-153	Calculus, Ordinary Differential Equations and Complex Variables	Nil	5(4-1-0)
3	BPM-242	Partial Differential Equations, Probability & Statistics	Nil	5(4-1-0)
4	BPP-199	Mechanics	Nil	5(3-1-2)
5	BPP-201	Oscillations, Waves and Optics	Nil	4(3-1-0)
6	BPC-102	Chemistry-I	Nil	4(3-0-3)
<b>Total</b>				<b>27</b>
<b>3. Engineering Sciences Courses(ESC)</b>				
1	TIP-103	Workshop Practices	Nil	3(1-0-2×2)
2	TCE-206	Engineering Mechanics	Nil	4(3-1-0)
3	TCE-209	Introduction to Fluid Mechanics	Nil	3(2-0-2)
4	TCE-114	Engineering Graphics and Design	Nil	3(1-0-4)
5	TME-209	Mechanical Engineering	Nil	3(2-2-0)
6	TME-214	Machine Drawing	Nil	2(0-0-4)
7	TIT-121	Programming for Problem Solving	Nil	4(3-0-2)
8	TEE-104	Basic Electrical Engineering	Nil	5(3-1-2)

9		TEC-227	Basic Electronics Engineering	Nil	4(3-0-2)
					<b>Total</b> <b>31</b>
<b>4. Professional Core Courses (PCC)</b>					
1		TIP-204	Foundry and Welding Engineering	Nil	4(3-0-2)
2		TIP-206	Manufacturing Science-I	Nil	4(3-0-3)
3		T1P-216	Basic Thermal Engineering	Nil	4(3-0-2)
4		TME-333	Machine Design	Nil	2(2-0-0)
5		TME-255	Material Science and Engineering	Nil	4(3-1-0)
6		TIP-306	Manufacturing Technology	Nil	4(3-0-2)
7		TIP-303	Mechanics of Materials	Nil	4(3-0-2) **
8		TME-322	Kinematics of Machines	Nil	3(2-0-2)
9		TME-323	Theory of Machines	Nil	4(3-0-2)
10		TIP-355	Design of Work Systems	Nil	3(2-0-2)
11		TIP-356	Fundamentals of Industrial Engineering	Nil	3(3-0-0)
12		TIP-357	Advanced Industrial Engineering	Nil	3(3-0-0)
13		TIP-358	Fundamentals of Operations Research	Nil	3(3-0-0)
14		TIP-359	Managerial Economics	Nil	3(3-0-0)
15		TIP-404	Industrial Metrology	Nil	3(3-0-0)
					<b>Total</b> <b>51</b>
<b>5. Professional Elective Courses (PEC)</b>					
1		TIP-	Elective -I	Nil	3(3-0-0)
2		TIP-	Elective -II	Nil	3(3-0-0)
3		TIP-	Elective -III	Nil	3(3-0-0)
4		TIP-	Elective -IV	Nil	3(3-0-0)
5		TIP-	Elective -V	Nil	3(3-0-0)
6		TIP-	Elective -VI	Nil	3(3-0-0)
					<b>Total</b> <b>18</b>
<b>6. Open Electives (OEC)</b>					
1			Open Elective I	Nil	3(3-0-0)
2			Open Elective II	Nil	3(3-0-0)
3			Open Elective III	Nil	3(3-0-0)
4			Open Elective IV	Nil	3(3-0-0)

						<b>Total</b>	<b>12</b>
<b>7. Project, Seminar, and Internship in industry</b>							
1		TIP-191	Practical Training I	Nil	2 weeks		
2		TIP-291	Practical Training II	Nil	2 weeks		
3		TIP-391	Practical Training III	Nil	4 weeks		
4		TIP-492	Seminar	Nil	1(0-0-3)		
5		TIP-495A	Project- I	Nil	4(0-0-8)		
6		TIP-495B	Project-II	Nil	8(0-0-16)		
				<b>Total</b>	<b>13</b>		
<b>8. Mandatory Courses (MC)</b>							
1		TME/TID/TCE/TSW-109	Introduction to Environmental Engineering& Disaster Management	Nil	3(3-0-0)		
2		BHS-100	Constitution of India	Nil	0(1-0-0)		
3		TIC-100	Induction Programme	Nil	2 weeks		
				<b>Total</b>	<b>03</b>		
<b>Grand Total (1+2+3+4+5+6+7+8)</b>						<b>166</b>	
		<b>LIST OF ELECTIVE COURSES (PCC)</b>					
1		TIP-371	Advanced Thermal Engineering	Nil	3(2-0-2)		
2		TIP-372	Computer Assisted Manufacturing	Nil	3(2-0-2)		
3		TIP-373	Automation and Robotics	Nil	3(3-0-0)		
4		TIP-374	Advanced Operations Research	Nil	3(3-0-0)		
5		TIP-375	Introduction to Micro Machining	Nil	3(3-0-0)		
6		TIP-462	Rapid Prototyping and re-engineering	Nil	3(3-0-0)		
7		TIP-464	Small and Micro Industry Management	Nil	3(3-0-0)		
8		TIP-465	Value Analysis	Nil	3(3-0-0)		
9		TIP-466	Cellular Manufacturing	Nil	3(3-0-0)		
10		TIP-467	Technology Management and IPR	Nil	3(3-0-0)		
11		TIP-468	Systems Engineering	Nil	3(3-0-0)		
12		TIP-469	Quality Engineering and management	Nil	3(3-0-0)		
13		TIP-470	Six Sigma Practices	Nil	3(3-0-0)		
14		TIP-484	Simulation and Modeling	Nil	3(3-0-0)		

*\*\* Lab shall be shared with CED*

Note:

1. Courses of 300 and 400 series from the list of elective courses shall be offered as professional elective courses for the students of IPED.
2. Courses of 400 series from the list of elective courses shall be offered as Open elective courses for the students of other departments.
- 3. The courses of B.Tech. (Industrial and Production Engineering) 1<sup>st</sup> and 2<sup>nd</sup> semester shall be same as that of B.Tech. (Mechanical Engineering).**

**Semester Wise Graduation Requirements For B. Tech. (Industrial & Production Engineering)**  
**Batch-2018 ( Direct Entry)**

Sl. No.	Course No.	Name of the Course	Credits (L-T-P)
<b>SEMESTER-I</b>			
1.	BPC-102	Chemistry-I	4(3-0-3)
2.	BPM-143	Calculus and linear Algebra	4(3-1-0)

3.	TEE-104	Basic Electrical Engineering	5(3-1-2)
4.	TIT-121	Programming for Problem Solving	4(3-0-2)
5.	TME/TID/TCE/TSW-109	Introduction to Environmental Engineering & Disaster Management	3(3-0-0)
6.	TWP-101	Work Program	1(0-0-2)
7.	TIC-100	Induction Programme	2 weeks
		<b>TOTAL</b>	<b>21</b>

### **SEMESTER-II**

1.	BPP-199	Mechanics	5(3-1-2)
2.	BPM-153	Calculus, Ordinary Differential Equations and Complex Variables	5(4-1-0)
3.	TCE-114	Engineering Graphics and Design	3(1-0-4)
4.	TIP-103	Workshop Practices	3(1-0-2×2)
5.	BHS-186	English	3(2-0-2)
6.	TIP-191	Practical Training I	4 weeks
7.	BHS-188	Industrial sociology	3(3-0-0)
		<b>TOTAL</b>	<b>22</b>

### **SEMESTER-III**

1.	BPP-201	Oscillations, Waves and Optics	4(3-1-0)
2.	BPM-242	Partial Differential Equations, Probability & Statistics	5(4-1-0)
3.	TEC-227	Basic Electronics Engineering	4(3-0-2)
4.	TCE-206	Engineering Mechanics	4(3-1-0)
5.	TME-255	Material Engineering	4(3-1-0)
6.	NSS-101	NSS	1(0-0-4)
		<b>TOTAL</b>	<b>22</b>

### **SEMESTER-IV**

1.	TCE-209	Introduction to Fluid Mechanics	3(2-0-2)
2.	TIP-204	Foundry and Welding Engineering	4(3-0-2)
3.	TME-214	Machine Drawing	2(0-0-4)
4.	TME-209	Mechanical Engineering	3(2-2-0)
5.	TIP-206	Manufacturing Science-I	4(3-0-3)

6	T1P-216	Basic Thermal Engineering	4(3-0-2)
7	BHS-286	Effective Technical Communication	3(3-0-0)
8.	TIP-291	Practical Training II	4 weeks
9.	NSS-102	NSS	0(0-0-4)
		<b>TOTAL</b>	
			<b>23</b>

### **SEMESTER-V**

1.	TIP-	Elective I	3(2-0-2)
2.	TIP-303	Mechanics of Materials	4(3-0-2)
3.	TIP-355	Design of Work Systems	3(2-0-2)
4.	TIP-306	Manufacturing Technology	4(3-0-2)
5.	TIP-356	Fundamentals of Industrial Engineering	3(3-0-0)
6.	TME-322	Kinematics of Machines	3(2-0-2)
7.	BHS-100	Constitution of India	0(1-0-0)
8.	NSS-201	NSS	1(0-0-4)
		<b>TOTAL</b>	
			<b>21</b>

### **SEMESTER-VI**

1.	TME-323	Theory of Machines	4(3-0-2)
2.	TIP-357	Advanced Industrial Engineering	3(3-0-0)
3.	TME-333	Machine Design	2(2-0-0)
4.	TIP-358	Fundamentals of Operations Research	3(3-0-0)
5.	TIP-359	Managerial Economics	3(3-0-0)
6	TIP-	Elective -II	3(3-0-0)
7.	TIP-	Elective -III	3(3-0-0)
8.	TIP-391	Practical Training III	4 weeks
9.	NSS-202	NSS	0(0-0-4)
		<b>TOTAL</b>	
			<b>21</b>

### **SEMESTER-VII**

1.	TIP-403	Industrial Metrology	3(3-0-0)
2.	TIP-428	Elective -IV	3(2-0-2)
3.	TIP-	Elective -V	3(3-0-0)

4.		Open Elective I	3(3-0-0)
5.		Open Elective II	3(3-0-0)
6.	TIP-492	Seminar	1(0-0-3)
7.	TIP-495A	Project- I	6(0-0-12)
		<b>TOTAL</b>	
		<b>22</b>	
<b>SEMESTER-VIII</b>			
1.	BHS-401	Values and Ethics for Engineers	2 (2-0-0)
2.	TIP-	Elective -VI	3(3-0-0)
4.		Open Elective III	3(3-0-0)
5.		Open Elective IV	3(3-0-0)
6.	TIP-495(B)	Project II	6(0-0-12)
		<b>TOTAL</b>	
		<b>17</b>	
<b>Grand Total</b>			
		<b>169</b>	

Total Credit Hours = **169**

**Structure of B.Tech. (Industrial and Production Engineering) Program for lateral Entry**  
**(Diploma students)**

Si. NO.	Category	Suggested credit hours by AICTE	Proposed credit hours by IPED (for direct entry students)	Proposed credit hours by IPED (for Lateral entry students)
1	Humanities and Social Sciences including Management	12*	11	07

	Courses(HSMC)			
2	Basic Sciences Courses(BSC)	25*	27	09
3	Engineering Sciences Courses(ESC)	24*	31	16
4	Professional Core Courses (PCC)	48*	51	51
5	Professional Elective Courses (PEC)	18*	18	18
6	Open Electives (OEC)	18*	12	12
7	Project, Seminar, and Internship in industry	15*	13	13
8	Mandatory Courses (MC)	Non credits	03	
<b>Total</b>		<b>160*</b>	<b>169</b>	<b>126</b>

*\*Minor variation is allowed as per need of the respective disciplines.*

**Graduation Requirement of B. Tech. (Industrial & Production Engineering)- Batch 2018-19 (Lateral Entry)**

<b>SI. No.</b>	<b>Course No.</b>	<b>Name of the Course</b>	<b>Pre-requisite</b>	<b>Credits (L-T-P)</b>
<b>(A) CORE PROGRAMME</b>				
<b>1. Humanities and Social Sciences including Management Courses(HSMC)</b>				
1	BHS-286	Effective Technical Communication	Nil	3(3-0-0)
2	BHS-401	Values and Ethics for Engineers	Nil	2 (1-0-2)
3	NSS-101	N.S.S	Nil	1(0-0-4)
4	NSS-102	N.S.S	Nil	0(0-0-4)
5	NSS-201	N.S.S	Nil	1(0-0-4)
6	NSS-202	N.S.S	Nil	0(0-0-4)
<b>Total</b>				<b>07</b>
<b>2. Basic Sciences Courses(BSC)</b>				
1	BPM-242	Partial Differential Equations, Probability & Statistics	Nil	5(4-1-0)
2	BPP-201	Oscillations, Waves and Optics	Nil	4(3-1-0)
<b>Total</b>				<b>09</b>
<b>3. Engineering Sciences Courses(ESC)</b>				
1	TCE-206	Engineering Mechanics	Nil	4(3-1-0)
2	TCE-209	Introduction to Fluid Mechanics	Nil	3(2-0-2)
3	TME-209	Mechanical Engineering	Nil	3(2-2-0)
4	TME-214	Machine Drawing	Nil	2(0-0-4)
5	TEC-227	Basic Electronics Engineering	Nil	4(3-0-2)
<b>Total</b>				<b>16</b>
<b>4. PROFESSIONAL CORE COURSES (PCC)</b>				
1	TIP-204	Foundry and Welding Engineering	Nil	4(3-0-2)
2	TIP-206	Manufacturing Science-I	Nil	4(3-0-3)
3	T1P-216	Basic Thermal Engineering	Nil	4(3-0-2)
4	TME-333	Machine Design	Nil	2(2-0-0)
5	TME-255	Material Engineering	Nil	4(3-1-0)
6	TIP-306	Manufacturing Technology	Nil	4(3-0-2)
7	TIP-303	Mechanics of Materials	Nil	4(3-0-2) **
8	TME-322	Kinematics of Machines	Nil	3(2-0-2)

9		TME-323	Theory of Machines	Nil	4(3-0-2)
10		TIP-355	Design of Work Systems	Nil	3(2-0-2)
11		TIP-356	Fundamentals of Industrial Engineering	Nil	3(2-0-2)
12		TIP-357	Advanced Industrial Engineering	Nil	3(2-0-2)
13		TIP-358	Fundamentals of Operations Research	Nil	3(2-0-2)
14		TIP-359	Managerial Economics	Nil	3(3-0-0)
15		TIP-404	Industrial Metrology	Nil	3(3-0-0)
<b>Total</b>					<b>51</b>

#### **5. Professional Elective Courses (PEC)**

1		TIP-	Elective -I	Nil	3(3-0-0)
2		TIP-	Elective -II	Nil	3(3-0-0)
3		TIP-	Elective -III	Nil	3(3-0-0)
4		TIP-	Elective -IV	Nil	3(3-0-0)
5		TIP-	Elective -V	Nil	3(3-0-0)
6		TIP-	Elective -VI	Nil	3(3-0-0)
<b>Total</b>					<b>18</b>

#### **6. OPEN ELECTIVES (OEC)**

1			Open Elective I	Nil	3(3-0-0)
2			Open Elective II	Nil	3(3-0-0)
3			Open Elective III	Nil	3(3-0-0)
4			Open Elective IV	Nil	3(3-0-0)
<b>Total</b>					<b>12</b>

#### **7. Project, Seminar, and Internship in industry**

1		TIP-291	Practical Training II	Nil	4 weeks
2		TIP-391	Practical Training III	Nil	4 weeks
3		TIP-492	Seminar	Nil	1(0-0-3)
4		TIP-495A	Project- I	Nil	6(0-0-12)
5		TIP-495B	Project-II	Nil	6(0-0-12)
<b>Total</b>					<b>13</b>

#### **8. Mandatory Courses (MC)**

1		BHS-100	Constitution of India	Nil	0(1-0-0)
<b>Total</b>					<b>00</b>
<b>Grand Total (1+2+3+4+5+6+7+8)</b>					<b>126</b>

<b>LIST OF ELECTIVE COURSES (PEC)</b>				
1	TIP-371	Advanced Thermal Engineering	Nil	3(2-0-2)
2	TIP-372	Computer Assisted Manufacturing	Nil	3(2-0-2)
3	TIP-373	Automation and Robotics	Nil	3(3-0-0)
4	TIP-374	Advanced Operations Research	Nil	3(3-0-0)
5	TIP-375	Introduction to Micro Machining	Nil	3(3-0-0)
6	TIP-462	Rapid Prototyping and re-engineering	Nil	3(3-0-0)
7	TIP-464	Small and Micro Industry Management	Nil	3(3-0-0)
8	TIP-465	Value Analysis	Nil	3(3-0-0)
9	TIP-466	Cellular Manufacturing	Nil	3(3-0-0)
10	TIP-467	Technology Management and IPR	Nil	3(3-0-0)
11	TIP-468	Systems Engineering	Nil	3(3-0-0)
12	TIP-469	Quality Engineering and management	Nil	3(3-0-0)
13	TIP-470	Six Sigma Practices	Nil	3(3-0-0)
14	TIP-484	Simulation and Modeling	Nil	3(3-0-0)

*\*\* Lab shall be shared with CED*

Note:

1. Courses of 300 and 400 series from the list of elective courses shall be offered as professional elective courses for the students of IPED.
2. Courses of 400 series from the list of elective courses shall be offered as Open elective courses for the students of other departments.
- 3. The courses of B.Tech. (Industrial and Production Engineering) 1<sup>st</sup> and 2<sup>nd</sup> semester shall be same as that of B.Tech. (Mechanical Engineering).**

**Semester Wise Graduation Requirements For B. Tech. (Industrial & Production Engineering)**  
**Batch-2018 ( Lateral Entry)**

<b>Sl. No.</b>	<b>Course No.</b>	<b>Name of the Course</b>	<b>Credits (L-T-P)</b>
<b>SEMESTER-I</b>			
1.	BPP-201	Oscillations, Waves and Optics	4(3-1-0)
2.	BPM-242	Partial Differential Equations, Probability & Statistics	5(4-1-0)
3.	TEC-227	Basic Electronics Engineering	4(3-0-2)
4.	TCE-206	Engineering Mechanics	4(3-1-0)
5.	TME-255	Material Engineering	4(3-1-0)
6.	NSS-101	NSS	1(0-0-4)
		<b>TOTAL</b>	<b>22</b>
<b>SEMESTER-II</b>			
1.	TCE-209	Introduction to Fluid Mechanics	3(2-0-2)
2.	TIP-204	Foundry and Welding Engineering	4(3-0-2)
3.	TME-214	Machine Drawing	2(0-0-4)
4.	TME-209	Mechanical Engineering	3(2-2-0)
5.	TIP-206	Manufacturing Science-I	4(3-0-3)
6	T1P-216	Basic Thermal Engineering	4(3-0-2)
7	BHS-286	Effective Technical Communication	3(3-0-0)
8.	TIP-291	Practical Training II	4 weeks
9.	NSS-102	NSS	0(0-0-4)
		<b>TOTAL</b>	<b>23</b>
<b>SEMESTER-III</b>			
1.	TIP-	Elective I	3(2-0-2)
2.	TIP-303	Mechanics of Materials	4(3-0-2)
3.	TIP-355	Design of Work Systems	3(2-0-2)

4.	TIP-306	Manufacturing Science-II	4(3-0-3)
5.	TIP-356	Fundamentals of Industrial Engineering	3(2-0-2)
6.	TME-322	Kinematics of Machines	3(2-0-2)
7.	BHS-100	Constitution of India	0(1-0-0)
8.	NSS-201	NSS	1(0-0-4)
		<b>TOTAL</b>	<b>21</b>

#### **SEMESTER-IV**

1.	TME-323	Theory of Machines	4(3-0-2)
2.	TIP-357	Advanced Industrial Engineering	3(2-0-2)
3.	TME-333	Machine Design	2(2-0-0)
4.	TIP-358	Fundamentals of Operations Research	3(2-0-2)
5.	TIP-359	Managerial Economics	3(3-0-0)
6	TIP-	Elective -II	3(3-0-0)
7.	TIP-	Elective -III	3(3-0-0)
8.	TIP-391	Practical Training III	4 weeks
9.	NSS-202	NSS	0(0-0-4)
		<b>TOTAL</b>	<b>21</b>

#### **SEMESTER-V**

1.	TIP-403	Industrial Metrology	3(3-0-0)
2.	TIP-428	Elective -IV	3(2-0-2)
3.	TIP-	Elective -V	3(3-0-0)
4.		Open Elective I	3(3-0-0)
5.		Open Elective II	3(3-0-0)
6.	TIP-492	Seminar	1(0-0-3)
7.	TIP-495A	Project- I	6(0-0-12)
		<b>TOTAL</b>	<b>22</b>

#### **SEMESTER-VI**

1.	BHS-401	Values and Ethics for Engineers	2 (2-0-0)
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2.	TIP-	Elective -VI	3(3-0-0)
4.		Open Elective III	3(3-0-0)
5.		Open Elective IV	3(3-0-0)
6.	TIP-495(B)	Project II	6(0-0-12)
		<b>TOTAL</b>	<b>17</b>
		<b>Grand Total</b>	<b>126</b>

Total Credit Hours = **126**

### **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and production Engineering
3	Title of the Course & Course No.	Workshop Practices TIP-103

4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and production Engineering
6	Credits	3(1-0-2×2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical and practical knowledge of workshop in the field of Engineering to the students.
9	General educational purpose      S	A. General Education                  Yes B. department specialization       Yes C. Students Research               No D. Out growth of instructors Research Programme       No
10	Relation to other courses	A. Pre-requisite                       No B. An introductory survey of knowledge represented by the department       Yes C. An introductory survey of a special area of knowledge       No D. A further development of course       Yes E. An introductory survey of a special area of knowledge represented by some other department       No F. a summarizing or integrated course       No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Engineering Sciences Courses
14	What is the exact place of this courses in the development of the educational programme of your department	Engineering Sciences Courses of B. Tech Industrial and production Engineering
15	Topical outline : Lecture	Attached
16	Practcial:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Workshop Practices**

**2. Course No. : TIP-103**

**3. Credits Hours : 3(1-0-2×2)**

**4. Pre-requisite : NO**

## **5. Syllabus /Catalogue Description:**

This is the fundamental course for the engineering branches. This course contains various methods of manufacturing and techniques which is more economical and sophisticated for particular product .This course contain major part in practice or practical hour, which is mainly use for all mechanical production in industries like foundry shop, welding shop, fitting shop, black smithy, machine shop, fabrication shop.

## **6. Topical outline:**

### **Module 1:**

General introduction of workshop, Safety Precautions, Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods. Properties of materials, types of materials.

Introduction to various carpentry tools, materials, types of wood, and their characteristics and defects of wood. Processes or operations in wood working. Applications of wood working. Engineering uses of timber, seasoning and preservation.

### **Module 2:**

Scope of molding, characteristics of mould materials, types of sands green and dry sand molding methods.Foundry terminology, introduction of pattern, types, materials, allowances, Gateing system, Casting processes, Classification, types of casting, equipment and tools used.solidification process, common casting defects. applications of casting.

### **Module 3:**

Introduction to welding, types of welding, Oxyacetylene gas welding, types of flames, welding techniques and equipment. Principle of arc welding, equipment and tools. Soldering and Brazing.General applications of welding in Engineering.

### **Module 4:**

Introduction to Common machine tools, lathe machine, Main operations, parts, tools used on lathe. Cutting tool materials and geometry of single point cutting tool, tool signature. Introduction to Shaper, Planer, drilling and milling – Principle specifications, operations tools etc.

### **Module 5:**

Introduction to fitting work, scope and applications. Introduction to Smithy tools and operations.forgingoperations,types, and tools, applications of forging.

## **7. List of Experiments:**

1. Preparation of simple joints: Cross half Lap joint; Preparation of Dovetail joint

2. Introduction to tools and measuring instruments for fitting;
3. Introduction to welding equipment, processes tools, their use and precautions;
4. Jobs on ARC welding – Lap joint, butt joint; T-Joint and corner joint in Arc welding;
5. Gas welding Practice – Lab, butt and T-Joints;
6. Mould making using one-piece pattern and two pieces pattern;
7. Demonstration of mould making using sweep pattern, and match plate patterns;
8. Introduction to metal casting equipment, tools and their use;
9. Introduction to machine shop machines and tools; Demonstration on Processes in machining and use of measuring instruments;
10. Practical jobs on simple turning, step turning; Practical job on taper turning, drilling and threading;
11. Operations on shaper and planer,
12. changing a round MS rod into square section with forging;

## **8. Text /Reference Books:**

1. Production Technology by R.K. Jain and S. C. Gupta.
2. A course in workshop Technology. Volume 1 and 2. By B.S. Raghuwanshi
3. Hazra, Choudhari S K and Bose S K. 1982. Elements of Workshop technology (Vol. I and II). Media Promoters and Publishers Pvt.Ltd., Mumbai.
4. Chapman W A J. 1989. Workshop Technology (Part I and II). Arnold Publishers (India) Pvt. Ltd., AB/9 Safdarjung Enclave, New Delhi.
5. Raghuwamsi B S. 1996. A Course in Workshop Technology (Vol. I and II). Dhanpat Rai and Sons, 1682 NaiDarak, New Delhi.

## **9. Marks Distribution:**

I Pre final Exam                            15 Marks

II Pre final Exam                            15 Marks

Lab    20 Marks

Final Exam                                    50 Marks

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Total    100 Marks  
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	Foundry and Welding Technology TIP204
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	4(3-0-2)

7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical and practical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Out growth of instructors Research Programme <b>Yes</b>
10	Relation to other courses	A. Pre-requisite <b>Yes</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus by AICTE to be implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial and Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities to be further developed
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation

21	Approved by	Course curriculum committee and BOFT
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- 1. Name of the course** : **Foundry and Welding Technology**
- 2. Course No.** : **TIP204**
- 3. Credits Hours C(L-T-P)** : **4 (3-0-2)**
- 4. Pre-requisite** : **TIP103 (Workshop Practices)**

### **5. Course Objectives:**

1. To understand the basics of foundry and welding.
2. To understand the concepts of riser design.
3. To understand the special casting processes.
4. To understand the concepts of advance welding processes.

### **6. Topical Outline:**

#### **Module 1:**

Foundry: Casting, Properties of moulding sands, testing, their importance and types. Types of cores, core binders, core making processes, core drying, sand additives and their needs. Elements of gating systems, considerations for design of gates.

#### **Module 2:**

Riser Design, Caine's method, Melting practices, Solidification of castings, Chavorinov's method etc. Special casting processes, Centrifugal casting, continuous casting, die casting and advance. Defects in casting and their remedies. Casting of plastics, Compression moulding, Injection moulding, below moulding, Cleaning and finishing of casting, selection product.

#### **Module 3:**

Introduction to metal joining processes. Welding definition, classification. of welding processes, advantages, applications, Electrodes-types, specifications, Welding positions, welded joints, edge preparation, Welding symbols and representation of welds, Voltage and current characteristics of manual arc welding.

#### **Module 4:**

Arc welding-principle, Arc, action of arc, shielded arc-welding processes. Manual metal arc welding, factors, requirements, plasma arc welding and ultrasonic welding - Resistance welding process- different types weld joints, welding positions. Brazing, soldering and adhesive bonding, process principles & applications. Electron beam welding, laser beam welding,

#### **Module 5:**

Hybrid welding- explosive welding – diffusion bonding – high frequency induction welding –twin wire active TIG welding. Modern welding processes, Inspection and testing of welded joints, Metallurgy of welding.

### **7. Lab Experiments**

1. To prepare a butt joint with mild steel strip using MMAW technique.
2. To prepare a butt joint with mild steel strips using brazing technique.
3. To study and observe the welding and brazing techniques through demonstration.
4. To understand the concepts of advance welding processes.
5. To prepare a sand mold, using the given single piece pattern.
6. To prepare a sand mold, using the given Split-piece pattern.
7. To study the various defects during casting process.
8. To understand the special casting processes.
9. To determine the Moisture Content in a given sand sample.
10. To determine the Clay Content in a given sand sample.

### **8. Text /Reference Books:**

1. Dr.R.S.Parmer "Welding processes and Technology" Khanna Publishers.
2. H.S.Bawa "Manufacturing Technology-I" Tata Me Graw Hill Publishers New Delhi, 2007.
3. S.V.Nadkami, Modern Arc Welding Technology, Oxford & IBH Publishing Co. Pvt. Ltd.
4. CORNU.J. Advanced welding systems – Volumes I, II and III, JAICO Publishers,1994.
5. LANCASTER.J.F. – Metallurgy of welding – George Alien & Unwin Publishers, 1980
6. Carry B., Modern Welding Technology, Prentice Hall Pvt Ltd., 2002
7. P .L. Jain “Principles of foundry Technology” Tata Mc Graw Hill Publishers.
8. Fundamentals of Metals Casting, P. C. Mukherjee, Oxford & IBH Pub. Co., 1988.
9. Casting Technology and Cast Alloys – AK Chakrabarti – PHI 2011 Edition

**9.Course Outcomes :**The course will help students to understand the basic and advanced concepts of foundry and welding process. They will also develop skill related to advance research in this field.

### **10. Marks Distribution**

I Pre final Exam

15 Marks

II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	Manufacturing Science-I TIP206
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	4(3-0-3)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Out growth of instructors Research Programme <b>Yes</b>
10	Relation to other courses	A. Pre-requisite <b>Yes</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus by AICTE to be implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of	Core Course of B. Tech Industrial and Production

	your department	Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities to be further developed
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Manufacturing Science-I**

**2. Course No. : TIP206**

**3. Credits Hours : 4 (3-0-3)**

**4. Pre-requisite : TIP103 (Workshop Practices)**

### **5. Course Objectives:**

1. To understand the properties of different engineering materials.
2. To understand the basics of metal forming processes.
3. To understand the basics of press working.
4. To understand the basics of powder metallurgy, plastics and rapid prototyping.

### **6. Topical Outline:**

#### **Module 1:**

Introduction to Engineering and Technology, Manufacturing, Casting, Forming, Machining, Welding, Engineering Materials, Mechanical Properties of Engineering Materials, Heat Treatment.

#### **Module 2:**

Fundamentals of Metal Forming, Rolling, Forging, Extrusion, Piercing, Drawing, Spinning, Wire and Rod Drawing, Tube Drawing, Hobbing, etc., Press, Forging, Tube Drawing, Extrusion, Rolling, Rolling Mills and their Classification, Unconventional Forming Processes, Special Effects in Unconventional Forming Processes, Types of Unconventional Forming Processes.

#### **Module 3:**

Press Working, Fundamentals of Press Working , Components of a Press Machine, Press Classification, Press Working Dies, Methods of Reducing Cutting Forces, Types of Blanking Dies, Drawing Dies, Calculation of Blank Size, Number of Draw, Bending and Bending Terminology, Bending Die Design Principles.

#### **Module 4:**

Powder Metallurgy, Methods of Producing Metallic Powders, Characteristics of Metallic Powders, Processes in the Powder Metallurgy, Advantages of Powder Metallurgy, Limitations of Powder Metallurgy, Applications of Powder Metallurgy.

Jigs and Fixtures: Basic Principles of Location, Various Locating Devices , Some Common Types of Clamps, Some Simple Drill Jigs, Differences between Fixtures and Jigs, Advantages of using Jigs and Fixtures, Limitations of Jigs and Fixtures.

#### **Module 5:**

Plastics, Properties, Applications and Limitations of Plastics, Types of Plastics, Fabrication of Plastics, Welding of Plastics, Future of Plastics and its Applications.

Adhesives and Resins, Making of an Adhesive Joint, Advantages of Adhesives, Disadvantages of Adhesives, Applications of Adhesive Bonded Joints, Types of Adhesives, Resins, applications of Resins,

Rapid Prototyping, Differences between Conventional Machining and Rapid Prototyping, Process Chain of Rapid Prototyping, Methods used for Rapid Prototyping, Laminated Object Manufacturing (LOM).

### **7. Lab Experiments**

1. To manufacture a 14 mm Ø and 56 mm long hexagonal bolt of M.S. by Hot Forming.
2. To manufacture a Spanner as per given drawing using Upsetting process of Hot Forming.
3. To study Wire Drawing Experimental Process.
4. Study the construction and working of a Two-High Rolling Mill.
5. To make a given component using Powder Metallurgy method.
6. Study of the Drill Jig for the given specimen.

### **8. Text /Reference Books:**

1. H.S.Bawa "Manufacturing Technology-I" Tata Me Graw Hill Publishers New Delhi, 2007.
2. E. Paul DeGarmo, J. T. Black, Ronald A. Kohser, "Materials and Processes in Manufacturing", Wiley; 9 edition (December 6, 2002) ISBN: 0471033065
3. Lindberg, "Processes and Materials of Manufacture ", Prentice Hall of India (p) Ltd
4. George.E. Dieter, "Engineering design (A materials and processing approach)", McGraw Hill – EditionII 1991
5. William F.Hosford& Robert M.Caddel "Metal forming"
6. Amitabha Ghosh and Mallik, "Manufacturing Science", East west press pvt ltd

7. Narayanaswamy. R, "Metal Working Technology", PHI (1997)
8. Nagpal. G.R., "Metal Forming Processes" Khanna publishers, Delhi 1998
9. Sinha and Prasad, "Theory of Metal Forming and Metal Cutting", Dhanpat Rai Publication 1999

## **9. Course Outcomes:**

The course will help students to understand the basic and advanced concepts of metal forming processes, press working, powder metallurgy, plastics and rapid prototyping. They will also develop skill related to advance research in this field.

## **10. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	Basic Thermal Engineering TIP-216
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	4(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      NO B. An introductory survey of knowledge represented by the department      No C. An introductory survey of a special area of knowledge No D. A further development of course      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial and Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Basic Thermal Engineering**

**2. Course No. : TIP- 216**

**3. Credits Hours : 4 (3-0-2)**

**4. Pre-requisite** : Nil

## **5. Syllabus /Catalogue Description**

Thermodynamics relations, modes of heat transfer, conduction –one dimensional steady and Unsteady; Convection, Boiling and condensation, heat exchangers, Radiation; Refrigeration-Vapour compression cycle, vapour absorption cycle, air refrigeration; Air conditioning.

## **6. Topical Outline**

### **Module 1:**

**Thermodynamic Relations:** Review of thermodynamics,  $T-dS$  equations for simple compressible systems, Helmholtz and Gibbs functions; Maxwell's relations, generalized relations for changes in enthalpy, entropy and internal energy, equations for specific heats; Clausius-Clapeyron equation; Joule-Thomson and Joule coefficients, applications of thermodynamic relations.

### **Module 2**

**Conduction:** Fourier's law, thermal conductivity of matter and other relevant properties, heat diffusion equation, boundary and initial conditions; One-dimensional steady-state conduction through plane wall, cylinder and sphere, conduction with thermal energy generation, heat transfer from extended surfaces; Transient conduction – lumped capacitance method and its validity.

### **Module 3**

**Convection:** laminar and turbulent flow, hydrodynamic and thermal boundary layers and their significance, convection transfer equations, Colburns and Reynolds analogy, boiling and condensation. Heat exchangers- types and their analysis, LMTD and NTU.

### **Module 4**

**Radiation:** Fundamental concepts, radiation intensity and its relation to emission, irradiation and radiosity, blackbody radiation, Planck distribution, Wien's displacement law, Stefan-Boltzmann law, surface emission, surface absorption, reflection, and transmission,

Kirchoff's law, gray surface; Radiation exchange between surfaces, view factor, blackbody radiation exchange, radiation exchange between diffuse gray surfaces in an enclosure.

### **Module 5**

**Refrigeration Systems:** Reversed Carnot cycle, ideal and actual vapour compression refrigeration cycle, effect of various parameters on cycle performance, selection of right refrigerant, heat pumps, multi-evaporator, multistage compression and cascade vapour compression systems, gas refrigeration cycle and vapour absorption refrigeration system.

**Air Conditioning:** Properties of gas vapour mixtures, adiabatic-saturation and wet-bulb temperatures, psychrometric chart, human comfort and air conditioning, various air conditioning processes and their mass and energy relations

## **7.Lab Experiments**

## **8. Text /Reference Books:**

### **Text Books**

1. Nag, P.K., "Basic and applied thermodynamics", 2<sup>nd</sup> Ed., McGraw-Hill
2. Holman,J.P., " Heat Transfer", SI edition, McGraw-Hill, 2017

### **Reference Books**

1. Arora, C.P., "Refrigeration and Air conditioning", McGraw Hill India
2. Rajput, R. K., "Heat and Mass Transfer", S.chand.
3. Moran, M.J., and Shapiro, H.M., "Fundamentals of Engineering Thermodynamics", 4<sup>th</sup> Ed., John Wiley & Sons
4. Cengel, Y.A. and Boles, M.A., "Thermodynamics: An Engineering Approach", 3<sup>rd</sup> Ed., Tata McGraw-Hill

## **9. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	<b>Manufacturing Technology</b> TIP306
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	4(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b>  B. department specialization <b>Yes</b>  C. Students Research <b>Yes</b>  D. Out growth of instructors  Research Programme <b>Yes</b>
10	Relation to other courses	A. Pre-requisite <b>Yes</b>  B. An introductory survey of knowledge represented by the department <b>No</b>  C. An introductory survey of a special area of knowledge <b>No</b>  D. A further development of course <b>No</b>  E. An introductory survey of a special area of knowledge represented by some other department <b>No</b>  F. a summarizing or integrated course <b>No</b>  G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus by AICTE to be implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course

14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial and Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities to be further developed
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Manufacturing Technology**

**2. Course No. : TIP306**

**3. Credits Hours : 4 (3-0-2)**

**4. Pre-requisite : Nil**

## **6.Course Objectives:**

- 1.To understand the concepts of metal cutting and tool life.
- 2.To understand the different machine tools.
- 3.To understand shaper and milling processes.
- 4.To understand the basics of finishing operations.

## **7. Topical Outline:**

### **Module 1:**

Introduction to Engineering and Technology, Importance of Manufacturing, Economic Considerations in Manufacturing, Technological Considerations in Manufacturing, Socioeconomic Factors, Some Technical Concepts. Cutting Tool Materials, Surface Treatments of Cutting Tools, Cutting Tool Failure, Tool Wear Measurement, Cutting Tool Life, Tool Life Equation and Factors affecting Tool Life, Machinability, Thermal Aspects in Metal Cutting, Measurement of Tool Tip Temperature, Cutting Fluid.

### **Module 2:**

Types of Chips Produced in Metal Cutting, Types of Metal Cutting, Cutting Speed, Feed and Depth of Cut, Factors Affecting Cutting Speed, Feed and Depth of Cut, Mechanism of Chip Formation, Thick Shear Zone and Thin Shear Plane Models of Metal Cutting, Piispanen's Idealized Card Deck Model of Cutting, Shear Plane Angle and its Measurement, Shear Strain

and Shear Strain Rate in Metal Cutting, Mechanics of Metal Cutting, Merchant's Cutting Force Diagram, Prediction of Shear Plane Angle, Cutting Power and Energy Consumed in Metal Cutting, Energy Consumption in Metal Cutting, Dynamometer.

### **Module 3:**

Basics of general purpose machines tools, Hand tools Vs Machine Tools, Definition of a machine tool, types of machine tools, Lathe: Principle of working, types of lathe, specification of lathe, parts of a lathe, lathe operations, lathe accessories, thread terminology, Types of thread, Methods of manufacturing screw threads, thread cutting on lathe machine.

Drill, types of drill, elements of a twist drill, Cutting speed, feed & depth of cut in drilling. Tool holding devices on a drill. Drilling and allied operations. Originating a true hole by drilling and allied operations, Boring and its advantages over drilling Boring Machines, Boring tools.

### **Module 4:**

Shaper and it's working principle, size of a shaper, construction of a mechanical shaper, classification of shapers, difference between mechanical & hydraulic shapers, quick return mechanisms of shapers, cutting tools used on shapers, shaper operations, speed, feed and depth of cut in shaper. Slotter machine, differences between a shaper and a slotter, principal parts of a slotter, slotter size, slotter operations, types of slotters.

Planer machine and differences between a shaper & a planer, types of planers, parts of a planer, size of a planer, work holding devices on planer, planer tools, speed, feed & depth of cut in planer operations.

Milling machine and advantages of milling over other conventional machining operations, types of milling machines, construction of a column & knee type of milling machine, mechanisms of milling machines, cutting speed, feed and depth of cut in milling, size of a milling machine, milling cutters, work holding devices on milling machines, milling machine attachments, basic milling processes, milling operations, Indexing head & its types, Indexing methods, Helical milling.

### **Module 5:**

Gear and types of gears, gear tooth forms and their relative advantages and disadvantages, gear tooth nomenclature, gear manufacturing processes, gear shaping & gear hobbing, worm gear manufacture. Grinding, types of grinding machines, types of grinding operations, important terms related to grinding Abrasive types, types of bonds, grinding wheel identification, selection of grinding wheel, manufacturing of grinding wheel. Honing & honing tool, honing machines, advantages & disadvantages of honing, applications of honing.

Lapping & lapping operation, methods of lapping, mechanism of lapping, advantages and disadvantages of lapping. applications of lapping. Super finishing and differences between super finishing and honing, super finishing machines. applications of super finishing. Broaching definition, broach, tool material, special features of broaching, classification of broaches, broaching machines, factors affecting design of a broach tool, advantages & disadvantages of broaching. applications of broaching. Importance of studying the economics of

machining, criteria used for analyzing economics of machining, optimization of cutting speed & feed for minimum cost for a single pass turning operation based on the minimum cost per component criterion, the maximum production rate criterion & the maximum profit rate criterion.

## **7. Lab Experiments:**

1. To perform Lathe machine operations : Plain turning, Taper turning, Step turning, Thread cutting, Facing, Knurling, on given specimens.
2. Manufacture a given component on a Capstan Lathe.
3. Spur Gear cutting on a Column and Knee type of Horizontal Milling machine.
4. Cutting of V-groove/ Dove-tail groove/ Rectangular groove on a Shaper machine.
5. To cut a Keyway of given size on an M.S. hub with a Slotter machine.
6. Drilling a true hole on an Upright Drilling machine and Counter-boring this hole to the given size.
7. Grinding a Tapered Cylindrical shaft on a Universal Cylindrical Grinding machine.
8. Grinding a Flat surface of given size on a Vertical spindle reciprocating table surface Grinding machine.
9. To study the construction and working of a Honing tool.
10. To Lap a given workpiece using manual lapping.

## **8. Text /Reference Books:**

1. Lindberg, "Processes and Materials of Manufacture", Prentice hall India (p) Ltd.
2. P.N.Rao, "Manufacturing Technology", TMH Ltd 1998(Revised edition)
3. Serope Kalpakjian, Steven R. Schmid, "Manufacturing Engineering and Technology". (4th Edition), Prentice Hall 2000-06-15 ISBN:0201361310
4. E.Paul DeGarmo, J.T.Black, Ronald A.Khosar, "Materials and Processes in Manufacturing" Wiley; 9 edition (December 6, 2002) ISBN:0471033065

## **9. Course Outcomes:**

The course will help students to understand the concepts of machining, tool life, metal cutting, cutting tools and finishing operations. They will also develop skill related to advance research in this field.

## **10. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks

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Total

100 Marks  
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	Mechanics of Materials TIP-303
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	4(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      No B. An introductory survey of knowledge represented by the department      No C. An introductory survey of a special area of knowledge No D. A further development of course      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial and Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Mechanics of Materials**

**2. Course No. : TIP-303**

**3. Credits Hours : 4(3-0-2)**

**4. Pre-requisite** : Nil

## **5. Syllabus /Catalogue Description**

### **Unit 1:**

**Simple Stresses and Strains**-Concept of stress and strain, St. Venant's principle, stress and strain diagram, Elasticity and plasticity – Types of stresses and strains, Hooke's law

– stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them, elongation of various bars under self load and external loads – Bars of varying section – composite bars – Temperature stresses.

**Compound Stresses and Strains**- Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, ellipse of stress and their applications. Two dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain. Relationship between elastic constants.

**Strain Energy** – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

### **Unit 2:**

**Bending stress and Shear stresses:** –Theory of bending:  $M/I = f/y = E/R$  - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T.

**Shear Stresses**- Derivation of formula –Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

### **Unit 3:**

**Deflection of beams**- Relations between slope, deflection and radius of curvature, calculation of deflection by integration, moment area and unit load method.

**Columns and struts:** Euler's theory of initially straight columns, critical loads for different end condition of columns, eccentric loading, columns with small and initial curvature, empirical formulae.

**Unit 4: Thin and Thick Shells:** thin cylinders - hoop stress, longitudinal stress, built up cylinders; spherical shells; Thick shells – thick cylinders, lame's theorem; thick spherical shells.

**Torsion:** torsion of solid and hollow circular shafts, stepped and composite shafts, closed coiled helical spring subjected to axial loads and axial twists, spring in parallel and series.

### **Unit 5:**

**Theories of failure**- Introduction to elastic theories of failure, elementary idea of Rankine theory, St. Venant theory, Tresca theory, Haigh's theory and Von Mises's theories of failure.

## **6. List of Experiments:**

1. Tension test
2. Bending tests on simply supported beam and Cantilever beam.
3. Compression test on concrete
4. Impact test
5. Shear test
6. Investigation of Hook's law that is the proportional relation between force and stretching in elastic deformation,
7. Determination of torsion and deflection,
8. Measurement of forces on supports in statically determinate beam,
9. Determination of shear forces in beams,
10. Determination of bending moments in beams,
11. Measurement of deflections in statically determinate beam,
12. Measurement of strain in a bar
13. Bend test steel bar;
14. Yield/tensile strength of steel bar;

## **7. Text /Reference Books:**

1. Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New York, USA.
2. Kazmi, S. M. A., "Solid Mechanics" TMH, Delhi, India.
3. Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall, 2004
4. Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 2nd ed. New York, NY: McGraw Hill, 1979
5. Laboratory Manual of Testing Materials - William Kendrick Hall
6. Mechanics of Materials - Ferdinand P. Beer, E. Russel Jhonston Jr., John T. DEwolf – TMH 2002.
7. Strength of Materials by R. Subramanian, Oxford University Press, New Delhi.

## **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	Manufacturing Processes TIP-305
4	Catalogue Description	Attached
5	To be offered	B.Tech, Mechanical Engineering
6	Credits	3(3-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      No B. An introductory survey of knowledge represented by the department      No C. An introductory survey of a special area of knowledge No D. A further development of course      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Engineering Science Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial and Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Manufacturing Processes**

**2. Course No. : TIP-305**

**3. Credits Hours : 3(3-0-2)**

## **5. Syllabus /Catalogue Description:**

This course contains basic manufacturing techniques or economical job techniques for particular product, and introductory course about finish product like grinding.

## **6. Topical outline:**

### **Module 1:**

Lathe Machine, Milling Machine, Drilling Machine, Shaper Machine, Planer Machine; types, operations, Structure, drives, Mechanism, Specifications. Indexing; simple and compound.

Machining parameters and their effects; Speed, feed and depth of cut, cutting fluids

### **Module 2:**

Introduction to tool materials, geometry of single point cutting tool and multipoint cutting tool, milling cutters, Tool signature

### **Module 3:**

Introduction to sheet metal working, blanking and piercing, types of presses and operation, power hammer. Forming, hot working and cold working, rolling, roll mill arrangements. Extrusion, tube and wire drawing, spinning, stretch forming

### **Module 4:**

Welding: Gas welding, Electric arc welding, AC and DC welding machines and their characteristics, flux, electrodes, pressure welding, electric, resistance welding, spot, seam welding, submerged arc welding, thermit welding, TIG, MIG, gas cutting

### **Module 5:**

Tool economics, cost, volume, profit analysis, tool life introduction. Introduction to advanced machining processes, micro machining, NC, CNC and DNC machines.

## **7. List of Experiments: NIL**

## **8. Text /Reference Books:**

1. Elements of workshop Technology Vol. I and II By Hazra and Chaudhary.
2. Elements of workshop Technology Vol. I and II By B.S Raghuwalshi.
3. Production technology by R.K Jain.

## **9. Marks Distribution:**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Design of Work Systems (TIP-355)
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical as well as practical knowledge in the field Industrial & Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Out growth of instructors Research Programme <b>Yes</b>
10	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed mandatory syllabus by AICTE to be implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities to be further developed
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course                   :     Design of Work Systems**

**2. Course No.                           :     TIP- 355**

**3. Credits Hours C(L-T-P)   :     3 (2-0-2)**

**4. Pre-requisite** : Nil

## **5. Course Objectives:**

1. To understand the basics of man, machine and environment.
2. To understand the concept of Industrial fatigue and Work Safety.
3. To understand the basics and applications of ergonomics at workplace.
4. To have an understanding of method study and Work measurement and its relationship with Industrial Engineering and Production Engineering.

## **6. Topical Outline:**

### **Module 1:**

**Productivity:** Introduction to industrial Engineering, Introduction, concept and definition of productivity, Expectations from productivity, benefits from productivity, Productivity measures, advantages and limitations of productivity measures, Productivity improvement techniques.

### **Module 2:**

**Work Study:** Introduction and importance of work study, advantages of work study, work study procedure, concept of work content, reasons for excess work content, techniques to reduce work content.

### **Module 3:**

**Method Study:** Introduction, objectives of method, Scope of method study, steps of method study, Job selection criteria for method study, method study symbols, Recording techniques, operation process chart, flow process chart, Two handed process chart, multiple activity chart, Diagrams-flow diagrams, string diagrams, Micro motion study-Simo chart, Critical examination, Principles of motion economy.

### **Module 4:**

**Work Measurement:** Definition and objectives of work measurement, Techniques of work measurement- Time study, Synthetic data, work sampling, Predetermined Motion Time Study (PMTS), Work measurement procedure, Concept of element and work cycle, reasons for breaking the job into elements, Different types of elements in work measurement,

Concept of qualified worker, observed time and standard time, calculation of standard time, different types of work allowances, Concept and applications of Method Time Measurement(MTM)

### **Module 5:**

**Ergonomics:** Introduction to Ergonomics-Concept and scope of Ergonomics. Contribution of Ergonomics in System design and Management, Man-machine systems, Anthropometry and Biomechanics: Anthropometric data and measurement techniques, joint movement and methods of measurement, analysis and application of anthropometric data, Human limitations in relation to stresses and demands of working environments. Mechanical environment; noise and vibration and their physiological effects, thermal environment: heat stress, thermal

comfort, effect on performance and behavior, field of vision, color discrimination, general guidelines for designing visual display, safety standards at work place.

## **7. List of Experiments :**

1. To study basic components of time study, Lap timing, Cumulative timing.
2. To study models for Two-Handed operations.
3. To study different types of safety signs at different work stations.
4. To solve different potentially hazardous industrial problems/processes of requiring ergonomically safe solutions.
5. Industrial visit to nearby factory to understand basic ergonomic issues.
6. To prepare different types of operation charts for different manufacturing operations.
7. To calculate standard times for different industrial operations.

## **8. Text /Reference Books:**

1. Work Study by I L O.
2. Work Study and Ergonomics by Shan.
3. Work Study by H. D. Sharma.
4. Motion & Time Study by Barnes
5. Bridger rs. 1995. Introduction to Ergonomics. McGraw Hill.
6. Charles D Reese. 200 I. Accident/Incident Prevention Techniques. Taylor & Francis.
7. Gavriel Salvendy. 1997. Hand Book of Human Factors and Ergonomics. John Wiley & Sons.

Kromer KHE. 2001. Ergonomics. Prentice Hall

**9. Course Outcomes:** The course will help students understand the work systems in today's complex socio technical systems which contain human, technology, internal and external environments, organization and management. After studying this course the students would be able to design a work system structure that has strong impact on work performance, strain and stress, safety and health of workers.

## **10. Marks Distribution**

I Pre final Exam                    15 Marks

II Pre final Exam                    15 Marks

Practical                            20 Marks

Final Exam                            50 Marks

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Total                                    100 Marks  
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	<b>Fundamentals of Industrial Engineering (TIP-356)</b>
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>NO</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per the directions of our regulatory body
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial and Production Engineering
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Fundamentals of Industrial Engineering**

**2. Course No. : TIP-356**

**3. Credits Hours : 3 (3-0-0)**

<b>4. Pre-requisite</b>	: Nil
<b>5. Course Objective</b>	: This course will provide an overview of basic industrial engineering principles.

## **6. Syllabus /Catalogue Description**

Introduction to IE; Productivity Management: Productivity measurement, Models of Productivity measurement, Need for Productivity Evaluation, Evaluation Methodology; Product Design and Development: value engineering and analysis, concurrent engineering. Production Planning and Inventory Control; Inventory Management; MRP and MRP-II; order control and flow control; routing, scheduling and priority dispatching; push and pull production systems, concept of JIT manufacturing system; logistics, distribution, and supply chain management; ERP; Line Balancing; Operations Scheduling: Gant charts, Basic scheduling problems, Line of balance, Flow production scheduling, Batch production scheduling, Product sequencing, Manufacturing lead time-Techniques for aligning completion times and due dates.

## **7. Topical Outline**

<b>UNIT I: Introduction to Industrial Engineering</b>	<b>10</b>
<b>Introduction:</b> Definition, History, Contributions, Approaches, Activities, Objectives, Functions, Techniques and place of Industrial Engineering in an Organization; Classification of production systems. <b>Productivity Management:</b> Basic concept and meaning of Productivity, Significance of Productivity, Factors affecting Productivity, Productivity cycle, Scope of Productivity Engineering and Management. Productivity measurement in International, National and Industrial level, Total Productivity Model, Productivity measurement in Manufacturing and Service sectors, Performance Objective Productivity (POP) model, Need for Productivity Evaluation, Evaluation Methodology.	
<b>UNIT II: Product Design and Development</b>	<b>6</b>
Principles of good product design, tolerance design; quality and cost considerations; product life cycle; standardization, simplification, diversification, value engineering and analysis, concurrent engineering.	
<b>UNIT III: Production Planning and Inventory Control</b>	<b>14</b>
Introduction to PPC, Objectives and functions of PPC, Forecasting techniques - causal and time series models, moving average, exponential smoothing, trend and seasonality; costs and accuracy of forecasts, Capacity Planning, aggregate production planning; master production scheduling; Process Planning vs Product planning-Extending the original product information-Value analysis-Problems in lack of product planning-Process planning and routing-Pre requisite information needed for process planning- Steps in process planning-Quantity determination in batch production-Machine capacity, balancing- Analysis of process capabilities in a multi product system. Production Control Systems, Periodic batch control-Material requirement planning, kanban; Dispatching-Progress reporting and expediting-	
<b>UNIT IV: Inventory Management</b>	<b>5</b>

Inventory Management- functions, costs, classifications, deterministic and probabilistic inventory models, basic inventory model, quantity discount; perpetual and periodic inventory control systems. MRP and MRP-II; order control and flow control; routing, scheduling and priority dispatching; push and pull production systems, concept of JIT manufacturing system; logistics, distribution, and supply chain management; ERP. Line Balancing problems.

## **UNIT V: Operations Scheduling**

**10**

Scheduling background - Scheduling function – Sequencing – Measures of performance – Scheduling theorems – Pure sequencing model assumptions. Single machine scheduling, Parallel machine scheduling, Flow shop scheduling and Job shop scheduling, problems and their characteristics, solution techniques. Loading and scheduling-Master Scheduling, Scheduling rules, Gant charts, Basic scheduling problems, Line of balance, Flow production scheduling, Batch production scheduling, Product sequencing, Manufacturing lead time-Techniques for aligning completion times and due dates.

## **8. Text /Reference Books:**

### **TEXT BOOKS**

1. Industrial Engineering and Production Management by MartandTelsang, S Chand.
2. Operations Management 9e by Krajewski, Ritzman, Pearson Education.

### **REFERENCES**

- 1 Industrial Engineering and Management by O.P. Khanna ,Dhanpat Rai publications.
2. Maynard's Industrial Engineering Handbook by Kjell B. Zandin, Fifth Edition

## **9. Course Outcomes**

**: The students shall learn**

1. The Evolution of Industrial Engineering as a discipline.
2. The concepts of productivity measurement and management.
3. The concepts of product design and development.
4. The basic knowledge for the analysis and design of a work task based on traditional Industrial Engineering Principles.
5. The basic knowledge of inventory management, operations planning and scheduling.

## **10. Marks Distribution :**

I Pre final Exam

15 Marks

II Pre final Exam	15 Marks
Assignments / Presentations	20 Marks
Final Exam	50 Marks
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Total 100 Marks

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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	<b>Advanced Industrial Engineering (TIP-357)</b>
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>NO</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per the directions of our regulatory body
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial and Production Engineering
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Advanced Industrial Engineering**

**2. Course No. : TIP-357**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

**5. Course Objective** : This course will develop the students to apply the basic industrial engineering principles.

## **6. Syllabus /Catalogue Description**

Cost Concepts, Make or Buy Decision Making-Introduction, costs of production, Break – Even Analysis (BEA), Cost – Volume – Profit (CVP) analysis, economic and non-economic factors and functional aspects of make or buy decisions; Job Evaluation, Merit Rating, Wages and Incentives; Plant Location, Plant Layout and Material Handling; Business Process Reengineering (BPR)- framework for reengineering, process of reengineering; Industrial Engineering and Reengineering; Information Technology leverage in BPR. Concurrent Engineering concepts; MIS, IPR and Industrial Safety- patent, copyright, industrial design and trademark; Problems of industrial accidents, causes, sources and safety; General safety rules, first aids; Efforts by Government.

## **7. Topical Outline**

### **UNIT I: Cost Concepts, Make or Buy Decision Making**

**6**

Introduction, costs of production, concept of cost accounting, elements of cost, factors affecting selling price / profit, fixed costs, variable costs, computation of actual cost, nature of costs, classification and types of costs, cost control, Break – Even Analysis (BEA), Cost – Volume – Profit (CVP) analysis. Make or Buy decisions, economic and non-economic factors influencing make or buy decisions, functional aspects of make or buy decisions.

### **UNIT II: Job Evaluation, Merit Rating, Wages and Incentives**

**10**

Definition and concepts, objectives, procedure, principles, methods of job evaluation, Job analysis, job description, job specification, job evaluation systems; Merit rating, selection of factors in setting up rating method, methods of merit rating; Concept of wage, minimum wage, desirable characteristics of good wage / incentive plans, factors affecting wages, types of wage plans, need for a rational wage policy, incentive schemes, individual and group incentive schemes, characteristics of a good incentive system, wage incentive plans.

### **UNIT III: Plant Layout and Material Handling**

**12**

Plant location, need and importance for selecting suitable location, plant location problem, importance of location, factors affecting plant location, quantitative methods for evaluation of plant location; Plant layout problem, objectives, principles, advantages, limitations, types of plant layout; Symptoms of bad layout, plant layout procedure, applications; Material flow pattern; Line balancing; Material handling, objectives, elements, functions, principles, factors of material handling; Types and selection of material handling equipments; Relation between plant layout and material handling.

### **UNIT IV: Business Process Reengineering (BPR)**

**7**

Definition, characteristics of BPR, need for reengineering, steps in reengineering, framework for reengineering, process of reengineering; Industrial Engineering and Reengineering; Success

factors in reengineering, advantages and limitations of reengineering; Information Technology leverage in BPR. Concurrent Engineering concepts.

## **UNIT V: MIS, IPR and Industrial Safety**

**10**

Value of information; information storage and retrieval system - database and data structures; knowledge based systems. Definition of intellectual property, importance of IPR; TRIPS and its implications, patent, copyright, industrial design and trademark; Problems of industrial accidents, causes, sources and safety; General safety rules, first aids; Efforts by Government.

## **8. Text /Reference Books:**

### **TEXT BOOKS**

1. Industrial Engineering and Production Management by MartandTelsang, S Chand.
2. Operations Management 9e by Krajewski, Ritzman, Pearson Education.

### **REFERENCES**

- 1 Industrial Engineering and Management by O.P. Khanna ,Dhanpat Rai publications.
2. Maynard's Industrial Engineering Handbook by Kjell B. Zandin, Fifth Edition

## **9. Course Outcomes : The students shall learn**

1. The application of cost concepts, make or buy decision making.
2. The concepts of job evaluation, merit rating, wage and incentive schemes.
3. The application of designing plant layout and material handling systems.
4. The advanced knowledge for the analysis and design of a work task based on BPR.
5. The advanced knowledge of MIS, IPR and industrial safety.

## **10. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Assignments / Presentations	20 Marks
Final Exam	50 Marks

Total

100 Marks

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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	<b>Fundamentals of Operations Research (TIP-358)</b>
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>NO</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	As per the directions of our regulatory body
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial and Production Engineering
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Fundamentals of Operations Research**

**2. Course No. : TIP-358**

**3. Credits Hours : 3 (3-0-0)**

<b>4. Pre-requisite</b>	: Nil
<b>5. Course Objective</b>	: This course will provide an overview of basic Operations Research principles.

## **6. Syllabus /Catalogue Description**

Introduction to OR; Linear Programming Problems –Graphical solution, Simplex Algorithm, Big-M Method, Two Phase Method, Revised Simplex Method. Problem of Degeneracy; Duality theory, Primal-Dual Relationships, Dual simplex method, Sensitivity analysis; Integer Linear Programming – Gomory's Cutting Plane Method, Branch and Bound Method; Transportation problems and their solution by NWC, MM, VAM etc.; Assignment problems and their solution by Hungarian Method; Traveling sales man problem; Multi-objective Optimization, Goal Programming; Queuing models and their Solution for Single Server, Multi Server, Limited Queue Capacity, Applications; Decision making under certainty, Decision making under risk, Decision making under uncertainty, Decision tree analysis; Game Theory – Two person zero sum games, pure and mixed strategies, graphical solution, solving by LP; Elements of dynamic programming, Bellman's Principle, state–stage-recursive equations, computational procedure – applications.

## **7. Topical Outline**

### **UNIT I :LINEAR PROGRAMMING 15**

Introduction – History, Definitions, Characteristics, Models, General Methods of Solving OR Models, Phases,, Scope, Shortcomings, Techniques, Convex Sets Theory, Fundamental Theorem of Linear Programming, Linear Programming Problems –Definitions, Formulation of linear programming model - Graphical solution, Solving LPP using Simplex Algorithm, Big-M Method, Two Phase Method, Revised Simplex Method. Problem of Degeneracy, Solution of Special Cases, Simultaneous Equations, Inverse of Matrix by Simplex Method.

### **UNIT II: ADVANCES IN LPP 15**

Duality theory – Writing Dual from Primal, Primal-Dual Relationships, Dual simplex method, Sensitivity analysis for changes in constraints and OF Coefficients. Integer Linear Programming – Definitions, Gomory's Cutting Plane Method, Branch and Bound Method. Transportation problems and their solution by NWC, MM, VAM etc., Assignment problems and their solution by Hungarian Method, Traveling sales man problem. Multi-objective Optimization, Goal Programming.

### **UNIT III :QUEUING THEORY 6**

Queuing theory terminology, Kendall's Notation, Classification of Queuing Models, Solution of Queuing Models, Single Server, Multi Server, Limited Queue Capacity, Applications – Markov chains

### **UNIT IV: DECISION THEORY 6**

Decision making under certainty – Decision making under risk – Decision making under uncertainty – Decision tree analysis – MCDM – AHP. Game Theory – Two person zero sum games, pure and mixed strategies – graphical solution – solving by LP.

## **UNIT V:DYNAMIC PROGRAMMING 3**

Elements of dynamic programming, Bellman's Principle, state–stage-recursive equations, computational procedure – applications.

### **8. Text /Reference Books:**

#### **TEXT BOOKS**

1. Hillier and Lieberman Introduction to Operations Research, TMH, 2000
2. R.Panneer selvam, Operations Research, PHI, 2006

#### **REFERENCES**

1. Philips, Ravindran and Solberg, Operations Research, John Wiley, 2002
2. Hamdy A Taha, Operations Research – An Introduction, Prentice Hall India, 2003
3. Ronald L Rardin, Optimisation in Operations Research, Pearson, 2003
4. David R. Anderson, et al , An Introduction to Management Science – Quantitative approaches to Decision Making, Thomson, 2003

### **9. Course Outcomes: The students shall learn**

1. The Evolution of Operations Research as a discipline.
2. The concepts of Linear Programming Models.
3. The concepts of Advanced Linear Programming Models.
4. The basic knowledge for the decision making under certainty or uncertainty .
5. The basic knowledge of dynamic programming

### **10. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Assignments / Presentations	20 Marks
Final Exam	50 Marks
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Total	100 Mark



## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Managerial Economics, TIP 359
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial Economics and its influence in managerial decisions
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial &Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Engineering and Managerial Economics**

**2. Course No. : TIP-359**

**3. Credits Hours : 3 (3-0-0)**

**5. Course Objectives :**

1. To give the student a fundamental understanding of capital investments analysis
2. To understand how engineering decisions are influenced by financial analysis

**6. Syllabus /Catalogue Description**

Decision making process, non-momentary factor and multiple objectives. Principles of engineering economics, engineering economy, methodology, cost terminology, Application of cost concepts, steps in engineering economic analysis, uniform series, gradient series, annuities, Nominal and effective interest, continuous compounding, Equivalence, present worth, annual worth and future worth, Methods, internal and external rates of return, payback, period method, comparison of alternatives equivalent worth methods, Depreciation and depletion, definition, types requirements of depreciation methods, Depreciation methods,

Replacement studies, reasons, investment value of existing assets, Public project evaluation by benefit cost, multipurpose project, and rate of interest to be charged. Sources of uncertainty, Break even analysis, sensitivity analysis.

**7. Topical Outline**

**UNIT-1:**

Decision making process, non-momentary factor and multiple objectives. Principles of engineering economics, engineering economy, methodology, cost terminology

**UNIT-2:**

Application of cost concepts, steps in engineering economic analysis, why return of capital, origin of interest, simple and compound interest, concept of equivalence, cash flow diagram, interest formula for discrete compounding and discrete cash flows, uniform series, gradient series, differed annuities, perpetuities. Nominal and effective interest, continuous compounding, Equivalence, present worth, annual worth and future worth, Methods, internal and external rates of return, payback, period method, comparison of alternatives equivalent worth methods, Rate of return methods, capitalized cost method.

**UNIT-3:**

Depreciation and depletion, definition, types requirements of depreciation methods, Depreciation methods, St. line, S and D, declining balance with or without switch over sinking fund method, output based methods, depletion cost, Depletion percentage and depletion,

## **UNIT-4:**

Replacement studies, reasons, investment value of existing assets.; of defender and challenger, Typical replacement problem, replacement v/s augmentation, retirement without replacement.

## **UNIT-5:**

Public project evaluation by benefit cost, ratio method difference between public and private projects, multipurpose project, and rate of interest to be charged. Evaluation of independent projects, Dealing with uncertainty, Sources of uncertainty, Break even analysis, sensitivity analysis.

## **8. Course Outcomes :**

The students will know the following:

1. Establish cash flow equivalencies. Analyze cash flows and develop them, and apply time-value- of-money techniques
2. Evaluate the aspects of engineering alternatives and use financial concepts using evaluation techniques, such as annual cost, present worth, incremental rate of return and cost- benefit analysis.
3. The student will also develop an understanding of the economics of engineering, business organization, & capital investment,

## **9. Text Books:**

1. Engineering Economy By E. Paul Degarmo.

## **10. Reference Books:**

- 1.Engineering Economics by Tara Chand.
2. Engineering Economics by Zemes L. Liggs.

## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering

3	Title of the Course & Course No.	Industrial Metrology, TIP-404
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Mechanical measurements and their influence in managerial decisions
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      NO B. An introductory survey of knowledge represented by the department      No C. An introductory survey of a special area of knowledge      No D. A further development of course      No E. An introductory survey of a special area of knowledge represented by some other department      No F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course.      No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial &Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Industrial Metrology**

**2. Course No. : TIP-404**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

**5. Course Objectives :**

- To make the students understand the concepts of mechanical measurements.
- To sensitize the students of the importance of course in real life environment
- To know fundamentals of sensors, Principles of measuring instruments

## **6. Syllabus /Catalogue Description**

General concept of measurement, Generalized measurement system-Units and standards-measuring instruments- sensitivity, readability, range of accuracy, precision-static and dynamic response repeatability-Systematic and random errors-correction, calibration, interchangeability.

Definition of metrology-Linear measuring instruments: Vernier, micrometer, interval measurement, Slip gauges and classification, interferometry, optical flats, limit & gauges.

Comparators, different types Measurement of screw threads-Thread gauges, measurement of gears-tooth thickness, surface finish, straightness, flatness and roundness measurements. Precision instruments based on laser-Principles- laser interferometer-application in linear,

angular measurements and machine tool metrology, Coordinate measuring machine (CMM), Measurement of Force, torque, power:-mechanical, pneumatic, hydraulic and electrical type-Flow measurement

## **7. Topical Outline**

### **UNIT 1:**

#### **CONCEPT OF MEASUREMENT**

General concept – Generalized measurement system-Units and standards-measuring instruments- sensitivity, readability, range of accuracy, precision-static and dynamic response repeatability-Systematic and random errors-correction, calibration, interchangeability.

### **UNIT 2:**

#### **LINEAR AND ANGULAR MEASUREMENT**

Definition of metrology-Linear measuring instruments: Vernier, micrometer, interval measurement, Slip gauges and classification, interferometry, optical flats, limit & gauges.

Comparators: Mechanical, pneumatic and electrical types, applications. Angular Measurements: -Sine bar, optical bevel protractor – Taper measurements.

### **UNIT 3:**

#### **FORM MEASUREMENT**

Measurement of screw threads-Thread gauges, floating carriage micrometer-measurement of gears-tooth thickness-constant chord and base tangent method-Gleason gear testing machine – radius measurements-surface finish, straightness, flatness and roundness measurements.

## **UNIT 4:**

### **LASER AND ADVANCES IN METROLOGY**

Precision instruments based on laser-Principles- laser interferometer-application in linear, angular measurements and machine tool metrology

Coordinate measuring machine (CMM)- Constructional features – types, applications – digital devices- computer aided inspection.

## **UNIT 5:**

### **M E A SUREMENT OF POWER, FLOW AND TEMPERATURE RELATED PROPERTIES**

Force, torque, power:-mechanical, pneumatic, hydraulic and electrical type-Flow measurement: Venturi, orifice, rotameter, pitot tube –Temperature: bimetallic strip, pressure thermometers,hot-wire anemometer, laser Doppler velocimeter thermocouples, electrical resistance thermister.

### **8. Course Outcomes :**

The students will know the following:

1. Working principles of different types of measuring instruments
2. Selection of most appropriate measuring instrument
3. Analysis of a measuring mechanism for its effective utilization.

### **9. Text Books:**

1. Engineering Metrology By R.K.Jain.
2. Metrology and Measuring instruments By M.H. Taher.

### **10. Reference Books:**

1. Manufacturing Science and Technology by Suresh Dalla.
2. Production Technology by O.P.Khanna and M.Lal.
3. Beckwith T.G, and N. Lewis Buck, “Mechanical Measurements”, Addison Wesley, 1991
4. Jain R.K., “Engineering Metrology”, Khanna Publishers, 1994
5. Alan S. Morris, “The Essence of Measurement”, Prentice Hall of India, 1997
6. Gupta S.C, “Engineering Metrology”, Dhanpat rai Publications, 1984
7. Jayal A.K, “Instrumentation and Mechanical Measurements”, Galgotia Publications 2000
8. Donald D Eckman, “Industrial Instrumentation”, Wiley Eastern.



## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Practical Training 1TIP-191
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	Nil
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial & Production Engineering to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical	Nil
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Practical Training 1**

**2. Course No. : TIP- 191**

**3. Credits Hours : Nil**

**4. Pre-requisite : Nil**

**5. Course Objective**

1. To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions.
2. To have hands-on experience in the students' related field so that they can relate and reinforce what has been taught at the university.
3. To promote cooperation and to develop synergistic collaboration between industry and the university in promoting a knowledgeable society.
4. To set the stage for future recruitment by potential employers.

## 6.Topical Outline

### Module-1:

The student is required to undergo 30 days training during summer vacation after completion of 4th /2nd semester exams in a large and reputed manufacturing organization to learn the following:

- Mission vision & objectives of the selected organization
- Organizational structure
- Products and services of the organization
- Shop floor working
- Production management of the organization.
- To complete a mini project in the organization, if possible

### Module-2:

The student is required to undergo 30 days training during summer vacation after completion of 6th /4nd semester exams in a large and reputed manufacturing organization other than the one in which the student has already undertaken training as required in unit 1 to learn the following:

- Mission vision & objectives of the selected organization
- Organizational structure
- Products and services of the organization
- Shop floor working
- Production management of the organization.
- To complete a mini project in the organization, if possible

### Module-3:

The student is required to learn c++ / java professional / any other language of relevance; show and submit 10 good running programmes of not less 100 lines in the absence of certificate from a reputed certifying agency.

### Module-4:

The student is required to learn at-least two CAD / CAM soft-wares viz. Pro-E/UG/Solid Works / Catia / any other latest; show and submit 10-10 CAD/CAM running programmes of not less 100 lines in the absence of a certificate from a reputed certifying agency.

### Module-5:

All India Technical Tour / 5 short industrial visits. Show and submit a certificate from tour in charge of the department.

## **7. List of Experiments:Nil**

## **8. Course Outcomes**

At the end of the course students should be able to:

1. Develop soft skills in management, team skill & leadership skill and responsibilities in the work environment.
2. Point out the acquired knowledge and their understanding to dwell with the environmental issue.
3. Improve their knowledge and skills relevant to their area of study

## **9. Text /Reference Books**

As per need.

## **10. Marks Distribution**

- |  |          |
|--|----------|
| 1. Training Report along with certificate for unit | 20 marks |
| 2. Training Report along with certificate for unit | 20 marks |
| 3. Training Report along with certificate for unit | 20 marks |
| 4. Training Report along with certificate for unit | 20 marks |
| 5. Tour Report along with certificate for unit 5   | 20 marks |

The evaluation shall be done along with seminar course (TIP-492) and / or separate viva-voce exams to ascertain the clear understanding of above five unit.

## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Practical Training 2 TIP-291
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	Nil
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial & Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>NO</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b>

		F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial	Nil
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : **Practical Training2**

**2. Course No.** : **TIP- 291**

**3. Credits Hours** : **Nil**

**4. Pre-requisite** : **Nil**

## **5. Course Objective**

1. To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions.
2. To have hands-on experience in the students' related field so that they can relate and reinforce what has been taught at the university.
3. To promote cooperation and to develop synergistic collaboration between industry and the university in promoting a knowledgeable society.
4. To set the stage for future recruitment by potential employers.

## **6. Topical Outline**

### **Module-1:**

The student is required to undergo 30 days training during summer vacation after completion of 4th /2nd semester exams in a large and reputed manufacturing organization to learn the following:

- Mission vision & objectives of the selected organization
- Organizational structure
- Products and services of the organization
- Shop floor working
- Production management of the organization.
- To complete a mini project in the organization, if possible

**Module-2:**

The student is required to undergo 30 days training during summer vacation after completion of 6th /4nd semester exams in a large and reputed manufacturing organization other than the one in which the student has already undertaken training as required in unit 1 to learn the following:

- Mission vision & objectives of the selected organization
- Organizational structure
- Products and services of the organization
- Shop floor working
- Production management of the organization.
- To complete a mini project in the organization, if possible

**Module-3:**

The student is required to learn c++ / java professional / any other language of relevance; show and submit 10 good running programmes of not less 100 lines in the absence of certificate from a reputed certifying agency.

**Module-4:**

The student is required to learn at-least two CAD / CAM soft-wares viz. Pro-E/UG/Solid Works / Catia / any other latest; show and submit 10-10 CAD/CAM running programmes of not less 100 lines in the absence of a certificate from a reputed certifying agency.

**Module-5:**

All India Technical Tour / 5 short industrial visits. Show and submit a certificate from tour in charge of the department.

**7. List of Experiments: Nil**

**8. Course Outcomes**

At the end of the course students should be able to:

1. Develop soft skills in management, team skill & leadership skill and responsibilities in the work environment.
2. Point out the acquired knowledge and their understanding to dwell with the environmental issue.
3. Improve their knowledge and skills relevant to their area of study

## **9. Text /Reference Books**

As per need.

## **10. Marks Distribution**

6. Training Report along with certificate for unit	20 marks
7. Training Report along with certificate for unit	20 marks
8. Training Report along with certificate for unit	20 marks
9. Training Report along with certificate for unit	20 marks
10. Tour Report along with certificate for unit 5	20 marks

The evaluation shall be done along with seminar course (TIP-492) and / or separate viva-voce exams to ascertain the clear understanding of above five units.



## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Practical Training 3TIP-391
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	Nil
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial & Production Engineering to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial	Nil
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course :** Practical Training3

**2. Course No. :** TIP- 391

**3. Credits Hours :** Nil

**4. Pre-requisite :** Nil

**5. Course Objective**

1. To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions.
2. To have hands-on experience in the students' related field so that they can relate and reinforce what has been taught at the university.
3. To promote cooperation and to develop synergistic collaboration between industry and the university in promoting a knowledgeable society.
4. To set the stage for future recruitment by potential employers.

## **6.Topical Outline**

### **Module-1:**

The student is required to undergo 30 days training during summer vacation after completion of 4th /2nd semester exams in a large and reputed manufacturing organization to learn the following:

- Mission vision & objectives of the selected organization
- Organizational structure
- Products and services of the organization
- Shop floor working
- Production management of the organization.
- To complete a mini project in the organization, if possible

### **Module-2:**

The student is required to undergo 30 days training during summer vacation after completion of 6th /4nd semester exams in a large and reputed manufacturing organization other than the one in which the student has already undertaken training as required in unit 1 to learn the following:

- Mission vision & objectives of the selected organization
- Organizational structure
- Products and services of the organization
- Shop floor working
- Production management of the organization.
- To complete a mini project in the organization, if possible

### **Module-3:**

The student is required to learn c++ / java professional / any other language of relevance; show and submit 10 good running programmes of not less 100 lines in the absence of certificate from a reputed certifying agency.

### **Module-4:**

The student is required to learn at-least two CAD / CAM soft-wares viz. Pro-E/UG/Solid Works / Catia / any other latest; show and submit 10-10 CAD/CAM running programmes of not less 100 lines in the absence of a certificate from a reputed certifying agency.

### **Module-5:**

All India Technical Tour / 5 short industrial visits. Show and submit a certificate from tour in charge of the department.

## **7. List of Experiments:Nil**

## **8. Course Outcomes**

At the end of the course students should be able to:

1. Develop soft skills in management, team skill & leadership skill and responsibilities in the work environment.
2. Point out the acquired knowledge and their understanding to dwell with the environmental issue.
3. Improve their knowledge and skills relevant to their area of study

## **9. Text /Reference Books**

As per need.

## **10. Marks Distribution**

1. Training Report along with certificate for unit	20 marks
2. Training Report along with certificate for unit	20 marks
3. Training Report along with certificate for unit	20 marks
4. Training Report along with certificate for unit	20 marks
5. Tour Report along with certificate for unit 5	20 marks

The evaluation shall be done along with seminar course (TIP-492) and / or separate viva-voce exams to ascertain the clear understanding of above five units.



## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Seminar TIP-492
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	1(0-0-3)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial & Production Engineering to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	Nil
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Seminar**

**2. Course No. : TIP- 492**

**3. Credits Hours : 1 (0-0-3)**

**4. Pre-requisite** : **Nil**

## **5. Course Objective**

1. To expose students to the real working environment and get acquainted with the organization structure, business operations and administrative function.
2. To promote and develop presentation skills and import a knowledgeable society.
3. To set the stage for future recruitment by potential employers.
4. To improve communication skills of students.

## **6. Topical Outline**

- It is mandatory that each student will give individually a seminar on exclusive topic.
- During the seminar session each student is expected to prepare and present a topic on Industrial Engineering/ Manufacturing Technology, for duration of not less than 20 minutes.
- During the seminar session each student is expected to prepare and present a report of training in five parts (unit1-5 of TPE-491) for duration of not less than 20 minutes. If the evaluation of practical training (TPE-491) is done through a separate seminar, then the duration of presentation shall be combined for a topic of a professional area as above without consideration of practical training here with this course.
- Also, the student has to submit a hard copy of the technical topic, in the form of a report consisting of a title page, Introduction, body chapters and a conclusion with references, running to not less than 40 pages; this will be evaluated by the faculty coordinator/guide.
- The students will be advised to consult latest books, scientific journals for preparing their seminar topic and report. The cut and paste from unreliable internet sources would be strictly prohibited.
- The students will be encouraged to submit a technical paper of his seminar, which should be written as per the guidelines of a standard journal of their choice.
- In a session of three periods per week, 3 students are expected to present the seminar.
- In 13 weeks all students of the class would have completed giving the seminar.
- For every student or for different area of their branch specialization, a faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also.
- Students are encouraged to use various teaching aids such as over head projectors, power point presentation and demonstrative models.

- This will enable them to gain confidence in technical presentation skills and to face the placement interviews.

## **7. List of Experiments**

As per need.

## **8. Course Outcomes**

Students will be able to work in actual working environment by utilizing technical resources. They will develop ability to write technical documents and give oral presentations related to work completed.

## **9. Text /Reference Books:**

As per need.

## **10. Marks Distribution**

Technical Report	20 marks
Technical Paper	20 marks
Get – up	10 marks
Presentation	20 marks
Participation Attendance	20 marks
Technical Report	20 marks
Technical Paper	20 marks



## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Project 1 TIP-495A
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	6(0-0-12)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial & Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Project 1**

**2. Course No.** : **TIP- 495A**

**3. Credits Hours** : **6 (0-0-12)**

**4. Pre-requisite** : **Nil**

## **5. Course Objective**

1. Demonstrates effective use of written, verbal, and non-verbal communication.
2. Contribute as an individual or in a team in development of technical projects.
3. identify, analyze, formulate and handle projects with a comprehensive and systematic approach.
4. acquire practical knowledge within the chosen area of technology for project development

## **6. Topical Outline**

- The students are expected to get formed into a team of convenient groups of not more than 4 members on a project. The project guide shall be allotted at the end of 6th /4th semester before summer vacations.
- Every project team shall have a guide who is the member of the faculty of the department. The students shall follow the following schedule for the completion of phase-I of their project in 7th semester.
- Three periods per week shall be allotted in the Time table and this Time shall be utilized by the students to receive the directions from the guide, for library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.
- The group has to identify and select the problem to be addressed as their project work; make through literature survey and finalize a comprehensive aim and scope of their work to be done.
- 35% of the total work to be done for the project work has to be completed by end of 7th semester.
- A mini project report (of the phase-I) to this effect has to be submitted by each student group.
- One mid semester review and another end semester review of the progress of the project work have to be conducted by a team of faculty (minimum 3 and a maximum of 5) along with their faculty guide as a member of the faculty team.

S.No.	Activity	Schedule
1.	Communicating title of project to Coordinator, Projects and copy to HPED	within 45 days from 1st day of registration
2.	Completing Literature survey	within 75 days from 1st day of registration
2.	Submitting material requirements in the department	within 90 days from 1st day of registration
3.	Submitting PERT/CPM diagram/Time bound plan of their	within 110 days from 1st day of

	project to the coordinator, projects and copy to HPED	registration
4.	Final VV/presentation before experts	In the last week of the semester, to be notified by I/C, TT

## 7. List of Experiments

As per need.

## 8. Course Outcomes

Students will be able to Design and conduct experiments, as well as to analyse and interpret data. They will understand the impact of Industrial & production engineering solutions in global, economic, environmental, and societal context.

## 9. Text /Reference Books

As per need.

## 10. Marks Distribution

- The project shall be evaluated as per the following marks distribution:
  - Viability of title/topic and scope of work 20 marks
  - Literature Review and Problem Formulation 40 marks
  - PERT / CPM diagram/Time bound plan and BOM 40 marks
- For uniformity in the evaluation, the project guide in consultation with project coordinator and HOD will award the marks of all groups of the students to registrar office.



## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Project 2 TIP-495B
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	6(0-0-12)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial & Production Engineering to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Project 2**

**2. Course No. : TIP- 495B**

**3. Credits Hours : 6 (0-0-12)**

**4. Pre-requisite** : **Nil**

## **5. Course Objective**

1. Demonstrates effective use of written, verbal, and non-verbal communication.
2. Contribute as an individual or in a team in development of technical projects.
3. identify, analyze, formulate and handle projects with a comprehensive and systematic approach.
4. acquire practical knowledge within the chosen area of technology for project development

## **6. Topical Outline**

- The students are expected to continue the work planned in the 7th semester.
- Six periods per week shall be allotted in the Time table and this Time shall be utilized by the students to receive the directions from the guide, for library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.
- The progress of the project is to be evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department.
- Each student shall finally produce a comprehensive report covering background information, literature survey, problem statement, project work details and conclusion/s. This final report shall be typewritten form as specified in the guidelines of the department.

## **7. Lab Experiments**

As per need.

## **8. Course Outcomes**

Students will be able to Design and conduct experiments, as well as to analyse and interpret data. They will understand the impact of Industrial & production engineering solutions in global, economic, environmental, and societal context.

## **9. Text /Reference Books**

As per need.

## **10. Marks Distribution**

1. The project work is evaluated by internal examiners constituted by the HOD based on oral presentation and the project report.
2. The marks distribution will be as follows:

(a) Organization of the project report	10
(b) Technical Material	20
(c) Get-up of the student	10
(d) Command over language(written/oral)	20
(e) References used	10
(f) Physical/theoretical models used	20
(g) Q & A	10

For uniformity in the evaluation, the project guide in consultation with project coordinator and HOD will award the marks of all groups of the students to registrar office.

## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	Advanced Thermal Engineering TIP-371
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>NO</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Professional elective Course of B. Tech Industrial and Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT
22	Prepared by	Er. Yogendra Kumar Singh

**1. Name of the course : Advanced Thermal Engineering**

**2. Course No. : TIP-371**

**3. Credits Hours : 3 (2-0-2)**

**4. Pre-requisite** : Nil

## **5. Syllabus /Catalogue Description**

Basic Power converting cycles, Rankine cycle and its applications, Boilers, Steam Turbines, Internal Combustion Engines- Air cycles, real cycles, Combustion, Fuels and Emissions; Gas Turbines.

## **6. Topical Outline**

### **Unit 1:**

Review of basic laws of thermodynamics, analysis of thermodynamic cycles related to energy conversion: Rankine, Otto, Diesel and Dual Cycles. ideal and real gases; compressibility factor; Gas mixtures

#### **Vapour Power Cycles:**

Review of Carnot and ideal Rankine cycle, effect of various parameters on efficiency of Rankine cycle, deviation of actual cycle from ideal cycle, principal irreversibilities and losses, superheat, reheat and regenerative vapour power cycle, reheat factor, binary vapour and supercritical cycles, co-generation.

### **Unit 2:**

**Boilers:** Classification, boiler performance, modern high pressure boilers, mountings and accessories, safety devices, natural, forced, induced and balanced drafts.

**Steam Turbine:** Types, impulse and reaction turbines, stage, pressure and velocity compounding.

### **Unit 3:**

#### **Internal Combustion Engines:**

Classifications, working of two stroke and four stroke engines, various components, their functions and materials,

**Thermodynamics** of fuel-air cycles, real cycles, various losses in actual engines.

**Combustion** processes in SI engine and its various stages, spark ignition, normal and abnormal combustion, knock pre-ignition, combustion stages in CI engines, ignition delay, types of combustion systems.

**Fuels** for SI and CI engines, their characteristics, alternative fuels, conventional and electronic fuel management systems for SI and CI engines.

**Emissions** from SI and CI engines, supercharging and turbocharging, cooling and lubrication, testing and performance of engines, modern developments in IC engines.

### **Unit 4:**

**Gas Power Cycles:** Gas turbine cycles, intercooling, reheat and regeneration, deviation of actual cycles from ideal cycles, combined cycle power plants.

## **Lab Experiments**

### **7. Text /Reference Books:**

#### **Text books:**

1. Nag, P.K., "Basic and applied thermodynamics", 2<sup>nd</sup> Ed., McGraw-Hill
2. Rajput, R.K., "Power Plant Engineering", S. Chand Publication.

#### **Reference Books**

1. Pulkrabek, W.W., "Engineering Fundamentals of the Internal Combustion Engines", 2<sup>nd</sup> Ed., Pearson Education
2. Cengel, Y.A., and Boles, M.A., "Thermodynamics: An Engineering Approach", 3<sup>rd</sup> Ed., Tata McGraw-Hill
3. Ganeshan, V., "Internal Combustion Engines", Tata McGraw Hill.

### **8. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Practical	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Industrial and production Engineering
3	Title of the Course & Course No.	Computer Assisted Manufacturing TIP-372
4	Catalogue Description	Attached
5	To be offered	B.Tech,Industrial and production Engineering
6	Credits	3(2-0-2)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Computer Assisted Manufacturing to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Professional elective Courses
14	What is the exact place of this courses in the development of the educational programme of your department	Professional elective Courses of B. Tech Industrial and production Engineering
15	Topical outline : Lecture	Attached
16	Practcial:	Attached
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : Computer Assisted Manufacturing

**2. Course No.** : TIP-372

**3. Credits Hours** : 3(2-0-2)

**4. Pre-requisite** : NO

**5. Syllabus /Catalogue Description:**

This course gives the basic knowledge artificial intelligence in manufacturing like robotics which is useful for fast manufacturing. This course contains Expert System Languages, Robotics; Process control etc. computer in manufacturing is useful for fast manufacturing process.

**6. Topical outline:**

**Module 1:**

Introduction to CAM, Automated Manufacturing system, Need of automation, Basic elements of automation, Levels of automation, Automation Strategies, Advantages & disadvantages of automation, Historical development and future trends.

Fundamental of Numerical Control, elements of NC machine tools, classification of NC machine tools, Advantages, suitability and limitations of NC machine tools, Application of NC system, Fundamental of CNC, elements of CNC machine tools, classification of CNC machine tools, Advantages, suitability and limitations of CNC machine tools, Application of CNC system,

**Module 2:**

Control system; Open and closed loops, point to point control systems, Incremental control system, feedback devices such as encoder, counting devices, digital to analog converter and vice versa control, Incremental close loop, Absolute close loop, Control loop in contouring systems, Adaptive control.

**Module 3:**

Manual (word address format) programming, Examples: Drilling, Turning and Milling, Canned cycles, Subroutine and Macro. APT programming, Geometry, Motion and Additional statements, Part Programming for drilling, lathe and milling machine operations, subroutines, canned Cycles, parametric sub routine

**Module 4:**

Flexible Manufacturing System, CIM, CAD/CAM, Computer aided process planning-Retrieval and Generative, Computer aided Inspection. Group Technology, IPMS Introduction, PPC fundamentals, Problems with PPC, JIT & GT applied to FMS, concepts of Expert System in Manufacturing and Management Information System, Different CAPP system, application and benefits

**Module 5:**

Types and generations of Robots, operation of Robot, Robot applications, Economics, Introduction: Robot Anatomy, Laws of Robot, Human System and Robotics, Coordinate system, Specifications of Robot. Power sources, actuators and Transducers, Robotic Sensors, Grippers, Robot Safety, Robot Programming and Robot Applications, Economic Considerations of Robotics system, Robot Kinematics and Dynamics, Robot Arm Dynamics. Introduction to Artificial Intelligence for Intelligent manufacturing. Concept of Mechatronics,

**7. List of Experiments:**

1. To study the basic feature and operation of NC and CNC machine
2. To demonstrate how to program (using the computer-assisted method) and machine a simple part on the CNC lathe
3. Study of CNC milling machine
4. To use AutoCAD to define a series of closed 2-D polygons that form initials, or other artistic creations, within a 150 x 100 mm border. To run the output data file through the AutoLISP program called “digitize.lsp”.
5. To run the G-code file and M code file generate machine code.
6. To complete the Pro/ENGINEER demonstration of surface, workpiece and tool path generation for two intersecting quarter cylinders.
7. To create a minimum number of 36 (6 x 6) data points from a mathematical surface model and input the data files into Pro/E to generate an analytical curved surface.

## **8. Text /Reference Books;**

1. Numerical Control and Computer aided Manufacturing, By Kundra, Rao and Tewari.
2. Automation, Production Systems and Computer Integrated Manufacturing by Mikell P.Groover.
3. Computer Aided Manufacturing by Kundra and Rao.
4. Computer control of Manufacturing systems by Koren.
5. NC Machine Tools by S.J. Martin.
6. NC Machines by Koren.
7. CAD/CAM by Groover.

## **9. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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# PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Industrial and production Engineering
3	Title of the Course & Course No.	Automation and Robotics TIP-373
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Automation and Robotics to the students of Industrial and production Engineering
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Professional elective Courses
14	What is the exact place of this courses in the development of the educational programme of your department	Professional elective Courses of B. Tech Industrial and production Engineering
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : Automation and Robotics

**2. Course No.** : TIP-373

**3. Credits Hours** : 3(3-0-0)

**4. Pre-requisite** : NO

## **5. Syllabus /Catalogue Description:**

This course gives the basic knowledge of Automation and Robotics so that it can be applied in industries. This subject is concerned with the use of mechanical, electronic, and computer-based systems in the operation and control of production, e.g. mechanical assembly machines, feedback control systems applied to industrial processes, numerically controlled machine tools, and Fixed Automation, Programmable Automation, Flexible Automation.

## **6. Topical outline:**

### **Module 1:**

Introduction to manufacturing systems concepts, manufacturing automation, flow systems, lines and assemblies, Introduction to CAM; Automated Manufacturing system; Need of automation, Basic elements of automation, Levels of automation, Automation Strategies, Advantages & disadvantages of automation, Historical development and future trends.

### **Module 2:**

Basic concepts in robotics, introduction, numerical control of machine tools, resolution, accuracy, and repeatability, Position representation, Classification and structure of robotic systems, point-to-point and continuous-path systems, control loops of robotic systems, Classification based on arm geometry, coordinate systems, etc.

### **Module 3:**

Drives and control systems, hydraulic systems, direct current servomotors, control approaches of robots, elimination of stationary position errors, control loops of CNC systems

Kinematic analysis and coordinate transformation, forward kinematics problem, Inverse kinematics, Denavit-Hartenberg convention, link description, coordinate system linkages, and joint mechanisms, actuator space, joint space and Cartesian space.

### **Module 4:**

Trajectory interpolators, Introduction, General considerations in path description and generation, Joint space schemes, Cartesian space schemes, Path generation at run Time, Collision free path planning Robot programming, Manual programming, Lead through programming, Programming languages.

### **Module 5:**

Sensors and intelligent robots, introduction to robotic sensors, vision systems, range detectors, assembly-aid devices, force and torque sensors, artificial intelligence, Computer integrated manufacturing systems, FMS, CAD/CAM systems, Factory of the future.

Applications of robots, handling, loading and unloading, manufacturing cell, welding assembly, machining. Evaluation and economic justification of robotic systems.

## **7. List of Experiments: NIL**

## **8. Text /Reference Books:**

1. Robotics for Engineers- YoranKoren, Publisher- McGraw-Hill International Editions
2. Advances in Robotics, Automation and Control - Editor Jesus Aramburo and Antonio Ramirez Trevino
3. Automation and Roboticsby Juan Manuel Ramos Arreguin - InTech , 2008
4. Industrial Robotics: Programming, Simulation and Applications - by Low Kin Huat - InTech , 2006
5. Robotic Systems - Applications, Control and Programming,- Editor Ashish Dutta

## **9. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks

## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	<b>Advanced Operations Research (TIP-374)</b>
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>NO</b> B. An introductory survey of knowledge represented by the department <b>NO</b> C. An introductory survey of a special area of knowledge <b>NO</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course	As per the directions of our regulatory body

	be offered at this present time	
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Elective Course
14	What is the exact place of this courses in the development of the educational programme of your department	Elective Course of B. Tech Industrial and Production Engineering
15	Topical outline : Lecture	Attached
16	Practical:	Yes
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

- 1. Name of the course** : **Advanced Operations Research**
- 2. Course No.** : **TIP-374**
- 3. Credits Hours** : **3 (3-0-0)**
- 4. Pre-requisite** : **Nil**
- 5. Course Objective** : This course will develop the students to apply the advanced operations research principles.

## **6. Syllabus /Catalogue Description**

Deterministic Inventory Models; Probabilistic inventory models- Instantaneous Demand, Uniform Demand, Discrete and Continuous cases, Reorder point model, Multi Product-Selective Inventory control. ABC, XYZ, FNSD, VED, Exponential Smoothing Analysis Methods, Probabilistic Order Level System with Lead Time, Multi-period Probabilistic Model with Constant Lead Time; Replacement models-Money value, present worth factor and discount rate, Replacement of Items that Deteriorate, Items that fail completely, Recruitment and promotion problems, Equipment Renewal Problem, Systems Reliability; Nonlinear programming-Optimization of nonlinear functions subject to constraints, Lagrange multipliers, Karush-Kuhn-Tucker optimality conditions, convexity, Approximation methods for Nonlinear programming: Line search methods, gradient methods, conjugate gradient methods; Sequencing Problems- General Sequencing Problems, Assumptions, Processing of n jobs through two, three and m machines. Bar Chart, Gantt Chart, Route and Schedule Chart, Line of Balance, Maximal

flow problems, Shortest route problem, Minimal spanning tree, Project network –CPM, PERT, Crashing, Resource Allocation and Resource Smoothing.

## **7. Topical Outline**

### **UNIT I: DETERMINISTIC INVENTORY MODELS 9**

Introduction, Inventory Models, Inventory Costs, Purchase model with no shortages, Manufacturing Model with no Shortage, Purchase Model with Shortage, Manufacturing Model with Shortages, EOQ with constraints, Model with price breaks.

### **UNIT II: PROBABILISTIC INVENTORY MODELS 10**

Probabilistic inventory models: Instantaneous Demand, Uniform Demand, Discrete and Continuous cases, Reorder point model, Multi Product-Selective Inventory control. ABC, XYZ, FNSD, VED, Exponential Smoothing Analysis Methods, Probabilistic Order Level System with Lead Time, Multi-period Probabilistic Model with Constant Lead Time.

### **UNIT III: REPLACEMENT MODELS 9**

Replacement models: Money value, present worth factor and discount rate. Replacement of Items that Deteriorate, Items that fail completely, Recruitment and promotion problems, Equipment Renewal Problem, Systems Reliability.

### **UNIT IV: NON-LINEAR PROGRAMMING 7**

Nonlinear programming: Optimization of nonlinear functions subject to constraints, Lagrange multipliers, Karush-Kuhn-Tucker optimality conditions, convexity, Approximation methods for Nonlinear programming: Line search methods, gradient methods, conjugate gradient methods.

### **UNIT V: NETWORK MODELS 10**

Sequencing Problems: General Sequencing Problems, Assumptions, Processing of n jobs through two, three and m machines. Bar Chart, Gantt Chart, Route and Schedule Chart, Line of Balance, Maximal flow problems – Shortest route problem – Minimal spanning tree -. Project network -CPM – PERT – Crashing – project costing and control. Resource Allocation and Resource Smoothing.

## **8. Text /Reference Books:**

### **TEXT BOOK**

1. Philips, Ravindran and Solberg, Operations Research, John Wiley,2002

### **REFERENCES**

1. Hamdy A Taha, Operations Research – An Introduction, Prentice Hall India,2003

2. Ronald L Rardin, Optimisation in Operations Research, Pearson, 2003

3. David R. Anderson, et al , An Introduction to Management science –

Quantitative approaches to Decision Making, Thomson,2003

## **9. Course Outcomes: The students shall learn**

1. The application of deterministic Inventory Models.
2. The application of probabilistic Inventory Models
3. The application of Replacement Models.
4. The advanced knowledge for the analysis and design based on non-linear models.
5. The advanced knowledge of project management models.

## **10. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Assignments / Presentations	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Introduction to Micro Machining (TIP-375)
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give basic knowledge in the field of Micro Machining to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme Yes
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed mandatory syllabus by AICTE to be implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	No
14	What is the exact place of this courses in the development of the educational programme of your department	Elective Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Introduction to Micro Machining**

**2. Course No. : TIP- 375**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

**5. Course Objectives:**

1. To understand the relevance of miniaturization of machines, parts and devices.
2. To understand importance of accuracy, uniformity and repeatability of machined parts.
3. To understand the basic principles of micro and nano machining and micromachining processes.
4. To have an overview of research trends in the area of micromachining.

## 6. Topical Outline

### Module 1:

Introduction to micromachining processes, Molecular Dynamics(MD) simulations of Machining at the atomic scale.

### Module 2:

Diamond turn machining, Micro Milling, abrasive jet micro machining, Magnetorheological nanofinishing processes, Ultrasonic micromachining.

### Module 3:

Micro Electric Discharge Micromachining, Laser micromachining techniques and their applications, focused ion beam machining, Electro-chemical spark micro-machining, Electron beam Micro machining, Electrolytic-In process Dressing(ELID) grinding.

### Module 4:

Metrology of micromachined components, X-Ray Lithography for fabrication of High Aspect Ratio Microstructures, Smart material based micro- sensors and actuators used for micro machining,

### Module 5:

Some applications of micromachining in thermal- fluid Engineering, Sustainability issues in Micromachining.

## 7.List of Experiments : Nil

**8. Course Outcomes:** After studying this course, the student would be able to acquainted with basic micromachining principles, machine tools and processes. He will also have an understanding of recent developments in the field of micromachining.

## 9. Text /Reference Books:

11. Introduction to Micromachining, V.K.Jain,Narosa Publishing House Pvt Ltd.
12. Nano and micro machining by J.PauloDavim And Mark J.Jackson,John Wiley & Sons.
13. Micro manufacturing and nano technology by N.P Mahalik.

## 10.Marks Distribution

I Pre final Exam	15 Marks
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II Pre final Exam	15 Marks
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Practical

20 Marks

Final Exam

50 Marks

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Total

100 Marks

## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Industrial and production Engineering
3	Title of the Course & Course No.	Automation in Manufacturing TIP-403
4	Catalogue Description	Attached
5	To be offered	B.Tech, Mechanical Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Mechanical Engineering to the students.
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite Yes B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Engineering Science Course
14	What is the exact place of this courses in the development of the educational programme of your department	Engineering Science Course of B. Tech Mechanical Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	NA
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : Automation in Manufacturing

**2. Course No.** : TIP-403

**3. Credits Hours** : 3(3-0-0)

**4. Pre-requisite** : NO

## **5. Syllabus /Catalogue Description:**

This subject make the student familiar with advanced technology which now a day's used by many industries in the field of design and automation and help the student to understand basic features of automation.

## **6. Topical outline:**

### **Module 1:**

Introduction to manufacturing system's concepts, manufacturing automation, flow systems. lines and assemblies, Introduction to CAM; Automated Manufacturing system; Need of automation, Basic elements of automation, Levels of automation, Automation Strategies, Advantages & disadvantages of automation, Historical development and future trends.

### **Module 2:**

Basic concepts in robotics, introduction, numerical control of machine tools, resolution, accuracy, and repeatability, Position representation, Classification and structure of robotic systems, point-to-point and continuous-path systems, control loops of robotic systems, Classification based on arm geometry, coordinate systems, etc.

### **Module 3:**

Drives and control systems, hydraulic systems, direct current servomotors, control approaches of robots, elimination of stationary position errors, control loops of CNC systems

Kinematic analysis and coordinate transformation, forward kinematics problem, Inverse kinematics, Denavit-Hartenberg convention, link description, coordinate system linkages, and joint mechanisms, actuator space, joint space and Cartesian space

### **Module 4:**

Trajectory interpolators, Introduction, General considerations in path description and generation, Joint space schemes, Cartesian space schemes, Path generation at run Time, Collision free path planning Robot programming, Manual programming, Lead through programming, Programming languages

### **Module 5:**

Sensors and intelligent robots, introduction to robotic sensors, vision systems, range detectors, assembly-aid devices, force and torque sensors, artificial intelligence Computer integrated manufacturing systems, FMS, CAD/CAM systems, Factory of the future.

Applications of robots, handling, loading and unloading, manufacturing cell, welding assembly, machining. Evaluation and economic justification of robotic systems

## **7. List of Experiments: NIL**

## **8. Text /Reference Books:**

- 1.Robotics for Engineers- Yoran Koren, Publisher- McGraw-Hill International Editions
- 2.Advances in Robotics, Automation and Control - Editor Jesus Aramburo and Antonio Ramirez Trevino
- 3.**Automation and Robotics by Juan Manuel Ramos Arreguin - InTech , 2008**
- 4.**Industrial Robotics: Programming, Simulation and Applications - by Low Kin Huat - InTech , 2006**
- 5.Robotic Systems - Applications, Control and Programming,- Editor Ashish Dutta

## **9. Marks Distribution:**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

<b>1</b>	College	Technology
<b>2</b>	Department	Industrial and Production Engineering
<b>3</b>	Title of the Course & Course No.	Rapid Prototyping and re-engineering TIP-462
<b>4</b>	Catalogue Description	Attached
<b>5</b>	To be offered	B.Tech, Industrial and Production Engineering
<b>6</b>	Credits	3(3-0-0)
<b>7</b>	Is this a new Course	Yes
<b>8</b>	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
<b>9</b>	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Outgrowth of instructors Research Programme <b>No</b>
<b>10</b>	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course? <b>No</b>
<b>11</b>	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
<b>12</b>	The course will not replace my existing courses	New Course
<b>13</b>	The courses will not require additional staff over and above	Professional Elective Course
<b>14</b>	What is the exact place of this courses in the development of the educational programme of your department	Elective Course of B. Tech Industrial and Production Engineering Department
<b>15</b>	Topical outline : Lecture	Attached
<b>16</b>	Practical:	NA
<b>17</b>	Text Book and Supplementary readings	Attached
<b>18</b>	Classroom, Laboratory and other facilities:	Required facilities exist
<b>19</b>	Would the introduction of this courses required additional staff:	No
<b>20</b>	Sequence of action	Proposed by AICTE for implementation
<b>21</b>	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Rapid Prototyping and re-engineering**

**2. Course No. : TIP-462**

**3. Credits Hours : 3(3-0-0)**

**4. Pre-requisite : NIL**

## **5. Course objective:**

1. Generating a good understanding of RP history, its development and applications.
2. To impart knowledge on different types of RP systems, i.e., the process, advantages, limitations and applications.
3. To expose the students to different types of materials used in RP systems to make best use of various RP machines.
4. To impart knowledge on various new techniques in RP and reverse engineering.

## **6. Topical Outline**

### **Module 1:**

History and development of RP systems, Applications in Product Development, Reverse Engineering, Rapid Tooling, Rapid Manufacturing- Principle and Fundamentals, medical applications of RP – On demand manufacturing – Direct material deposition - Shape Deposition Manufacturing.

### **Module 2:**

MATERIALS FOR RAPID PROTOTYPING SYSTEMS: Nature of material – type of material – polymers, metals, ceramics and composites liquid based materials, photo polymer development – solid based materials, powder based materials - case study.

### **Module 3:**

#### **LIQUID BASED AND SOLID BASED RAPID PROTOTYPING SYSTEMS:**

Classification – Liquid based system - Stereo lithography Apparatus (SLA), details of SL process, products, Advantages, Limitations, Applications and Uses. Solid based system - Fused Deposition Modeling, principle, process, products, advantages, applications and uses - Laminated Object Manufacturing

### **Module 4:**

POWDER BASED RAPID PROTOTYPING SYSTEMS : Selective Laser Sintering – principles of SLS process, principle of sinter bonding process, Laser sintering materials, products, advantages, limitations, applications and uses. Three Dimensional Printing – process, major applications, research and development. Direct shell production casting key strengths of the process and applications. Laser Sintering System, e-manufacturing using Laser sintering, customized plastic parts, customized metal parts, e-manufacturing - Laser Engineered Net Shaping (LENS).

### **Module 5:**

REVERSE ENGINEERING AND NEW TECHNOLOGIES: Introduction, measuring device-contact type and non-contact type, CAD model creation from point clouds-preprocessing, point clouds to surface model creation, medical data processing -types of medical imaging, software for making medical models, medical materials, other applications - Case study.

## **7. List of Experiments: NIL**

## **8. Course Outcomes:**

This course is designed to give graduate students from any discipline a broad exposure to and a basic understanding of essential digital technologies and production techniques for both, digital-to-physical methods (digital modeling, rapid prototyping, etc), and physical-to-digital methods (reverse engineering.) Students use an inquiry approach that requires both application of relevant literature and original design work, refined through successive iterations and product prototypes. This study can empower graduate students from a variety of fields to better refine and communicate their designs for three-dimensional products.

## **9. Text /Reference Books:**

1. Rafiq I. Noorani, Rapid Prototyping – Principles and Applications, Wiley & Sons, 2006.
2. Chua C.K, Leong K.F and Lim C.S, Rapid Prototyping: Principles and Applications, second edition, World Scientific, 2003.
3. N. Hopkinson, r.j.m, Hague, p m, dickens, “Rapid Manufacturing – An Industrial revolution for the digital age”, Wiley, 2006.
4. IAN GIBSON, “Advanced Manufacturing Technology for Medical applications: Reverse Engineering, Software conversion and Rapid Prototyping”, Wiley, 2006.
5. Paul F. Jacobs, Rapid Prototyping and Manufacturing, “Fundamentals of Stereo lithography”, McGraw Hill 1993.
6. D.t. Pham and S.S. Dimov, “Rapid Manufacturing”, Springer Verlog, 2001.

## **10. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab/Assignment	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Small and Micro Industry Management TIP-464
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Mechanical measurements and their influence in managerial decisions
9	General educational purpose	A. General Education Yes B. department specialization Yes C. Students Research No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite No B. An introductory survey of knowledge represented by the department No C. An introductory survey of a special area of knowledge No D. A further development of course No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial &Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Small and Micro Industry Management**

**2. Course No. : TIP-464**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite** : Nil

**5. Course objective** :

- To develop thought of organized working through industrialization
- To understand functions of management, organizational structure and its dynamics.
- To develop modern concepts of Entrepreneurship

**6. Syllabus:**

Micro, small, medium, and large scale industries, Role of small scale industries in national economy, exemption from registration and licensing under industries act. Entrepreneurship, Qualities, development skills, behavior, motivation and goal setting. Opportunities, identification assessment criterion and environment. Importance of new product planning and development (NPP and D) in today's economy, Search for new ideas, screening new ideas. Industrial support agencies, schemes of assistance, other sources of information. Project planning and formation, productivity, Financial aspects, Men, Machines, materials, Money, products, marketing accounting. Financing and Management. Preparation of feasibility studies. Case studies,

## **7. Topical Outlines**

### **UNIT 1:**

Role of small scale industries in national economy, Definition, industrial Products Research for small scale sector, exemption from registration and licensing under industries act. Entrepreneurship, Qualities, development skills, behavior, motivation and goal setting. Opportunities, identification assessment criterion and environment.

### **UNIT 2:**

Importance of new product planning and development (NPP and D) in today's economy, need for a formal product strategy; implications of the product life cycle organizing for NPP and D; Search for new ideas, screening new ideas.

### **UNIT 3:**

Industrial support agencies, setting up an enterprise, sources of supports, of supports, schemes of assistance, other sources of information. Project planning and formation, product, feasibility report, site selection, layout design, equipment selection, processing and productivity, Financial aspects, aspects commercial viability, scheduling, report preparation and implementation,

### **UNIT 4:**

Initiation of Product development, Testing and commercialization; New Products through acquisition Policies and procedure for NPP and D. Management aspects, Men, Machines, materials, Money, products, marketing accounting.

### **UNIT 5:**

Financing and Management. Preparation of feasibility studies. Case studies, examples of feasibility reports from government agencies. Visits to small scale industries/ small scale industry directorate discussions with entrepreneurs.

## **8. Course Outcomes :**

The students will know the following:

1. Categorization of industrial sector
2. Concept of new product development and product life cycle
3. Understanding of entrepreneurship

## **9. Text Books:**

1. Patel V.G. 1986, A Hand Book of for New Entrepreneurs, Entrepreneurship Development institute of India, Ahemadabad.
2. Jain Rajiv, 1984, Planning a small scale Industry, a guide to interprenous, S. S. Book Association.

## **10. Reference Books:**

1. Gupta Ramvtar 1992, Industrial Entrepreneurship, print Well Jaipur.
2. Chandra Santa Kohli 1991, Development of Women .



## **PROPOSAL FOR A NEW COURSE**

<b>1</b>	College	Technology
<b>2</b>	Department	Industrial and Production Engineering
<b>3</b>	Title of the Course & Course No.	Value Analysis TIP-465
<b>4</b>	Catalogue Description	Attached
<b>5</b>	To be offered	B.Tech, Industrial and Production Engineering
<b>6</b>	Credits	3(3-0-0)
<b>7</b>	Is this a new Course	Yes
<b>8</b>	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
<b>9</b>	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Outgrowth of instructors Research Programme <b>No</b>
<b>10</b>	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
<b>11</b>	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
<b>12</b>	The course will not replace my existing courses	New Course
<b>13</b>	The courses will not require additional staff over and above	Professional Elective Course
<b>14</b>	What is the exact place of this courses in the development of the educational programme of your department	Elective Course of B. Tech Industrial and Production Engineering Department
<b>15</b>	Topical outline : Lecture	Attached
<b>16</b>	Practcial:	NA
<b>17</b>	Text Book and Supplementary readings	Attached
<b>18</b>	Classroom, Laboratory and other facilities:	Required facilities exist
<b>19</b>	Would the introduction of this courses required additional staff:	No
<b>20</b>	Sequence of action	Proposed by AICTE for implementation
<b>21</b>	Approved by	Course curriculum committee and BOFT

**1. Name of the course                   :** **Value Analysis**

**2. Course No.                           :** **TIP-465**

**3. Credits Hours                       :** **3(3-0-0)**

**4. Pre-requisite** : **NIL**

## **5. Course objective:**

1. To understand the difference between value analysis and value engineering.
2. Students will identify the opportunities to remove unnecessary costs while assuring quality, reliability and performance of product.
3. Understanding of critical factors to meet or exceed the customer's expectations and requirements.
4. To find and improve in value mismatch in products, processes and capital projects.

## **6. Topical Outline**

### **Module 1: Value Engineering Concepts:**

Advantages, applications in product development, process improvement, service improvement and system design, problem recognition, role in productivity, criteria for comparison, elements of choice.

### **Module 2: Analysis of Functions:**

Anatomy of function; Values: Use, antique, cost, esteem and exchange; Primary versus secondary versus tertiary/unnecessary functions; Functional Analysis: Function Analysis System Technique and quantitative evaluation of ideas, case studies.

### **Module 3: ValueEngineeringTechniques:**

Selecting products and operations for VE action, timing; VE programmes, determining and evaluating functions, assigning rupee equivalents, developing alternate means to required functions, decision making for optimum alternative, use of decision matrix, make or buy decisions, measuring profits, reporting results and follow up.

### **Module 4: Implementation:**

Action plan, record progress, report progress, review meetings, problems in implementation, human factors.

### **Module 5: Managing VE:**

Level of VE in the organization, size and skill of VE staff, small plant VE activity management supports; Audit of savings.

## **7. List of Experiments: NIL**

## **8. Course Outcomes:**

VE is a rigorous, systematic effort to improve the value and optimize the life cycle cost of a facility. VE generates these cost improvements without sacrificing needed performance levels. A wide range of companies and establishments have used VE effectively to achieve their continuous goal of improving decision making.

## **9. Text /Reference Books:**

1. Value Engineering- A Systematic approach by Arthur P. Mudge.
2. Value Engineering in Manufacturing by ASTME.
3. Techniques of value and engineering. By L.D.Miles.
4. Industrial Engineering hand book by Gravel Salvendry
5. Techniques of Value Analysis and Engineering by Lawrence D.Miles

## **10. Marks Distribution:**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab/Assignment	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

<b>1</b>	College	Technology
<b>2</b>	Department	Industrial and Production Engineering
<b>3</b>	Title of the Course & Course No.	Cellular Manufacturing TIP-466
<b>4</b>	Catalogue Description	Attached
<b>5</b>	To be offered	B.Tech, Industrial and Production Engineering
<b>6</b>	Credits	3(3-0-0)
<b>7</b>	Is this a new Course	Yes
<b>8</b>	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
<b>9</b>	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Outgrowth of instructors Research Programme <b>No</b>
<b>10</b>	Relation to other courses	A. Pre-requisite <b>No</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
<b>11</b>	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
<b>12</b>	The course will not replace my existing courses	New Course
<b>13</b>	The courses will not require additional staff over and above	Professional Elective Course
<b>14</b>	What is the exact place of this courses in the development of the educational programme of your department	Elective Course of B. Tech Industrial and Production Engineering Department
<b>15</b>	Topical outline : Lecture	Attached
<b>16</b>	Practcial:	NA
<b>17</b>	Text Book and Supplementary readings	Attached
<b>18</b>	Classroom, Laboratory and other facilities:	Required facilities exist
<b>19</b>	Would the introduction of this courses required additional staff:	No
<b>20</b>	Sequence of action	Proposed by AICTE for implementation
<b>21</b>	Approved by	Course curriculum committee and BOFT

**1. Name of the course** : **Cellular Manufacturing**

**2. Course No.** : **TIP-466**

**3. Credits Hours** : **3(3-0-0)**

**4. Pre-requisite** : **NIL**

## **5. Course objective:**

1. To design cells in such a way that some measure of performance is optimized.
2. To produce families of parts within a single line and Systematic job rotation and training conditions for effective cell development.
3. To have the idea of mixed model production with reduced investment on machinery and equipment.
4. Students understand the importance reduced work in process inventory.

## **6. Topical Outline**

### **Module 1:**

Concepts of manufacturing systems and cellular manufacturing. Explosive and Implosive systems. Types of production, job shop, batch and Relationships between manufacturing systems.

### **Module 2:**

Historical back-ground of cellular manufacturing, importance of cellular manufacturing, basic concepts, strategic approach. Major areas of cellular manufacturing. Applications and benefits of cellular manufacturing to industries.

### **Module 3:**

Part analysis for family formation, part family formation visual design basis. Classification of coding, product flow analysis (PFA).

### **Module 4:**

Types of layout: line layout, ground layout, functional layouts and composite component system. ROC method, design of cellular manufacturing cell, economics of cellular manufacturing. Flexible manufacturing system and Cellular manufacturing.

### **Module 5:**

Single stage group production scheduling, multistage group production scheduling. Tow M/C flow shop group scheduling, optimization and Industrial case studies.

## **7. List of Experiments: NIL**

## **8. Course Outcomes:**

Cellular manufacturing is a hybrid system that links the advantages of a job shop with the product layout of the continuous flow line. Group technology is the realization that many problems are similar, and that by grouping similar problems, a single solution can be found to a set of problems thus saving time and effort. The smallest organizational unit is the Group. Similar parts of a group are arranged into part families. Where each part family possesses similar designs are manufacturing characteristics. Grouping the production equipment into

machine cells, where each cell specializes in the production of part families, is called as cellular manufacturing. Cellular manufacturing is an example of mixed model production.

## **9. Text /Reference Books:**

- 1.Group technology, production methods in manufacturing by Gallaghar, C.G. and W.A. Knight.
- 2.Handbook of Cellular Manufacturing Systems by Shahrukh A. Irani.
- 3.Cellular Manufacturing Systems: An Integrated Approach by B.S. Nagendra Parashar.

## **10. Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Lab/Assignment	20 Marks
Final Exam	50 Marks
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Total	100 Marks
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Technology Management and IPR, TIP-467
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial & Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Mechanical measurements and their influence in managerial decisions
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      No B. An introductory survey of knowledge represented by the department      No C. An introductory survey of a special area of knowledge No D. A further development of course      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial &Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practical:	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Technology Management and IPR**

**2. Course No. : TIP-467**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite** : Nil

**5. Course objective :**

- To understand technology as a commodity
- To understand how to link different technologies for commercialization
- To understand concept of IPR and related legal procedures

**6. Syllabus:**

Technology Management, introduction, concept and meaning of technology, scope and classification of technology, levels of technology , concept of system, socio-technical system,

Fundamentals of Technology Management: Introduction technology-management interaction, life cycle approach of technology management, business mission, technology strategy development technology gap analysis. Technology Forecasting, Technology Development, Technology Transfer, technology adoption & adaptation, IPR in technology transfer, role of government, Management of manufacturing technology: Productivity & its improvement, Intellectual Property Rights: Introduction and meaning of IPR, role of IPR, world intellectual property organization (WIPO) and its responsibilities, Legislations Converging IPR in India: The patent Act its amendments design, Meaning of opposition under Indian patent Acts, role of patent attorney, transfer of patent rights, licensing, world-wide patent, database, reforms of IPR laws in India.

**7. Topical Outlines**

**UNIT-1:**

Technology: introduction, concept and meaning of technology, scope and classification of technology, levels of technology ,science& technological changes, technology as an environment, Systems and its Complexity: Introduction, concept of system, system elements, socio-technical system, complexity and: its association with system, complex system, problems related to complex system.

**UNIT-2:**

Fundamentals of Technology Management: Introduction technology-management interaction, life cycle approach of technology management, business mission, technology strategy development technology gap analysis. Technology Forecasting: Its meaning, exploratory technology forecasting ; decision matrices, relevance tree, normative forecasting; trend model, Delphi approach, problems in technology forecasting, environmental and human factors, applications of technology forecasting, case studies.

**UNIT-3:**

Technology Development; Introduction, individual & group creativity, technological innovations & its sources, management of innovation, different models of innovation, innovative organization, Internal and external acquisition of technology in product, process & service.

Technology Transfer: Introduction, objectives of technology transfer, methods of technology transfer, formal and informal processes, internal and external technology transfer, cooperative and collaborative venture, transfer of know-who, know-what and know-why of technology, technology adoption& adaptation, IPR in technology transfer, case of international technology transfer, technology policy, role of government.

#### **UNIT-4:**

Management of manufacturing technology: Productivity & its improvement, continuous improvement, structure of world class manufacturing, flexibility in manufacturing technology and its critical issues, technology fusion, cost- benefit analysis and strategic evaluation of a technology, selection of appropriate technology, case studies of MoT in automobile sector.

Intellectual Property Rights: Introduction and meaning of IPR, role of IPR, world intellectual property organization (WIPO) and its responsibilities; industrial property, intellectual property & necessity of its protection, patent & its meaning.

#### **UNIT-5:**

Legislations Convering IPR in India: The patent Act its amendments design Act, trade mark Act, international copy right order & its comparison with similar previous Acts, information technology Act, administrative authority of IPR in India,

Meaning of opposition under Indian patent Acts, role of patent attorney, transfer of patent rights, licensing, work trade organization (WTO), patent corporation treaty, patentability of a product or invention

#### **UNIT-6:**

Product and process patent & their difference, how to file a patent, method, authority, and cost, responsibility of patentee, terms and conditions of a patent in India. IPR in R &D Patent search, patent database, world-wide patent, database, reforms of IPR laws in India.

### **8. Course Outcomes :**

The students will know the following:

1. Commercialization of Technology
2. How to make hybrid useful technology
3. Role of IPR in corporate word and related legal issues

### **9.Text Books:**

1. Technology in Context; Technology Assessment for Managers By Ernest Braun  
Publisher: Rutledge, London.
2. Integrating Innovation and Technology Management.; By Edosomwan& Johnson  
Publisher : John Wiley & Sons, IBM Corporation;
3. The management of technology, Perception and Opportunities; by Paul Lowe Publisher:  
Chapman & Hall; London.

### **10. Reference Books:**

1. Management of Technology and Innovation, Competing Through Technological Excellence By P. N. Rastogi Publisher: Sage Publication.
2. Introduction to Managing Technology; By M W. Cardullo Publisher: John Wiley & Sons.

## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	System Engineering TIP-468
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Quality Management to the students.
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      NO B. An introductory survey of knowledge represented by the department      No C. An introductory survey of a special area of knowledge No D. A further development of course      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : System Engineering**

**2. Course No. : TIP-468**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

## **5. Course Objective:**

1. This course in systems engineering examines the principles and process of creating effective systems to meet application demands.
2. To introduce concepts of system engineering to software engineers
3. The course is organized as a progression through the systems engineering processes of analysis, design, implementation, and deployment with consideration of verification and validation throughout.
4. To describe the system procurement and system engineering processes
5. To discuss reliability in a system context

## **6. Topical Outline**

### **Module 1 :**

What is System Engineering, Origin, Examples of Systems requiring systems engineering, Systems Engineer Career Development Model, Perspectives of Systems Engineering, Systems Domains, Systems Engineering Fields, System Engineering Approaches,

### **Module 2:**

Structure of Complex Systems, System Building Blocks and Interfaces, Hierarchy of Complex Systems, System Building Blocks, The System Environment, Interfaces and Interactions, Complexity in Modern Systems,

### **Module 3:**

Concept Development and Exploration, Originating a New System, Operations Analysis, Functional Analysis, Feasibility, System Operational Requirements, Implementation of Concept Exploration.

### **Module 4:**

Engineering Development, Reducing Program Risks, Requirements Analysis, Functional Analysis and Design, Prototype Development as a Risk Mitigation Technique, Development Testing, Risk Reduction.

### **Module 5:**

Integration and Evaluation, Integrating, Testing, and Evaluating The Total System, Test Planning and Preparation, System Integration, Developmental System Testing, Operational Test and Evaluation, Engineering For Production, Transition From Development To Production, Production Operations

## **7. List of Experiments: NIL**

**8. Course Outcomes:** After successful completion of the course, students would be able to Plan and manage the systems engineering process and examine systems from many perspectives (such as software, hardware, product, etc.) Students can distinguish critical functions, diagnose problems, and apply descoping strategies and judge the complexity of production and deployment issues

## 9. Text /Reference Books:

1. Alexander Kossiakoff, William N Sweet, "System Engineering Principles and Practice, Wiley India
2. Blanchard Fabrycky, Systems engineering and analysis, Pearson
3. Dennis M. Buede, William D. Miller, "The Engineering Design of Systems: Models & Methods" Wiley India
4. JeffreyL Whitten, Lonnie D Bentley, "System Analysis and Design Methods"
5. Richard Stevens, Peter Brook," System Engineering – Coping with complexity, Prentice Hall

## 10. Marks Distribution

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Assignment	20 Marks
Final Exam	50 Marks
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<b>Total</b>	<b>100 Marks</b>
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## PROPOSAL FOR A NEW COURSE

1	College	Technology
2	Department	Industrial & Production Engineering
3	Title of the Course & Course No.	Quality Engineering and Management TIP-469
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Quality Management to the students.
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      NO

		B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Program Core Course
14	What is the exact place of this courses in the development of the educational programme of your department	Core Course of B. Tech Industrial & Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Quality Engineering and Management**

**2. Course No. : TIP-469**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite : Nil**

## **5. Course Objective**

1. To give the students an overview of quality and TQM and explaining the salient contributions of Quality Gurus like Deming, Juran and Crosby. General barriers in implementing TQM.
2. To make students to understand the TQM concepts like customer Focus, Employee Focus and their involvement, continuous process improvement and Supplier Management
3. To provide exposure to students on the basic and new seven management tools, Quality concepts like Six sigma, Failure mode effect analysis
4. To explore industrial applications of Quality function deployment, Taguchi quality concepts and TPM.
5. To impart detailed exposure to students on various quality systems like ISO and its standards

## **6. Topical Outline**

### **Module 1 :**

#### **Quality Concepts**

Evolution of Quality control, concept change, TQM Modern concept, Quality concept in design, Review off design, Evolution of prototype.

### **Control on Purchased Product**

Procurement of various products, evaluation of supplies, capacity verification, Development of sources, procurement procedure. Manufacturing Quality, Methods and Techniques for manufacture, Inspection and control of product, Quality in sales and services, Guarantee, analysis of claims

### **Module 2:**

#### **Quality Management**

Organization structure and design, Quality function, decentralization, Designing and fitting organization for different types products and company, Economics of quality value and contribution, Quality cost, optimizing quality cost, seduction programme.

Human Factor in Quality Attitude of top management, co-operation, of groups, operators attitude, responsibility, causes of operators error and corrective methods

### **Module 3:**

#### **Control Charts**

Theory of control charts, measurement range, construction and analysis of R charts, process capability study, use of control charts. Attributes of Control Charts Defects, construction and analysis off-chart, improvement by control chart, variable sample size, construction and analysis of C-chart

### **Module 4 :**

#### **Defects Diagnosis and Prevention**

Defect study, identification and analysis of defects, corrective measure, factors affecting reliability, MTTF, calculation of reliability, Building reliability in the product, evaluation of reliability, interpretation of test results, reliability control, maintainability, zero defects, quality circle equation,

### **Module 5 :**

ISO-9000 and its concept of Quality Management:

ISO 9000 series, Taguchi method, Lean and JIT Quality

Philosophy

## **7. List of Experiments: NIL**

## **8. Course Outcomes:**

1. Students will be able to gain basic knowledge in total quality management relevant to both manufacturing and service industry including IT sector

2. Students will be able to implement the basic principles of TQM in manufacturing and service based organization.
3. The student would be able to apply the tools and techniques of quality management to
4. manufacturing and services processes
5. The students will be able to gain the knowledge on various ISO standards and quality systems

## **9. Text /Reference Books:**

1. D. C. Montgomery, Introduction to Statistical Quality Control, John Wiley & Sons, 3<sup>rd</sup> Edition
2. Total Quality Management, by Dr Simon John and Rashid Minhas
3. Quality Management Demystified, by Sid Kemp
4. Total Quality: Management, Organization and Strategy, by James R. Evans
5. Total Quality Management: An Executive Guide to Continuous Improvement, by Hubert K. Rampersad
6. The Five Pillars of TQM: How to Make Total Quality Management Work for You (Truman Talley), by BillCreech

## **10.Marks Distribution**

I Pre final Exam	15 Marks
II Pre final Exam	15 Marks
Assignment	20 Marks
Final Exam	50 Marks
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<b>Total</b>	<b>100 Marks</b>
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## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	<b>Six Sigma Practises TIP470</b>
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education <b>Yes</b> B. department specialization <b>Yes</b> C. Students Research <b>No</b> D. Out growth of instructors Research Programme <b>No</b>
10	Relation to other courses	A. Pre-requisite <b>NO</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. a summarizing or integrated course <b>No</b> G. in your judgment does this course overlap to a considerable extent with any other course. <b>No</b>
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Professional elective Course
14	What is the exact place of this courses in the development of the educational programme of your department	Professional elective Course of B. Tech Industrial and Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	no
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Six Sigma Practises**

**2. Course No. : TIP- 470**

**3. Credits Hours : 3 (3-0-0)**

**4. Pre-requisite** : **Nil**

## **5. Course objective:**

The primary objective of the Six Sigma methodology is

- The implementation of a measurement based strategy, which focuses on process and sub-processes improvement through the application of Six Sigma best practice such as DMAIC and DMADV.
- The Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control ) method is applied for improving existing processes and looking for incremental improvement.
- The Six Sigma DMADV (Define, Measure, Analyze, Design, Verify) is applied for developing new processes or products at Six Sigma quality levels.
- It can also be employed if a current process requires more than just incremental improvement.

## **6. Topical Outlin**

### **Module 1: Quality Perception;**

Quality in Manufacturing, Quality in Service Sector; Differences between Conventional and Six Sigma concept of quality; Six Sigma success stories. Statistical foundation and methods of quality improvement. Descriptive statistics: Data Type, Mean, Median, Mode, Range, Variation, Standard Deviation, Skewness, Kurtosis. Probability Distribution: Normal, Binomial, Poisson Distribution

### **Module 2: Basics of Six Sigma:**

Concept of Six Sigma, Defects, DPMO, DPU, Attacks on X'S, Customer focus, Six Sigma for manufacturing, Six Sigma for service. Z score, Understanding Six Sigma organization, Leadership council, Project sponsors and champions, Master Black Belt, Black Belt, Green Belts.

### **Module 3: Methodology of Six Sigma,**

DMAIC, DFSS, Models of implementation of Six Sigma, Selection of Six Sigma Projects.

### **Module 4: Six Sigma tools:**

Project Charter, Process Mapping, Measurement system analysis, Hypothesis testing, Quality function deployment, Failure mode analysis, Design of experiments.

### **Module 5: Sustenance of Six Sigma,**

Communication plan, Company culture, Reinforcement and control, Introduction to software for Six Sigma, Understanding Minitab, Graphical analysis of Minitab plots.

## **7. List of Experiment: Nil**

## **8. Course Outcome:**

After completing the course, student will be able to appreciate the importance of quality in manufacturing. They will be able to use tools to quantify quality in product. Appreciate place of six sigma in quality and learn the methodology, tools and sustenance of six sigma.

## **9. References Books:**

1. Six Sigma: SPC and TQM in manufacturing and service, Geoff Tennant, Grover Publishing Co.
2. Six Sigma for managers, Greg Brue, TMH
3. What is Six Sigma, Pete Pande, TMH
4. The Six Sigma Way, Pete S.Pande, TMH

## **10. Evaluation System:**

S. No.	Course	Marks
1 <sup>st</sup> Pre-final	Unit-1,2	15
2 <sup>nd</sup> Pre-final	Unit-3,4	15
Assignment		20
Final Examination	Unit-1 to 5	50
Total		100



## **PROPOSAL FOR A NEW COURSE**

1	College	Technology
2	Department	Industrial and Production Engineering
3	Title of the Course & Course No.	Simulation and Modelling TIP484
4	Catalogue Description	Attached
5	To be offered	B.Tech, Industrial and Production Engineering
6	Credits	3(3-0-0)
7	Is this a new Course	Yes
8	Curricular purpose of the course	To give theoretical knowledge in the field of Industrial and Production Engineering to the students.
9	General educational purpose	A. General Education      Yes B. department specialization      Yes C. Students Research      No D. Out growth of instructors Research Programme No
10	Relation to other courses	A. Pre-requisite      No B. An introductory survey of knowledge represented by the department      No C. An introductory survey of a special area of knowledge No D. A further development of course      No E. An introductory survey of a special area of knowledge represented by some other department No F. a summarizing or integrated course      No G. in your judgment does this course overlap to a considerable extent with any other course. No
11	What are the urgent reasons why this course be offered at this present time	Due to proposed syllabus to be mandatory implemented
12	The course will not replace my existing courses	New Course
13	The courses will not require additional staff over and above	Professional elective Course
14	What is the exact place of this courses in the development of the educational programme of your department	Professional elective Course of B. Tech Industrial and Production Engineering Department
15	Topical outline : Lecture	Attached
16	Practcial:	No
17	Text Book and Supplementary readings	Attached
18	Classroom, Laboratory and other facilities:	Required facilities exist
19	Would the introduction of this courses required additional staff:	No
20	Sequence of action	Proposed by AICTE for implementation
21	Approved by	Course curriculum committee and BOFT

**1. Name of the course : Simulation and Modelling**

**2. Course No. : TIP- 484**

**3. Credits Hours** : **3 (3-0-0)**

**4. Pre-requisite** : **Nil**

## **5. Course objective:**

The primary objective of the Six Sigma methodology is

1. Principles of the systems simulation and modeling.
2. Monte Carlo Simulation.
3. Discrete Event Simulation.
4. Continuous system simulation.
5. Basics of the mathematical modeling.
6. Key concepts of the queuing theory.
7. Practical application of the systems simulation and modeling through the use of the simulation tools.

## **6. Topical Outline**

### **Module-1:**

Black box and distributed parameter models, transient response. Model testing; stochastic vs. deterministic models; Inverse problems; Experimental techniques

### **Module-2:**

Geometrical modeling and configuration design, Principles of simulation, Discrete event simulation & Applications, Continuous and discrete probability distributions, Application of Monte Carlo methods for production

### **Module-3:**

Need for system modeling, systems approach to modeling, open and feedback system, combination of simple feedback systems, feedback time lag effect, feedback and managerial systems

### **Module-4:**

Principle of analytical methods, measures of effectiveness, Cost analysis, Monte Carlo simulation

### **Module-5:**

Generation of stochastic variety suction systems, Computer simulation models, Marco dynamic model

## **7. List of Experiment: Nil**

## **8. Course Outcome:**

After completing the course, student will be able to learn the importance and appreciate the importance of simulation and modeling. They will be able learn the tools for simulation and modeling using Monte Carlo Simulation, Discrete Event Simulation, Continuous system simulation of real time and practical events.

## **9. References Books**

1. Creating Computer Simulation Systems: An Introduction to the High Level Architecture, by Dr. Frederick Kuhl
2. Modelling and Simulation: Exploring Dynamic System Behaviour, by Louis G. Birta
3. Simulations of Machines Using MATLAB and SIMULINK (Bookware Companion Series), by John F. Gardner
4. Handbook of Simulation: Principles, Methodology, Advances, Applications, and Practice, by Jerry Banks
5. Simulation Modeling and Analysis with Expertfit Software, by Averi

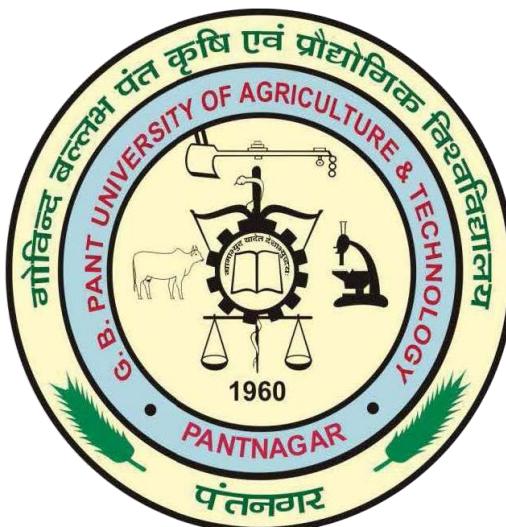
## **10. Evaluation System:**

S. No.	Course	Marks
1 <sup>st</sup> Pre-final	Unit-1,2	15
2 <sup>nd</sup> Pre-final	Unit-3,4	15
Assignment		20
Final Examination	Unit-1 to 5	50
Total		100





**Proposal for Graduation  
Requirement  
Bachelor of Technology  
In  
Information Technology  
Batch 2018-19  
(As per AICTE Model Curriculum 2018)**



*Department of Information  
Technology  
College of Technology  
G.B. Pant University of Agriculture  
of Technology Pantnagar-263145  
(Uttarakhand)*

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**GRADUATION REQUIREMENT FOR B.TECH.(INFORMATION TECHNOLOGY),**

**(BATCH –2018 ONWARDS)**

Sl. No.	Course Code	Course Title	Hours per week			Credits	Pre- requisite	Remarks
			L	T	P			
58.	BPC-102	CHEMISTRY-I	3	1	2	5	NIL	New
59.	BPM-143	CALCULUS AND LINEAR ALGEBRA	3	1	0	4	NIL	New
60.	TEE-104	BASIC ELECTRICAL ENGINEERING	3	1	2	5	NIL	New
61.	TID/ TSW/ TCE/ TME- 109	INTRODUCTION TO ENVIRONMENTAL ENGINEERING AND DISASTER MANAGEMENT	3	0	0	3	NIL	Existing
62.	TIT-121	PROGRAMMING FOR PROBLEM SOLVING	3	0	2	4	NIL	New
63.	TWP-101	WORK PROGRAMME	0	0	2	1	NIL	Existing
64.	TIC-100	INDUCTION PROGRAMME (2 WEEKS)	-	-	-	0	NIL	New
65.	BPP-151	PHYSICS WAVES AND OPTICS AND INTRODUCTION TO QUANTUM MECHANICS	3	1	2	5	NIL	New
66.	BPM-154	MULTIVARIABLE CALCULUS, TRANSFORMS & ORDINARY DIFFERENTIAL EQUATIONS	3	1	0	4	NIL	New
67.	TCE-114	ENGINEERING GRAPHICS & DESIGN	1	0	4	3	NIL	New
68.	TIP-103	WORKSHOP PRACTICES	1	0	4	3	NIL	New

<b>69.</b>	BHS-186	ENGLISH	2	0	2	3	NIL	New
<b>70.</b>	BHS-188	INDUSTRIAL SOCIOLOGY	3	0	0	3	NIL	Existing
<b>71.</b>	TIT-191	PRACTICAL TRAINING-I (2 WEEKS)	-	-	-	-	NIL	New
<b>72.</b>	TIT-233	DATA STRUCTURES	3	0	2	4	NIL	New
<b>73.</b>	TEC-302	DIGITAL ELECTRONICS	3	0	2	4	NIL	New
<b>74.</b>	BPS-228	PROBABILITY AND STATISTICS	3	1	0	4	NIL	New
<b>75.</b>	BHS-286	EFFECTIVE TECHNICAL COMMUNICATION	3	0	0	3	NIL	New
<b>76.</b>	NSS101	NATIONAL SERVICE SCHEME	0	0	2	1	NIL	Existing
<b>77.</b>	TIT-234	FOUNDATIONS OF INFORMATION TECHNOLOGY	2	0	2	3	NIL	New
<b>78.</b>	TIT-235	FORMAL LANGUAGE & AUTOMATA THEORY	3	0	0	3	NIL	New
<b>79.</b>	TIT-241	DISCRETE MATHEMATICS	3	0	0	3	NIL	New
<b>80.</b>	TIT-242	COMPUTER ORGANIZATION	3	0	2	4	NIL	New
<b>81.</b>	TIT-243	OPERATING SYSTEMS	3	0	2	4	NIL	New
<b>82.</b>	NSS102	NATIONAL SERVICE SCHEME	0	0	0	0	NIL	Existing
<b>83.</b>	TEC-301	ANALOG ELECTRONIC CIRCUITS	3	0	2	4	NIL	New
<b>84.</b>	TIT-244	OBJECT ORIENTED PROGRAMMING	2	0	4	4	NIL	New
<b>85.</b>	TIT-291	PRACTICAL TRAINING-II (2 weeks)				0	NIL	New
<b>86.</b>	TIT-351	DATABASE MANAGEMENT SYSTEMS	3	0	2	4	NIL	New
<b>87.</b>	TIT-352	JAVA PROGRAMMING	2	0	4	4	NIL	New
<b>88.</b>	TIT-*	ELECTIVE-I	3	0	0	3	NIL	New

<b>89.</b>	BHS-100	CONSTITUTION OF INDIA	1	0	0	1	NIL	New
<b>90.</b>	TIT-353	DESIGN & ANALYSIS OF ALGORITHMS	3	0	2	4	NIL	New
<b>91.</b>	TIT-362	E-COMMERCE	2	0	2	3	NIL	New
<b>92.</b>	NSS201	NATIONAL SERVICE SCHEME	0	0	2	1	NIL	Existing
<b>93.</b>	TIT-*	ELECTIVE-II	3	0	0	3	NIL	New
<b>94.</b>	TIT-*	ELECTIVE-III	3	0	0	3	NIL	New
<b>95.</b>	*****	OPEN ELECTIVE-I	-	-	-	3	NIL	New
<b>96.</b>	NSS-202	NATIONAL SERVICE SCHEME	0	0	0	0	NIL	Existing
<b>97.</b>	TIT-363	MODERN TRENDS IN INFORMATION TECHNOLOGY	2	0	2	3	NIL	New
<b>98.</b>	TIT-365	WEB AND INTERNET TECHNOLOGY	3	0	2	4	NIL	New
<b>99.</b>	TIT-364	COMPUTER NETWORKS	3	0	2	4	NIL	New
<b>100.</b>	TIT-391	PRACTICAL TRAINING-III (4 WEEKS)				0	NIL	New
<b>101.</b>	TIT-483	COMPUTER SYSTEM SECURITY	2	0	2	3	NIL	New
<b>102.</b>	TIT-*	ELECTIVE-IV	3	0	0	3	NIL	New
<b>103.</b>	TIT-*	ELECTIVE-V	3	0	0	3	NIL	New
<b>104.</b>	TIT-484	IT WORKSHOP	1	0	2	2	NIL	New
<b>105.</b>	*****	OPEN ELECTIVE-II	-	-	-	3	NIL	New
<b>106.</b>	TIT-495A	PROJECT-I	0	0	8	4	NIL	New
<b>107.</b>	TIT-492	SEMINAR	0	0	2	1	NIL	Existing
<b>108.</b>	TIT-486	OPEN SOURCE SYSTEMS	2	0	2	3	NIL	New
<b>109.</b>	TIT-*	ELECTIVE-VI	3	0	0	3	NIL	New
<b>110.</b>	*****	OPEN ELECTIVE-III	-	-	-	3	NIL	New
<b>111.</b>	*****	OPEN ELECTIVE-IV	-	-	-	3	NIL	New
<b>112.</b>	TIT-495B	PROJECT-II	0	0	16	8	NIL	New
<b>TOTAL CREDITS</b>						<b>163</b>		

**Note:**

1. Those students who have not taken Hindi at the High School or equivalent level will also require to register the course BHS-105, Elementary Hindi – 2 Credits.
2. An Induction Programme of Two week is to be offered to the students at the start of first year.
3. The Students can take open elective from any department of the University.

**LIST OF ELECTIVE COURSES**

S. No.	Course No	Course Name	Credit (L-T-P)	Pre-requisite	Remarks
1.	TIT-301	COMPUTER ARCHITECTURE	3(3-0-0)	NIL	New
2.	TIT-302	IT MARKETING	3(3-0-0)	NIL	New
3.	TIT-303	THEORY OF COMPUTATION	3(3-0-0)	NIL	New
4.	TIT-304	SOFTWARE ENGINEERING	3(3-0-0)	NIL	New
5.	TIT-305	KNOWLEDGE MANAGEMENT	3(3-0-0)	NIL	New
6.	TIT-307	INTERNET OF THINGS	3(3-0-0)	NIL	New
7.	TIT-308	ARTIFICIAL INTELLIGENCE	3(3-0-0)	NIL	New
8.	TIT-309	DATA ANALYTICS	3(3-0-0)	NIL	New
9.	TIT-310	MULTIMEDIA TECHNOLOGY	3(3-0-0)	NIL	New
10.	TIT-311	COMPILER DESIGN	3(3-0-0)	NIL	New
11.	TIT-401	EMBEDDED SYSTEMS	3(3-0-0)	NIL	New
12.	TIT-402	MOBILE COMPUTING	3(3-0-0)	NIL	New
13.	TIT-403	CLOUD COMPUTING	3(3-0-0)	NIL	New
14.	TIT-404	COMPUTER GRAPHICS AND ANIMATION	3(3-0-0)	NIL	New
15.	TIT-405	DISTRIBUTED COMPUTING	3(3-0-0)	NIL	New
16.	TIT-406	IMAGE PROCESSING	3(3-0-0)	NIL	New
17.	TIT-407	DATA MINING & WARE HOUSING	3(3-0-0)	NIL	New
18.	TIT-408	DECISION SUPPORT SYSTEMS	3(3-0-0)	NIL	New
19.	TIT-409	AD-HOC & SENSOR NETWORKS	3(3-0-0)	NIL	New

20.	TIT-410	MACHINE LEARNING	3(3-0-0)	NIL	New
21.	TIT-366	INTELLECTUAL PROPERTY RIGHTS	3(3-0-0)	NIL	New
22.	TIT-411	MANAGEMENT INFORMATION SYSTEMS	3(3-0-0)	NIL	New
23.	TIT-412	SIMULATION & MODELING	3(3-0-0)	NIL	New

**GRADUATION REQUIREMENTS FOR**

**B. TECH. IN INFORMATION TECHNOLOGY (REGULAR)**

**SEMESTER-WISE DISTRIBUTION OF COURSES**

**SEMESTER I (FIRST YEAR I-SEMESTER)**

Sl. No.	Course Code	Course Title	Hours per week			C
			L	T	P	
1	BPC-102	Chemistry-I	3	1	2	5
2	BPM-143	Calculus and Linear Algebra	3	1	0	4
3	TEE-104	Basic Electrical Engineering	3	1	2	5
4	TID/ TSW/ TCE/ TMF-109	Introduction to Environmental Engineering and Disaster Management	3	0	0	3
5	TIT-121	Programming for Problem Solving	3	0	2	4
6	TWP-101	Work Programme	0	0	2	1
7	TIC-100	Induction Programme (2 Weeks)	-	-	-	-
<b>Total Credits</b>						<b>22</b>

**SEMESTER II (FIRST YEAR II-SEMESTER)**

1	BPP-151	Physics Waves and Optics and Introduction to Quantum Mechanics	3	1	2	5
2	BPM-154	Multivariable Calculus, Transforms & Ordinary differential equations	3	1	0	4
3	TCE-114	Engineering Graphics & Design	1	0	4	3
4	TIP-103	Workshop Practices	1	0	4	3
5	BHS-186	English	2	0	2	3
6	BHS-188	Industrial Sociology	3	0	0	3
7	TIT-191	Practical Training-I (2 weeks)	-	-	-	-
<b>Total Credits</b>						<b>21</b>

**SEMESTER III (SECOND YEAR I-SEMESTER)**

Sl. No.	Code	Course Title	Hours per week			Credits
			L	T	P	
1.	TIT-233	Data structures	3	0	2	4
2.	TEC-302	Digital Electronics	3	0	2	4

3.	BPS-228	Probability and Statistics	3	1	0	4
4.	BHS-286	Effective Technical Communication	3	0	0	3
5.	NSS101	National Service Scheme	0	0	2	1
6.	TIT-234	Foundations of Information Technology	2	0	2	3
7.	TIT-235	Formal Language & Automata Theory	3	0	0	3
<b>TOTAL CREDITS</b>						<b>22</b>

#### **SEMESTER IV (SECOND YEAR II-SEMESTER)**

Sl. No.	Code	Course Title	Hours per week			Credits
			Lecture	Tutorial	Practical	
1.	TIT-241	Discrete Mathematics	3	0	0	3
2.	TIT-242	Computer Organization	3	0	2	4
3.	TIT-243	Operating Systems	3	0	2	4
4.	NSS102	National Service Scheme	0	0	0	0
5.	TEC-301	Analog Electronic Circuits	3	0	2	4
6.	TIT-244	Object Oriented Programming	2	0	4	4
7.	TIT-291	Practical Training-II	(2 Weeks)			0
<b>TOTAL CREDITS</b>						<b>19</b>

#### **SEMESTER V (THIRD YEAR I-SEMESTER)**

Sl. No.	Code	Course Title	Hours per week			Credits
			L	T	P	
1.	TIT-351	Database Management Systems	3	0	2	4
2.	TIT-352	Java Programming	2	0	4	4
3.	TIT-*	Elective-I	3	0	0	3
4.	BHS-100	Constitution of India	1	0	0	1
5.	TIT-353	Design & Analysis of Algorithms	3	0	2	4
6.	TIT-362	E- Commerce	2	0	2	3
7.	NSS201	National Service Scheme	0	0	2	1
<b>TOTAL CREDITS</b>						<b>20</b>

#### **SEMESTER VI (THIRD YEAR II-SEMESTER)**

Sl.	Code	Course Title	Hours per week			Credits
			Lecture	Tutorial	Practical	
1.	TIT-*	Elective-II	3	0	0	3
2.	TIT-*	Elective-III	3	0	0	3

3.	*****	Open Elective-I	-	-	-	3
4.	NSS202	National Service Scheme	0	0	0	0
5.	TIT-363	Modern Trends in Information Technology	2	0	2	3
6.	TIT-365	Web and Internet Technology	3	0	2	4
7.	TIT-364	Computer Networks	3	0	2	4
8.	TIT-391	Practical Training-III	(4 Weeks)			0
<b>TOTAL CREDITS</b>						<b>20</b>

**SEMESTER VII (FOURTH YEAR I-SEMESTER)**

Sl.	Code	Course Title	Hours per week			Credits
			L	T	P	
1.	TIT-483	Computer System Security	2	0	2	3
2.	TIT-*	Elective-IV	3	0	0	3
3.	TIT-*	Elective-V	3	0	0	3
4.	TIT-484	IT Workshop	1	0	2	2
5.	*****	Open Elective-II	-	-	-	3
6.	TIT-495A	Project-I	0	0	8	4
7.	TIT-492	Seminar	0	0	2	1
<b>TOTAL CREDITS</b>						<b>19</b>

**SEMESTER VIII (FOURTH YEAR II-SEMESTER)**

Sl.	Code	Course Title	Hours per week			Credits
			Lecture	Tutorial	Practical	
1.	TIT-486	Open Source Systems	2	0	2	3
2.	TIT-*	Elective-VI	3	0	0	3
3.	*****	Open Elective-III	-	-	-	3
4.	*****	Open Elective-IV	-	-	-	3
5.	TIT-495B	Project-II	0	0	16	8
<b>TOTAL CREDITS</b>						<b>20</b>

**TIT-\***: Elective Course- Course to be selected from the list of Elective Courses.

**\*\*\*\*\***: Open Elective Course- The Students can take open elective from any department of the University.

**Total Credit Hours: 163**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**GRADUATION REQUIREMENT FOR B.TECH.(INFORMATION TECHNOLOGY),**

**(DIPLOMA BATCH –2019 ONWARDS)**

Sl. No.	Course Code	Course Title	Hours per week			Credits	Pre- requisite	Remarks
			L	T	P			
1.	TWP-101	WORK PROGRAMME	0	0	2	1	NIL	Existing
2.	TIT-233	DATA STRUCTURES	3	0	2	4	NIL	New
3.	TEC-302	DIGITAL ELECTRONICS	3	0	2	4	NIL	New
4.	BPS-228	PROBABILITY AND STATISTICS	3	1	0	4	NIL	New
5.	BHS-286	EFFECTIVE TECHNICAL COMMUNICATION	3	0	0	3	NIL	New
6.	NSS101	NATIONAL SERVICE SCHEME	0	0	2	1	NIL	Existing
7.	TIT-234	FOUNDATIONS OF INFORMATION TECHNOLOGY	2	0	2	3	NIL	New
8.	TIT-235	FORMAL LANGUAGE & AUTOMATA THEORY	3	0	0	3	NIL	New
9.	TIT-241	DISCRETE MATHEMATICS	3	0	0	3	NIL	New
10.	TIT-242	COMPUTER ORGANIZATION	3	0	2	4	NIL	New
11.	TIT-243	OPERATING SYSTEMS	3	0	2	4	NIL	New
12.	NSS102	NATIONAL SERVICE SCHEME	0	0	0	0	NIL	Existing
13.	TEC-301	ANALOG ELECTRONIC CIRCUITS	3	0	2	4	NIL	New

<b>14.</b>	TIT-244	OBJECT ORIENTED PROGRAMMING	2	0	4	4	NIL	New
<b>15.</b>	TIT-291	PRACTICAL TRAINING-II (2 weeks)			0		NIL	New
<b>16.</b>	TIT-351	DATABASE MANAGEMENT SYSTEMS	3	0	2	4	NIL	New
<b>17.</b>	TIT-352	JAVA PROGRAMMING	2	0	4	4	NIL	New
<b>18.</b>	TIT-*	ELECTIVE-I	3	0	0	3	NIL	New
<b>19.</b>	BHS-100	CONSTITUTION OF INDIA	1	0	0	1	NIL	New
<b>20.</b>	TIT-353	DESIGN & ANALYSIS OF ALGORITHMS	3	0	2	4	NIL	New
<b>21.</b>	TIT-362	E-COMMERCE	2	0	2	3	NIL	New
<b>22.</b>	NSS201	NATIONAL SERVICE SCHEME	0	0	2	1	NIL	Existing
<b>23.</b>	TIT-*	ELECTIVE-II	3	0	0	3	NIL	New
<b>24.</b>	TIT-*	ELECTIVE-III	3	0	0	3	NIL	New
<b>25.</b>	*****	OPEN ELECTIVE-I	-	-	-	3	NIL	New
<b>26.</b>	NSS-202	NATIONAL SERVICE SCHEME	0	0	0	0	NIL	Existing
<b>27.</b>	TIT-363	MODERN TRENDS IN INFORMATION TECHNOLOGY	2	0	2	3	NIL	New
<b>28.</b>	TIT-365	WEB AND INTERNET TECHNOLOGY	3	0	2	4	NIL	New
<b>29.</b>	TIT-364	COMPUTER NETWORKS	3	0	2	4	NIL	New
<b>30.</b>	TIT-391	PRACTICAL TRAINING-III (4 WEEKS)			0		NIL	New
<b>31.</b>	TIT-483	COMPUTER SYSTEM SECURITY	2	0	2	3	NIL	New
<b>32.</b>	TIT-*	ELECTIVE-IV	3	0	0	3	NIL	New
<b>33.</b>	TIT-*	ELECTIVE-V	3	0	0	3	NIL	New
<b>34.</b>	TIT-484	IT WORKSHOP	1	0	2	2	NIL	New
<b>35.</b>	*****	OPEN ELECTIVE-II	-	-	-	3	NIL	New

<b>36.</b>	TIT-495A	PROJECT-I	0	0	8	4	NIL	New
<b>37.</b>	TIT-492	SEMINAR	0	0	2	1	NIL	Existing
<b>38.</b>	TIT-486	OPEN SOURCE SYSTEMS	2	0	2	3	NIL	New
<b>39.</b>	TIT-*	ELECTIVE-VI	3	0	0	3	NIL	New
<b>40.</b>	*****	OPEN ELECTIVE-III	-	-	-	3	NIL	New
<b>41.</b>	*****	OPEN ELECTIVE-IV	-	-	-	3	NIL	New
<b>42.</b>	TIT-495B	PROJECT-II	0	0	16	8	NIL	New
<b>TOTAL CREDITS</b>						<b>121</b>		

**LIST OF ELECTIVE COURSES**

S. No.	Course No	Course Name	Credit (L-T-P)	Pre-requisite	Remarks
1.	TIT-301	COMPUTER ARCHITECTURE	3(3-0-0)	NIL	New
2.	TIT-302	IT MARKETING	3(3-0-0)	NIL	New
3.	TIT-303	THEORY OF COMPUTATION	3(3-0-0)	NIL	New
4.	TIT-304	SOFTWARE ENGINEERING	3(3-0-0)	NIL	New
5.	TIT-305	KNOWLEDGE MANAGEMENT	3(3-0-0)	NIL	New
6.	TIT-307	INTERNET OF THINGS	3(3-0-0)	NIL	New
7.	TIT-308	ARTIFICIAL INTELLIGENCE	3(3-0-0)	NIL	New
8.	TIT-309	DATA ANALYTICS	3(3-0-0)	NIL	New
9.	TIT-310	MULTIMEDIA TECHNOLOGY	3(3-0-0)	NIL	New
10.	TIT-311	COMPILER DESIGN	3(3-0-0)	NIL	New
11.	TIT-401	EMBEDDED SYSTEMS	3(3-0-0)	NIL	New
12.	TIT-402	MOBILE COMPUTING	3(3-0-0)	NIL	New
13.	TIT-403	CLOUD COMPUTING	3(3-0-0)	NIL	New
14.	TIT-404	COMPUTER GRAPHICS AND ANIMATION	3(3-0-0)	NIL	New
15.	TIT-405	DISTRIBUTED COMPUTING	3(3-0-0)	NIL	New
16.	TIT-406	IMAGE PROCESSING	3(3-0-0)	NIL	New
17.	TIT-407	DATA MINING & WARE HOUSING	3(3-0-0)	NIL	New
18.	TIT-408	DECISION SUPPORT SYSTEMS	3(3-0-0)	NIL	New
19.	TIT-409	AD-HOC & SENSOR NETWORKS	3(3-0-0)	NIL	New
20.	TIT-410	MACHINE LEARNING	3(3-0-0)	NIL	New
21.	TIT-366	INTELLECTUAL PROPERTY RIGHTS	3(3-0-0)	NIL	New
22.	TIT-411	MANAGEMENT INFORMATION SYSTEMS	3(3-0-0)	NIL	New
23.	TIT-412	SIMULATION & MODELING	3(3-0-0)	NIL	New

**Note:**

1. Those students who have not taken Hindi at the High School or equivalent level will also require to register the course BHS-105, Elementary Hindi – 2 Credits.
2. The Students can take open elective from any department of the University.

**I-SEMESTER, B.TECH (I.T.), II YEAR**

Sl. No.	Code	Course Title	Hours per week			Credits
			L	T	P	
1.	TIT-233	Data structures	3	0	2	4
2.	TEC-302	Digital Electronics	3	0	2	4
3.	BPS-228	Probability and Statistics	3	1	0	4
4.	BHS-286	Effective Technical Communication	3	0	0	3
5.	NSS101	National Service Scheme	0	0	2	1
6.	TIT-234	Foundations of Information Technology	2	0	2	3
7.	TIT-235	Formal Language & Automata Theory	3	0	0	3
8.	TWP-101	Work Programme	0	0	2	1
<b>TOTAL CREDITS</b>						<b>23</b>

**II-SEMESTER, B.TECH (I.T.), II YEAR**

Sl. No.	Code	Course Title	Hours per week			Credits
			Lecture	Tutorial	Practical	
1.	TIT-241	Discrete Mathematics	3	0	0	3
2.	TIT-242	Computer Organization	3	0	2	4
3.	TIT-243	Operating Systems	3	0	2	4
4.	NSS102	National Service Scheme	0	0	0	0
5.	TEC-301	Analog Electronic Circuits	3	0	2	4
6.	TIT-244	Object Oriented Programming	2	0	4	4
7.	TIT-291	Practical Training-II	(2 Weeks)			0
<b>TOTAL CREDITS</b>						<b>19</b>

**III-SEMESTER, B.TECH (I.T.), III YEAR**

Sl. No.	Code	Course Title	Hours per week			Credits
			L	T	P	
1.	TIT-351	Database Management Systems	3	0	2	4
2.	TIT-352	Java Programming	2	0	4	4
3.	TIT-*	Elective-I	3	0	0	3

4.	BHS-100	Constitution of India	1	0	0	1
5.	TIT-353	Design & Analysis of Algorithms	3	0	2	4
6.	TIT-362	E- Commerce	2	0	2	3
7.	NSS201	National Service Scheme	0	0	2	1
<b>TOTAL CREDITS</b>						<b>20</b>

#### IV-SEMESTER, B.TECH (I.T.), III YEAR

Sl.	Code	Course Title	Hours per week			Credits
			Lecture	Tutorial	Practical	
1.	TIT-*	Elective-II	3	0	0	3
2.	TIT-*	Elective-III	3	0	0	3
3.	*****	Open Elective-I	-	-	-	3
4.	NSS202	National Service Scheme	0	0	0	0
5.	TIT-363	Modern Trends in Information Technology	2	0	2	3
6.	TIT-365	Web and Internet Technology	3	0	2	4
7.	TIT-364	Computer Networks	3	0	2	4
8.	TIT-391	Practical Training-III	(4 Weeks)			0
<b>TOTAL CREDITS</b>						<b>20</b>

#### V-SEMESTER, B.TECH (I.T.), IV YEAR

Sl.	Code	Course Title	Hours per week			Credits
			L	T	P	
1.	TIT-483	Computer System Security	2	0	2	3
2.	TIT-*	Elective-IV	3	0	0	3
3.	TIT-*	Elective-V	3	0	0	3
4.	TIT-484	IT Workshop	1	0	2	2
5.	*****	Open Elective-II	-	-	-	3
6.	TIT-495A	Project-I	0	0	8	4
7.	TIT-492	Seminar	0	0	2	1
<b>TOTAL CREDITS</b>						<b>19</b>

#### VI-SEMESTER, B.TECH (I.T.), IV YEAR

Sl.	Code	Course Title	Hours per week			Credits
			Lecture	Tutorial	Practical	
1.	TIT-486	Open Source Systems	2	0	2	3

2.	TIT-*	Elective-VI	3	0	0	3
3.	*****	Open Elective-III	-	-	-	3
4.	*****	Open Elective-IV	-	-	-	3
5.	TIT-495B	Project-II	0	0	16	8
<b>TOTAL CREDITS</b>					<b>20</b>	

**DETAILED 4-YEAR CURRICULUM**

**CONTENTS UNDERGRADUATE DEGREE**

**IN ENGINEERING & TECHNOLOGY**

**BRANCH INFORMATION TECHNOLOGY**

## **PROFESSIONAL CORE COURSES**

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Programming for Problem Solving  TIT-121
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits :	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title** :Programming for Problem Solving

**2. Course No** : TIT-121

**3. Credit Hours :** 4(3-0-2)

**4. Prerequisite** : NIL

**5. Syllabus/Catalogue Description:**

S. No.	Lecture Topics	No. of Lectures
1.	<b>Unit 1:</b> Introduction to Programming,  Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.),  Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.  From algorithms to programs; source code, variables (with data types) variables and memory  locations, Syntax and Logical Errors in compilation, object and executable code	9
2.	<b>Unit 2(Part 1):</b> Arithmetic expressions and precedence.  <b>Unit 2(Part 2):</b> Conditional Branching and Loops  Writing and evaluation of conditionals and consequent branching  Iteration and loops	7
3.	<b>Unit 3:</b> Arrays  Arrays (1-D, 2-D), Character arrays and Strings	5
4.	<b>Unit 4:</b> Pointers  Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)	3
5.	<b>Unit 5:</b> Basic Algorithms Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of  equations, notion of order of complexity through example programs (no formal definition required)	5
6.	<b>Unit 6:</b> Function  Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference	5
7.	<b>Unit 7:</b> Recursion  Recursion, as a different way of solving problems. Example programs, such as Finding	5

	Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.	
8.	<b>Unit 8:</b> Structure  Structures, Defining structures and Array of Structures	5
9.	<b>Unit 9:</b> File handling	2
10.	Pre-final	2
		<b>Total</b> <b>48</b>

### PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Familiarization with programming environment, Simple computational problems using arithmetic expressions	3
2.	Iterative problems based on branching & loops	3
3.	1D & 2D array implementation	3
4.	Pointers, structures and dynamic memory allocation	3
5.	Implementation of Functions including recursive function	2
6.	Implementation of file handling operations	2
		<b>Total</b> <b>16</b>

### REFERENCE BOOKS

- (i) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- (ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
- (iii) Let us C by Yashwant Kanetkar.
- (iv) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

### Course outcomes

1. Illustrate the flowchart and design an algorithm for a given problem and to develop IC programs using operators
2. Develop conditional and iterative statements to write C programs
3. Exercise user defined functions to solve real time problems
4. Inscribe C programs that use Pointers to access arrays, strings and functions.
5. Exercise user defined data types including structures and unions to solve problems
6. Inscribe C programs using pointers and to allocate memory using dynamic memory management functions.
7. Exercise files concept to show input and output of files in C

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Data Structures  TIT-233
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. Govind Verma
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title** :Data Structures

**2. Course No** : TIT-233

**3. Credit Hours** :4(3-0-2)

**4. Prerequisite** : NIL

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	<b>Introduction:</b> Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. <b>Searching:</b> Linear Search and Binary Search Techniques and their complexity analysis.	9
2.	<b>Stacks and Queues:</b> ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.	11
3.	<b>Linked Lists:</b> Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis. <b>Trees:</b> Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees. <b>B Tree, B+ Tree:</b> definitions, algorithms and analysis.	11
4.	<b>Sorting and Hashing:</b> Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.	9
5.	<b>Graph:</b> Basic Terminologies and Representations, Graph search and traversal	6

	algorithms and complexity analysis.	
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

S. No.	Name of Practical	No. of Practicals
1.	Program to perform various operations on Singly Linked List ADT	1-2
2.	Program to perform various operations on Arrays	3-4
3.	Program to perform various Sorting algorithms	5-6
4.	Program to perform various operations on Trees	7-9
5.	Program to perform various operations on Graphs	10-13

#### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

#### REFERENCE BOOKS

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.
2. Algorithms, Data Structures, and Problem Solving with C++, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
3. "How to Solve it by Computer", 2nd Impression by R. G. Dromey, Pearson Education.

#### Course outcomes

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.

4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Foundations of Information Technology  TIT-234
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Foundations of Information Technology**

**2. Course No : TIT-234**

**3. Credit Hours : 3(2-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description**

**Course Details:**

S. No.	Lecture Topics	No. of Lectures
1.	<b>Information Concept &amp; Processing :</b> Definition of Information, Need for Information, Quality of Information, Value of Information, Categories and Levels of Information in Business Organization, Data concepts and Data Processing, data Representation-Number System.	5
2.	<b>Computer Appreciation:</b> Definition of an Electronic Digital Computer, History, Generations, Characteristics, and applications of computers, Classification of computers. Elements of Computers Processing System, Hardware CPU, Peripherals, Storage Media, Software Definition, Role and Categories, Firmware and Human-ware.	5
3.	<b>Computer &amp; Communication:</b> Need for Data Transmission Over Distances, Types of Data Transmission, Media for Data Transmission, Networking of Computers-Introduction of LAN & WAN, Client-Server Architecture.	4
4.	<b>Programming Language Classification:</b> Computer Languages, Generation of Languages, Translators-Interpreters, Compilers, Assembles, Introduction to 4GLS.	5
5.	<b>Internet Technologies:</b> Basic Internet Applications, Collaborations tools. Understanding websites, web servers and blogs. Internet technologies Overview, Understanding the difference between internet and intranet. HTML and CSS. Information Security Basics, Various Cyber-Attacks: Denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks, Phishing and spear phishing attacks, Drive-by attack, Password attack, SQL injection attack, Cross-site scripting (XSS) attack, Eavesdropping attack. VIRUS, Worms and Trojans.	11
6.	Pre-final	2
	<b>Total</b>	<b>32</b>

**DISTRIBUTION OF MARKS**

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

S. No.	Name of Practical	No. of Practicals
1.	Office Tools	1-4
2.	Internet Searching Tools And Techniques	5-6
3.	File Management & Windows Explorer Skills	7-9
4.	O.S. Installation of Various Types	10-13
5.	Educational Copyright, Computer Security	14-16

#### **REFERENCE BOOKS**

1. Foundation of Information Technology by D.S. Yadav, New Age International (P) Limited.
2. Rajaraman, V., "Introduction to Computer".
3. Morris, "Computer Organization".
4. Hamacher, "Computer Organization".
5. Kanter, "Managing Information System".

#### **Course outcomes**

On successful completion of the course students will be able to:

1. Understand the nature of the IT industry.
2. Recognize the context and constraints of any information system.
3. Recognize ethical issues associated with the use of IT.
4. Model and analyze the ways that organizations or other systems work.
5. Build appropriate models for the operation of an information system.
6. Build an application which uses web and database technologies to provide a solution to a realistic problem.
7. Work and communicate as an effective member of a well managed team.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Formal Language & Automata Theory TIT-235
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title** : **Formal Language & Automata Theory**

**2. Course No** : **TIT-235**

**3. Credit Hours** : **3(3-0-0)**

**4. Prerequisite:** **NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course**

1. Develop a formal notation for strings, languages and machines.
2. Design finite automata to accept a set of strings of a language.
3. Prove that a given language is regular and apply the closure properties of languages.
4. Design context free grammars to generate strings from a context free language and convert them into normal forms.
5. Prove equivalence of languages accepted by Push Down Automata and languages generated by context free grammars
6. Identify the hierarchy of formal languages, grammars and machines.
7. Distinguish between computability and non-computability and Decidability and undecidability.

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Alphabet, languages and grammars , productions and derivation, Chomsky hierarchy of languages. Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA.	8
2.	Regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata. Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL),	12
3.	Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs. Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG. Turing machines:	13
4.	The basic model for Turing machines (TM), Turing- recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.	6
5.	Undecidability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice's theorem, undecidable problems about languages.	7

6.	Prefinals		2
		Total	48

#### DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

#### Suggested books

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.

#### Suggested reference books:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
3. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
4. John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.

#### Course Outcomes:

1. Write a formal notation for strings, languages and machines.
2. Design finite automata to accept a set of strings of a language.
3. For a given language determine whether the given language is regular or not.
4. Design context free grammars to generate strings of context free language.
5. Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars
6. Write the hierarchy of formal languages, grammars and machines.
7. Distinguish between computability and non-computability and Decidability and undecidability.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Discrete Mathematics  TIT-241
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Discrete Mathematics**

**2. Course No : TIT-241**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. This course provides students the opportunity to learn Discrete Mathematical Structures.
2. Familiarize the student with Set theory (Proposition and logical operators. Truth table, tautologies and Implication, laws of logic, Mathematical Induction, Quantifiers) Algebraic Structures.
3. Introduce students graph theory, finite field.
4. Upon successful completion of this course, students will be able to cover Set theory, Algebraic Structures, Groups, and finite fields

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	Set theory (Proposition and logical operators. Truth table, tautologies and Implication , laws of logic, Mathematical Induction, Quantifiers )	10
2.	Algebraic Structures, Groups: Monoids and groups, Subgroups, Groups, Homomorphism and Isomorphism. Groups Codes.	10
3.	Graph Theory: Introduction, Connectivity, Traversals and coloring Lattices: Lattices and semi lattices, sublattices, modular, geometrical, Boolean lattices	10
4.	Finite Fields, (Integral domain and fields Extension of fields, Existence theorem, finite fields), Boolean algebra, Atoms of a Boolean algebra as n – Tuple of 0's and 1's Boolean Expression and Boolean function	10
5.	Boolean Sub algebra, Application Boolean Algebra to switching theory (NAND) gates and NOR gates.)	6
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

**DISTRIBUTION OF MARKS**

I Pre-final Examination 20% II Pre-final Examination 20%

Assignment 10% Final Examination 50%

**REFERENCE BOOKS:**

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications, 4th edition, Wadsworth Publishing Co. Inc.

3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.
4. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG Edition, TataMcgraw-Hill
5. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press.
- Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,
6. Discrete Mathematics, Tata McGraw - Hill
7. Swapan Kumar Sarkar, "A Text Book of Discrete Mathematics", S.Chand Publication.
8. C L Liu,"Elements of Discrete Mathematics", McGraw-Hill Publication.

**Course Outcomes:**

1. For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives.
2. For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference.
3. For a given a mathematical problem, classify its algebraic structure.
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
5. Develop the given problem as graph networks and solve with techniques of graph theory.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Computer Organization  TIT-242
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes

8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	<p>a. General education: Yes</p> <p>b. Department specialization: Yes</p> <p>c. Student research: No</p> <p>d. Outgrowth of instructors research programme: No</p>
10.	Relation to other courses :	<p>a. Pre-requisite: NIL</p> <p>b. An Introductory survey of knowledge represented by the department: No</p> <p>c. An Introductory survey of special area of knowledge: No</p> <p>d. A further development of courses: No</p> <p>e. An Introductory survey of special area of knowledge represented by some other department: No</p> <p>f. A summarizing or integrated course: No</p> <p>g. In your judgment does this course overlap to a considerable extent with any other course: No</p>
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.

19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Computer Organization**

**2. Course No : TIT-242**

**3. Credit Hours : 4(3-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. To expose the students to the following: How Computer Systems work & the basic principles.
2. Instruction Level Architecture and Instruction Execution, the current state of art in memory system design, how I/O devices are accessed and its principles.
3. To provide the knowledge on Instruction Level Parallelism, to impart the knowledge on micro programming, concepts of advanced pipelining techniques.

**THEORY:**

S. No.	Lecture Topics	No. of Lectures
1.	<b>Functional blocks of a computer:</b> CPU, memory, input-output subsystems, control unit.  Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.  <b>Data representation:</b> signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.	12
2.	<b>Introduction</b> to x86 architecture.  <b>CPU control unit design:</b> hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU.  <b>Memory system design:</b> semiconductor memory technologies, memory organization.  <b>Peripheral devices and their characteristics:</b> Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB	13

3.	<b>Pipelining:</b> Basic concepts of pipelining, throughput and speedup, pipeline hazards.  <b>Parallel Processors:</b> Introduction to parallel processors, Concurrent access to memory and cache coherency.	10
4.	Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.	11
5.	Pre-final	2
	<b>Total</b>	<b>48</b>

S. No.	Name of Practical	No. of Practicals
1.	Logic gates and flip flops	1-2
2.	Ripple Carry adder	3-4
3.	4-bit shift register	5-6
4.	Multiplier circuit	7-9
5.	Chip select generator circuit	10-13
6.	Memory read and write operations	14-15
7.	Assembly programs on arithmetic operations	16-17

#### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

#### REFERENCE BOOKS:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.
3. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGrawHill

4. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
5. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

### **Course outcomes**

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Operating Systems TIT-243
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. Govind Verma
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Operating Systems**

**2. Course No : TIT-243**

**3. Credit Hours : 4(3-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course**

Students will demonstrate:

1. Knowledge of process control, threads, concurrency,
2. Memory management scheduling, I/O and files, distributed systems, security,
3. Networking. Student teams will implement a significant portion of an operating system.

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	<b>Introduction:</b>  Basics of Operating Systems: Definition – Generations of Operating systems – Types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine	5
2.	<b>Process Management:</b>  Processes: Definition , Process Relationship , Process states , Process State transitions , Process Control Block ,Context switching – Threads – Concept of multithreads , Benefits of threads – Types of threads  Process Scheduling: Definition , Scheduling objectives ,Types of Schedulers ,Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) , Scheduling algorithms : Pre emptive and Non , pre emptive , FCFS – SJF – RR , Multiprocessor scheduling : Types , Performance evaluation of the scheduling.	10
3.	<b>Inter process Communication:</b>  Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, and Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc., Scheduling, Scheduling Algorithms.	8
4.	<b>Deadlocks:</b>  Definition, Deadlock characteristics , Deadlock Prevention , Deadlock Avoidance :banker's algorithm, Deadlock detection and Recovery.	6

5.	<b>Memory Management:</b>  Basic Memory Management: Definition, Logical and Physical address map, Memory allocation : Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction , Paging : Principle of operation – Page allocation – Hardware support for paging –,Protection and sharing – Disadvantages of paging.  Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging ( Concepts only) – Page Replacement policies : Optimal (OPT) , First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU)	10
6.	<b>I/O Management:</b>  Principles of I/O Hardware: I/O devices, Device controllers , Direct memory access Principles of I/O Software: Goals of Interrupt handlers , Device drivers , Device independent I/O software , Secondary-Storage Structure: Disk structure ,Disk scheduling algorithm. File Management: File concept, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table),efficiency & performance.	7
7.	<b>Pre-final</b>	2
	<b>Total</b>	<b>48</b>

## PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Introduction(Working with Linux - Shell Scripting)	1-2
2.	System Calls	3-4
3.	Process Management	5-6
4.	Scheduling Algorithms	7-9
5.	Multi Threading Using pthread library	10-13
6.	Inter Process Communication : Shared Memory and Pipe	14-15
7.	Process/Thread Synchronization Memory Management	15-17

## DISTRIBUTION OF MARKS

I Pre-final Examination

15%

II Pre-final Examination

15%

Practical

20% Final Examination

50%

**REFERENCE BOOKS:**

1. Operating System Concepts Essentials, 9th Edition by Avi Silberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.
3. Andrew Tanenbaum, Modern Operating Systems, Prentice Hall.
4. William Stallings, Operating Systems, Prentice Hall.
5. Harvey M. Deitel, An introduction to operating systems. Addison-Wesley.
6. Andrew Tanenbaum & Albert Woodhull, Operating Systems: Design and Implementation. Prentice-Hall.
7. Douglas Comer, Operating System Design - The XINU Approach. Prentice-Hall.
8. A.M. Lister, Fundamentals of Operating Systems. Macmillan (1979).

**Course Outcomes**

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU Utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.
5. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Object Oriented Programming TIT-244
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(2-0-4)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite : NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. Govind Verma
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Object Oriented Programming**

**2. Course No : TIT-244**

**3. Credit Hours : 4(2-0-4)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course**

Students who successfully pass this course will be able to:

1. Justify the philosophy of object-oriented design and the concepts of encapsulation, abstraction, inheritance, and polymorphism
2. Design, implement, test, and debug simple programs in an object-oriented programming language
3. Describe how the class mechanism supports encapsulation and information hiding
4. Design, implement, and test the implementation of “is-a” relationships among objects using a class hierarchy and inheritance
5. Compare and contrast the notions of overloading and overriding methods in an object-oriented language;
6. Describe how iterators access the elements of a container.

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	Object oriented programming viz-a-viz traditional programming	4
2.	Objects, classes, Private and public, data encapsulation	4
3.	Inheritance and reusability polymorphism and overloading. C++/Java as a language for OOP	4
4.	Constructors, destructors and member functions derived classes and dynamic binding, virtual functions	3
5.	Input and Output streams. Arrays, Pointers and pointer arithmetic	3
6.	Structured data type in C++ templates implementation of stacks queue and trees using templates.	4
7.	Modeling object oriented systems, Class design issue. Advanced input output in C++/Java.	8
8.	Pre-final	2
	<b>Total</b>	<b>32</b>

**PRACTICAL**

S. No.	Name of Practical	No. of Practicals

1.	Stream I/O: C++ /Java Streams, Java Stream Classes, Unformatted I/O Operations, Formatted I/O Operations, Manipulators, Designing own Manipulators.	1-4
2.	Disk I/O: File Stream Classes, Opening and Closing a File, File Modes, File Pointers, Sequential I/O Operations, Errors, Command Line Arguments.	5-8
3.	Templates: Function and Class Templates, Overloading of Template Functions.	9-10
4.	Standard Template Library: Components of STL, Containers, Algorithms, Iterators, Vectors, Lists, Maps, Common C++ Library Files.	11-13
5.	Exception Handling: Exceptions; Try, Throw and Catch; Multiple Catches, Rethrowing, Specifying Exceptions.	14-16

### **DISTRIBUTION OF MARKS**

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

### **REFERENCE BOOKS:**

1. E. Balagurusamy, "Object Oriented Programming with C++", TMH.
2. B. Stroustrup, "The C++ Programming Language", Addison-Wesley.
3. H. Schildt, "C++: The Complete Reference", Fourth Edition, Osborne/McGraw-Hill.
4. Rumbagh et. al., "Object Oriented Modeling", PHI.
5. R.S. Pressman, "Software Engineering: A Practitioners Approach", Mc Graw Hill.

### **Course outcomes**

1. Understand the features of C++ supporting object oriented programming
2. Understand the relative merits of C++ as an object oriented programming language
3. Understand how to produce object-oriented software using C++
4. Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
5. Understand advanced features of C++ specifically stream I/O, templates and operator overloading

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Database Management Systems  TIT-351
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Database Management Systems**

**2. Course No : TIT-351**

**3. Credit Hours : 4(3-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course**

At the end of the course the student will be able to do:

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
3. To understand and use data manipulation language to query, update, and manage a database
4. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
5. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

S. No.	Lecture Topics	No. of Lectures
1.	Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML),  <b>Data Models :</b> Entity –relationship model, Network model, relational and Object Oriented models, integrity constraints, data manipulation operations	10
2.	<b>Relational Query languages :</b> Relational Algebra, Tuple and Domain Relational Calculus, SQL, DDL and DML constructs, Open source and commercial DBMS: MYSQL, ORACLE, DB2, SQL SERVER  <b>Relational Database Design :</b> Domain and data dependency, Armstrong's axioms, Normal Form, Dependency preservation, Lossless Design  <b>Query processing and optimization :</b> Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms	12
3.	<b>Storage strategies :</b> Indices, B trees, Hashing	4
4.	<b>Transaction processing :</b> Concurrency control, ACID property, Serializability of	8

	Scheduling, Locking and time stamp based schedulers, Multiversion and optimistic concurrency control schemes, Database recovery	
5.	<b>Database Security :</b> Authentication, Authorization and Access control, DAC, MAC and RBAC, Intrusion Detection, SQL injection	6
6.	<b>Advanced topics:</b> Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.	6
7.	Pre-final	2
	<b>Total</b>	<b>48</b>

#### PRACTICALS

S. No.	Name of Practical	No. of Practicals
1.	Write the queries for Data definition and Data Manipulation Language.	1
2.	Write SQL queries using Logical operators.	1
3.	Write SQL queries using SQL operators (Between, AND, IN(List), Like, IS NULL and also with negative expressions).	2
4.	Write SQL queries using character, number, date and group functions.	2
5.	Write SQL queries for Relational Algebra (UNION, INTERSECT, MINUS, etc.)	1
6.	Write SQL queries for extracting data from more than one table.	2
7.	Concepts of ROLL BACK, COMMIT and CHECK POINTS.	2
8.	Write program by using PL/SQL.	2
9.	Concepts of ROLL BACK, COMMIT and CHECK POINTS.	1
10	Create Views, Cursors and triggers and write assertions.	2
	<b>Total</b>	<b>16</b>

#### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

#### REFERENCE BOOKS:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.
2. "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.

3. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education
4. "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

## **Course Outcomes**

- 100.** For a given query write relational algebra expressions for that query and optimize the developed expressions
- 101.** For a given specification of the requirement design the databases using E R method and normalization.
- 102.** For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2.
- 103.** For a given query optimize its execution using Query optimization algorithms
- 104.** For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
- 105.** Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Java Programming  TIT-352
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(2-0-4)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course

13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. Govind Verma
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Java Programming**

**2. Course No : TIT-352**

**3. Credit Hours : 4(2-0-4)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course**

After completing this course students should be able to

1. Solve problems using various Java language and library features
  2. Understand and use Object Oriented concepts to develop reusable, reliable, and maintainable software
- Prerequisites Undergraduate courses or equivalent knowledge in programming in a high-level language.

S. No.	Lecture Topics	No. of Lectures
1.	Introduction to Computers, the Internet and Java Introduction to Java Applications; Input/Output and Operators	2
2.	Introduction to Classes, Objects, Methods, and Strings Control Statements: Part 1; Assignment, ++ and – Operators, Control Statements: Part 2; Logical Operators	4
3.	Introduction to JShell: Java 9's REPL Debugging / Testing / GUI basic	2
4.	Methods: A Deeper Look Arrays and Array Lists	2
5.	Classes and Objects: A Deeper Look Object-Oriented Programming: Inheritance Object-Oriented Programming: Polymorphism and Interfaces	4
6.	Exception Handling: A Deeper Look	2
7.	JavaFX Graphical User Interface:	2
8.	Strings, Characters, and Regular Expressions Files, Streams, and Object Serialization	4
9.	Generic Collections Java SE 8 Lambdas and Streams	2
10.	Recursion, Searching, Sorting	4

11.	Introduction to Generic Classes and Methods  Custom Generic Data Structures	2
12.	Pre-final	2
		<b>Total</b> <b>32</b>

### PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Developing classes and Object.	2
2.	Methods and String Manipulation	2
3.	Develop OOD concepts	4
4	Implementation of Exception Handling	2

### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

### Reference Books:

1. Text Java: How to Program (Early Objects), 11<sup>th</sup> Edition, by Paul Deitel and Harvey Deitel, Pearson
2. Java Software Solutions John Lewis, William Loftus. Addison Wesley
3. Introduction to Programming Using Java, Sixth Edition Version 6.0, June 2011 Author: David J. Eck
4. Head First Java, Bert Bates, Kathy Sierra, Publisher: O'Reilly Media, Inc.

### Course Outcomes

After taking the course, students will be able to:

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Design and Analysis of Algorithms  TIT-353
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes  b. Department specialization: Yes  c. Student research: No  d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL  b. An Introductory survey of knowledge represented by the department: No  c. An Introductory survey of special area of knowledge: No  d. A further development of courses: No  e. An Introductory survey of special area of knowledge represented by some other department: No  f. A summarizing or integrated course: No  g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Design and Analysis of Algorithms**

**2. Course No : TIT-353**

**3. Credit Hours : 4(3-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course**

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis
5. Synthesize efficient algorithms in common engineering design situations.

Sr. No	Lecture topic	No. of Lectures
1.	Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds - best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.	10
2.	Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch- and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving , Bin Packing, Knap Sack TSP. Heuristics - characteristics and their application domains.	10
3.	Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.	10
4.	Tractable and Intractable Problems: Computability of Algorithms, Computability classes - P,NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.	10
5.	Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP - P SPACE	6

6.		Pre-final	2
		<b>Total</b>	<b>48</b>

### PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Using OpenMP, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.	1-4
2.	Obtain the Topological ordering of vertices in a given digraph.	5-6
3.	Compute the transitive closure of a given directed graph using Warshall's algorithm.	7-8
4.	Implement 0/1 Knapsack problem using Dynamic Programming	9-10
5.	From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.	11-12
6.	Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.	13-14
7.	Print all the nodes reachable from a given starting node in a digraph using BFS method.	15-16

### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

### Suggested books:

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.
3. Algorithm Design, 1ST Edition, Jon Kleinberg and Éva Tardos, Pearson.
4. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.

5. Algorithms -- A Creative Approach, 3<sup>rd</sup> Edition, UdiManber, Addison-Wesley, Reading, MA.
6. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
7. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.

### **Course Outcomes**

1. For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms .
2. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.
3. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation.
4. Describe the dynamic programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computational complexity.
5. For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems.
6. Explain the ways to analyze randomized algorithms (expected running time, probability of error).
7. Explain what an approximation algorithm is. Compute the approximation factor of an approximation algorithm (PTAS and FPTAS).

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.l	E-Commerce  TIT-362
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes  b. Department specialization: Yes  c. Student research: No  d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite : NIL  b. An Introductory survey of knowledge represented by the department: No  c. An Introductory survey of special area of knowledge: No  d. A further development of courses: No  e. An Introductory survey of special area of knowledge represented by some other department: No  f. A summarizing or integrated course: No  g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :  	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : E-Commerce**

**2. Course No : TIT-362**

**3. Credit Hours : 3(2-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Course Details:**

S. No.	Lecture Topics	No.of Lectures
1.	Introduction: What is E Commerce, Forces behind E Commerce, E Commerce Industry Framework, Brief History of E Commerce, Inter Organizational E Commerce, Intra Organizational E Commerce, Consumer to Business Electronic Commerce, Architectural frame work	5
2.	Network Infrastructure for E Commerce: Network infrastructure for E Commerce, Market forces behind I-Way, Component of I Way, Access Equipment, Global Information Distribution Network, Broad band Telecommunication	5
3.	Mobile Commerce: Introduction to Mobile Commerce, Mobile Computing Applications, Wireless Application Protocols, WAP Technology, Mobile information Devices.	4
4.	Web Security: Introduction to Web Security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, Firewalls & Network Security.  Encryption: World Wide Web & Security, Encryption, transaction security, Secret Key Encryption, Public Key Encryption, virtual Private Networks (VPM), Implementation & Management Issues.	8
5.	Electronic Payments: Overview of Electronic Payments, Digital Token based Electronic Payment System, Smart Cards, Credit Card/ Debit Card based EPS, Emerging financial Instruments. Home Banking, Online Banking  Net Commerce: EDI, EDI Application in Business, Legal requirement in E Commerce, Introduction to Supply Chain Management, CRM, issues in customer Relationship management.	8
6.	Pre-final	2
	<b>Total</b>	<b>32</b>

**PRACTICAL**

S. No.	Name of Practical	No. of Practicals

1.	Blogging and Micro Blogging using Self and third party domain with/without the help of CMS(Content Management System)	3
2	Creating of E-Commerce portals with the help of various E-commerce tools	3
3.	Revenue generation using various available product based E-commerce portals	3
4.	Affiliate marketing	3
5.	Creation of own Website with self-hosting/free hosting	4
<b>TOTAL</b>		16

#### **DISTRIBUTION OF MARKS**

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

#### **Suggested books:**

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", AddisonWesley.
2. Pete Lohsin , John Vacca "Electronic Commerce", New Age International
3. The Complete E-Commerce Book: Design, Build & Maintain a Successful Web-based Business by Janice Reynolds (Author)
4. Alibaba: The House that Jack Ma by Duncan Clark

#### **Course Outcomes:**

1. Demonstrate an understanding of the foundations and importance of E-commerce
2. Demonstrate an understanding of retailing in E-commerce by: Analyze the impact of E-commerce on business models and strategy
3. Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.
4. Describe the infrastructure for E-commerce
5. Describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.
6. Discuss legal issues and privacy in E-Commerce
7. Assess electronic payment systems
8. Recognize and discuss global E-commerce issues

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Modern Trends in Information Technology  TIT-363
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course

13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. Govind Verma
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Modern Trends in Information Technology**

**2. Course No : TIT-363**

**3. Credit Hours : 3(2-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. To understand the vision of IoT from a global context.
2. Use of Devices, Gateways and Data Management in IoT.
3. To provide comprehensive knowledge of Cloud Computing concepts, technologies, architecture and applications.
4. To expose the students to frontier areas of Cloud Computing, while providing sufficient foundations to enable further study and research.
5. To provide a thorough introduction to the Android environment and tools for creating Android applications.
6. To impart knowledge of Objective-C and Apple iOS application design and development.

S. No.	Lecture Topics	No. of Lectures
1.	IoT-The Vision-Introduction, M2M towards IoT- the global context, A use case example, Differing Characteristics, An emerging industrial structure for IoT, M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations	3
2.	IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints-Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.  Cloud Computing–History of Cloud Computing–Cloud Architecture, Cloud Storage–Why Cloud Computing Matters, Advantages of Cloud Computing, Disadvantages of Cloud Computing, Companies in the Cloud Today, Cloud Services	5

3.	Web-Based Application, Pros and Cons of Cloud Service Development, Types of Cloud Service Development: Software as a Service, Platform as a Service, Web Services, On-Demand Computing, Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds  Collaborating via Web-Based Communication Tools, Evaluating Web Mail Services, Evaluating Web Conference Tools, Collaborating via Social Networks and Groupware, Collaborating via Blogs and Wikis	6
4.	Introduction to various mobile device OS, Introduction to Android and Working with Basic UI, Evaluation of Android and OHA, Architecture of Android OS, Introduction to Android SDK, Android Development tools : The Android Virtual Device and SDK Manager, The Android Emulator, Dalvik Debug Monitor Service (DDMS), The Android Debug Bridge (ADB)	8
5.	Android Application Structure: AndroidManifest.xml, Resources & R.java, Assets, Layouts & Drawable Resources, .apk structure, Working with Basic UI with Android Activity: Widgets(Button, Image Button, Edit Text, Check Box, Toggle Button, Radio Button, Radio Group, Views, Progress Bar View and Auto Complete Text View, Text Fields, Views and View Groups	
6.	Introduction to iOS and Objective-C Basics, Introduction to Mac OS architecture, installing iPhone SDK, Components of SDK, Objective-C basics: Classes, Objects, and Methods, Data Types and Expressions, Control Structures, Inheritance, Categories & Protocol	8
7.	Pre-final	2
	<b>Total</b>	<b>32</b>

## PRACTICAL

### PRACTICALS

S. No.	Name of Practical	No. of Practicals
1.	Interacting with device peripherals (GPIO , ADC , servos )	1-2
2.	Connecting to the Internet (eg. The device showing the current weather forecast )	3-4
3.	Exposition of device functionality as services ( 1 ) ( COAP protocol)	5-6
4.	Exposition of Basic UI with Android Activity	7-9
5.	Installation of iPhone SDK and program implementation	10-13
6.	Exposition of cloud services development	14-16

## **DISTRIBUTION OF MARKS**

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

## **REFERENCE BOOKS:**

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1<sup>st</sup> Edition, Academic Press, 2014.
2. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1<sup>st</sup> Edition, VPT, 2014.
3. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1<sup>st</sup> Edition, Apress Publications, 2013.
4. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
5. Beginning Android 4 Application Development, WEI-MENG LEE, WROX Publication-Wiley-India
6. Professional Android 4 Application Development by Reto Meier WROX Publication-Wiley-India, 2012
7. Android Programming Unleashed, B.M. Harwani, Sams Publishing
8. Beginning Android 4 Onur Cinar Apress Publication
9. Beginning iPhone SDK Programming with Objective-C, WeiMeng Lee, Wrox

## **Course Outcomes:**

1. Create a business case for an emerging information technology
2. Identify factors affecting the successful adoption of new information technologies
3. Identify the key attributes, business benefits, risks, and cost factors of a new technology
4. Know how to effectively use advanced search and selection metrics for identifying and selecting new technology
5. Describe technology trends that presently drive or are expected to drive the selection of new technologies over the next decade

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Computer Networks  TIT-364
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course

13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B. Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Computer Networks**

**2. Course No : TIT-364**

**3. Credit Hours : 4(3-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course**

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANS).
3. To provide an opportunity to do network programming
4. To provide a WLAN measurement ideas.

S. No.	Lecture Topics	No. of Lectures
1.	Data communication Components: Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum. Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction- Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back - N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA	13
2.	Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back - N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA	10
3.	Network Layer: Switching, Logical addressing - IPV4, IPV6; Address mapping - ARP, RARP, BOOTP and DHCP-Delivery, Forwarding and Unicast Routing protocols.	8
4.	Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.	8
5.	Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography	7
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

**PRACTICAL**

S. No.	Name of Practical	No. of Practicals
1.	Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.	1-3
2.	Preparing straight and cross cables. Study of various LAN topologies and their creation using network devices, cables and computers.	4-6
3.	Study of various LAN topologies and their creation using network devices, cables and computers.	7-9
4.	Configuration of TCP/IP Protocols in Windows and Linux.	10-13
5.	Implementation of file and printer sharing. Designing and implementing Class A, B, C Networks	14-16

**DISTRIBUTION OF MARKS**

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

**REFERENCE BOOKS:**

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.

**Course Outcomes:**

1. To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
3. To be familiar with wireless networking concepts.
4. To be familiar with contemporary issues in networking technologies.
5. To be familiar with network tools and network programming.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Web And Internet Technology  TIT-365
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : WEB and Internet Technology**

**2. Course No : TIT-365**

**3. Credit Hours : 4(3-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the Course**

1. This course is an overview of the modern Web technologies used for the Web development.
2. The purpose of this course is to give students the basic understanding of how things work in the Web world from the technology point of view as well as to give the basic overview of the different technologies.
3. The topics include (although in some cases briefly): History of the Web, Hypertext Markup Language (HTML), Extensible HTML (XHTML), Cascading Style Sheets (CSS), and JavaScript. We will follow the guidance of the World Wide Web Consortium (W3C) to create interoperable and functional websites.

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	<b>Internet:</b> Internet Connecting to Internet : Telephone, cable, Satellite connection, choosing an ISP, Introduction to Internet services-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing  <b>Introduction to WWW :</b> Protocols and programs, secure connections, application and development tools, the web browser, What is server, choices, setting up UNIX and Linux web servers, Logging users, dynamic IP Web Design: Web site design principles, planning the site and navigation,	5
2.	<b>Introduction to HTML :</b> The development process, Html tags and simple HTML forms, web site structure <b>Introduction to XHTML :</b> XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser.	6
3.	<b>Style sheets :</b> Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2	6
4.	<b>Javascript :</b> Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions,	8

	conditions, loops and repetition. Introduction to JSON	
5.	Advance script, Javascript and objects, Javascript own objects, the DOM and web browser environments, forms and validations DHTML : Combining HTML, CSS and Javascript, events and buttons, controlling your browser, Ajax: Introduction, advantages & disadvantages ,Purpose of it ,ajax based web application, alternatives of ajax	9
6.	XML : Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT	6
7.	<b>Java Servlet and JSP:</b> Servelets Basic, Servlet API Basic, Life Cycle of a Servlet, Running Servlet, Debugging Servelets, Thread-safe Servelets, HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).	6
8.	Pre-final	2
	<b>Total</b>	<b>48</b>

### PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Developing classes and Object.	2
2.	Methods and String Manipulation	2
3.	Develop OOD concepts	4
4	Implementation of Exception Handling	2

### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

### REFERENCE BOOKS:

1. Steven Holzner," HTML Black Book", Dremtech press.
2. Web Technologies, Black Book, Dreamtech Press
3. Web Applications : Concepts and Real World Design, Knuckles, Wiley-India
4. Internet and World Wide Web How to program, P.J. Deitel& H.M. Deitel Pearson.

**Course Outcomes:**

1. Analyze a web page and identify its elements and attributes.
2. Create web pages using XHTML and Cascading Styles sheets.
3. Build dynamic web pages using JavaScript (client side programming).
4. Write non-trivial programs using C#.
5. Create XML documents.
6. Build and consume web services.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Computer System Security  TIT-483
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Computer System Security**

**2. Course No : TIT-483**

**3. Credit Hours : 3(2-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the Course:**

This course provides students the opportunity to

1. Learn concepts of cryptography, security, attacks, services and mechanisms, Steganography etc.
2. At the end of the course, Students will be able to apply various security schemes to various systems, networks systems etc.
3. Students will be to apply Web Security: Secure Socket Layer Security, Secure Electronic Transaction (Set), system security: Intruders, Viruses, Firewall Design Principles, Trusted Systems.

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	<b>Introduction to Cryptography:</b> Introduction to Security: Attacks, Services & Mechanisms. Security, Attacks, Security Services. Conventional Encryption: Classical Techniques. Conventional Encryption Model, And Steganography, Classical Encryption Techniques. Modern Techniques : Simplified DES, Block Chiper Principles, DES standard, DES Strength Differential & Linear Cryptanalysis, Block Chiper Design principles, Block chopper Modes of Operation.	6
2.	<b>Conventional Encryption algorithms:</b> Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, RC2 Placement & Encryption function, key Distribution, Random Number Generation, Placement of Encryption Function.	4
3.	<b>Public Key Encryption:</b> Public- Key Cryptography: Principles of Public -Key Cryptosystems, RSA Algorithm, Key Management, Fermat's & Fuler's Theorm, Primarily, The Chinese Remainder Theorem.	7
4.	<b>H Hash Functions:</b> Authentication Requirements, Authentication function, Message Authentication Codes, Hash Functions, Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA) Digital Signature: Digital Signatures, Authentication Protocol, Digital Signature Standard (DSS), Proof of Digital Signature Algorithm	6
5.	<b>Network &amp; System Security:</b> Authentication Applications; Kerberos X.509, directory authentication Service electronic Mail Security, Pretty Good Privacy (PGP), S/Mime,	7

	Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management, Web Security :Secure Socket Layer Security, Secure Electronic Transaction (Set),system security : Intruders, Viruses, Firewall Design Principles, Trusted Systems.	
6.	Pre-final	2
		<b>Total</b> <b>32</b>

### PRACTICAL

S. No.	Name of Practical	No. of Practicals
1	Implementation of substitution and transposition techniques	1
2	Implementation of DES algorithm	2-3
3.	Implementation of block chiper algorithm	4-5
4.	Implementation of RSA algorithm	6-10
5.	Implementation of Digital Signature Standard algorithm	11-14
6.	CASE study and comparison on various cryptographic algorithm	15-16

### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

### REFERENCE BOOKS:

1. William Stallings, "Cryptography and Network Security: Principles and Practice" Hall.
2. Johannes A Buchmann, "Introduction to cryptography", Springer-Verlag.
3. Atul Kahate, "Cryptography and Network Security", TMH.

### Course Outcomes:

1. The ability to determine the computer security strategy, the location of these systems` administrator.
2. The students are expected to have the ability to specify security policies including: protected resources, defined procedures and available technologies and the role of people involved in the procedure.
3. Understand how malicious code functions (e.g., viruses), what the vulnerabilities that make propagation possible (e.g., buffer overflows), and what methods and practices are available for mitigation (e.g., the Common Criteria).

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	IT Workshop  TIT-484
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	2(1-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B. Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. Govind Verma
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : IT Workshop**

**2. Course No : TIT-484**

**3. Credit Hours : 2(1-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objective of the course:**

1. To impart the basic concepts and working of IT Workshop using Sci Lab.
2. To make students practically sound on various technologies.

<b>S. No.</b>	<b>Lecture Topics</b>	<b>No. of Lectures</b>
1.	Introduction: Overview of Scilab, How to get and install Scilab: Installing Scilab under Windows, Installing Scilab under Linux, Installing Scilab under Mac OS, Getting help from Scilab demonstrations and macros  Getting started with: console, editor	2
2.	Basic elements of the language: Creating real variables, Variable names, Comments and continuation lines, Elementary mathematical functions, Pre-defined mathematical variables, Booleans, Complex numbers, Integers: Overview of integers, Conversions between integers, Circular integers and portability issues, Floating point integers; The ans variable, Strings, Dynamic type of variables	3
3.	Matrices Overview: Create a matrix of real values, The empty matrix, Query matrices, Accessing the elements of a matrix, The colon ":" operator, The eye matrix, The dollar "\$" operator, Low-level operations, Elementwise operations, Conjugate transpose and non-conjugate transpose, Multiplication of two vectors, Comparing two real matrices, Issues with floating point integers, More on elementary functions, Higher-level linear algebra	4
4.	Looping and branching: The if statement, The select, The for statement, The while statement, The break and continue statements. Functions: Overview, Defining a function, Function libraries, Managing output arguments, Levels in the call stack, The return statement, Debugging functions with pause.	3
5.	Plotting: Overview, 2D plot, Contour plots, Titles, axes and legends, Export	2
6.	Pre-final	2
	<b>Total</b>	<b>16</b>

**PRACTICAL**

<b>S. No.</b>	<b>Name of Practical</b>	<b>No. of</b>

		<b>Practicals</b>
1.	Installation of Sci Lab and starting with console and editor	1
2	Creation of real variables, Pre-defined mathematical variables, Booleans use of Comments and continuation lines, Elementary mathematical functions, Complex numbers, Integers: Overview of integers, Conversions between integers, Circular integers and portability issues, Floating point integers; The ans variable, Strings, Dynamic type of variables	3
3.	Matrix implementation and elementary operation over the matrix, Conjugate transpose and non-conjugate transpose, Demonstration on Higher-level linear algebra	3
4.	Looping and branching: Implementation of The if statement, The select, The for statement, The while statement, The break and continue statements.	3
5.	Functions: Defining a function, Function libraries, Managing output arguments, Levels in the call stack, The return statement, Debugging functions with pause.	3
6.	Plotting: Overview, 2D plot, Contour plots, Titles, axes and legends, Export	3
<b>TOTAL</b>		<b>16</b>

#### **DISTRIBUTION OF MARKS**

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical Examination	20%	Final Examination	50%

#### **Suggested books:**

1. Scilab: I. Fundamentals: Sci Lab from theory to Practice by Perrine Mathieu, Philippe Roux 2016
2. Programming in Scilab 4.1 by Vinu

#### **Course Outcomes:**

1. Understanding the Basic elements of Sci Lab.
2. Matrices Overview and performance over Sci Lab.
3. Various kinds of plotting like 2D plotting, Contour plotting.
4. Sci Lab Looping and branching, the implementation of various logical statements.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Open Source System  TIT-486
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Open Source Systems**

**2. Course No : TIT-486**

**3. Credit Hours : 3(2-0-2)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. Students will become familiar with the open source movement, its philosophy and history, the open source process and its development methods, tools, communication mechanisms and licensing issues. During the semester students will:
2. Choose between the various open source licenses and learn the implications for users, developers, and the software community in general
3. Use the communication modes particular to the open source world through participation in such things as mailing lists, IRC, wikis, etc.
4. Become familiar with and become adapt using the tools of open source development, for example: distributed revision control; documentation tools; automated build and test systems; debuggers; source code utilities; tracking systems; online resources, etc.
5. Write software that integrates and interacts with the open project's code. For example: addons; bug fixes; new features; etc.
6. Learn and understand Agile development methodology and use it to develop open source software within the project
7. Work collaboratively with fellow students and other members of the project's community

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	<b>History and Emergence of Open Source Software:</b> The philosophy of OSS, Richard Stallman, The Cathedral and the Bazaar (CatB), commercial software vs OSS, free software vs freeware. Open source development models. Application Programming Interface (API). GNU Project, Free Software Foundation.	6
2.	<b>Community Building:</b> Importance of Communities in Open Source Movement. JBoss Community. Developing blog, group, forum, social network for social purpose.	4
3.	<b>Open Standards:</b> National Information Standards Organization (NISO), The Digital Library Federation (DLF). The Dublin Core Metadata Initiative. MARC standards, Resource Description and Access (RDA). Open Archives Initiative. OAI-PMH. Search / Retrieval via URL (SRU), SRW/CQL. Java Platform, Enterprise Edition (Java EE).	5
4.	<b>Open Source Licenses:</b> GNU General Public License (GPL) version 2,3, GNU Lesser General Public License (LGPL) version 2.1,3, GNU Affero General Public License (AGPL) version 3, Apache License, Version 2.0, Artistic License 2.0, etc.	5
5.	<b>Operating System:</b> The Linux operating system and its use both for desktops and as server software.	4

6.	<b>Webserver:</b> Apache HTTP Server and its flavors. WAMP server (Windows, Apache, MySQL, PHP). Open Source MySQL. Apache, MySQL, PHP, JAVA as development platform.	3
7.	Open Source Software: Category of Open Source Software. OSS for podcasts, RDBMS, online social networks, etc. open source bibliometric softwares like pajek, ucinet, etc	3
8.	Pre-final	2
	<b>Total</b>	<b>32</b>

### PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Unix installation	1-4
2.	Web server intsallation	5-8
3.	MYSQL INSTALLATION	9-12
4.	Study of various open source softwares	13-16

### DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical Examination	20%	Final Examination	50%

### REFERENCE BOOKS:

1. Open Source Technology and Policy by Fadi P. Deek & James A. M. McHugh, New Jersey Institute of Technology
2. Fundamentals of Open Source Software, M. N. Rao

### Course Outcomes:

1. Ability to install and run open-source operating systems.
2. Ability to gather information about Free and Open Source Software projects from software releases and from sites on the internet.
3. Ability to build and modify one or more Free and Open Source Software packages.
4. Ability to use a version control system and to interface with version control systems used by development communities.
5. Ability to contribute software to and interact with Free and Open Source Software development projects.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Project-I  TIT-495A
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(0-0-8)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To provide practical knowledge of different approaches and emerging technologies to students
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

<b>1. Course Title</b>	<b>:</b>	<b>Project-I</b>
<b>2. Course No.</b>	<b>:</b>	<b>TIT-495A</b>
<b>3. Credits Hours</b>	<b>:</b>	<b>4(0-0-8)</b>
<b>4. Pre-requisite</b>	<b>:</b>	<b>NIL</b>

#### **5. Guidelines:**

The object of Project Work I is to enable the student to take up investigative study in the broad field of Information Technology, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or group of students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work.

The assignment to normally include: Survey and study of published literature on the assigned topic; Working out a preliminary Approach to the Problem relating to the assigned topic; Conducting preliminary Analysis/Modelling/Simulation/Experiment/Design/Feasibility; Preparing a Written Report on the Study conducted for presentation to the Department; Final Seminar, as oral Presentation before a departmental committee.

#### **6. Marks Distribution**

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

#### **DISTRIBUTION OF MARKS**

**Total: 100 Marks**

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	Project-II  TIT-495B
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	8(0-0-16)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To provide practical knowledge of different approaches and emerging technologies to students
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

- 1. Course Title** : **Project-II**
- 2. Course No.** : **TIT-495B**
- 3. Credits Hours** : **8(0-0-16)**
- 4. Pre-requisite** : **NIL**

**5. Guidelines:**

The object of Project Work II is to enable the student to extend further the investigative study taken up under Project-I or any independent study taken altogether by an individual or group of students, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:

In depth study of the topic assigned in the light of the Report prepared under: Review and finalization of the Approach to the Problem relating to the assigned topic; Preparing an Action Plan for conducting the investigation, including team work; Detailed Analysis/ Modeling/ Simulation/ Design/ Problem Solving/ Experiment as needed; Final development of product/process, testing, results, conclusions and future directions; Preparing a paper for Conference presentation/Publication in Journals, if possible; Preparing a Dissertation in the standard format for being evaluated by the Department.

Final Seminar Presentation before a Departmental Committee.

**6. Marks Distribution**

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

**DISTRIBUTION OF MARKS**

**Total: 100 Marks**



## **ELECTIVE COURSES SYLLABUS**

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	COMPUTER ARCHITECTURE  TIT-301
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required

14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B. Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

- 1. Course Title : COMPUTER ARCHITECTURE**  
**2. Course No : TIT-301**  
**3. Credit Hours : 3(3-0-0)**  
**4. Prerequisite : NIL**  
**5. Syllabus/Catalogue Description**

**Objectives of the course:**

1. This course provides the students with opportunity to learn about advancements in the computer architecture which influenced the performance of computer.
2. To know about architecture of different components of ALU viz. adders, multipliers etc, cache architecture, associativity in caches, pipelining in processors, different aspects of multiprocessors.

**Theory**

S. No.	Lecture Topics	No. of Lectures
1.	Instruction set architecture, op-code encoding techniques, processor performance	8
2.	ALU, adders, carry propagation adders, CLA adders, Booths Multiplier.	8
3.	Memory technology, direct-mapped vs. associative caches, write-through vs write-back caches, analyzing cache memory performance.	12
4.	Characteristics of multiprocessors, interconnection structures, time shared common bus, multi port memory, cross bar switch, system bus, inter processor communication and synchronization, conditions for incoherence, solutions to cache coherence.	12
5.	Parallel processing, pipelining, pipelining hazards and resolution.	6
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

**DISTRIBUTION OF MARKS**

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

**REFERENCE BOOKS:**

1. Computer System Architecture by Morris Mano, PHI
2. Modern Processor Design by John Paul Shen, Mikko H Lipasti, TMH

**Course Outcomes:**

After completing this course, students will be able to:

1. Design basic and intermediate RISC pipelines, including the instruction set, data paths, and ways of dealing with pipeline hazards.
2. Consider various techniques of instruction-level parallelism, including superscalar execution, branch prediction, and speculation, in design of high-performance processors.
3. State and understand memory hierarchy design, memory access time formula, performance improvement techniques, and trade-offs.
4. State and compare properties of shared memory and distributed multiprocessor systems and cache coherency protocols.
5. Learn from additional topics in computer architecture, such as multi-core processors, thread-level parallelism, and warehouse computing.

### PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	IT MARKETING  TIT-302
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

- 1. Course Title : IT MARKETING**
- 2. Course No : TIT-302**
- 3. Credit Hours : 3(3-0-0)**
- 4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

Fundamentals IT marketing, Industrial Buyer Behavior models, Decision making units, Technology and Marketing, System selling, Role of service, Intangibles in Industrial Marketing, Derived Demand Methodologies, Globalization, Contract Review, Selling, Strategies for Diversification, Market Planning and Direct Restructuring, Marketing strategy case studies. Marketing orientation, Pricing Decision, Promotion, Distribution Sales Mgt, Marketing Information Systems, Market Planning & Control, Market Research.

**Objectives of the course:**

At the end of the course the student will be able to do:

1. To familiarize students with real life marketing problems by exposing them to marketing
2. Practices and consulting situation.
3. To apply their knowledge in solving engineering problems.
4. To develop a business model for optimizing the resources in terms of requirements and demands pertaining to different entities existing in the system.
5. To facilitate students in developing and presenting practical solutions to a specific problem assigned by a firm.

**Theory**

S. No.	Lecture Topics	No. of Lectures
1.	Microeconomics Demand Theory & Demand Forecasting, Production Theory, Cost Theory, X-Inefficiency.	12
2.	Market Dynamics Forms of Market, Elements of Competition, Perfect Competition, Monopoly & Price Discrimination, Imperfect Competition Oligopoly. Pricing Policies, Profit Concepts & Measurement, Entry Deterring Pricing, Predatory Pricing, Implicit Price Fixing, Multi-product Pricing, Peak Load Pricing, Two part Tariff, Product Life Cycle, Information Problems and Associated Cost.	12
3.	Firm as an Organization, Objectives of the Firm, Types of the Firm, Firm versus markets, Uncertainty and Firm, Vertical and Horizontal Integration, Diversification, Merges and Takeovers	12
4.	Macroeconomics, Macroeconomic Aggregates and Concepts, Simple macroeconomic Models, Business Cycle, Inflation, Unemployment, Input Output	10

	Analysis.	
5.	<b>Prefinal</b>	2
	<b>Total</b>	48

#### DISTRIBUTION OF MARKS

**I Pre-final Examination 20%**                    **II Pre-final Examination 20%**

<b>Assignment</b>	<b>10%</b>	<b>Final Examination</b>	<b>50%</b>
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#### Suggested books:

1. Gupta, G.S. "Managerial Economics".
2. Davis, H., "Managerial Economics", ELBS – Pitman.

#### Suggested reference books

1. Mote, V.N., Paul Samuel& Gupta, G.S. "managerial Economics: Concepts and Cases", Tata McGraw Hill Co. Ltd. New Delhi.
2. RamakrishnaRao, T.V.S. "Theory of firms: Economic and Managerial Aspects", Affiliated East West Press Pvt. Ltd. New Delhi.
3. Dean, Joel, "Managerial Economics", Prentice Hall.

#### Course Outcomes

At the end of the course, students will demonstrate the ability to:

1. Understand the role of IT marketing and its aim and objectives.
2. Understand the problems and research queries that a marketing manager faces.
3. Analyze and design a behavior model for the problems being faced in real world.
4. Understand and devise strategies for sales, marketing, pricing etc in an organization.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	THEORY OF COMPUTATION TIT-303
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. Course Title : **THEORY OF COMPUTATION**
2. Course No : **TIT-303**
3. Credit Hours : **3(3-0-0)**
4. Prerequisite : **NIL**
5. Syllabus/Catalogue Description:

## **THEORY**

<b>S. No.</b>	<b>Lecture Topics</b>	<b>No. of Lectures</b>
1.	Deterministic and Non- deterministic computation; Wang machines, post machines, RAMs and their equivalence, Universal machines, Halting problem, Decidability and undecidability .	10
2.	Introduction to recursive function theory, equivalence of general recursive function and Turing computable functions, Church's thesis, regular, Context free, context sensitive languages and their relation to automata, complexity classes	10
3.	Introduction to logic for computer: Syntax of propositional formulas, Truth and the semantics of propositional Logic, Notions of satisfiability, validity, inconsistency, Deduction Systems for propositional logic, Completeness of Deductive system.	10
4.	Theorem Proving, Introduction to model theory, Completeness and compactness theorems, First order theories, Robinsons Revolution.	10
5.	Herbrand models, Completeness of resolution, Application of resolution to automatic theorem proving and logic programming.	6
6.	<b>Prefinal</b>	2
	<b>Total</b>	<b>48</b>

## **DISTRIBUTION OF MARKS**

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

## **REFERENCE BOOK:**

1. Introduction to computer theory, Cohen Daniel A.
2. Introduction to theory of computation, GurariEiten M.
3. Recursive function theory and logic, AnnYasuhsara

## **Course Outcomes:**

After completing this course, students will be able to:

1. Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
2. Demonstrate their understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving.
3. Prove the basic results of the Theory of Computation.

4 state and explain the relevance of the Church-Turing thesis.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	SOFTWARE ENGINEERING  TIT-304
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : SOFTWARE ENGINEERING**

**2. Course No : TIT-304**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. This course provides the students with opportunity to learn Software Engineering.
2. It provides the student to know the basic concepts of software requirement specification, testing principles, software project management, reliability and quality assurance and applications that help in industry to make a project and enhance the advance knowledge of students.

**THEORY**

S. No	Lecture Topics	No. of Lectures
1.	Development Phase: Preliminary Design, Detailed Design, Organization for software development.	10
2.	Maintenance Phase: Software Engineering, Maintenance	9
3.	Structured Coding: Importance of structure, Structured coding, code format.	9
4.	Software Engineering for Small Projects: Nature of small projects, small project project development, small project maintenance, Fundamentals of Software Software cost estimation methods and Procedures.	10
5.	Management Issues: An Organizational framework, software project failure, education, how to establish software engineering.	8
6.	Pre-final	2
7.	<b>Total</b>	<b>48</b>

**DISTRIBUTION OF MARKS**

I Pre-final Examination                  20%                  II Pre-final Examination                  20%

Assignment                  10%                  Final Examination                  50%

**REFERENCE BOOKS:**

- 1.K. K. Aggarwal&Yogesh Singh, "Software Engineering", New Age International, 200 I.
- 2.R. S. Pressman, "Software Engineering - A practitioner's approach", 5<sup>th</sup> Ed., McGraw Hill Int. Ed., 200 I.
- 3.R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
- 4.P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.

**Course Outcomes:**

After completing this course, students will be able to:

1. Acquire strong fundamental knowledge in science, mathematics, fundamentals of computer science, software engineering and multidisciplinary engineering to begin in practice as a software engineer.
2. Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.
3. Deliver quality software products by possessing the leadership skills as an individual or contributing to the team development and demonstrating effective and modern working strategies by applying both communication and negotiation management skill.
4. Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles :  Course No.:	KNOWLEDGE MANAGEMENT  TIT-305
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes  b. Department specialization: Yes  c. Student research: No  d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre- requisite: NIL  b. An Introductory survey of knowledge represented by the department: No  c. An Introductory survey of special area of knowledge: No  d. A further development of courses: No  e. An Introductory survey of special area of knowledge represented by some other department: No  f. A summarizing or integrated course: No  g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented

12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : KNOWLEDGE MANAGEMENT**

**2. Course No : TIT-305**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description :**

**Objectives of the course:**

Introduction, Knowledge assets; how to manage and make use of knowledge assets, developing knowledge; preserving knowledge; using knowledge, and sharing knowledge, planning and control of actions, Knowledge Management Difficulties, Knowledge engineering methods and tools, Knowledge Management Framework, van der Spek and de Hoogstrategies, Techniques to Manage Knowledge ,SWOT (Strengths Weaknesses Opportunities Threats) analysis, balanced scorecards, modeling languages such as: IDEF (Process Flow and Object State Description Capture Method), and RADs (Role Activity Diagrams,); Knowledge Asset Road Maps, IT Support for Knowledge Management , Dependency Networks

**DISTRIBUTION OF MARKS**

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

**REFERENCE BOOKS:**

K. K. Aggarwal&Yogesh Singh

**Course Outcomes:**

After completing this course, students will be able to:

1. Define the nature and topology of knowledge and knowledge management within a business context.
2. Identify technologies that are most useful for capturing/acquiring, organizing, distributing, and sharing knowledge within an enterprise.

3. Explain how to formulate a knowledge management strategy, identify major requirements and issues for designing enterprise knowledge architecture and implementing knowledge management project
4. To understand the theoretical foundation for knowledge and to build capabilities to manage knowledge within and across organizational boundaries.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	INTERNET OF THINGS  TIT-307
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B. Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : INTERNET OF THINGS**

**2. Course No : TIT-307**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:** Internet of Things (IoT) is presently a hot technology worldwide. Government, academia, and industry are involved in different aspects of research, implementation, and business with IoT. IoT cuts across different application domain verticals ranging from civilian to defence sectors. These domains include agriculture, space, healthcare, manufacturing, construction, water, and mining, which are presently transitioning their legacy infrastructure to support IoT. Today it is possible to envision pervasive connectivity, storage, and computation, which, in turn, gives rise to building different IoT solutions. IoT-based applications such as innovative shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems, are gradually relying on IoT based systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

**Objectives of the course:**

1. Vision and Introduction to IoT.
2. Understand IoT Market perspective.
3. Data and Knowledge Management and use of Devices in IoT Technology.
4. Understand State of the Art – IoT Architecture.
5. Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

**THEORY**

<b>S. No.</b>	<b>Lecture Topics</b>	<b>No. of Lectures</b>
1.	M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.	8
2.	M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.	10
3.	M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management	8
4.	IoT Architecture-State of the Art – Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference	8

	Model	
5.	IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Industrial Automation- Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things, Commercial Building Automation-Introduction, Case study: phase one-commercial building automation today, Case study: phase two- commercial building automation in the future.	12
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

#### DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignments	10%	Final Examination	50%

#### REFERENCE BOOKS:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
3. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013

#### Course Outcomes:

At the end of the course the student will be able to:

1. Understand the vision of IoT from a global context.
2. Determine the Market perspective of IoT.
3. Use of Devices, Gateways and Data Management in IoT.
4. Building state of the art architecture in IoT.
5. Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	ARTIFICIAL INTELLIGENCE  TIT-308
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course

13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : ARTIFICIAL INTELLIGENCE**

**2. Course No : TIT-308**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

## **THEORY**

<b>S. No.</b>	<b>Lecture Topics</b>	<b>No. of Lectures</b>
1.	<b>What Is Artificial Intelligence:</b> The Computer and the Brain; Theories of Intelligence, Detecting and Measuring Intelligence, What makes a computer program intelligent? The AI problems; what is an AI technique? Problems, Problem Spaces and Search: Defining the problem as a state space search, Production systems and its characteristics, Issues in the design of search programs. <b>Knowledge Representation:</b> Knowledge Representation Issues, Representation and Mappings, Approaches to knowledge Representation, Issues in knowledge Representation, Structural/ Causal networks	8
2.	<b>Using Predicate Logic:</b> Representing simple Facts in Logic, Representing Instance and ISa Relationships ,Computable functions and predicates ,Resolution,Natural Deduction ,Representing Knowledge using Rules ,Procedural versus declarative knowledge ,Logic Programming ,Forward versus Backward reasoning ,Matching.	10
3.	<b>Heuristic Search Techniques :</b> Search Applications, Basic search Algorithms ,The "British Museum "Procedure, Generate and Test, Depth first Search, Breadth first search ,Uniform cost search ,Hill climbing , Intelligent Searching: Best first search ,The A* Algorithm, Measuring search, Design of Heuristics, Choice of Search Algorithm.	10
4.	<b>Game Playing:</b> MINMAX and Game Trees cutting of search with static Evaluations. <b>alpha-beta pruning:</b> Analysis of Alpha-Beta Pruning Alternatives to Alpha-Beta Pruning Enhancements to the Alpha-Beta Algorithm Quiescence search Iterative deepening, Killer Move Heuristics.	8
5.	<b>Natural Language Processing :</b> Syntax, semantics, and pragmatics Parsing Languages, - Regular Languages, Context free languages Context free subsets of Natural languages Weak and strong context free Languages General Grammars and Augmented Transition Networks Natural Language interfaces to software systems Case study of one or more examples from Natural Language Processing, Question, Answering, Expert system, Vision etc.	10

6.	Pre-final	2
	<b>Total</b>	<b>48</b>

### DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignments	10%	Final Examination	50%

### REFERENCE BOOKS:

1. Artificial Intelligence by Elaine Rich,Kerin Knight, Tata McGraw Hill
2. Principles of Artificial Intelligence by Nills J Nillson; Narosa Publ.
3. Artificial Intelligence by Winston; Addition Wesley
4. Introduction to Artificial Intelligence by Charniak and McDermott Addition Wesley

### Course Outcomes:

After completing this course, students will be able to:

1. Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
2. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
3. Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
4. Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
5. Formulate and solve problems with uncertain information using Bayesian approaches.
6. Apply concept Natural Language processing to problems leading to understanding of cognitive computing.

### PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	DATA ANALYTICS  TIT-309
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : DATA ANALYTICS**

**2. Course No : TIT-309**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. The Student should be made to be exposed to big data learn the different ways of data analysis  
be familiar with data streams learn the mining and clustering be familiar with the visualization.
2. Know about structural equation modeling.

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	Basic statistics, probability theory, statistical distribution.	6
2.	Introduction to Big Data Platform – Challenges of conventional systems - Web data – Evolution of Analytic scalability, analytic processes and tools, analysis vs reporting - Modern data analytic tools, statistical concepts: Sampling distributions, re-sampling, prediction error.	8
3.	Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Analysis of time series: linear systems analysis, nonlinear dynamics - Rule induction - Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks	10
4.	Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform (RTAP) applications	10
5.	Structural equation modeling- Single group analysis, Multiple group analysis, MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:	12
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

**DISTRIBUTION OF MARKS**

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignments	10%	Final Examination	50%

**REFERENCE BOOKS:**

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. AnandRajaraman and Jeffrey David Ullman, Mining of Massive Datasets,Cambridge University Press, 2012.

**Course Outcomes:**

After completing this course, students will be able to:

1. Obtain, clean/process and transform data.
2. Analyze and interpret data using an ethically responsible approach.
3. Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues.
4. Apply computing theory, languages and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use data analyses.
5. Formulate and use appropriate models of data analysis to solve hidden solutions to business-related challenges.

### PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	MULTIMEDIA TECHNOLOGY  TIT-310
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : MULTIMEDIA TECHNOLOGY**

**2. Course No : TIT-310**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description :**

**Objectives of the course:**

1. Introduction, Stages of Multimedia Projects, Multimedia Building Blocks.
2. Data Compression, Speech Compression & Synthesis, Images, Video.

**Theory**

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Introduction to Multimedia, Multimedia objects, Multimedia in business & work.	6
2.	Stages of Multimedia Projects: Multimedia Hardware, Memory & Storage Devices, Communication Devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools Card and page based authoring tools.	12
3.	Multimedia Building Blocks: Text, sound, MIDI, Digital Audio, audio file formats, MIDI under windows environment, Audio & video Capture	10
4.	Images: Multiple monitors, bitmaps, vector drawing, lossy graphic compression, image file formation animations, Images standards, JPEG Compression, ZigZag Coding.	9
5.	Video: Video representation, Colors, Video Compression, MPEG standard, recent development in Multimedia.	9
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

**DISTRIBUTION OF MARKS**

I Pre-final Examination                  20%                  II Pre-final Examination                  20%

Assignments                  10%                  Final Examination                  50%

**REFERENCE BOOKS:**

1. Tay Vaughan "Multimedia, Making it work", Osborne McGraw Hill
2. Buford, "Multimedia Systems", Addison Wesley
3. Mark Nelson " Data Compression Book", BPB
4. Rosch "Multimedia Bible", Sams Publishing

**Course Outcomes:**

Students successfully completing this course will be able to:

1. Discuss the technical details of common multimedia data formats, protocols, and compression techniques of digital images, video and audio content.
2. Describe and understand the technical details of JPEG and MPEG families of standards.
3. Discuss the significance of "Quality of Service" in multimedia networking.
4. Develop simple but demonstrative multimedia applications using JAI and JMF.
5. Understand and describe technical aspects of popular multimedia web applications.

### PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	COMPILER DESIGN  TIT-311
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : Compiler Design**

**2. Course No : TIT-311**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. Lexical analyzer, design of assemblers, two pass assembler location counter, symbol definition, symbol table, manipulation.
2. Expression parser expression evaluation machine code generation bootstrapping, absolute loader, relocation, relocating loader, linker, link editor, dynamic loader.
3. Dynamic linker debugger segments, multiple locations counters macros-macro pre-processor macro assembler.
4. Introduction to compilation recursive descent parser code generation for assignment statements, expression, conditional statements etc.

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	<b>Introduction:</b> Translator & compiler Cousin of compilers boot strapping, compiler writing tools, phases of compilers.	3
2.	<b>Lexical Analyzer:</b> The role of lexical analyzer regular expression finite automata, implementation of Lexical analyzer from DFA, scanning & token generation; Buffer management of various desired features of lexical analyzer.	6
3.	<b>Parsing:</b> Syntactic specification of programming languages, context free grammar, capabilities of context free grammar, Basic Parsing technique-shift reduce, operator precedence top down predictive passing LR parsing	6
4.	<b>Assembler:</b> Design of Assembler-statement of problem, data structure format of data bases Algorithm, look for modularity	4
5.	Loaders-design of absolute loader-statement of problem, data structure format of data bases, Algorithm.	2
6.	Macros – features of, micro-facility- macro institution argument conditional macro expansion. Implementation-two pass algorithm, single pass algorithm, Implementation within an assembler.	2
7.	<b>Symbol Table:</b> Symbol, contents of symbol table data structure representation of scope information, implementation, simple list self organizing list, hash table run time storage administration-case of FORTRAN, ALGOL	6
8.	<b>Code Generation of Optimization:</b> Syntax direct translation Intermediate code- Quadruple Triple Translation of statements assignment, Boolean Expression & arithmetic expression.	3

9.	Principle services of optimization, loop optimization, loop invariant computation, Induction value elimination	3
10.	Problems in code generation, machine model A simple code generator.	2
11.	Pre-final	2
	<b>Total</b>	<b>39</b>

#### **DISTRIBUTION OF MARKS**

I Pre-final Examination                  20%                  II Pre-final Examination                  20%

Assignment                  10%                  Final Examination                  50%

#### **REFERENCE BOOKS:**

1. Introduction to Automata Theory, Languages, and Computation By Hopcroft, Motwani, & Ullman (2nd, Second Edition), Pearson Publication
2. Principles, Techniques and Tools, by Alfred V. Aho , Monika, Ravi Sethi , D. Jeffrey Ulman, Pearson Publication
3. Principles of Compiler Design by Rohit Khurana, ITL ESL Pearson Publication

#### **Course Outcomes:**

Students successfully completing this course will be able to:

1. Describe the design of a compiler including its phases and components.
2. Develop a large, complex, but well-structured software system that implements various phases of a compiler such as the scanner, parser, code generator, and optimizer.
3. Describe current developments in compiler design and implementation.
4. Identify the similarities and differences among various parsing techniques and grammar transformation techniques.
5. Describe the role of the compiler in ensuring the security, privacy and integrity of data.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course No.	EMBEDDED SYSTEMS  TIT-401
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : EMBEDDED SYSTEMS**

**2. Course No : TIT-401**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description :**

#### **THEORY**

<b>S. No.</b>	<b>Lecture Topics</b>	<b>No. of Lectures</b>
1.	Introduction to Embedded Systems – The build process for embedded systems- Structural units in Embedded processor , selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock.	9
2.	Embedded computing platform- CPU bus, memory devices, I/O devices, interfacing, designing with microprocessors, debugging techniques. Program design and analysis- models of program, assembly and linking, compilation techniques, energy, power and size.	10
3.	Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modelling of EDLC; issues in Hardware-software Co-design	9
4.	I/O Device Ports & Buses– Serial Bus communication protocols - RS232 standard – RS422 – RS485 - CAN Bus -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C)	10
5.	State machine model, Sequential Program Model, concurrent Model, object oriented Model.	8
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

#### **DISTRIBUTION OF MARKS**

I Pre-final Examination                  20%                  II Pre-final Examination                  20%

Assignment                  10%                  Final Examination                  50%

#### **REFERENCE BOOK:**

1. Wolf, W. Computers as components- Principles of embedded computing system design. Academic Press (Indian edition available from Harcourt India Pvt. Ltd., 27M Block market, Greater Kailash II, New Delhi-110 048.)

**Course Outcomes:**

Students successfully completing this course will be able to:

1. Understand what is a microcontroller, microcomputer, embedded system.
2. Understand different components of a micro-controller and their interactions.
3. Become familiar with programming environment used to develop embedded systems.
4. Understand key concepts of embedded systems like IO, timers, interrupts, interaction with peripheral devices.
5. Learn debugging techniques for an embedded system.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	MOBILE COMPUTING TIT-402
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

- 1. Course Title : MOBILE COMPUTING**
- 2. Course No : TIT-402**
- 3. Credit Hours : 3(3-0-0)**
- 4. Prerequisite : NIL**
- 5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. Understand the basic concept of mobile computing
2. be familiar with network protocol stack
3. Learn the basics of mobile telecommunication & ad-hoc Network
5. Gain Knowledge about different platforms and application development

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling.  Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling, Performance Analysis: Admission control and handoffs	12
2.	2.5/3G Mobile Wireless systems: packet switched Data  Introduction, 3G CDMA cellular standards, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G. 2.5/3G TDMA: General Packet Radio Services (GRPS) and EDGE.	10
3.	Access Scheduling techniques in cellular systems  Slotted Aloha access, integrated access: voice and data, scheduling in packet based cellular systems.  Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.	10
4.	Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).	6
5.	Simulations Results Analysis and Viewing Tools  Display Forms: Tables, Graphs, and Multidimensional Visualization  Terminals, X and MS Windows, and Web Interfaces	4

	of Model Results	
6.	Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.  Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.	4
7.	Pre-final	2
	<b>Total</b>	<b>48</b>

### DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

### REFERENCE BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2004.
2. Raj Kamal, "Mobile Computing", Oxford Higher Education, 2008.
3. SipraDasBit, Biplab K. Sikdar, "Mobile Computing", PHI, 2009.

### Course Outcomes:

Students successfully completing this course will be able to:

1. Describe the basic concepts and principles in mobile computing.
2. Understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks.
3. Explain the structure and components for Mobile IP and Mobility Management.
4. Understand positioning techniques and location-based services and applications.
5. Describe the important issues and concerns on security and privacy.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	CLOUD COMPUTING  TIT-403
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : CLOUD COMPUTING**

**2. Course No : TIT-403**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

## **THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	Cloud Computing–History of Cloud Computing–Cloud Architecture–Cloud Storage–Why Cloud Computing Matters–Advantages of Cloud Computing– <i>Disadvantages of Cloud Computing–Companies in the Cloud Today–Cloud Services</i>	8
2.	Web-Based Application –Pros and Cons of Cloud Service Development–Types of Cloud Service Development– Software as a Service–Platform as a Service – Web Services– On-Demand Computing– Discovering Cloud Services Development Services and Tools– Amazon Ec2 – Google App Engine – IBM Clouds	9
3.	Centralizing Email Communications– Collaborating on Schedules–Collaborating on To-Do Lists– Collaborating Contact Lists–Cloud Computing for the Community–Collaborating on Group Projects and Events– Cloud Computing for the Corporation	9
4.	Collaborating on Calendars, Schedules and Task Management–Collaborating via Web-Based Communication Tools–Evaluating Web Mail Services–Cloud Computing–History of Cloud Computing–Cloud Architecture–Cloud Storage–Why Cloud Computing Matters–Advantages of Cloud Computing– <i>Disadvantages of Cloud Computing–Companies in the Cloud Today–Cloud Services</i>	10
5.	Web-Based Application –Pros and Cons of Cloud Service Development–Types of Cloud Service Development– Software as a Service–Platform as a Service – Web Services– On-Demand Computing– Discovering Cloud Services Development Services and Tools– Amazon Ec2 – Google App Engine – IBM Clouds Centralizing Email Communications– Collaborating on Schedules–Collaborating on To-Do Lists–Collaborating Contact Lists– Cloud Computing for the Community–Collaborating on	10
6.	Pre-final	2
	Total	48

## **DISTRIBUTION OF MARKS**

I Pre-final Examination 20% II Pre-final Examination 20%

Assignment 10% Final Examination 50%

**REFERENCE BOOK:**

1. Michael Miller, Cloud Computing: Web Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

**Course Outcomes:**

Students successfully completing this course will be able to:

1. Define Cloud Computing and memorize the different Cloud service and deployment models
2. Describe importance of virtualization along with their technologies.
3. Use and Examine different cloud computing services
4. Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing
5. Describe the key components of Amazon web Service
6. Design & develop backup strategies for cloud data based on features.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	COMPUTER GRAPHICS AND ANIMATION  TIT-404
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : COMPUTER GRAPHICS AND ANIMATION**

**2. Course No : TIT-404**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. Learning the fundamentals of computer graphics;
2. Learning to program computer graphics algorithms;
3. Learning the mathematics behind computer graphics;

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1-	Introduction: What is computer graphics and what are the applications, Graphics Systems: Video display devices, Raster scan and random scan displays, Flat panel displays, Three-dimensional viewing devices, Video controller, Input devices, Graphics on the internet, Graphics software, Coordinate representations.  Introduction to OpenGL, Basic OpenGL syntax, Related libraries, Header Files, Display-window management using GLUT, A complete OpenGL program.	8
2-	Geometric Transformations: Two dimensional translation, Rotation and scaling, Matrix representations and homogeneous coordinates, Inverse transformations, Composite transformations, Reflection, Shear, Raster methods for geometric transformations, Geometric transformations in three-dimensional space, Affine transformations, OpenGL geometric-transformation programming examples.	8
3-	Two Dimensional Viewing: Viewing pipeline, Clipping window, Normalization and viewport transformations, Clipping Algorithms: Cohen-Sutherland line clipping, Liang-Barsky line clipping, Line clipping against non rectangular clip windows, Polygon Clipping: Sutherland-Hodgman, Weiler-Atherton, Curve clipping, Text clipping	10
4-	Three dimensional viewing, Transformations from world to viewing coordinates, 3-D Clipping Three-Dimensional Object Representations: Polyhedra, Curved and quadric surfaces, Blobby objects, Spline representations, Bezier spline curves, Bezier surfaces, B-spline curves, B-spline Surfaces, Octrees, Introduction to fractals.	8
5-	Simulations Results Analysis and Viewing Tools	8

	Display Forms: Tables, Graphs, and Multidimensional Visualization  Terminals, X and MS Windows, and Web Interfaces    Validation of Model Results	
6-	Visible Surface Detection Methods: Classification, Back-Face detection, Depth- Buffer method, A-buffer method, Scan-line method, Curved surfaces.  Illumination Models and Surface Rendering Methods: Basic illumination models- Ambient light, Diffuse reflection, Specular reflection and the Phong model, Polygon Rendering Methods: Gouraud surface rendering, Phong surface rendering, Ray tracing, Texture mapping.	4
7-	Pre-final	2
	<b>Total</b>	<b>48</b>

### DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

### REFERENCE BOOKS:

1. Hughes, Van Dam, et al. Computer Graphics Principles and Practice 3e, Pearson, 2014
2. OpenGL Programming Guide, Addison-Wesley, 2004.
3. OpenGL Reference Manual, Addison-Wesley, 2004.
4. E. Angel, OpenGL: A Primer Addison-Wesley, 2004.
5. P Shirley, Fundamentals of Computer Graphics, 2e, AK Peters, 2005

### Course Outcomes:

Students successfully completing this course will be able to:

1. List the basic concepts used in computer graphics.
2. Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
3. Describe the importance of viewing and projections.
4. Define the fundamentals of animation, virtual reality and its related technologies.
5. Understand a typical graphics pipeline
6. Design an application with the principles of virtual reality.

### PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	DISTRIBUTED COMPUTING  TIT-405
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : DISTRIBUTED COMPUTING**

**2. Course No : TIT-405**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**Objectives of the course:**

1. Motivation, Topology, Communication, System Type, File system.
2. Modes of Computation, Event Ordering, Synchronization.
3. Deadlock Handling, Robustness, Reaching Agreement Election Algorithms etc.

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1-	<p>The Trend To Distributed Processing: Meaning of distributed processing/computing, Local Vs remote distribution, Distributed data and categories of data diatribe, Centralization Vs de centralization.</p> <p>Types Of Distributed Systems: Horizontal Vs vertical distribution, Function distribution vs. system distribution, Hierarchical distributed processing, Non cooperative system, cooperating systems</p>	8
2-	<p>Private Networks and Public Networks: Introduction to Distributed Algorithms: Parallelism and distribution, Basic Elements; Processes, Communication paths, Features of distributed algorithms, Classifying distributed algorithms</p> <p>Election And Mutual Exclusion Algorithms: Ricart and Agrawala/Suzuki KasamiAlgorithms, Messages and time stamping, Algorithm for regenerating the token, Various Elective Algorithms</p>	8
3-	<p>Algorithms for Detection and Resolution of Deadlock: Problem of Deadlock, Characterization of deadlock situation, Distribution of a centralized algorithm: Lomet'salgorithms, TheRosenkrantz, Stearns and Lewis Algor., Algorithms for detection deadlocks, Deadlocks due to communications: algorithm of chandy, Misra and Haas</p> <p>Algorithms for Detecting Termination: Problem of termination, Termination and Deadlock, Use of diffusing computation: algorithm of dikstra and scholtein, Termination on a ring:algorithmofDijkstra, feijen and van Gasteren, Use of time stamping-Rana's Algorithm</p>	10
4-	Protocols for Data Transfer: Introduction, Protocols for the implementations of CSP:Silberschatz's protocol Bernstein's protocol, Methodsof or scribble broadcasting of Messages: The problem, context of the problem	8

5-	Management of Distributed Data: Nature and Distribution of data Consistency of duplicated data, Detection of mutual in Consistency: algorithm of Parker et.al. Maintaining mutual consistency, initializing a new site, Distribution of control algorithms, Construction of a total ordering, distributed tonicity.	6
6-	Problems Of Gaining Consensus In The Presence Of Uncertainties (Or How To Avoid Byzantine Quarrels):The problem of consensus, Thelamport, shostak, and Pease alga., Solutions using signed messages, Broad casting in a less connected system, Thebabaoğlu and Drummed algo.	6
7-	Pre-final	2
	<b>Total</b>	<b>48</b>

### DISTRIBUTION OF MARKS

#### I Pre-final Examination 20%

Assignment

10%

#### II Pre-final Examination 20%

Final Examination

50%

### REFERENCE BOOKS:

1. Computer Networks and Distributed Processing by James Martin. PHI
2. Distributed systems Concepts and Design by G.Conloris et.al; addisionWesley PHI
3. Distributed Algorithms and protocols by Michel Raynal, John Wiley& Sons. PHI

### Course Outcomes:

Students successfully completing this course will be able to:

1. Explain why to design a distributed system and what the desired properties of such systems are.
2. List the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions.
3. Discuss how the principles are applied in contemporary distributed systems and specific distributed infrastructure such as cloud infrastructure and cloud platforms.
4. Explain how these principles and features affect software design on specific application problems.

5. Analyze workflow applications and workflow management mechanisms on multiple virtual instances and the challenges with respect to secure data storage, communications, configurability, performance, etc., in distributed systems and clouds.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	IMAGE PROCESSING  TIT-406
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er.H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : IMAGE PROCESSING**

**2. Course No : TIT-406**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:** Image processing, and various image Transforms, Image Enhancement Techniques, Image restoration Techniques and methods, image compression and Segmentation used in digital image processing.

**Objectives of the course:**

1. Mathematically represent the various types of images and analyze them.
2. Process these images for the enhancement of certain properties or for optimized use of the resources.
3. Develop algorithms for image compression and coding.

**Theory**

<b>S. No.</b>	<b>Lecture Topics</b>	<b>No. of Lectures</b>
1-	<b>Image Fundamentals</b> -Elements of visual perception, image sensing and acquisition, image sampling and quantization, basic relationships between pixels – neighborhood, adjacency, connectivity, distance measures.	6
2-	<b>Image Enhancements and Filtering</b> -Gray level transformations, histogram equalization and specifications, pixel-domain smoothing filters – linear and order-statistics, pixel-domain sharpening filters – first and second derivative, two-dimensional DFT and its inverse, frequency domain filters – low-pass and high-pass.	8
3-	<b>Color Image Processing</b> -Color models–RGB, YUV, HSI; Color transformations–formulation, color complements, color slicing, tone and color corrections; Color image smoothing and sharpening; Color Segmentation.	7
4-	<b>Image Segmentation</b> - Detection of discontinuities, edge linking and boundary detection, thresholding – global and adaptive, region-based segmentation.	8
5-	<b>Wavelets and Multi-resolution image processing</b> - Uncertainty principles of Fourier Transform, Time-frequency localization, continuous wavelet transforms, wavelet bases and multi-resolution analysis, wavelets and Subband filter banks, wavelet	8
6-	<b>Image Compression-Redundancy</b> –inter-pixel and psycho-visual; Lossless compression – predictive, entropy; Lossy compression- predictive and transform coding; Discrete Cosine Transform; Still image compression standards – JPEG and JPEG-2000.	9

7-	Prefinal	2
	<b>Total :</b>	<b>48</b>

#### DISTRIBUTION OF MARKS

<b>I Pre-final Examination 20%</b>	<b>II Pre-final Examination</b>	<b>20%</b>	
<b>Assignment</b>	<b>10%</b>	<b>Final Examination</b>	<b>50%</b>

#### TEXT/REFERENCE BOOKS:

1. R.C. Gonzalez and R.E. Woods, Digital Image Processing, Second Edition, Pearson Education 3rd edition 2008
2. Anil Kumar Jain, Fundamentals of Digital Image Processing, Prentice Hall of India.2nd edition 2004
3. Murat Tekalp , Digital Video Processing" Prentice Hall, 2nd edition 2015

#### Course Outcomes:

1. To apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
4. To function on multidisciplinary teams and to identify, formulate, and solve engineering problems
5. To use the techniques, skills, and modern engineering tools necessary for engineering practice.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	DATA MINING AND WAREHOUSING  TIT-407
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : DATA MINING AND WAREHOUSING**

**2. Course No : TIT-407**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

### Theory

S. No.	Lecture Topics	No. of Lectures
1-	Data Warehousing: Multidimensional Data Model, OLAP operations, Warehouse schema Data Warehousing architecture, Warehouse server, Metadata, OLAP Engine. Data Mining (DM) Definitions, KDD vs. Data Mining, DBMS vs. DM, DM Techniques Issues and challenges in DM, DM application areas – Case Studies.	10
2-	Methods to discover Association Rules, A Priori Algorithm, Partition Algorithm, Pioneer- Search Algorithm, and Dynamic Item set counting Algorithm, FP-tree Growth Algorithm Incremental Algorithm Border Algorithm, and Generalized Association rule.	8
3-	Introduction, Clustering Paradigms, Partitioning Algorithm, K-Medoid Algorithm, CLARA, CLARANS Hierarchical Clustering, DBSCAN, BIRCH, CURE, Categorical Clustering Algorithms, STIRR, ROCK, CACTUS.	10
4-	Introduction, Tree Construction principle, Best Split, Splitting Indices, Splitting Criteria, Decision Tree construction Algorithms, CART, ID3, C4.5, CHAID, Decision Tree Construction with Presorting, Rain Forest, Approximate Methods, CLOUDS, BOAT, Pruning Technique, Integration of Pruning and construction.	10
5-	Introduction, Temporal Association Rules, Sequence Mining, GSP Algorithm, SPADE, SPIRIT, WUM, Episode Discovery, Event Prediction Problem, Time-Series Analysis, Spatial Mining, Spatial Mining Tasks, Spatial Clustering, Spatial Trends.	8
6-	Pre-final	2
	<b>Total :</b>	<b>48</b>

### DISTRIBUTION OF MARKS

**I Pre-final Examination 20%****Assignment****10%****II Pre-final Examination 20%****Final Examination****50%****REFERENCE BOOKS:**

1. Berson, "Data Warehousing, Data-Mining & OLAP", TMH.
2. Mallach, "Decision Support and Data Warehousing System", TMH.
3. BhavaniThura-is-ingham, "Data-Mining Technologies, Techniques Tools & Trends", CRC Press.
4. Navathe, " Fundamental of Database System", Person Education
5. Margaret H. Dunham,"Data-Mining. Introductory & Advanced Topics, Pearson Education.
6. PeiterAdrians ,DolfZantinge, "Data-Mining," Person Education.

**Course Outcomes:**

Students successfully completing this course will be able to:

1. Identify the scope and necessity of Data Mining & Warehousing for the society.
2. Describe the designing of Data Warehousing so that it can be able to solve the root problems.
3. To understand various tools of Data Mining and their techniques to solve the real time problems.
4. To develop ability to design various algorithms based on data mining tools.
5. To develop further interest in research and design of new Data Mining techniques.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	DECISION SUPPORT SYSTEMS  TIT-408
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : DECISION SUPPORT SYSTEMS**

**2. Course No : TIT-408**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

### Theory

S. No.	Lecture Topics	No. of Lectures
1-	Introduction to decision support systems, decision theory, rational decisions, applicability. Database management systems, MySQL in Linux platform.  Relational database concept, relationships, normal forms, database design for complex systems.	10
2-	Database queries, query languages and query optimization for decision support systems. Implementing SQL through server side scripting. User interfaces, HTML+PHP as user interface (UI) designing tools. Server side programming, interfacing with MySQL etc.	8
3-	Usability considerations of UI, information gathering and presentation for decision support, manipulation of query results.	8
4-	Decision support system models, model-database, simulation models. Mathematical and empirical models, model validation and verification. Output analysis, alternate decisions analysis. Economic order quantity models, implementing a EOQ decision support system, considerations.	10
5-	Application of decision support system in manufacturing systems. Enterprise resource planning implementation of decision support systems and applications. Advancements in decision support systems, knowledge based systems, artificially intelligent systems.	10
6-	Pre-final	2
	<b>Total :</b>	<b>48</b>

## DISTRIBUTION OF MARKS

I Pre-final Examination 20%	II Pre-final Examination 20%		
Assignment	10%	Final Examination	50%

## REFERENCE BOOKS:

1. Decision Support Systems and Intelligent Systems, Seventh Edition, Efraim Turban, Jay E. Aronson, Richard V. McCarthy, Prentice-Hall of India, 2007
2. Decision Support Systems, A Knowledge-Based Approach, Clyde W. Holsapple and Andrew B. Whinston
3. Decision Support Systems For Business Intelligence by Vicki L. Sauter

## Course Outcomes:

Students successfully completing this course will be able to:

1. Recognize the relationship between business information needs and decision making
2. Appraise the general nature and range of decision support systems
3. Appraise issues related to the development of DSS
4. Select appropriate modeling techniques.
5. Analyze, design and implement decision support systems.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	AD-HOC & SENSOR NETWORKS  TIT-409
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)

7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	<p>a. General education: Yes</p> <p>b. Department specialization: Yes</p> <p>c. Student research: No</p> <p>d. Outgrowth of instructors research programme: No</p>
10.	Relation to other courses :	<p>a. Pre-requisite: NIL</p> <p>b. An Introductory survey of knowledge represented by the department: No</p> <p>c. An Introductory survey of special area of knowledge: No</p> <p>d. A further development of courses: No</p> <p>e. An Introductory survey of special area of knowledge represented by some other department: No</p> <p>f. A summarizing or integrated course: No</p> <p>g. In your judgment does this course overlap to a considerable extent with any other course: No</p>
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities	Required facilities exist.

	:	
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

<b>Course Title</b>	<b>:</b>	<b>Ad-hoc &amp; Sensor Networks</b>
<b>Course No.</b>	<b>:</b>	<b>TIT-409</b>
<b>Credit Hours</b>	<b>:</b>	<b>3(3-0-0)</b>
<b>Prerequisite</b>	<b>:</b>	<b>Nil</b>

**Catalogue Description:** issues in Ad-Hoc Wireless Networks, routing protocols, Sensor Network, WSN routing, Mesh Networks, Vehicular Mesh Networks.

### **Objectives of the course:**

1. This course provides students the opportunity to learn the advance concept of Adhoc& Sensor Networks.
2. It provides the student to know advance concepts in Ad-Hoc Wireless Networks , routing protocols, Sensor Network, WSN routing, Mesh Networks, Vehicular Mesh Networks and to know the constraints of the wireless physical layer that affect the design an performance of Ad-hoc sensor network and Architecture.

### **Theory**

<b>S. No.</b>	<b>Lecture Topics</b>	<b>No. of Lectures</b>
1-	Issues in Ad-Hoc Wireless Networks. MAC Protocols overview, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.	6
2-	Classifications of routing protocols, Hierarchical and Power aware, Multicast routing Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc, Feedback based Ad Hoc TCP, and Split TCP.	8
3-	Introduction to Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols, self-organizing, Hybrid TDMA/FDMA and CSMA based MAC.	8
4-	Issues in WSN routing – OLSR, AODV. Localization Indoor and Sensor Network Localization. QoS in WSN.	8
5-	Mesh Networks, MAC IEEE 802.11s Architecture, Opportunistic routing, Self configuration and Auto configuration, Capacity Models Fairness, Heterogeneous Mesh Networks, and Vehicular Mesh Networks.	8
6-	Issues in Ad-Hoc Wireless Networks. MAC Protocols overview, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.	8
7-	Pre-final	2
	<b>Total</b>	<b>48</b>

## **DISTRIBUTION OF MARKS**

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

## **REFERENCE BOOKS:**

1. C. Siva Ram Murthy and B. Smanoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
2. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufman Publishers, 2004.
3. C.K. Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
4. Thomas Krag and Sebastin Buetrich, "Wireless Mesh Networking", O'Reilly Publishers, 2007.

## **Course Outcomes:**

Students successfully completing this course will be able to:

1. Describe an adhoc network and analyze various technologies associated with it.
2. Analyze transport layer and various protocols associated with it.
3. Analyze adhoc & sensor based networks and compute various parameters associated with it..
4. Understand routing challenges and design issues in wireless.
5. Learn routing strategies in wireless sensor networks.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	MACHIME LEARNING  TIT-410
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : MACHINE LEARNING**

**2. Course No : TIT-410**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description:**

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	Evolution of Computing-Soft Computing Constituents – from Conventional AI to Computational Intelligence-Machine Learning Basics.	8
2.	Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, crossover, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem), Differences &	10
3.	Machine Learning using Neural Network, Adaptive Networks– Feed Forward Networks – Supervised Learning Neural Networks– Radial Basis Function Networks– Reinforcement Learning– Unsupervised Learning Neural Networks– Adaptive Resonance	10
4.	Fuzzy Sets– Operations on Fuzzy Sets– Fuzzy Relations– Membership Functions– Fuzzy Rules and Fuzzy Reasoning– Fuzzy Inference Systems– Fuzzy Expert Systems– Fuzzy Decision Making	8
5.	Adaptive Neuro - Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling– Classification and Regression Trees– Data Clustering Algorithms– Rule base Structure Identification– Neuro-Fuzzy Control– Case Studies.	10
6.	Pre-final	2
	<b>Total</b>	<b>48</b>

**DISTRIBUTION OF MARKS**

I Pre-final Examination                    20%                    II Pre-final Examination                    20%

Assignments                                 10%                    Final Examination                        50%

**REFERENCE BOOKS:**

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003

2. Kwang H. Lee, "First course on Fuzzy Theory and Applications", Springer– Verlag Berlin Heidelberg, 2005

**Course Outcomes:**

On completion of the course students will be able to:

1. Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
2. Have an understanding of the strengths and weaknesses of many popular machine learning approaches.
3. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
4. Design and implement various machine learning algorithms in a range of real-world applications.

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	Intellectual Property Rights  TIT-366
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

- 1. Course Title** : **Intellectual Property Rights**  
**2. Course No** : **TIT-366**  
**3. Credit Hours** : **3(3-0-0)**  
**4. Prerequisite** : **NIL**  
**5. Syllabus/Catalogue Description**

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Introduction, Protection of Intellectual Property, Types of Intellectual Property Rights: Patents, Trademarks, Copyrights, Industrial Designs, Geographical Indications, International Conventions: Brief Background	6
2.	Patents: General Introduction of a Patent, Product / Design Patents & Terminology, Patent Claims, Patent Life and Geographical Boundaries, Utilization of Intellectual Patents, Patent Search, Patent Databases & Library, Patent Acts & Rules, Legal Decision making process, Ownership of Patents	8
3.	Obtain IPR Rights: Elements of patentability, Patentable subject matter, Utility, novelty and non-obviousness, Illustrations: Using business method patents in commerce, Worldwide Patent Protection (TRIPS, Paris Convention, PCT and Patent Harmonization), Indian & US Patent Acts & Latest Amendments.	8
4.	Patent Valuations & Business Concerns : Meaning of Trademarks, Different kinds of marks (brand names, logos, signatures, symbols), Use of a Mark, Registration of Trademarks Procedure, Opposition to Registration-Procedure, Domain Names ,Nature of Copyright, Copyright pertaining to Software/Internet, Nature of Geographical Indications, Conditions & Procedure for Registration, Offences.	8
5.	Commercializing and Future Developments of IPR: Antitrust Laws, Employee Confidentiality, Assignment of Intellectual Property Rights, Technology Transfer Agreements, Intellectual Property Issues in the Sale of Business, Care & Maintenance of Confidential Information.	8
6.	Legal Auditing of Intellectual ,IPR developments for Database, Indian Traditional Medicine & IP Protection , Folklore ,Patenting of Life Forms, International Traditional Medicines & Health Foods.	8
7.	Pre-final	2
	<b>Total</b>	<b>48</b>

#### DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

**REFERENCE BOOKS:**

1. IEEE papers.
2. ACM papers.
3. SCI journals
4. Intellectual Property Rights and the Law, Dr. G.B. Reddy, Gogia Law Agency.
5. Law relating to Intellectual Property, Dr. B.L.Wadehra, Universal Law Publishing Co.
6. IPR P. Narayanan
7. Law of Intellectual Property, Dr.S.R. Myneni, Asian Law House,

**Course Outcomes:**

- 1- The students once they complete their academic projects
- 2- They get awareness of acquiring the patent and copyright for their innovative works.
- 3- They also get the knowledge of plagiarism in their innovations which can be questioned legally.

**PROPOSAL FOR A NEW COURSE**

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	MANAGEMENT INFORMATION SYSTEMS  TIT-411
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes

8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.

19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

**1. Course Title : MANAGEMENT INFORMATION SYSTEMS**

**2. Course No : TIT-411**

**3. Credit Hours : 3(3-0-0)**

**4. Prerequisite : NIL**

**5. Syllabus/Catalogue Description**

**CATALOGUE DESCRIPTION:**

Introduction to management information systems, system approach to management and information, MIS planning and development analysis, design tools, data modeling, MIS design and evaluation, Technological aspects of MIS.

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Basic definitions of information systems (IS) and MIS etc, Levels of management, concept and types of management information, functions and roles of management information needs of managers, properties of useful management information characteristics of MIS, structure of MIS.	6
2.	System Approach To Information And Management: System concepts, feedback and control, control of system performance, other system characteristics, a business as a system, IS concepts, IS model, IS activities, IS resources, operations information systems, IS for management decision making, information reporting systems, decision support system, executive information system.	8
3.	Mis Planning and Development Analysis and Design Tools:  Introduction to planning terminology, types of planning, role of planning, tactical and operational planning, planning methodologies, business system planning(BSP), BSP approach, critical success factors(CSF), CSF approach, development cycle,	8
4.	Systems investigation, planning and feasibility, organizational environment, system requirements analysis, system design, user interface design, data design, process design, logical system design, physical system design.	8
5.	Data Modeling: Hierarchical, Network, Relational, Micro-based, client server models.	8
7.	Mis Design and Evaluation: Gross design, detailed design, steps in the design of MIS, Evaluation, technological and behavioral aspects,	8

8.	Pre-final	2
	<b>Total</b>	<b>48</b>

### **DISTRIBUTION OF MARKS**

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

### **REFERENCE BOOKS:**

1. Management Information System by O. Brain (TMH Pub.)
2. Management Information System by Jawadegar (TMH Pub.)

### **Course Outcomes:**

- 1 Describe the role of information technology and information systems in business
- 2 Record the current issues of information technology and relate those issues to the firm
- 3 Reproduce a working knowledge of concepts and terminology related to information technology
- 4 Appraise the knowledge previously acquired of Microsoft Office
- 5 Analyze how information technology impacts a firm
- 6 Interpret how to use information technology to solve business problems
- 7 Illustrate the impact of information systems in society

## PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles:  Course Titles.	SIMULATOIN & MODELING  TIT-412
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme: No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge: No d. A further development of courses: No e. An Introductory survey of special area of knowledge represented by some other department: No f. A summarizing or integrated course: No g. In your judgment does this course overlap to a considerable extent with any other course: No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require	Not required

	additional staff over and above :	
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

- 1. Course Title : Simulation and Modeling**
- 2. Course No :TIT-412**
- 3. Credit Hours : 3(3-0-0)**
- 4. Prerequisite : NIL**
- 5. Syllabus/Catalogue Description**

**Objectives of the course:**

1. The course aims to teach the generic (i.e., tool and application domain independent) concepts of modelling and simulation.
2. By the end of this course, you should have a deep understanding of the concepts of modelling and simulation of dynamic systems using a variety of formalisms.
3. Able to build modelling and simulation systems.
4. Ample background to understand and use existing modelling and simulation systems.
5. The course presents general modelling and simulation principles by applying them to concrete problems.

**THEORY**

S. No.	Lecture Topics	No. of Lectures
1.	Simulation Basics Handling Stepped and Event-based Time in Simulations Discrete versus Continuous Modelling Numerical Techniques Sources and Propagation of Error	6
2.	Dynamical, Finite State, and Complex Model Simulations Graph or Network Transitions Based Simulations Actor Based Simulations Mesh Based Simulations Hybrid Simulations	8

3.	Converting to Parallel and Distributed Simulations  Partitioning the Data  Partitioning the Algorithms  Handling Inter-partition Dependencies	8
4.	Probability and Statistics for Simulations and Analysis  Introduction to Queues and Random Noise  Random Variates Generation  Sensitivity Analysis	8
5.	Simulations Results Analysis and Viewing Tools  Display Forms: Tables, Graphs, and Multidimensional Visualization  Terminals, X and MS Windows, and Web Interfaces  Validation of Model Results	8
7.	Open Source Software: Category of Open Source Software. OSS for podcasts, RDBMS, online social networks, etc. open source bibliometric softwares like pajek, ucinet, etc	8
8.	Pre-final	2
	<b>Total</b>	<b>48</b>

#### DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

#### REFERENCE BOOKS:

1. A plethora of modelling formalisms: Paul A. Fishwick. Simulation Model Design and Execution, building digital worlds: Prentice Hall, 1995.
2. The foundations of modelling and simulation: Bernard P. Zeigler, Herbert Praehofer, and Tag Gon Kim. Theory of Modelling and Simulation: Integrating Discrete Event and Continuous Complex Dynamic Systems. Academic Press, second edition, 2000. Chapters 1 - 9, 17, 18.
3. Random variates, random number generation: Averill M. Law and David W. Kelton. Simulation Modeling and Analysis. McGraw-Hill, 1991. Chapters 8, 9.
4. Discrete event world views: Osman Balci. The implementation of four conceptual frameworks for simulation modeling in high-level languages. In M. Abrams, P. Haigh, and J. Comfort, editors,

- Proceedings of the 1988 Winter Simulation Conference, pages 287-295. Society for Computer Simulation International (SCS), 1988.
5. The process interaction language GPSS: Geoffrey Gordon. System Simulation. Prentice Hall of India, second edition, 1996. Chapters 8 - 10.
  6. Continuous system modelling theory, causality, Forrester System Dynamics: Francois E. Cellier. Continuous System Modeling. Springer-Verlag, New York, 1991. Chapters 1, 2, 5, 7, 10, 11, 15.
  7. Numerical simulation, System Dynamics: Hartmut Bossel. Modeling and Simulation. A.K. Peters, Ltd., 289 Linden Street, Wellesley, MA 02181, 1994. Chapters 1 - 3.
  8. Petri Nets and Timed Models: Christos G. Cassandras. Discrete Event Systems. Irwin, 1993.
  9. Statecharts and applications in object-oriented software design: David Harel. On visual formalisms. Communications of the ACM, 31(5):514-530, May 1988.

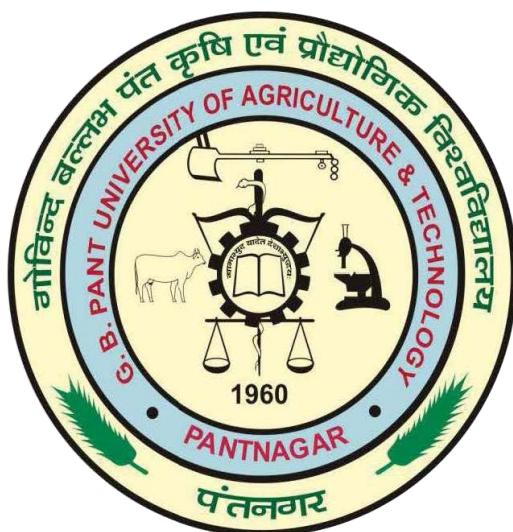
### **Course Outcomes**

Upon successful completion of this course, the student will be able to:

1. Characterize engineering systems in terms of their essential elements, purpose, parameters, constraints, performance requirements, sub-systems, interconnections and environmental context.
2. Engineering problem modeling and solving through the relationship between theoretical, mathematical, and computational modeling for predicting and optimizing performance and objective.
3. Mathematical modeling real world situations related to engineering systems development, prediction and evaluation of outcomes against design criteria.
4. Develop solutions and extract results from the information generated in the context of the engineering domain to assist engineering decision making.
5. Interpret the model and apply the results to resolve critical issues in a real world environment.
6. Develop different models to suit special characteristics of the system being modeled.

# **Proposal for Graduation Requirement Bachelor of Technology In Mechanical Engineering Batch 2018-19**

**(As per AICTE Model Curriculum 2018)**



# ***Department of Information Technology College of Technology***

## **GRADUATION REQUIREMENT FOR THE ACADEMIC YEAR 2018-19 B.Tech. (Mechanical Engineering) - 2018 Batch**

**A.**

<b>Sl. No.</b>	<b>Course Category</b>	<b>Course No.</b>	<b>Course Name</b>	<b>Credit Hrs. (Load Distribution) Contact Hrs.</b>
1.	BSC	B+PP-199	Mechanics	5(3-1-2)6
2.	BSC	BPP-201	Oscillations, Waves and Optics	4(3-1-0)4
3.	BSC	BPM-143	Calculus and Linear Algebra	4(3-1-0)4
4.	BSC	BPM-153	Calculus, ODE & Complex Variabgfiles	5(4-1-0)5
5.	BSC	BPC-102	Chemistry I	4(3-0-3)6
6.	BSC	BHS-186	English	3(2-0-2)4
7.	ESC	TEE-104	Basic Electrical Engineering	5(3-1-2)6
8.	ESC	TCE-114	Engineering Graphics & Design	3(1-0-4)5
9.	ESC	TIT-121	Programming for Problem Solving	4(3-0-2)5
10.	ESC	TIP- 103	Workshop Practice	3(1-0-4)5
11.	ESC	TEC- 263	Basic Electronics Engineering	4(3-1-0)4
12.	ESC	TME-214	Machine Drawing	1(0-0-2)2
13.	MC	BHS -188	Industrial Sociology	3(3-0-0)3
14.	MC	TME-109	Int. Environmental Engineering & Disaster Management	3(3-0-0)3
15.	MC	NSS -101	NSS	1(0-0-2)2
16.	MC	NSS -102	NSS	0(0-0-0)0
17.	MC	NSS -201	NSS	1(0-0-2)2
18.	MC	NSS -202	NSS	0(0-0-0)0
19.	MC	TWP-101	Work Programme	1(0-0-2)2
20.	MC	TME -191	Practical Training I	2 weeks
21.	MC	TME- 291	Practical Training II	2 weeks
22.	MC	TME 391	Practical Training III	4 weeks

23.	ESC	BPM 242	PDE, Probability and Statistics	5(4-1-0)5
24.	MC	TIC-100	Induction Programme	2-3 weeks
25.	ESC	TIP-305	Manufacturing Processes	4(3-0-2)5
26.	ESC	TIP-306	Manufacturing Technology	4(3-0-2)5
27.	ESC	TIP-403	Automation in Manufacturing	3(3-0-0)3

### **B. Professional Core Courses**

Sl. No.	Course Category	Course No.	Course Name	Credit Hrs. (Load Distribution) Contact Hrs.
1.	PCC	TME-201	Engineering Mechanics	4(3-1-0)4
2.	PCC	TME-210	Fluid Mechanics	4(3-0-2)5
3.	PCC	TME-206	Instrumentation & Control	4(3-0-2)5
4.	PCC	TME-216	Mechanics of Solids	4(3-0-2)5
5.	PCC	TME-218	Engineering Thermodynamics	4(3-1-0)4
6.	PCC	TME-255	Material Science & Engineering	4(3-0-2)5
7.	PCC	TME-303	Refrigeration and Air Conditioning	4(3-0-2)5
8.	PCC	TME-318	Design of Machine Elements	4(3-0-2)5
9.	PCC	TME-424	Fluid Machinery & Systems	4(3-0-2)5
10.	PCC	TME-322	Kinematics of Machines	3(2-0-2)4
11.	PCC	TME-323	Theory of Machines	4(3-0-2)5
12.	PCC	TME-325	Heat Transfer	4(3-0-2)5
13.	PCC	TME-319	Internal Combustion Engines	4(3-0-2)5
14.	PCC	TME-416	Advanced Solid Mechanics	4(3-1-0)4
15.	PCC	TME-429	Numerical Methods for Mechanical Systems	3(2-0-2)4
16.	Proj.	TME-495 A	Project I	4(0-0-8)
17.	Proj.	TME-495 B	Project II	8(0-0-16)

### **C. Professional Elective Courses**

Sl. No.	Course Category	Course No.	Course Name	Credit Hrs. (Load Distribution) Contact Hrs.
1	PEL	TME-457	Gas Dynamic & Jet Propulsion	3(2-0-2)4
2	PEL	TME-458	Finite Element Analysis	3(2-0-2)4
3	PEL	TME-444	Mechanical Vibrations	3(2-0-2)4
4	PEL	TME-459	Advance Machine Design	3(2-0-2)4
5	PEL	TME-465	Experimental Stress Analysis	3(2-0-2)4
6	PEL	TME-466	Non Conventional Energy Source And Systems	3(2-0-2)4
7	PEL	TME-430	Composite Materials	3(2-0-2)4
8	PEL	TME-431	Mechatronics Systems	3(2-0-2)4
9	PEL	TME-463	Computer Aided Design	3(2-0-2)4
10	PEL	TME-464	Automobile Engineering	3(2-0-2)4
11	PEL	TME-467	Power Plant Engineering	3(2-0-2)4
12	PEL	TME-468	Solar Energy Thermal Process	3(2-0-2)4
13	PEL	TME-469	Experimental Methods in Thermal Science	3(2-0-2)4

14	PEL	TME-470	Computational Fluid Dynamics and Heat Transfer	3(2-0-2)4
15	PEL	TME-472	Fatigue, Creep and Fracture	3(2-0-2)4
16	PEL	TME-474	Tribology	3(2-0-2)4
17	PEL	TME-476	Design of Refrigeration Systems	3(2-0-2)4
18	PLE	TME-475	Nano Engineering Materials	3(2-0-2)4
19	PEL	TME 480	Product Innovation and Design	3(2-0-2)4

**SEMESTER WISE LOAD DISTRIBUTION FOR 2018 BATCH**

Sl. No.	Course Category	Course No.	Course Name	Credit Hrs. (Load Dist.) Contact Hr
<b>I Semester</b>				
1	ESC	TIT-121	Programming for Problem Solving	4(3-0-2)5
2	BSC	BPM-143	Calculus & Linear Algebra	4(3-1-0)4
3	ESC	TEE-104	Basic Electrical Engineering	5(3-1-2)6
4	BSC	BPC-102	Chemistry I	4(3-0-3)6
5	MC	TWP-101	Work Programme	1(0-0-2)2
6	MC	TIC 100	Induction Programme	2-3 weeks
7	MC	TME-109	Int. Environmental Engg. & Disaster Management	3(3-0-0)3
Total Credits: 21				
<b>II. Semester</b>				
1	BSC	BPM-153	Calculus ODE & Complex Variables	5(4-1-0)5
2	ESC	TIP-103	Workshop Practices	3(1-0-4)5
3	ESC	TCE-114	Engineering Graphics & Design	3(1-0-4)5
4	BSC	BHS-186	English	3(2-0-2)4
5	BSC	BPP-199	Mechanics	5(3-1-2)6
6	MC	BHS 188	Industrial Sociology	3(3-0-0)3
7	MC	TME-191	Practical Training I	2 Weeks
Total Credits: 21				
<b>III. Semester</b>				
1	BSC	BPP-201	Oscillations, Waves and Optics	4(3-1-0)4
2	BSC	BPM-242	PDE, Probability & Statistics	5(4-1-0)5
3	ESC	TEC-263	Basic Electronics Engineering	4(3-1-0)4
4	PCC	TME-201	Engineering Mechanics	4(3-1-0)4
5	PCC	TME-255	Material Science & Engineering	4(3-0-2)5
6	MC	NSS-101	NSS	1(0-0-2)2
Total Credits: 22				
<b>IV. Semester</b>				
1	PCC	TME-210	Fluid Mechanics	4(3-0-2)5
2	PCC	TIP-305	Manufacturing Processes	4(3-0-2)5
3	ESC	TME-429	Numerical Methods for Mechanical Systems	3(2-0-2)4
4	PCC	TME-216	Mechanics of Solids	4(3-0-2)5
5	PCC	TME-218	Engineering Thermodynamics	4(3-1-0)4
6	PCC	TME-206	Instrumentation & Control	4(3-0-2)5
7	PCC	TME-214	Machine Drawing	1(0-0-2)2
8	MC	TME-291	Practical Training II	2 Weeks
9	MC	NSS 102	NSS	0(0-0-0)0
Total Credits: 24				

<b>V. Semester</b>				
1	PCC	TME- 325	Heat Transfer	4(3-0-2)5
2	PCC	TME-319	Internal Combustion Engines	4(3-0-2)5
3	PCC	TME-322	Kinematics of Machines	3(2-0-2)4
4	PEL	TME-	Elective I	3(2-0-2)4
5	PEL	TME-	Elective II	3(2-0-2)4
6	OEL		Open Elective -I	3(L-T-P)
7	MC	NSS 201	NSS	1(0-0-2)2
				Total Credits: 21

<b>VI. Semester</b>				
1	PCC	TME-323	Theory of Machines	4(3-0-2)5
2	PCC	TIP-306	Manufacturing Technology	4(3-0-2)5
3	PCC	TME-318	Design of Machine Elements	4(3-0-2)5
4	PCC	TME-303	Refrigeration and Air Conditioning	4(3-0-2)5
5	PEL	TME-	Elective III	3(2-0-2)4
6	PT	TME-391	Practical Training III	4Weeks
7	PEL	TME-	Elective IV	3(2-0-2)4
8	MC	NSS-202	NSS	0(0-0-0)0
				Total Credits: 22

<b>VII. Semester</b>				
1	PCC	TIP-403	Automation in Manufacturing	3(3-0-0)3
2	PCC	TME-424	Fluid Machinery & Systems	4(3-0-2)5
3	PCC	TME-416	Advanced Solid Mechanics	4(3-1-0)4
4	PEL	TME-	Elective V	3(2-0-2)4
5	OEL		Open Elective II	3(L-T-P)
6	Proj	TME-495 A	Project I	4(0-0-8)
				Total Credits: 21

<b>VIII. Semester</b>				
1	PEL	TME-	Elective VI	3(2-0-2)4
2	OEL		Open Elective III	3(L-T-P)
3	OEL		Open Elective IV	3(L-T-P)
4	Proj	TME- 495 B	Project II	8(0-0-16)
				Total Credits: 17

**Total Credits Degree Programme: 169**

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*Note:*

1. Semester wise interchange in the course curriculum may be done as per the availability of the experts and lab facilities.

**Graduation requirement for Diploma Holders admitted to  
2<sup>nd</sup> Year B. Tech. (Mechanical Engineering) - 2018 Batch**

**a) Pre-Professional Courses (Core Courses):**

Course No.	Course Name	Credit Hrs.(Load distribution)	Pre- requisites
			Contact Hrs.
BPM-233	Engineering Maths-III	2(2-1-0)3	BPM-132*
TIP-201	Manufacturing Processes	3(1-0-6)7	TIP-101
BPM-261	Programming in Fortran &C	3(3-2-0)5	Nil
BPS-218	Probability, Statistics & Queuing Models	2(2-1-0)3	Nil
CE-131	Solid Mechanics	4(3-1-2)6	Nil
TCE-240	Fluid Mechanics	3(2-1-2)5	Nil
TME-101	Thermodynamics & Heat Engines	4(3-1-2)6	Nil
TME-251	Material Science	4(3-1-2)6	Nil
NSS-101	N.S.S	1(0-0-2)2	Nil
NSS-102	N.S.S	0	Nil
NSS-201	N.S.S	1(0-0-2)2	Nil
NSS-202	N.S.S	0	Nil
TWP-101	Work Programme	1(0-0-3)3	Nil
TME-231	Machine Drawing	2(0-0-4)4	TCE-100*
TME-213	Numerical Methods for Mechanical Engineers	2(2-1-0)3	Nil
TME-241	Kinematics of Machine	3(2-1-2)5	Nil

\* These pre-requisites are waived for these students

**b) Professional Courses:**

<b>Course No.</b>	<b>Course Name</b>	<b>Credit Hrs. (Load distribution)</b>	<b>Pre- requisites</b>
			<b>Contact Hrs.</b>
TME-211	Theory of fluid Flow	3(3-1-0)4	TCE-240
TME-301	Heat and Mass Transfer	4(3-1-2)6	TME-101
TME-310	Fluid Machinery & System-I	4(3-1-2)6	TME-211
TME-342	Theory of Machines	4(3-0-2)4	TME-241
TME-351	Strength of Materials	3(3-1-0)4	Nil
TME-343	Mechanical Vibrations	3(2-1-2)5	Nil
TME-212	Internal Combustion Engines	4(3-1-2)6	TME-101
TME-313	Fluid Machinery & Systems-II	4(3-1-2)6	TME-211
TME-302	Ref. and Air Conditioning	4(3-0-2)5	TME-101
TME-421	Power Plant Engg. & Energy conversion	4(3-0-2)5	TME-101
TIP-352	Engineering and Managerial Economics	3(3-1-0)4	Nil
TIP-304	Production Engineering	4(3-0-2)5	TIP-201
TIP-455	Industrial Organization and Management	3(2-0-2)4	Nil
TME-333	Machine Design-I	4(3-0-2)5	TME-231
TME-434	Machine Design-II	4(3-0-2)5	TME-333

TME-435	Measurement & Control	4(3-1-2)6	Nil
TIP-353	Work System Design	3(3-2-0)5	Nil
TME-462	Computer Aided Design	3(3-2-0)5	Nil
TME-	Elective-I	4/3 6/5	
TME-	Elective-II	4/3 6/5	
TME-	Elective-III	4/3 6/5	
TME-491	Practical Training	30 days	
TME-492	Seminar	1(0-0-3)3	
TME-490(A)	Project	2(0-0-6)6	
TME-490(B)	Project	4(0-0-12)12	

**C) Elective Courses:**

Course No.	Course Name requisites	Credit Hrs. (Load distribution)	Pre-
Contact Hrs.			
TME-425	Nuclear Engineering	3(3-2-0)5	Nil
TME-405	Planning and Design of Refrigeration Systems	3(3-2-0)5	TME-302
TME-426	Solar Thermal Processes	3(3-2-0)5	TME-301
TME-450	Gas Dynamics and Jet Propulsion	3(3-2-0)5	TME-211
TME-460	Automobile Engineering	3(3-2-0)5	TME-212
TME-417	Design of Rotodynamic Pumps	3(3-2-0)5	Nil
TME-436	Bearing and Lubrication	3(3-2-0)5	Nil
TME-437	Pressure Vessel Design	3(3-2-0)5	Nil
TME-453	Experimental Stress Analysis	3(3-2-0)5	TME-351
TME-418	Design of Blowers and	3(3-2-0)5	TME-310

	Rotary Compressors		
TME-427	Non-Conventional Energy Sources and Systems	3(3-2-0)5	Nil
TME-406	Fuels and Combustion	3(2-0-2)4	Nil
TME-404	Introduction to Finite Element Methods in Engg.	3(3-2-0)5	Nil

All other courses of 400 series of any other department of College of Technology subject to the fulfilment of Pre-requisite of the course.

**SEMESTERWISE COURSE DISTRIBUTION for Diploma Holders admitted to 2<sup>nd</sup> Year B. Tech. (Mechanical Engineering) - 2018 Batch**

S.No.	Course No.	Course Name	Credit Hrs. (Load distribution)	Pre-requisites	Contact Hrs.
<b>I Semester</b>					
1.	TME-101	Thermodynamic & Heat Engines	4(3-1-2)6		
2.	TME-251	Material Science	4(3-1-2)6		
3.	BPM-233	Engg. Maths III	2(2-1-0)3		
4.	TCE-240	Fluid Mechanics	3(2-1-2)5		
5.	BPM-261	Programming in Fortran & C	3(3-2-0)5		

6.	TME-241	Kinematics of Machines	3(2-1-2)5
7.	NSS-101	N. S. S.	1(0-0-2)2
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			20      32

### **II Semester**

1.	TCE-131	Solid Mechanics	4(3-1-2)6
2.	TIP-201	Manufacturing Process	3(1-0-6)7
3.	TME-211	Theory of Fluid Flow	3(3-1-0)4
4.	TME-231	Machine Drawing	2(0-0-4)4
5.	BPS-218	Probability, Statistics & Queuing Models	2(2-1-0)3
6.	TME-212	Internal Combustion Engines	4(3-1-2)6
7.	TME-213	Numerical Methods for Mechanical Engineers	2(2-1-0)3
8.	NSS-102	N. S. S.	0
			_____
			20      33

### **III Semester**

1.	TME-351	Strength of Materials	3(3-1-0)4
2.	TME-301	Heat and Mass Transfer	4(3-1-2)6
3.	TME-310	Fluid Machinery & System-I	4(3-1-2)6
4.	TME-302	Ref. & Air Conditioning	4(3-0-2)5
5.	TME-342	Theory of Machines	4(3-0-2)5
6.	TWP-101	Work Programme	1(0-0-3)3
7.	NSS-201	N. S. S.	1(0-0-2)2
			_____
			21      31

### **IV Semester**

1.	TME-343	Mechanical Vibrations	3(2-1-2)5
2.	TME-313	Fluid Machinery & Systems-II	4(3-1-2)6

3.	TIP-352	Engineering and Managerial Economics	3(3-1-0)4
4.	TIP-304	Production Engineering	4(3-0-2)5
5.	TME-333	Machine Design-I	4(3-0-2)5
6.	TIP-353	Work System Design	3(3-2-0)5
7.	NSS-202	N. S. S.	0
8.	TME-491	Practical Training	30 days
			-----
			21 30

## **V Semester**

1.	TME-421	P.P.E. & E.C.	4(3-0-2)5
2.	TIP-455	Industrial Organization & Management	3(2-0-2)4
3.	TME-434	Machine Design II	4(3-0-2)5
4.	TME-462	Computer Aided Design	3(3-2-0)5
5.	TME-435	Measurement & Control	4(3-1-2)6
6.	TME-490(A)	Project	2(0-0-6)6
			_____
			20      31

## **VI Semester**

1.	TME-	Elective I	4/3  6/5
2.	TME-	Elective II	4/3  6/5
3	TME-	Elective III	4/3  6/5
4.	TME-492	Seminar	1(0-0-3)3
5.	TME-490(B)	Project	4(0-0-12)12
			_____
			17/14  33/30

**Grand Total**

**119/116  190/187**

## **PROPOSAL FOR A NEW COURSE**

<b>PEL</b>	<b>TME- 314</b>	<b>Machine Drawing</b>	<b>1(0-0-2)2</b>
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### **Course Objective**

1. To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
2. To prepare you to communicate effectively
3. To prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

### **Course Content:**

#### **Unit I**

Layout of drawing sheet, Conventional Representation of common features.

Orthographic projection- 1<sup>st</sup> angle and 3<sup>rd</sup> angle Projections Missing line problems, Isometric views.

#### **Unit II**

Rivet heads and riveted joints

Nuts and Bolts: Nut, bolt and washer assembly.

#### **Unit III**

Sectioning methods and types. Sectioning problems for Footstep bearing, Cone pulley and stepped pulley.

#### **Unit IV**

Cotter Joint, Stuffing Box, Screw Jack, Couplings, Brackets, Stop valves,

#### **Unit V**

Assembly drawings of Footstep Bearing, Knuckle Joint, Plumber Block, Connecting rod

### **Outcomes:**

1. Introduction to engineering design and its place in society
2. Exposure to the visual aspects of engineering design
3. Exposure to engineering graphics standards
4. Able to understand how to assemble various components

**TEXT BOOKS:**

1. Machine Drawing by N.D. Bhatt and V.M. Panchal

**REFERENCE BOOKS:**

1. Engineering Drawing by A.C, Parkinson
2. Text Book of Machine Drawing by Laxminarayana and M.L. Mathur
3. Elementary Engg. Drawing by N.D. Bhatt

## **PROPOSAL FOR A NEW COURSE**

22.	College	College of Technology, Pantnagar
23.	Department	Mechanical Engineering
24.	Title of the Course & Course No.	<b>Engineering Mechanics (TME-201)</b>
25.	Catalogue Description	Attached
26.	To be offered	B.Tech. Mechanical Engineering
27.	Credits	<b>4(3-1-0)4</b>
28.	Is this a new Course	Yes
29.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
30.	General educational purpose	E. General Education <b>Yes</b> F. Department specialization <b>Yes</b> G. Students Research <b>Yes</b> H. Outgrowth of instructors research Program <b>No</b>
31.	Relation to other courses	H. Pre-requisite <b>Nil</b> I. An introductory survey of knowledge represented by the department <b>No</b> J. An introductory survey of a special area of knowledge <b>No</b> K. A further development of course <b>No</b> L. An introductory survey of a special area of knowledge represented by some other department <b>No</b> M. A summarizing or integrated course <b>No</b> N. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
32.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
33.	The course will not replace my existing courses	New Course
34.	The courses will not require additional staff over and above	Not required
35.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
36.	Topical outline : Lecture	Attached
37.	Practical:	Yes
38.	Text Book and supplementary reading	Attached
39.	Classroom, Laboratory and other facilities:	Required facilities exist
40.	Would the introduction of this courses required additional staff:	No
41.	Proposed by	Dr. Neeraj Bisht
42.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-201	Engineering Mechanics	4(3-1-0)4
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### **Course Objectives:**

1. To understand the concept of statics and apply them to structural problems
2. To understand the concept of friction and moment of inertia
3. To understand the theory of virtual work and energy methods
4. To understand the kinematics and kinetics involved with rigid bodies

### **Unit I: Basics of Statics:**

Fundamental principles & concepts: Vector algebra, Newton's laws, gravitation, force (external and internal, transmissibility), couple, moment (about point and about axis), Varignon's theorem, resultant of concurrent and non-concurrent coplanar forces, static equilibrium, free body diagram, reactions. Problem formulation concept; 2-D statics, two and three force members, alternate equilibrium equations, constraints and static determinacy; 3-D statics.

### **Unit II: Analysis of structures:**

Trusses: Assumptions, rigid and non-rigid trusses; Simple truss (plane and space), analysis by method of joints, Analysis of simple truss by method of sections; Compound truss (statically determinate, rigid, and completely constrained). Analysis of frames and machines. Internal forces; Beams: types of loading and supports; shear force, bending moment, and axial force diagrams. Beams (contd): shear force and bending moment diagrams and equations relating them with external load. Cables (coplanar): assumptions, parabolic and catenary cables.

### **Unit III: Friction and Moment of Inertia**

Coulomb dry friction laws, simple surface contact problems, friction angles, types of problems, wedges. Disk friction (thrust bearing); Belt friction (flat, V). Square-threaded screw (self locking, screw jack). Journal bearings (axle friction). Wheel friction and rolling resistance. First moment of mass and center of mass, centroids of lines, areas, volumes, composite bodies. Area moments- and products- of inertia, radius of gyration, transfer of axes, composite areas. Rotation of axes, principal area-moments-of-inertia, Mohr's circle. Second moment of mass, Mass moments- and products- of inertia, radius of gyration, transfer of axes, flat plates (relation between area- and mass- moments- and products- of inertia), composite bodies. Rotation of axes, principal mass-moments-of-inertia.

### **Unit IV: Virtual Work and Energy Method**

Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency.

Conservative forces and potential energy (elastic and gravitational), energy equation for equilibrium. Applications of energy method for equilibrium. Stability of equilibrium.

### **Unit V: Plane kinematics and kinetics of rigid bodies**

Rotation; Parametric motion. Relative velocity, instantaneous center of rotation. Relative acceleration, rotating reference frames. Rotating reference frames, 3-part velocity and 5-part acceleration relations, Coriolis acceleration. Applications of rotating reference frames. Kinetics of system of particles and derivation of moment equation. Translation. Fixed axis rotation; General planar motion. General planar motion. Work – kinetic energy, potential energy. Potential energy (contd.), power; Impulse-momentum. Impulse-momentum (contd.), impact; Combination problems.

### **TEXT BOOKS**

1. Irving H. Shames , Engineering Mechanics, Prentice Hall
2. Bansal R.K. A Text Book of Engineering Mechanics, Laxmi Publications

### **REFERENCE BOOKS**

1. F. P. Beer and E. R. Johnston (2011), Vector Mechanics for Engineers, Vol I - Statics, Vol II, –Dynamics, 9th Ed, Tata McGraw Hill
2. R.C. Hibbler (2006), Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.

### **Course Outcomes:**

1. Students will able to make free body diagrams and solve structural problems.
2. Students will be able to apply virtual work and energy theorems for solution of structural problems.
3. Students will be able to apply the concepts of kinematics and kinetics to rigid body mechanisms.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Fluid Mechanics (TME-210)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. S.S. Bhandari
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-210	Fluid Mechanics	4(3-0-2)5
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### **Course Objectives:**

1. To learn about the application of mass and momentum conservation laws for fluid flows
2. To understand the importance of dimensional analysis
3. To obtain the velocity and pressure variations in various types of simple flows

### **Unit I**

Concept of basic principles of Fluid Flow, Kinematics of Fluid Flow, Dynamics of Fluid Flow, Incompressible Flow Principles, Boundary Layer Theory, Application of Hydrodynamics, Compressible Flow Principles, Mach Number, Flow Regimes, Normal shock, shock wave, Measurement of Compressible Flow. Definition of Fluid, Properties of Fluid, Types of Fluids, Rheological diagram, Fluid Particle, No Flow, Basic Equations, Methods of Analysis, Dimensions and Units.

### **Unit II**

Continuum, Velocity Field, Surface and body forces, Point Force, Line Force, Forces Influencing Hydraulic Phenomena- Inertia Force, Viscous Force, Gravity Force, Pressure Force, Elastic Force, Surface Tension Force, Stress at a point, Fluid statics, Description and Classification of Fluid Flows-Steady and unsteady Flow, Ideal and Real Flow, Rotational and Irrotational Flow, one, two and three-dimensional Flows, Pressure and Pressure less Flow, Sub Critical, Critical, and Super Critical Flow, Isothermal, Adiabatic, and Isentropic Flow.

### **Unit III**

Pressure and centre of pressure, Hydrostatic forces on plane and curved surface, Metacentric height, Principle of buoyancy and floating, Stability of floating and submerged bodies.

Methods of describing Fluid Motion, Lagrangian Method, Eulerian Method, Total Derivative (Material Change), Equation for acceleration, Components of Acceleration in Cartesian Coordinates and Cylindrical Coordinates, Tangential and Normal Components of Acceleration, Lines of Flow-Streamlines, Pathlines and Streak lines, streamtube, Different Types of Displacement of Fluid Particle, Circulation, Vorticity, Vorticity Components in Cartesian, Cylindrical, polar, and Curvilinear orthogonal coordinates, Irrotational and Rotational Flow.

### **Unit IV**

Differential Form of General Continuity Equation in Cartesian and Cylindrical Coordinates, Reynolds Transport Theorem, Integral Form of Continuity Equation, Velocity Potential Function & Stream Function in Cartesian and Polar Coordinates, Relation Between Stream Function and Velocity Potential Function, Stream Surface, Flow Net, Navier stokes equation of motion, Equation of Motion, Euler's Equation of Motion; Bernoulli's Equation, Applications of Bernoulli's Equation, Linear Momentum Equation, Energy Equation, Vortex Flow, Vortex Lines, Vortex Tube, Free Vortex and Forced Vortex.

## **Unit V**

Basic Flow Fields, Rectilinear Flow, Source and Sink Flow, Combining flows by Superposition, Rankine method of Constructing Streamlines, Combined Flow Fields-Source in a Rectilinear Flow, Source and Sink pair Flow, Source and Sink Pair in a Uniform Flow, Doublet (Dipole), Doublet in a Uniform Flow, Doublet and Free Vortex in Uniform Flow, D'Alembert Paradox, Kutta-Joukowski Theorem and Magnus Effect, Flow in a porous medium.

## **Unit VI**

Reynolds' Experiments and their Significance, Lift and Drag, Pressure Drag, Skin Friction Drag, Flow Around a Circular Cylinder, Concept of boundary layer; boundary layer along a thin flat plate, boundary layer Equation in 2-D Flow; Boundary layer thickness and Displacement thickness, Momentum thickness; Momentum Correction Factor, Energy thickness; Momentum Equation for boundary layer by Von-Karmann; Laminar boundary layer, Transition in boundary layer, Turbulent Boundary Layer; Boundary Layer Separation.

## **Course Outcomes**

1. Upon completion of this course, students will be able to mathematically analyze simple flow situations.
2. They will be able to apply principle of continuity, momentum and energy to various flow problems.
3. They will be able to diagnose flow problems and concept of boundary layer help to calculate drag and lift force in various flow bodies.

## **Text Books**

1. Engineering Fluid Mechanics by Dr. D.S. Kumar.

2. Fluid Mechanics by Dr. S. S. Rattan

**Reference Books:**

1. Introduction to Fluid Mechanics by Fox and McDonald.
2. Mechanics of Fluids by I.H. Shames
3. Fluid Mechanics by Yuan
4. Fluid mechanics by F.M.White
5. Fluid mechanics by Cengel and Cimbala.

**List of Practical:**

1. Experiments on study of drag and lift of aerofoil.
2. Reynolds experiments to verify Bernoulli theorem.
3. Viscosity measurement apparatus.
4. Study of Free and forced vortex flow
5. Study of Optical measurement like Schlieren, Interferometry, shadowgraph.
6. Measurement of static and dynamic pressure with pitot static tube.
7. Flow meter measurement.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Instrumentation &amp; Control (TME-206)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. Neeraj Bisht
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-206	Instrumentation & Control	4(3-0-2)5
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**Course Objective:**

1. To understand the principles of measurement systems and static and dynamic characteristics of measurement systems
2. To understand the principles of various types of transducers and recording equipments
3. To understand the basic principles of pressure, temperature, force and torque measurement
4. To understand the basic principles of strain measurement and the circuitry involved
5. To understand the concepts of control theory and to characterize different control systems
6. To apply the measurement systems studied in practical applications

**Course Content:**

**Unit I: Measurement Systems and their characteristics:**

Significance of measurement, methods of measurement, classification of measurement systems, elements of generalized measurement system, input-output characteristics of measurement systems, methods of correction for modifying and interfering inputs. Static characteristics of systems, dynamic characteristics of systems, error involved in measurement.

**Unit II: Transducers and Recording Equipments**

Introduction to transducers, their classification and study of various types of transducers viz. capacitive, resistive, inductive and optical. Various kinds of recording equipments- CRO's; digital Voltmeters Magnetic Tape recorders etc..introduction to intermediate elements like amplifiers, compensators etc.

**Unit III: Pressure, temperature and flow measurement**

Study of various kinds of pressure, temperature and force measurement systems

**Unit IV: Strain, force, torque and power measurements**

Study of various kinds of strain, force, torque and power measurements systems

**Unit V: Control Systems**

Control-definition, elements of control system-open loop and closed loop system. Concept of feedback control system. Basic concept of stability, Routh's criteria Root locus technique, curve plotting for various control systems. Frequency response- Bode plot, Polar plot. control method – P, PI, PID

### **Course Outcomes:**

1. Upon completion of this course, the students will be able to understand various systems related to measurement of mechanical parameters and design the measurement system for the same.
2. Upon completion of this course, the students will be able to understand the basic concepts of control, able to use various controllers and analyse their performance like stability and time response

### **Text Books**

1. Control System Engg.-Nagrath & Gopal
2. Instrumentation, Measurement and Analysis- Nakra and Chaudhary

### **Reference Book**

1. Instrumentation- Sharma, Rangan& Mani
2. Physical Measurement & Analysis Cook & Rabnowicz
3. Engineering Control System - K. Ogata
4. Mechanical Measurement - Buck & Beckwith
5. Mechanical Measurements - System and Design Deobelin

### **Lab Experiments:**

1. Measurement of temperature using a thermocouple.
2. Measurement of temperature using a RTD.
3. Measurement of strain in a cantilever beam using strain gauges.
4. To measure the force applied to a system using a load cell.
5. To measure linear displacements using a LVDT
6. To measure time constant of various types of fluids.
7. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
8. Calibration of capacitive transducer for angular displacement
9. To study the performance characteristic of a controller.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Mechanics of Solids (TME-216)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. V.K. Singh
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-216	Mechanics of Solids	4(3-0-2)5
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### **Objectives:**

To understand the nature of stresses developed in simple geometries such as bars, cantilevers, beams, shafts, cylinders and spheres for various types of simple loads.

To calculate the elastic deformation occurring in various simple geometries for different types of loading

### **Course Content:**

#### **Unit I**

Deformation in solids- Hooke's law, stress and strain- tension, compression and shear stresses- elastic constants and their relations- volumetric, linear and shear strains- principal stresses and principal planes- Mohr's circle., Theories of failures for 2D.

#### **Unit II**

Beams and transverse loading on beams- shear force and bending moment diagrams-Types of beam supports, simply supported and over-hanging beams, cantilevers. Theory of bending of beams, bending stress distribution and neutral axis, shear stress distribution, point and distributed loads.

#### **Unit III**

Moment of inertia about an axis and polar moment of inertia, deflection of a beam using double integration method, computation of slopes and deflection in beams, Maxwell' reciprocal theorems.

#### **Unit IV**

Torsion, stresses and deformation in circular and hollow shafts, stepped shafts, deflection of shafts, stresses and deflection of helical springs.

#### **Unit V**

Axial and hoop stresses in cylinders subjected to internal pressure, deformation of thick and thin cylinders, deformation in spherical shells subjected to internal pressure

#### **Unit VI**

Columns and Struts, Euler's formula, equivalent length of columns, eccentric loading, struts with transverse loading, empirical formulae

#### **Course Outcomes:**

1. After completing this course, the students should be able to recognise various types of loads applied on machine components of simple geometry and understand the nature of internal stresses that will develop within the components.
2. The understanding of material behaviour under two dimensional load system
3. The students will be able to evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.

#### **Test Book**

1. Egor P. Popov, Engineering Mechanics of Solids, Prentice Hall of India, New Delhi, 2001.

#### **Reference Books:**

1. Singh D. K." Strength of Materials" Ane's Books Pvt. Ltd.
2. R. Subramanian, Strength of Materials, Oxford University Press, 2007.
3. Ferdinand P. Been, Russel Johnson Jr and John J. Dewole, Mechanics of Materials, Tata McGraw Hill Publishing Co. Ltd., New Delhi 2005.

#### **Experiments:**

1. To study of different types material testing of standards of specimen for tensile, compression, impact, flexural tests
2. Preparation of standard specimens for tensile, compression, impact & flexural test
3. To study the Rockwell Hardness testing machine and perform the Rockwell hardness test.
4. To study the Impact Testing machine and Perform impact tests
5. To study and perform the tensile test
6. To study and perform the compressive test
7. To study and perform the three point bending test on UTM

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Engineering Thermodynamics (TME-218)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-1-0)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. L. Varshney
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-218	Engineering Thermodynamics	4(3-1-0)4
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### **Objectives:**

1. To learn about work and heat interactions, and balance of energy between system and its surroundings
2. To learn about application of I law to various energy conversion devices
3. To evaluate the changes in properties of substances in various processes
4. To understand the difference between high grade and low grade energies and II law
5. limitations on energy conversion

### **Course Content:**

#### **Unit 1**

Fundamentals - System & Control volume; Property, State & Process; Exact & Inexact differentials; Work - Thermodynamic definition of work; examples; Displacement work; Path dependence of displacement work and illustrations for simple processes; electrical, magnetic, gravitational, spring and shaft work.

#### **Unit 2**

Temperature, Definition of thermal equilibrium and Zeroth law; Temperature scales; Various Thermometers- Definition of heat; examples of heat/work interaction in systems- First Law for Cyclic & Non-cyclic processes; Concept of total energy E ; Demonstration that E is a property; Various modes of energy, Internal energy and Enthalpy.

#### **Unit 3**

Definition of Pure substance, Ideal Gases and ideal gas mixtures, Real gases and real gas mixtures, Compressibility charts- Properties of two phase systems - Const. temperature and Const. pressure heating of water; Definitions of saturated states; P-v-T surface; Use of steam tables and R134a tables; Saturation tables; Superheated tables; Identification of states & determination of properties, Mollier's chart.

#### **Unit 4**

First Law for Flow Processes - Derivation of general energy equation for a control volume; Steady state steady flow processes including throttling; Examples of steady flow devices; Unsteady processes; examples of steady and unsteady I law applications for system and control volume.

#### **Unit 5**

Second law - Definitions of direct and reverse heat engines; Definitions of thermal efficiency and COP; Kelvin-Planck and Clausius statements; Definition of reversible process; Internal and external irreversibility; Carnot cycle; Absolute temperature scale.

Clausius inequality; Definition of entropy ; Demonstration that entropy as a property; Evaluation of entropy change various processes; Principle of increase in entropy;

Irreversibility and Availability, Availability function for systems and Control volumes undergoing different processes, Lost work. Second law analysis for a control volume. Exergy balance equation and Exergy analysis.

## **Unit 6**

Thermodynamic cycles - Basic Rankine cycle; Basic Brayton cycle; Basic vapor compression cycle and comparison with Carnot cycle.

### **Course Outcomes:**

1. After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions
2. Students can evaluate changes in thermodynamic properties of substances
3. The students will be able to evaluate the performance of energy conversion devices
4. The students will be able to differentiate between high grade and low grade energies.

### **Text Books:**

1. Nag, P.K, Engineering Thermodynamics, Tata McGraw-Hill Publishing Co. Ltd.

### **Reference Books:**

2. Sonntag, R. E, Borgnakke, C. and Van Wylen, G. J., 2003, 6th Edition, Fundamentals of Thermodynamics, John Wiley and Sons.
3. Jones, J. B. and Duggan, R. E., 1996, Engineering Thermodynamics, Prentice-Hall of India
4. Moran, M. J. and Shapiro, H. N., 1999, Fundamentals of Engineering Thermodynamics, John Wiley and Sons.

### **Objectives:**

1. To familiarize with the terminology associated with IC engines.
2. To understand the basics of IC engines.
3. To understand combustion, and various parameters and variables affecting it in various types of IC engines.

4. To learn about various systems used in IC engines and the type of IC engine required for various applications

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Numerical Methods for Mechanical Systems (TME 429)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. Rakesh Saxean
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

ESC	TME 429	Numerical Methods for Mechanical Systems	3(2-0-2)4
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### **Course Objectives:**

1. To know what are numerical methods, their importance, and applications To understand approximations and errors in computing
2. To compute roots of nonlinear equations To solve system of linear equations - directly and iteratively with applications
3. To fit curve - using regression and interpolation with applications
4. To understand numerical - differentiation and integration and apply them in different applications
5. To solve ordinary and partial differential equations To solve initial value and boundary value problems.

### **Course Content:**

#### **UNIT I**

**Introduction:** Definition and importance of Numerical Methods

**Approximations and Errors in Computing:** Significant Digits & Precision, Introduction to computing Package MATLAB/Freemat, Types of Errors, Error Propagation & Compound Errors, Conditioning & Stability, Effect of Subtractive Cancellation

#### **UNIT II**

**Solution of Equations of One Variable/Roots of Nonlinear Equations:** Methods of Solution, Starting % stopping an Iterative Process, Bisection Method & its Convergence, False Position Method, Newton-Raphson Method, Secant Method, Fixed Point Method

**Direct Solution of Linear Equations:** Gauss Elimination, Gauss Elimination with Pivoting, LU Factorization - Dolittle & Crout Algorithms, Cholesky Method

**Iterative Solution of Linear Equations:** Jacobi Method, Gauss-Seidel Method, Method of Relaxation, Convergence of Iterative Methods - Condition for convergence, Rate of Convergence

### **UNIT III**

**Curve Fitting:Regression:** Introduction, Fitting Linear Equations, Least Squares Regression, Fitting Nonlinear curves, Fitting a Polynomial Function, Multiple Linear Regression

**Curve Fitting:Interpolation:** Linear Interpolation, Lagrange Interpolation Polynomial, Newton Interpolation Polynomial, Divided Difference Table, Spline Interpolation - Natural Cubic Spline

### **UNIT IV**

**Numerical Differentiation:** Differentiating Continuous Functions - Forward, Backward, & Central Difference Quotients, Higher -order Derivatives, Differentiating Tabulated Functions

**Numerical Integration:** Interpolation with Equidistant Points - Gregory-Newton Forward Difference Formula, Newton-Cotes Methods - Trapezoidal Rule, Simpson's 1/3 Rule - Composite Rules, Gaussian Integration

### **UNIT V**

**Numerical Solution of Ordinary Differential Equations(ODEs):** Types of ODE, Initial Value Problems - Euler's Method, Heun's Method, Runge-Kutta Methods, Boundary Value Problems - Finite Difference Method

**Numerical Solution of Partial Differential Equations:** Laplace Equation, Poisson Equation

### **Course Outcome**

After completing this course, the students will be able to understand the importance of numerical methods. They will understand the concepts of root finding techniques, interpolation, regression. They will be able to perform numerical differentiation and integration and solve differential equations.

### **Text**

1. Balagurusamy, E., Numerical Methods, Tata Mcgraw-Hill

### **Reference**

1. Chapra, S.C. and Canale, R.P.,Numerical Methods for Engineers, McGraw-Hill

2. MatLab Student Edition, The Mathworks
3. Press,W.H., Flannery,B.P., Teukolsky,S.A. and Vetterling, W.T. , Numerical Recipes :  
The Art of Scientific Computing, Cambridge University Press
4. Sastry, S.S.,Numerical Methods, PHI

### **Laboratory**

- 1) Introduction to MATLAB/FreeMat
- 2) Practice with MATLAB/FreeMat
- 3) Solution of Equations of One Variable/Roots of Nonlinear Equations
- 4) Direct Solution of Linear Equations
- 5) Iterative Solution of Linear Equations
- 6) Curve Fitting - Regression
- 7) Curve Fitting - Interpolation - 2 labs
- 8) Numerical Integration - 2 labs

Total Number of Labs - 10

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Materials Science &amp; Engineering (TME-255)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Mrs. Sakshi Chauhan
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-255	Materials Science & Engineering	4(3-0-2)5
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### **Objectives:**

1. Understanding of the correlation between the internal structure of materials, their mechanical properties and various methods to quantify their mechanical integrity and failure criteria.
2. To provide a detailed interpretation of equilibrium phase diagrams
3. Learning about different phases and heat treatment methods to tailor the properties of Fe-C alloys.

### **Course Content:**

#### **Unit I**

Introduction, structure of metals and non-metals. Solid solutions, Diffusion, Mechanical, Electrical and Thermal properties of materials. Cast iron, Non-ferrous metals and their alloys.

#### **Unit II**

Crystal Structure: Unit cells, Metallic crystal structures, Imperfection in solids: Point, line, interfacial and volume defects; dislocation strengthening mechanisms and slip systems, critically resolved shear stress.

#### **Unit III**

Mechanical Property measurement: Tensile, compression and torsion tests; Young's modulus, relations between true and engineering stress-strain curves, generalized Hooke's law, yielding and yield strength, ductility, resilience, toughness and elastic recovery; Hardness: Rockwell, Brinell and Vickers and their relation to strength.

#### **Unit IV**

Alloys, substitutional and interstitial solid solutions- Phase diagrams: Interpretation of binary phase diagrams and microstructure development; eutectic, peritectic, peritectoid reactions. Iron-Iron-carbide phase diagram and microstructural aspects of ledeburite, austenite, ferrite and cementite, cast iron.

#### **Unit V**

Heat treatment of Steel: Annealing, tempering, normalising and spheroidising, isothermal transformation diagrams for Fe-C alloys and microstructure development. Continuous cooling

curves and interpretation of final microstructures and properties- austempering, martempering, case hardening, carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening, vacuum and plasma hardening.

Alloying of steel, properties of stainless steel and tool steels,

### **Course Outcomes:**

1. Student will be able to identify crystal structures for various materials and understand the defects in such structures
2. How to quantify mechanical integrity/ various properties of material
3. To understand alloying and how to read and interpret phase diagrams.
4. Understand how to tailor material properties using heat treatment of ferrous and non-ferrous alloys

### **TEXT Books**

1. First course in Materials Science by V. Raghvan
2. Elements of Material Science by Vaan Vlack

### **REFERENCE BOOKS**

1. Material science and engineering: An Introduction by William D. Callister
2. Introduction to Physical Metallurgy by Sidney H. Avner
3. Mechanical Metallurgy by George E. Dieter
4. The structure & Properties of Materials (Vol. 1-IV) by Hayden, Moffat and Wulff.

### **Practical**

1. To study crystal structure using ball model.
2. To study defects and drawing of burger vector using ball model.
3. To study iron carbon equilibrium diagram using a chart.
4. To conduct and design creep test for lead wire
5. To study creep testing machine and drawing of creep curve.
6. To find out the impact strength of mild steel specimen mild steel specimen by fracture using Charpy and Izod test.
7. To determine the hardness of given specimen using Rockwell and Brinell hardness testing machine.
8. To study the fracture of brittle material by Griffith theory with the help of models.
9. To determine the wear loss of a polymer material.



## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Refrigeration and Air Conditioning (TME- 303)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. A.K. Pratihar
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PCC</b>	<b>TME- 303</b>	<b>Refrigeration and Air Conditioning</b>	<b>4(3-0-2)5</b>
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### **Objectives:**

1. To familiarize students with the terminology and concepts associated with refrigeration and air conditioning systems
2. To understand basic refrigeration processes
3. To understand the basics of psychrometry and practice of applied psychometrics
4. To familiarize students with alternate refrigeration systems

### **Course Content:**

#### **Unit I**

Review of basic thermodynamic laws, methods of cooling, Basic vapour compression refrigeration cycle; influence of operating conditions on cycle performance, actual vapour compression cycle, Advanced vapour compression cycles; Multistage and multi evaporator systems; cascade systems.

#### **Unit II**

Refrigerants and their mixtures: properties and characteristics; thermodynamic, chemical and physical requirements, Ozone layer depletion and global warming issues.

#### **Unit III**

System components: compressors, condensers, expansion devices and evaporators, Performance matching of components of refrigeration systems.

#### **Unit IV**

Introduction to vapour absorption system and their components, Air cycle refrigeration its performance and application to air craft refrigeration.

#### **Unit VI**

Properties of moist air, use of psychrometric charts, Psychrometry of air conditioning processes; sensible, latent and total heat processes, SHF, bypass factor, simple summer air conditioning system. Applications of AC systems, concept of enthalpy potential, air washers, cooling towers, Design conditions, Comfort air conditioning and effective temperature, Cooling load calculations.

### **Course outcome:**

1. A student who has done this course will have good understanding of the working principles of refrigeration and air conditioning systems.
2. He will be able to do performance calculations of these systems.
3. The student will be able to apply this knowledge in understanding actual refrigeration and air conditioning systems.
4. The student will become familiar with alternate refrigeration systems other than commercial systems.

Text Book:

1. Arora, C. P., Refrigeration and Air conditioning, Tata McGraw Hill, 3<sup>rd</sup> Edition, 2009.

Reference Books:

1. Stoecker, W. F. and Jones, J. W., Refrigeration and Air conditioning, McGraw Hill, 2<sup>nd</sup> Edition, 1986.
2. Kuehn, T.H., Ramsey, J.W. and Threlkeld, J.L., Thermal Environmental Engineering, Prentice Hall, 3<sup>rd</sup> Edition, 1998.
3. Dossat, R.J., Principles of Refrigeration, Wiley International Edition, 1961.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Advanced Solid Mechanics (TME-416)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-1-0)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. V.K. Singh
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PCC</b>	<b>TME-416</b>	<b>Advanced Solid Mechanics</b>	<b>4(3-1-0)4</b>
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### **Course Objectives:**

The objective is to present the mathematical and physical principles in understanding the linear continuum behavior of solids

### **Course Contents:**

#### **Unit I**

Stress and strain at a point. Cartesian stress components. Notation and sign convention. Stress invariants and principal stresses in three dimensions. Mohr's circle in three dimensions. Strain displacements, rectangular strain components Interpretation of  $xy$ ,  $yz$ ,  $zx$  as shear strain component, Strain invariants and principal stresses (3D).

#### **Unit II**

Generalized statement of hooks law, stress strain relation for isotropic material, relations between the elastic constraints, displacement equations of equilibrium. Theories of failures, significance of theories of failure.

#### **Unit III**

Elastic strain energy and Energy methods, Elastic strain energy due to normal and shearing stresses, dilations and distortions strain energy, strain energy due to bending & torsional load, stresses due to suddenly applied loads, Strain energy theorem. Castigliano's theorem, reciprocal theorem. Application of energy methods for determining slope, and deflection in beams.

#### **Unit IV**

Unsymmetrical bending. Shear center. Curved beams; Bending of beams having initial curvature beams of large initial curvature, location of neutral axis Distribution of stresses across cross section having rectangular, Circular & trapezoidal shapes. Analysis of springs.

#### **Unit V**

Torsion of General Prismatic bars, Torsion of circular and elliptical bars, torsion of equilateral triangular bar and torsion of thin walled cell closed sections, torsion of bars with thin

rectangular sections, torsion of rolled sections, multiply connected sections, centre of twist and flexural centre. Symmetric problems; Stresses and displacements in thick cylinder, spherical shell, rotating disc, cylinders.

**Course Outcomes:**

1. Upon completion of this course, students will be able understand the deformation behavior of solids under different types of loading
2. The understanding three dimensional stress system will developed.
3. Obtain mathematical solutions for simple geometries.

**Text Books**

1. Advanced Solid Mechanics, By L.S. Srinath
2. Strength of Materials, by Srivastava & Gope

**Reference Books:**

1. G. T. Mase, R. E. Smelser and G. E. Mase, Continuum Mechanics for Engineers, Third Edition, CRC Press, 2004.
2. Y. C. Fung, Foundations of Solid Mechanics, Prentice Hall International, 1965.
3. Lawrence. E. Malvern, Introduction to Mechanics of a Continuous Medium, Prentice Hall international, 1969.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Design of Machine Elements (TME-318)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. P.C. Gope
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-318	Design of Machine Elements	4(3-0-2)5
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### Objectives:

1. This course seeks to provide an introduction to the design of machine elements commonly encountered in mechanical engineering practices.
2. A strong background in mechanics of materials based failure criteria underpinning the safety-critical design of machine components.
3. An overview of codes, standards and design guidelines for different elements.

### Course Contents:

#### Unit I

**1. Mechanical engineering design:** Introduction to design procedure, Stages in design, Code and Standardization, Interchangeability, Preferred numbers, Fits and Tolerances, Engineering materials: Ferrous, Non-ferrous, Non-metals, design requirements – properties of materials, Material selection, Use of Data books.

**2. Fundamentals of Machine Design:** Types of load, Modes of failure, factor of safety concepts, Theories of Failure, concept and mitigation of stress concentration, Fatigue failure and curve, endurance limit and factors affecting it, Notch sensitivity, Goodman, Gerber and Soderberg criteria.

#### Unit II

**3. Machine Element Design:** Design of Joints: Rivets, welds and threaded fasteners based on different types of loading, Boiler joints, cotter joints and knuckle joints.

#### Unit III

**4. Design of Keys, Shaft and Couplings:** Classification of keys and pins, Design of keys and pins, Design of shafts: based on strength, torsional rigidity and fluctuating load, ASME code for shaft design, Design of couplings: Rigid coupling, Flexible coupling.

**5. Design of Mechanical Springs:** Types of helical springs, Design of Helical springs, bulking of spring, spring surge, end condition of springs, Design of leaf springs: nipping.

#### Unit IV

**6. Bearings:** Types and selection of ball and roller bearings, Dynamic and static load ratings, Bearing life, Design of sliding contact bearings, Journal bearing, foot step bearing.

## **Unit V**

**Design of power transmission elements:** spur, helical, bevel and worm gears; belt drives

### **Course Outcomes:**

1. Student will develop an understanding of the origins, nature and applicability of empirical design principles, based on safety considerations.
2. Upon completion of this course, students will get an overview of the design methodologies employed for the design of various machine components. An appreciation of parameter optimization and design iteration.
3. An appreciation of the relationships between component level design and overall machine system design and performance of various components.

### **Text Books:**

1. Machine Design: Fundamentals and Applications, PHI Publication

### **Reference Books**

1. Mechanical Engineering Design, Fifth Edition, Shigley, J.E. and Mischke, C.R., McGraw-Hill International; 1989.
2. Design of Mechanical Elements by V.B. Bhandari.
3. Fundamentals of Machine Component Design, Juvinal, R.C., John Wiley, 1994.
4. Design of Machine elements, Spottes, M.F., Prentice-Hall India, 1994.
5. Mechanical Design – An Integrated Approach, R. L. Norton, Prentice Hall, 1998

### **Design Data Hand Books:**

1. P.S.G. Design Data Hand Book, PSG College of Tech Coimbatore
2. Design Data Hand Book, K. Lingaiah, McGraw Hill, 2nd Ed. 2003.

### **Practical (Design Of Machine Elements)**

1. Design & drawing of Riveted joint
2. Design and drawing of Cotter joint
3. Design and drawing of Knuckle joint
4. Design of shafts subjected to combined loading
5. Design and drawing of Flange coupling
6. Design of spring
7. Design of bearing

Drawing should be using CAD software like AutoCad/Pro-E/CATIA/ANSYS

1. Design of any one working model related to Design of machine elements i.e., Unit II to Unit V
2. Design of any one working model related to Design of machine
3. Society needs based Innovative design

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Fluid Machinery &amp; Systems (TME-424)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. P.C. Tewari
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-424	Fluid Machinery & Systems	4(3-0-2)5
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### **Course Objectives:**

1. Impact of water jet on different Vanes/ plates.
2. Study of different rotors and series of vanes.
3. To analyze the flow in water pumps
4. Various turbines and related lab experiments.
5. Centrifugal Pump study.

### **Course Content:**

#### **Unit I**

Entire spectrum of fluid machines, linear momentum and angular momentum equations, Dynamic force exerted by a jet on stationary flat and inclined plates, on curved plates/vanes, Force on moving flat, inclined plates, and curved vanes; Force on series of flat plates; series of curved vanes and series of radial curved vanes; Euler's Equation of Fluid Machines; Degree of Reaction. Dynamic action of fluid on stationary and moving vanes; units and specific quantities, whirling of fluids; Airfoils, Lift and Drag, Hydro-electric power development, Hydro-electric power development, layout and various parts hydro power plants, mini an large plants, pump storage plants, Impulse Turbines, Reaction turbines, Governing and performance of turbines.

#### **Unit II**

Unit and specific quantities ,Unit quantities as unit discharge, unit force, unit power, unit speed, unit torque etc., specific quantities; specific speed of pumps and of turbines. Head, Losses and efficiencies of hydraulic turbines.

#### **Unit III**

Classification of turbines, Impulse turbines, guide Mechanism; buckets and runner; casing; Hydraulic brake, speed ratio, jet ratio, Different layouts; Design of components of a Pelton turbine, constructional details, velocity components at entry and exit of the rotor, velocity triangles, power and efficiency calculations, governing of turbines.

Francis and Kaplan turbines, constructional details, velocity triangles, power and efficiency calculations, Draft tube theory; types of draft tubes;; cavitation in turbines, Methods to avoid cavitation , runaway speed, unit and specific speed, performance characteristics, governing of turbines.

## **Unit IV**

Centrifugal pumps, Reciprocating pumps, Classifications of centrifugal pumps, manometric head of a pump; Theory of centrifugal pumps; work done and manometric efficiency of centrifugal pump, multi-stage Pumps, pumps in series and parallel operation, NPSH, Selection of centrifugal pumps an impellers , specific speed, cavitation and performance characteristics.

## **Unit V**

Classification, slip and coefficient of discharge, velocity and acceleration of water in reciprocating pumps, Air vessels, Saving in work by air vessels, Theory of working of air vessels.

## **Unit VI**

Hydraulic Systems like Hydraulic lift, Ram, Crane, Press, fluid Coupling, Torque Converters, Pressure accumulator, intensifier and field applications.

### **Course Outcomes:**

Upon completion of the course, the students will be able to understand

1. Impact of Jet on different types of vanes.
2. Working principle of Centrifugal Pump and Reciprocating pump .
3. Working principle of Turbines, types and other hydraulic machines.
4. Function and application of hydraulic systems in the field

### **Text Books:**

1. Hydraulic Machines - Dr. Jagdish Lal
2. Hydraulic Machines - S.S. Rattan

### **Reference Books:**

1. Hydraulics & Fluid Machines - Modi and Seth
2. Fluid Machines and Hydraulic
3. Machines - R. K. Bansal

**Lab Experiments:**

1. Impact of water jet on different Vanes,
2. Study of Pelton turbine,
3. Study of Francis turbine,
4. Study of Kaplan turbine,
5. Study of Centrifugal Pumps,
6. Study of Reciprocating Pumps.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Kinematics of Machine (TME-322)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. Anadi Misra
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-322	<b>Kinematics of Machine</b>	<b>3(2-0-2)4</b>
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### **Objectives:**

1. To understand the kinematics and rigid- body dynamics of kinematically driven machine components.
2. To understand the motion of linked mechanisms in terms of the displacement, velocity and acceleration at any point in a rigid link
3. To be able to understand and design belt and rope motion and power transmissions system.
4. Analyze and Design various braking system used in automobile.
5. To understand the kinematics of gear trains.

### **Course Contents :**

#### **Unit I**

Machine and Mechanism: Classification of mechanisms, Basic kinematic concepts and definitions, Degree of freedom, Grashof's law, Kinematic inversions of four bar chain and slider crank chains, Description of some common mechanisms, Quick return mechanism, Straight line generators, Universal Joint, Rocker mechanisms.

#### **Unit II**

Velocity and Acceleration in Mechanism: Instantaneous Center, Body centrode and space centrode, Properties of Instantaneous Center, Instantaneous center and their types, Kennedy three centers in line theorem, Velocity and acceleration analysis graphically, using instantaneous center method and relative velocity method, Coriolis component of acceleration.

#### **Unit III**

Belt and Rope Analysis: Types of belt and materials of belts, Types of flat belt drives, Velocity ratio of belt drive & velocity ratio of a compound belt drive, Slip of belt, Creep of belt, Length of belt in case of open and cross belt drive. Power transmitted by a belt, Ratio of driving tension for flat, V belt and rope. Determination of angle of contact, Centrifugal tension in belts or ropes, Maximum tension in belts, Conditions for transmission of maximum power in case of flat belt drive, Initial tension in the belt, Effect of initial tension on transmission of maximum power for flat belt drive, Design of belt dimension.

#### **Unit IV**

Brakes and Dynamometers: Types of Brakes, Materials for brake lining, Single block or shoe brake, Pivoted block or shoe brake, Simple Band brake, Differential Band brake, Band and

block brake, Internal expanding shoe brake, Types of Dynamometers, Absorption dynamometers, Transmission dynamometers.

## **Unit V**

Gears and their Analysis: Types of gears, Gear terminology, Law of gearing, Involute and Cycloidal gear profiles and their comparison, System of gear teeth, Path and Arc of contact, Number of pairs of teeth in contact, Interference in Involute gears, Helical Gears, Spiral gears, Centre distance for a pair of Spiral gears, Efficiency of Spiral gears, Simple, Compound, Reverted trains, Determining velocity of gears in epicyclic gear train by tabular method.

### **Course Outcomes:**

1. Describe the concepts of machines, mechanisms and related terminologies.
2. Determine the degrees-of-freedom (mobility) of a mechanism.
3. Analyse planar mechanism for displacement, velocity and acceleration graphically.
4. Analyse various motion transmission elements like gears, gear trains, belt drive and rope drive.
5. Understand and analyse Braking system

### **Text Books:**

1. Thomas Bevan, Theory of Machines, CBS Publishers & Distributors, New Delhi
2. S.S Rattan, Theory of Machines, Tata McGraw-Hill Publishing Company Limited  
New Delhi

### **Reference Books:**

1. CleghornW.L. , Mechanisms of Machines, Oxford University Press
2. Robert L. Norton, Kinematics and Dynamics of Machinery, Tata McGrawHill
3. Ghosh A. and Mallick A.K., Theory of Mechanisms and Machines, Affiliated East-West Pvt. Ltd, New Delhi
4. Rao J.S. and Dukkipati R.V., “Mechanisms and Machines theory”, Wil
5. J.Uicker, Gordon R Penstock & J. E. Shigley, “Theory of Machines and Mechanism”, Oxford International Edition.
6. P.L Ballaney, Theory of Machines, Khanna Publishers ,New Delhi

## **LIST OF EXPERIMENTS**

**1** Study & Analysis of various mechanism in Lab and determine

- (1) Number of Kinematic Links
- (2) Number of Kinematic Pairs and their types
- (3) To Find Degree of Freedom of each mechanism

**2** Study the slider crank mechanism, draw the following experimental curves and also

plot their theoretical curves and compare them –

- (1) Displacement Vs. Time
- (2) Velocity Vs. Time
- (3) Acceleration Vs. Time

**3** Study the quick return mechanism and determine

- (1) Experimental ratio of forward stroke to the return stroke
- (2) Theoretical ratio of forward stroke to the return stroke compare with experimental ratio.

**4** Study the Oldham's coupling and show that

- (1) Peripheral velocity of the intermediate disc is proportional to the eccentricity.
- (2) Compare the results of velocity with theoretical values.

**5** Study the Hook's joint and determine

- (1) Experimental ratio of angular velocity of driver and driven shafts.
- (2) Theoretical ratio of angular velocity of driver and driven shafts and compare with experimental ratio.

**6** To find the coefficient of friction ( $\mu$ ) between

- (1) Flat belt and pulley
- (2) V-belt and pulley
- (3) Rope and pulley

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Theory of Machines (TME-323)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. Anadi Misra
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

PCC	TME-323	Theory of Machines	4(3-0-2)5
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### **Objectives:**

1. Develop the design and practical problem solving skills in the area of equilibrium of mechanisms.
2. To impart knowledge on force analysis of mechanisms, balancing of rotating and reciprocating masses.
3. To build understanding and application of Governor and Cam in mechanism
4. To introduce the fundamentals in Gyroscopes, and it's effect in stability of aeroplane and ship.
5. To develop understanding of Flywheel and it's application

### **Course Contents:**

#### **Unit I**

Classification of cams and followers: Terminology and definitions, Displacement diagrams for the follower performing Uniform velocity or Parabolic or Simple harmonic motion or derivatives of follower motions, Specified contour cams: circular and tangent cams, pressure angle and undercutting.

#### **Unit II**

Governors and their applications: Difference between governor and Flywheel, Types of governors, Constructional details and analysis of Watt, Porter, Proell, Hartnell and Wilson Hartnell governors, Power and Effort of a Governor, Controlling force curves, Sensitiveness, Stability, Hunting, Isochronism.

#### **Unit III**

Introduction to balancing: Static balancing, Dynamic balancing, Balancing of single rotating mass by single mass or by two masses rotating in two different parallel planes, Transference of a force from one plane to another, Balancing of multiple rotating masses rotating in single plane by a mass in the same plane, Balancing of multiple rotating masses rotating in different parallel plane by two masses rotating in two different parallel planes. Primary and secondary unbalanced forces, Unbalance due to reciprocating masses, Partial balancing of primary force, Balancing of locomotive, Hammer-blow, Variation in tractive effort, Hammer blow.

#### **Unit IV**

Static force analysis: Static equilibrium, Equilibrium of Two- Force and Three-Force members and member subjected to two forces and torque, Force convention and Free body diagram, Superposition and Principle of Virtual work, Dynamic force analysis: D'Alembert's Principle,

Equivalent offset inertia force, Dynamic force analysis of four link mechanisms, Turning moment diagrams, Coefficient of fluctuation of speed and energy, Flywheel application in Punching Press.

## **Unit V**

Gyroscope: Space motion of rigid bodies, Precessional motion and definitions, Gyroscopic acceleration, Angular momentum, Gyroscopic couple, Effect of gyroscopic couple on aeroplane, Effect of gyroscopic couple on naval ship during steering, pitching and rolling, Gyroscopic stabilization of ship, Davis Steering gear, Ackerman's steering gear, Stability of four wheel and two wheel vehicles moving on curved paths.

### **Course Outcomes:**

1. Introduction to Theory of Machines, To understand and Analyse Cams
2. To understand the Theory of Gearing and Gear Trains
3. To understand the Dynamics of Reciprocating Parts
4. To understand Gyroscopic Motion, To understand Working of Governors
5. To understand Flywheel Motion, To understand Balancing of Rotating and Reciprocating Masses

### **Text Books:**

- 1 Thomas Bevan, Theory of Machines, CBS Publishers & Distributors, New Delhi
- 2 S.S Rattan, Theory of Machines, Tata McGraw-Hill Publishing Company Limited New Delhi

### **Reference Books:**

1. CleghornW.L. , Mechanisms of Machines, Oxford University Press
2. Robert L. Norton, Kinematics and Dynamics of Machinery, Tata McGrawHill
3. Ghosh A. and Mallick A.K., Theory of Mechanisms and Machines, Affiliated East-West Pvt. Ltd, New Delhi
4. Rao J.S. and Dukkipati R.V., "Mechanisms and Machines theory", Wil
5. J.Uicker, Gordon R Penstock & J. E. Shigley, "Theory of Machines and Mechanism", Oxford International Edition.
6. P.L Ballaney, Theory of Machines, Khanna Publishers ,New Delhi

### **LIST OF EXPERIMENTS**

1. Draw the cam profile with the help of cam and roller follower mechanism and also draw cam profile graphically and compare.
2. To determine input torque on the link of four bar mechanism subjected to forces and torques by Superposition Method and compare it with results of Virtual Work Method.
3. To determine input torque on the crank of slider crank mechanism subjected to forces and torques by Superposition Method and compare it with results of Virtual Work Method.
4. To determine balancing mass for rotating system having unbalance masses in (1) Two parallel planes (2) In same plane (3) In different parallel planes
5. To prepare performance characteristic curves for Proell and Porter Governor, and to find stability & sensitivity of governor
6. To study gyroscopic effects in case of aeroplane and ship and determine gyroscopic couple.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Heat Transfer (TME-325)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. D.S. Murthy
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PCC</b>	<b>TME-325</b>	<b>Heat Transfer</b>	<b>4(3-0-2)5</b>
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### **Course Objective:**

1. The aim of the course is to build a solid foundation in heat transfer exposing students to the three basic modes namely conduction, convection and radiation.
2. Rigorous treatment of governing equations and solution procedures for the three modes will be provided, along with solution of practical problems using empirical correlations.
3. The course will also briefly cover boiling and condensation heat transfer, and the analysis.
4. This course will introduce the topic of mass transfer.

### **Course Content:**

#### **Unit I**

Introduction to : Modes of heat transfer, One and two dimensional steady state heat conduction, heat transfer from extended surface, Unsteady state heat conduction, Natural and forced convection, hydrodynamic and thermal boundary layers, heat transfer with phase change, heat exchanger, radiation properties and laws, diffusive and convective mass transfer.

#### **Unit II**

Introduction to three modes of heat transfer, Derivation of heat balance equation- Steady one dimensional solution for conduction heat transfer in Cartesian, cylindrical and spherical geometry, concept of conduction and film resistances, critical insulation thickness, lumped system approximation and Biot number, heat transfer through pin fins- Two dimensional conduction solutions for both steady and unsteady heat transfer-approximate solution to unsteady conduction heat transfer by the use of Heissler charts.

#### **Unit III**

Heat transfer by convection, basic equations, boundary layers- Forced convection, external and internal flows- Natural convective heat transfer- Dimensionless parameters for forced and free convection heat transfer-Correlations for forced and free convection- Approximate solutions to laminar boundary layer equations (momentum and energy) for both internal and external flow- Estimating heat transfer rates in laminar and turbulent flow situations using appropriate correlations for free and forced convection.

#### **Unit IV**

Interaction of radiation with materials, definitions of radiative properties, Stefan Boltzmann's law, black and gray body radiation, Calculation of radiation heat transfer between surfaces using radiative properties, view factors and the radiosity method.

## **Unit V**

Types of heat exchangers, Analysis and design of heat exchangers using both LMTD and  $\epsilon$ -NTU methods. Boiling and Condensation heat transfer, Pool boiling curve. Introduction mass transfer, Similarity between heat and mass transfer.

### **Course Outcomes:**

1. After completing the course, the students will be able to formulate and analyze a heat transfer problem involving any of the three modes of heat transfer
2. The students will be able to obtain exact solutions for the temperature variation using analytical methods where possible or employ approximate methods or empirical correlations to evaluate the rate of heat transfer
3. The students will be able to design devices such as heat exchangers and also estimate the insulation needed to reduce heat losses where necessary.

### **Text Books:**

1. Engineering Heat Transfer By C.P. Gupta & Prakash
2. Heat Transfer By J.P. Holman

### **Reference Books:**

1. Heat & Mass Transfer by Incroper & De Witt, Pub.John Wiley & Sons (Asia) Pte.Ltd.
2. Heat Transfer by Bejan

### **Heat Transfer laboratory**

1. Heat flow through lagged pipes.
2. Thermal conductivity of insulating powder.
3. Experiment on natural convection.
4. Experiment on forced convection.
5. Experiment on fourth power law of radiation.
6. Test on emissivity apparatus.
7. Calibration of thermocouple.
8. Experiment Stephan Boltzmann apparatus.

9. Experiment on critical heat flux apparatus.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Internal Combustion Engines (TME-319)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>4(3-0-2)5</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. L. Vashney
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PCC</b>	<b>TME-319</b>	<b>Internal Combustion Engines</b>	<b>4(3-0-2)5</b>
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### **Course Contents:**

#### **Unit I**

Review of ideal cycles; Details of fuel-air cycles, Air standard Otto, Diesel and Dual cycles-Air standard Brayton cycle, Classification of I.C. Engines, Two and four stroke engines and their working, Valve timing diagrams, Comparison of two stroke and four stroke engines, comparison of S.I. and C.I. engines, Introduction to solid, liquid and gaseous fuels, Petroleum base liquid fuels, Stoichiometry, Rating of S.I. and C.I. engine fuels exhaust gas analysis-

#### **Unit II**

First law analysis of combustion reactions- Heat calculations using enthalpy tables- Adiabatic flame temperature- Chemical equilibrium and equilibrium composition calculations using free energy.

#### **Unit III**

Combustion in SI, Flame front propagation, Factors affecting flame speed, Abnormal combustion and variables affecting detonation.

#### **Unit IV**

Combustion in CI engines, Ignition delay and knocking, Combustion chamber designs, Fuel injection in CI engines, carburetors, Air-Fuel requirements, Port fuel injection, Direct injection and Common rail injection. Ignition system, Battery, Magneto and electronic ignition systems.

#### **Unit V**

Lubrication system and Cooling system. Testing of IC engines, Engine emissions and control. Advanced IC Engine concepts. Supercharging, Thermodynamic cycle for supercharged engines, Supercharging in S.I. and C.I. engines.

### **Course Outcomes:**

- 1 Students who have done this course will have a good idea of the following:
- 2 Knowledge about basic components and principles of operations of various parts/components

- 3 Knowledge of various operating parameters on the performance characteristics of IC Engines
- 4 Knowledge about various alternative fuels and their effect on performance of engine
- 5 Information about emissions from automobile engines and their effect on human beings

**Text Books:**

1. Obert E. F, "Internal Combustion Engines and Air Pollution", Harper and Row Publication Inc. NY, 1973.
2. Internal Combustion Engines by V. Ganeshan

**Reference Books:**

1. Heisler H, "Advanced Engine Technology", Edward Arnold, 1995.
2. Heywood J. B, "Internal Combustion Engine Fundamentals", McGraw Hill Book Co. NY, 1989
3. Heldt P. M, "High Speed Combustion Engines", Oxford & IBH publishing Co. India, 1985.
4. Stockel M W, Stockel T S and Johanson C, "Auto Fundamentals", The Goodheart, Wilcox Co. Inc., Illinois, 1996.

**Details of Experiments in I.C. Engines**

1. To determine the frictional power and mechanical efficiency of a multi-cylinder petrol engine at different rotational speeds using Morse test.
2. To determine the frictional power of a diesel engine by Willan's line method.
3. To obtain heat balance on single cylinder diesel engine at 0, 1/3, 2/3 and full load at constant r.p.m.
4. To determine the optimum rate of cooling in water cooled twin cylinder diesel engine.
5. To determine the effect of engine speed on volumetric efficiency of a diesel engine.

6. To determine the effect of inlet air heating on volumetric efficiency of a diesel engine.
7. Study of emissions from S.I. Engines
8. Study of emissions from C.I. Engines
9. Determination of indicated power using indicator diagram in I.C. Engine
10. Determination of calorific value of a given fuel and its flash and fire points.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Gas Dynamics &amp; Jet Propulsion (TME-457)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. S.S. Bhandari
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-457</b>	<b>Gas Dynamics &amp; Jet Propulsion</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

1. To understand the features of compressible isentropic flows and irreversibilities like shocks.
2. To provide a basic knowledge of jet and rocket propulsion technologies.

### **Course Content:**

#### **Unit I**

Steady one dimensional isentropic flow, adiabatic flow with friction, flow with heat transfer; Normal shocks; Nozzle flow with shocks, oblique shocks; Aero-thermodynamics of Jet engines; Axial flow compressors and turbines; Rocket propulsion engines. Basic Gas Dynamics

#### **Unit II**

Introduction; Dynamics of fluid flow; Continuity equation; Conservation of energy (1 Law of thermodynamics); Momentum Equation; Propagation of small disturbance, velocity of sound; Mach Number; Mach waves; Mach cone; Mach angle; Total or stagnation properties.

#### **Unit III**

Horse Flow One dimensional adiabatic flow; Isentropic flow through a passage of varying cross-sectional area; choking in isentropic flow; Operation of nozzles under varying pressure ratios; Converging nozzles; Reynolds Number; Adiabatic flow with friction in constant area ducts; Fanno relations for perfect gases.

#### **Unit IV**

Flow with Normal/oblique shock waves Normal shock; Equations with normal shocks; Governing equations; Strength of shock wave, shocks, in a converging- diverging Nozzle; Nature of flow through oblique shockwaves.

#### **Unit V**

Jet Propulsion Introduction; Thrust; Thrust horsepower; Efficiencies; Thrust equation; Turbojet; Thrust augmentation; Turboprop, Turbofan engines; Ramjet; Pulse jet engines; Ram Rocket; Comparison of various propulsion devices; Effect of forward speed and attitude.

### **Programme outcomes:**

1. They will be able to apply conservation principles to various compressible flow problems.
2. They will be able to understand different types of compressible flow like normal and oblique wave, fanno and Rayleigh flow.
3. They will understand fundamentals of jet and rocket propulsion technologies.

**Text Books:**

1. Fundamentals of Compressible Flow by S. M. Yahya, Pub.Wiley Eastern Ltd.New Delhi-1991.
2. Introduction to gas dynamics and jet propulsion by E. Radhakrisnan, PHI Learning pvt Ltd.2000.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Finite Element Analysis (TME-458)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. P.C. Gope
21.	Approved by	Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-458</b>	<b>Finite Element Analysis</b>	<b>3(2-0-2)4</b>
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### **Objectives:**

1. To illustrate the principle of mathematical modelling of engineering problems
2. To introduce the basics and application of Finite Element Method

### **Course Contents:**

#### **Unit I**

Historical Background, Mathematical modeling of field problems in engineering, governing equations, discrete and continuous models, boundary and initial value problems, Weighted Residual Methods, Variational formulation of boundary value problems, Ritz technique, Basic concept of Finite Element Method.

#### **Unit II**

One dimensional second order equation, discretization, linear and higher order elements, derivation of shape functions, Stiffness matrix and force vectors, assembly of elemental matrices, solution of problems from solid mechanics and heat transfer, longitudinal vibration and mode shapes, fourth order beam equation, transverse deflections and natural frequencies.

#### **Unit III**

Two dimensional equations, variational formulation, finite element formulation, triangular elements- shape functions, elemental matrices and RHS vectors; application to thermal problems, torsion of non-circular shafts, quadrilateral and higher order elements. Plane stresses and plane strain problems, body forces and thermal loads, plate and shell elements.

#### **Unit IV**

Natural coordinate systems, isoparametric elements and shape functions, numerical integration and application to plane stress problems, matrix solution techniques, solution of dynamic problems, introduction to FE software.

### **Course Outcomes:**

Upon completion of the course, students will understand the FEM formulation and its application to simple structural and thermal problems

### **Text Books:**

1. Reddy J.N., An Introduction to Finite Element Method, 3rd ed., Tata McGraw Hill, 2005.
2. Seshu P., Text Book of Finite Element Analysis, Prentice Hall, New Delhi, 2007.
3. Rao S.S., The Finite Element Method in Engineering, 3rd ed., Butterworth Heinemann, 2004.
4. Chandraputla&Belegundu, Introduction to Finite Elements in Engineering, 3rd ed., Prentice Hall, 1990.

## **Practical**

Hands on experience on ANSYS/Matlab

Programming using different languages

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Mechanical Vibrations (TME- -344)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. V.K. Singh
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME- -344</b>	<b>Mechanical Vibrations</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

1. To understand the basic concepts of vibrations and its terminology, Free Vibrations with and without damping.
2. To understand Forced Vibrations with and without damping, Vibration Isolation and transmissibility, reciprocating and rotating unbalance.
3. To understand and analyze vibrations of multiple degree of freedom systems. To attain the knowledge of vibration measuring instruments, vibration absorbers.
4. To learn different methods to solve vibration problems.
5. To learn how to find various properties of materials and fluids using vibration concepts like, viscosity, natural frequency, moment of inertia, modulus of rigidity, young's modulus, etc.

### **Course Contents:**

#### **Unit I**

Periodic and harmonic motions, harmonic analysis, Vector method of representing vibrations. Superposition of simple harmonic motions. Work done in harmonic Motion.

#### **Unit II**

Free vibrations without damping, Equilibrium method for solving free vibrations without damping system, Energy method and Rayleigh's method for solving free vibrations without damping system, Effect of mass of spring and shaft on free vibrations without damping system

#### **Unit III**

Free vibrations with damping, Viscous damping with Over-damped system, Viscous damping with under-damped system, Viscous damping with critical damped system, Coulomb damping & structural damping, Logarithmic decrement

#### **Unit IV**

Forced vibration with constant harmonic excitation, Steady state vibrations, Force Transmission, Forced vibration with rotating and reciprocating unbalance, Forced vibration due to excitation of the support, Forced vibration with coulomb Damping, Forced vibration with

coulomb and viscous Damping, Force Vibration with coulomb, viscous Damping structural damping, Vibration Measuring Instruments, Two degree of freedom, torsional systems Combined Rectilinear, Two mass fixed on a tight stretched spring, Double Pendulum.

## **Unit V**

Free vibrations-equations of motion: for spring mass system for multi degree system, Influence coefficients methods to solve free vibrations-equations, Stiffness co-efficient: methods to solve free vibrations-equations, Holzer's Method, Raleigh's Method

### **Course Outcomes:**

1. After completing this course, the students will be able to apply the concepts of mechanical vibration to solve various practical problems which are faced in industries.
2. Further the students would be able to use the knowledge achieved in their project work.
3. The understand the effect of forces on dynamic motion.

### **Text Books:**

1. Singh V.P. " Mechanical Vibrations" Dhanpat Rai & Co.

### **Reference Books:**

1. Church, A.H. "Mechanical Vibration"
2. Thomson, W.T. "Vibration Theory and Applications" Prentice Hall
3. Grover, G.K. "Mechanical Vibration" Nem Chand Publishers, Roorkee.
4. Rao, S.S. "Mechanical Vibrations, Addison-Wesley.

### **Experiments:**

1. To verify the relation  $T = 2\pi \sqrt{\frac{L}{g}}$  and find out the value of gravitation acceleration 'g' of the dynamics lab
2. To determine the polar moment of inertia of a rectangular mass.
3. To determine the radius of gyration 'k' of given bar pendulum
4. To determine the radius of gyration 'k' of given bar by using Bi-Filer suspension.
5. To study the longitudinal vibrations of helical spring and to determine the frequency or period of vibration (oscillation) theoretically and actually by experiment.
6. To study the undamped free vibration of equivalent spring mass system.
7. To study the Forced Vibrations of Equivalent Spring Mass System
8. To study the Torsional Vibrations (Undamped) of Single Rotor Shaft System.

9. To study the Free Vibrations of Two Rotor System and to determine the Natural Frequency of Vibration Theoretically & Experimentally.
10. To study the damped torsional oscillations and determine the damping co-efficient  $c_t$ .
11. To study the forced lateral vibrations of the beam for different damping.
12. To verify the Dunkerley's Rule

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Advanced Machine Design (TME-459)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. P.C. Gope
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-459</b>	<b>Advanced Machine Design</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

- i. To study design concepts in order to enhance the basic design.
- ii. To study behaviour of mechanical components under fatigue and creep.
- iii. To study statistical techniques and its applications in mechanical design.

### **Course Content:**

#### **Unit I**

**Introduction:** Introduction to Advanced Mechanical Engineering Design. Review of materials & processes for machine elements. Case studies of mechanical engineering design failures. Review of theories of failure

#### **Unit II**

**Design Against Fatigue:** Damage theories, Cycle counting Techniques, Stress based fatigue Analysis & design: one dimensional analysis, multiaxial analysis and Cumulative damage. Fundamentals of LEFM Fatigue, Strain based fatigue Analysis & design: one dimensional analysis, multiaxial analysis .Surface integrity & fatigue life improvement.

#### **Unit III**

**Design For Large Deflection & Hertz Contact Theory:** Design for large deflection and applications, Introduction to Hertz contact theory, The Hertzian Contact, Point Contact - Two Spheres, Line Contact - Two Cylinders.

#### **Unit IV**

**Design against Creep:** creep of material, creep parameters, exponential creep law, hyperbolic sine creep law, etc. Estimated time to rupture, correlation of creep-rupture data, stress relaxation, creep in bending, etc. materials for application at elevated temperatures.

#### **Unit V**

Introduction to Finite Element Methods, One and two dimensional problem formulations and solution methods.

#### **Unit VI**

**Engineering Statistics:** Introduction to Probability Distributions, Analysis of variance (ANOVA), factorial design and regression analysis, Reliability theory, design for reliability, Hazard analysis, and fault tree analysis., Test of Hypothesis, F- test, Z- test, T-test, Reliability Theory, Design for Reliability

### **Course Outcomes:**

Upon completion of this course, students will be able to:

- 1 Analyze mechanical elements critically.
- 2 Analyze behaviour of mechanical elements under fatigue and creep.
- 3 Understand applications of statistical techniques in mechanical design.

### **Text books:**

1. P C Gope, Machine Design: Fundamentals and Applications, PHI Publication, New Delhi, India
2. Norton L. R., "Machine Design – An Integrated Approach" Pearson Education, 2005
3. Fundamentals of Machine Component Design Robert C. Juvinall, Kurt M. Marshek, John Wiley & Sons
4. P.S.G. Tech., "Design Data Book", Coimbatore, 2003

### **Reference books:**

1. Joseph E. Shigley, Charles R. Mischke, Richard G. Budynas, "Mechanical Engineering Design", McGraw Hill, 2004.
2. Fatigue Design: life expectancy of machine parts –Eliahu Zahavi & Valdimir Torbilo, CRC Press

### **Practical/Experimental**

1. Computer based design problems
2. Use of Finite element methods for problem solving
3. Use of statistical packages for data analysis

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Experimental Stress Analysis (TME-465)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. Neeraj Bisht
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-465</b>	<b>Experimental Stress Analysis</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

1. To understand the concept of optics and apply them to structural analysis using Photoelasticity
2. To understand the various techniques to obtain stress strain information for a structure
3. To understand the principles of strain gauges and their instrumentation for extraction of stress and strain fields
4. To understand the techniques of brittle coating and Moire fringe methods

### **Unit I**

**Introduction to Solid Mechanics:** Concepts of stress and strain in three dimensions, stress invariants, compatibility conditions, Cauchy's stress quadric,Airy's stress function etc.

### **Unit II**

**Photoleasticity:** Introduction to optics, Photoleasticity, basic elements of a polariscope, effect of a model in plane and circular polariscope.Compensation techniques, separation techniques, photoelastic materials, 3-D photoelasticity.

### **Unit III**

**Strain Gauges:** Strain gauge- working principles, various types, cross senstivity, gauge factors, measuring circuits. Strain rosettes.

### **Unit IV**

**Brittle coating Techniques:** Procedure for fringe measurement, brittle lacquer method, lacquer selection, lacquer application method, test procedure, calibration method.

### **Unit V**

**Moiré fringe and Grid method:** Moir'e fringe method; Fundamental properties of Moir'e fringes, Moir'e fringes analysis techniques. Grid Method; Principle of the method, strain Displacement Relation for large strains, Application of Grid.

### **Course Outcomes:**

- 1 Students will demonstrate a basic understanding of experimental methods (e.g. strain gages, photoelasticity, image correlation) commonly used in experimental solid mechanics.
- 2 Students will demonstrate the ability to complete a detailed laboratory report and present their findings in a structured, logical manner.

- 3 Students will demonstrate the ability to analyze experimental data and develop appropriate, logical conclusions based on comparisons to theoretical results and other experimental evidence.

### **Text Books**

1. Experimental stress analysis by Dr. Shadhu Singh

### **Reference Books**

1. Experimental stress Analysis & Motion measurement by Dove & Adams.
2. Experimental Stress Analysis by Dally and Riley.

### **Lab Experiments:**

1. To determine the material fringe value using disc under compression.
2. To determine the fracture parameters of a rectangular specimen using photoelasticity.
3. To use the strain gauges to determine the state of stress in a stressed specimen.
4. To use Tardy's method of compensation to determine the fringe order at any point within the specimen

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Non Conventional Energy Source and Systems (TME-466)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. A.K. Pratihar
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-466</b>	<b>Non Conventional Energy Source and Systems</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

1. To familiarize students with various non-conventional energy sources and limitation of environmental energy sources.
2. To impart the knowledge of solar energy and equipments for harnessing solar energy.
3. To understand wind energy ocean thermal tidal power and MHD power etc.

### **Catalogue Description**

Conventional sources of commercial energy fossil fuels, their consumption rates, energy reserves and estimate of time for which conventional energy sources will last, Alternate energy sources, Introduction to photovoltaic and thermoelectric conversion, Introduction to MHD power fuel cells.

The solar-option direct and indirect applications, availability of solar radiation., Energy collection and concentration for photothermal applications. Thermal storage Wind energy, types of wind mills, elementary design principle, Ocean thermal energy conservation, Geothermal energy systems, extent of available resources. Heat transport in geothermal systems. Introduction to tidal and wave energy

### **Unit I**

Conventional sources of energy; fossil fuels and hydro power etc availability in future present status Solar Radiations; Solar constant spectrum, radiation geometry, Beam and diffuse radiations, radiation intensity at tilted surface Electromagnetic radiation black and grey body concept sky radiating characteristics of absorber surfaces, convection and radiation in collectors, heat transfer coefficient.

### **Unit II**

Flat plate collects and concentrating collector. Energy storage; hot water, rocked and Latent heat storage. Water heating, space heating and cooling. Introduction to photovoltaics

### **Unit III**

Mechanism of wind, Type of wind mills, elementary design principles, power in the wind (calculations) power coefficient. Introduction, to Ocean thermal electric conversion system; open cycle, closed and hybrid cycle. Energy from tides; Basic principle of tidal power, Tidal basin, power generation

### **Unit IV**

Wave energy: Introduction, advantages and disadvantages of wave energy. Geothermal energy: Geothermal field, Sources: Hydrothermal, vapour dominated liquid dominated systems, Geopressured resources, Hot dry rocks, magma resources, advantages and disadvantages of Geothermal energy. Introduction to Magneto Hydro Dynamics (MHD) power and fuel cells.

### **Unit V**

Introduction, Biomass conversion technologies, Bio gas generation, Types of biogas plants anaerobic digestion.

**Course Outcomes**

1. The students will be able to understand about various other non conventional sources of energy and various system used for harnessing the same.

**Text Books:**

1. Energy Conversion Systems by Rakosh Das Begamudre, Pub: New Age Int.(P) Ltd.
2. Renewable Energy Sources & Conversion Technology by N.K.Banoal, M.Kleeman & M.Meliss

**Reference Books:**

1. Non-Conv.Energy Source by G.D.Rai,
2. Solary Energy by H.P. Garg & J.Prakash
3. Solar energy by J.A Duffie and W.A. Beckman

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Composite Materials (TME-430)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Mrs. Sakshi Chauhan
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-430</b>	<b>Composite Materials</b>	<b>3(2-0-2)4</b>
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### **Objectives:**

1. To understand the mechanical behaviour of composite materials.
2. To develop an understanding for composite characterization and its performance in various industries
3. To get an overview of the methods of manufacturing composite materials.
4. To understand the mechanics of Fracture and safety measures.

### **Course Contents:**

#### **Unit I**

Introduction: Definition of composite material, Classification based on matrix and topology, Constituents of composites, Interfaces and Interphases, Distribution of constituents, Nano-composites.

#### **Unit II**

Characterization Composites: Control of particle/fiber and porosity content, particle/fiber distribution, Interfacial Reaction of matrix-reinforcing component, Coating of reinforcing component, Strength analysis

Performance of Composite in Nonstructural Applications: Composites in Electrical, Superconducting and Magnetic Applications, Nano-composite devices.

#### **Unit III**

Fabrication Composites: Fabrication of Metal Matrix Composites: Commonly used Matrices, Basic Requirements in Selection of constituents, solidification processing of composites - XD process, Spray processes - Osprey Process, Rapid solidification processing, Dispersion Processes - Stir-casting & Compo-casting, Screw extrusion, Liquid metal impregnation technique - Squeeze casting, Pressure infiltration, Lanxide process), Principle of molten alloy infiltration, rheological behaviour of melt particle slurry.

#### **Unit IV**

Synthesis of In situ Composites; Fabrication of Polymer Matrix Composites - Commonly used Matrices Basic Requirements in selection of Constituents, Moulding method, Low pressure closed moulding, pultrusion, Filament winding, Fabrication of ceramic matrix composites - Various techniques of vapour deposition, Liquid phase method and Hot pressing etc., Fabrication of nano-composites

#### **Unit V**

Fracture & Safety of Composite : Fracture behaviour of composites, Griffith theory of brittle fracture and modification for structural materials, Basic fracture mechanics of composite.

**Text Books:**

1. Composite materials, K.K. Chawala, 2nd ed.,(1987) Springer-Verlag, New York.

**Reference Books:**

1. Gibson R.F. Principles of Composite Material Mechanics, second edition, McGraw Hill, 1994.
2. Hyer M.W., Stress Analysis of Fiber- Reinforced Composite Materials, McGraw Hill, 1998.

**Course Outcomes:**

1. Upon completion of this course, the students will have an overview of the mechanical behaviour and application of composite materials.
2. They will be able to characterize various composite and required fabrication technique
3. They will develop an understanding regarding various ways too analyse composite and their features.

**Practical/Experiments**

1. Fabrication of composite materials
2. Fabrication of particulate composite materials
3. Fabrication of fiber reinforced composite materials
4. Fabrication of hybrid composite materials
5. Testing and characterisation of composite materials

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Mechatronics System (TME-431)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Er. Sandeep Gupta
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-431</b>	<b>Mechatronics System</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

1. To understand the structure of microprocessors and their applications in mechanical devices
2. To understand the principle of automatic control and real time motion control systems, with the help of electrical drives and actuators
3. To understand the design and working of mechatronics system.

### **Course Contents:**

#### **Unit I**

**Introduction:** Introduction, scope and applications of Mechatronics systems. Design process, measurement systems, Process control automation, Introduction to Programmable logic controller, Classification of control system, Microelectronics

#### **Unit II**

**Introduction to Sensors and transducers:** Classification, different types of transducers, Electro-mechanical transducers, Thermoelectric transducers, Photoelectric Transducers, Acceleration, Force, Torque, Power, Flow and Temperature Sensors, Light Detection, strain gauges.

#### **Unit III**

**Signal conditioning Systems:** Introduction to measurement systems, Signal production, Signal conditioning, signal amplification, amplifier, Data Acquisition, digital signals, Analog to Digital Conversion, Digital to Analog conversion, Data Presentation system.

#### **Unit IV**

**Introduction to Actuators:** Electro-mechanical Actuators, Electrical Machines, Direct current motors, Alternating current motors, stepped motors, Piezoelectric Actuators, Hydraulic Actuators, Hydraulic valves, Pneumatic Actuation Systems.

#### **Unit V**

**Design of Mechatronics systems:** Microprocessors and Microcontrollers, Introduction of mechatronics systems: Home appliances, ABS (anti-lock braking system) and other areas

in automotive engineering, Elevators and escalators, Mobile robots and manipulator arms, Computer Numerically Control (CNC) production machines.

### **Course Outcomes:**

1. Upon completion of this course, students will be able to:
2. Understand and analyze mechanical, electrical and electronics systems and their interconnections.
3. Understand the different types of sensors and actuators.
4. Understand the data measurement and signal conditioning and data display system
5. Use of microprocessors and micro-controllers in design of mechatronics system.
6. Develop a simulation model for simple physical systems and explain mechatronics design process

### **Text Books:**

1. A Textbook of Mechatronics, R.K.Rajput, S. Chand & Company Private Limited, 2007
2. Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, William Bolton, Prentice Hall, 2011

### **Reference books:**

1. Mechatronics System Design, Devdas Shetty & Richard A. Kolk, PWS Publishing Company (Thomson Learning Inc.)
2. Mechatronics: A Multidisciplinary Approach, William Bolton, Pearson Education

### **Lab experiments:**

1. Study the following devices (a) Analog & digital multimeter (b) Function/ Signal generators (c) Regulated d. c. power supplies (constant voltage and constant current operations)
2. Study of Speed Measurement System: (a) Magnetic Pick-up (b) Stroboscope
3. Study of Load Measurement System Load Cell
4. Measurement of temperature using thermocouple, thermistor and RTD
5. Measurement of displacement using POT, LVDT & Capacitive transducer
6. Torque measurement using torque measuring devices
7. Strain Measurement using strain gauge
8. Frequency to Voltage Converter and vice versa

9. Study on the application of data acquisition system for industrial purposes
10. Speed control of DC motor using PLC.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Computer Aided Design (TME-463)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. Rakesh Saxena
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-463</b>	<b>Computer Aided Design</b>	<b>3(2-0-2)4</b>
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### **Course Objective:**

1. Introduction to CAD, to understand applications and benefits of CAD
2. To understand computer hardware
3. To understand computer software
4. To study and understand various aspects of geometric modelling
5. To understand geometric transformations
6. Introduction to finite element method

### **Course Content:**

#### **Unit I**

**Introduction to CAD**, CAD/CAM Tools, CAD Hardware – input/output devices, CAD Software – graphics standards, data structure, database, database coordinate system

#### **Unit II**

**Geometric Modeling** – introduction

**Curve Representation** – introduction, analytic curves – line, circle, ellipse, parabola, hyperbola, synthetic curves – Hermite cubic spline, Bezier curve, B-spline curve

**Surface Modeling** – introduction, analytic surface, synthetic surface

**Solid Modeling** – introduction, solid entities, half spaces, boundary representation (B-Rep), constructive solid geometry (CSG), various solid representations

#### **Unit III**

**Geometric Transformations** – translation, rotation, scaling, shearing, reflection, homogeneous representation

**Projection** – orthographic, isometric, perspective

#### **Unit IV**

**Computer Algorithms** – clipping, Bresenham's line algorithm, mid-point circle algorithm

#### **Unit V**

**Introduction to Finite Element Method** – bar, spring, beam elements, applications.

**Course Outcomes:**

After completing this course, the students will be able to understand the importance of CAD. They will understand software and hardware aspects of CAD. They will learn the geometric modeling and geometric transformations. They will get familiar with finite element method.

**Text Book:**

1. Zeid, I and Sivasubramanian, R., CAD/CAM Theory & Practice, McGraw Hill Education

**Reference Books:**

1. Hughes, J.F., van Dam, A., McGuire, M., Sklar, D.F., Foley, J.D., Feiner, S.K., Akeley, K., Computer Graphics: Principles and Practice, Addison Wesley
2. Hearn, D. D. and Baker, M. P., Computer Graphics, Pearson
3. Groover, M.P. and Zimmers, W.E., CAD/CAM Computer-Aided Design and Manufacturing, Prentice Hall

**Experiments**

- 1) Introduction to Matlab/Freemat
- 2) Analytic Curves
- 3) Synthetic Curves
- 4) Geometric Transformation
- 5) Projection
- 6) Computer Algorithms
- 7) Introduction to CREO
- 8) Modeling on CREO
- 9) Modeling on CREO
- 10) Analysis on CREO

Total number of labs = 10



## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Automobile Engineering (TME-464)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Er. Sandeep Gupta
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-464</b>	<b>Automobile Engineering</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

1. To understand the anatomy and working of various parts of an automobile and its performance.

### **Course Content:**

#### **Unit I**

**Frame & Body:** Layout of chassis, types of chassis frames and bodies, their constructional features and materials. Clutches: single plate, multi-plate, cone clutch, semi centrifugal, electromagnetic, vacuum and hydraulic clutches. Fluid coupling. Brakes: Classification and function; Mechanical, hydraulic, vacuum air and self engineering brakes; Brake shoes and lining materials.

#### **Unit II**

**Gear Boxes:** Sliding mesh, constant mesh, synchromesh and epicyclic gear boxes, Automatic transmission system; Hydraulic torque converter; Drives: Overdrive, Propeller shaft, Universal joints, Differential; Rear axle drives. Hotchkiss and torque tube drives; Rear axle types; Front wheel and All wheel drive

#### **Unit III**

**Wheels and Tyres:** Tyre types, Tyre construction; Tyre inflation pressure, Tyre wear and their causes; Re-treading of the tyre, Steering system: steering gear boxes, Steering linkages, Steering mechanism, Under and Over steering. Steering Geometry, Effect of camber, caster, king pin inclination, toe in and toe out; Power steering; Integral and linkage types, Suspension system: objective and requirements, Suspension spring, front and rear suspension systems, Independent suspension system, Shock absorbers.

#### **Unit IV**

**Automotive Electrical System:** Battery construction, Charging and testing, battery types, Starting and Battery Charging System: Starter motor construction, types of drive, Alternator construction, regulation and rectification. Ignition System: Magneto and coil ignition systems, System components and requirements, Automotive lighting: Wiring systems Electrical instruments; head lamp, electric horn, fuel level indicator.

#### **Unit V**

**Automotive Air Conditioning:** Introduction, Loads, Air conditioning system Components, Refrigerants, Fault Diagnosis. **Automotive Safety:** Safety requirements, Safety Devices, Air bags, belts, radio ranging, NVS (Night Vision System) GPS (Global Positioning System)

## **Unit VI**

**Pollution and Performance:** Pollution in our society, Types of pollutants, controlling pollution, and Road performance

### **Course Outcomes:**

Upon completion of this course, students will be able to:

- 1 Identify the different parts and understand the function of each automobile component
- 2 Describe how the steering and the suspension and other systems operate
- 3 Understand the environmental implications of automobile emissions
- 4 Understand about the vehicle performance

### **Text books:**

1. Kirpal Singh, Automobile Engineering, 13th ed., Standard Publishers, New Delhi, 2012.
2. Jain K.K. and Asthana R.B., Automobile Engineering, Tata McGraw Hill, New Delhi, 2002.

### **Reference books:**

1. Heisler H., Advanced Vehicle Technology, SAE International Publ., USA, 2002.
2. Crouse & Anglin, "Automotive Mechanics", Tata McGrawHill, New Delhi, 10<sup>th</sup> Edition 2007.

### **Lab experiments:**

1. To study and prepare report on the constructional details, working principles and operation of the Automotive Clutches.
2. To study and prepare report on the constructional details, working principles and operation of the Automotive Transmission systems.
3. To study and prepare report on working principles and operation of the Multi-cylinder: Diesel and Petrol Engines.
4. To study and prepare report on working principles and operation of the Fuels supply systems.
5. To study and prepare report on working principles and operation of the Engine cooling & lubricating Systems.
6. To study and prepare report on Automotive Emission / Pollution control systems.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Power Plant Engineering (TME-467)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. P.C. Tewari
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-467</b>	<b>Power Plant Engineering</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

1. To provide an overview of coal fired thermal power plants, equipments and related Cycles.
2. To understand the field application of Nozzles
3. To understand steam turbine power plants and related equipments
4. To understand Gas turbine power plants and related equipments
5. To understand the importance of biofuels and energy conversion systems
6. To understand the Economics of Power Generation
7. Equipments used in power plants and the energy conversion issues and related lab experiments.

### **Course Contents:**

#### **Unit I**

Various energy resources, Coal based thermal power plants, Basic Rankine cycle and its modifications like Reheat, Regenerative, Reheat-Regenerative Cycles , Effects of Pressure Temperature Variation at inlet of Turbine on Rankine Cycle, Mean Temperature of Heat addition, layout of modern coal fired power plant, Modern boilers, super critical boilers, FBC boilers. Boiler Efficiency, Heat balance Sheet, Subsystems of thermal power plants, Layout of fuel and ash handling, Boiler Draught systems and Chimney Height Analysis.

#### **Unit II**

Steam Nozzle and Types, Flow through Nozzle analysis, Critical Pressure Ratio, Throat and exit areas. Steam Turbines Types, Velocity Diagrams, Degree of Reaction, Various Efficiencies, Losses in Steam Turbine, Compounding of Steam Turbine. Condensers, Advantages, Various Efficiencies of condensers, steam and heating rates, and cooling water requirement. Cooling ponds and cooling towers. Cogeneration systems.

#### **Unit III**

Gas turbine and combined cycle power plants, Brayton cycle analysis and optimization, components of gas turbine power plants. Basics of nuclear Power Plant, Layout and subsystems of nuclear power plants, nuclear reactor and its parts. Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANDU Reactor.

## **Unit IV**

Bio-fuels, Use of Bio-Fuels in Engines and Benefits, Diesel Power Plants, Principles of wind, Tidal, solar PV and solar thermal, geothermal and fuel cell, thermo electric power systems.

## **Unit V**

Energy, economics and environmental issues, power tariffs, load distribution parameters, load curve, capital and operating cost of different power plants, site selection, depreciation. Pollution control technologies including waste disposal for coal fired steam power plants.

### **Course Outcomes:**

Upon completion of the course, the students can understand

1. Different sources of energy and their utilisation.
  2. The principles of operation for coal based power plants.
  3. Various equipments of boilers and other related equipments.
  4. Basic working principle of different types of power plants.
  5. Economics of power generation.
  6. Pollution control and ash disposal of coal fired power plants
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### **Text Books:**

1. Nag P.K., Power Plant Engineering, 3rd ed., Tata McGraw Hill, 2008.
2. El Wakil M.M., Power Plant Technology, Tata McGraw Hill, 2010.

### **Reference Books:**

1. Elliot T.C., Chen K and Swanekamp R.C., Power Plant Engineering, 2nd ed., McGraw Hill, 1998.
2. Thermal Engineering by Arora and Domkundwar

### **Lab Experiments:**

1. Pressure temperature relation on Mercets boiler
2. Study of water tube boiler and mountings

3. Steam Turbine study
4. Condenser Study
5. Nozzle air flow experiment
6. Study of Air Compressor
7. Study of Air blower.
8. Flow visualization around an aerofoil.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Solar Energy Thermal Process (TME-468)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. L. Varshney
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-468</b>	<b>Solar Energy Thermal Process</b>	<b>3(2-0-2)4</b>
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### **Course Objective:**

1. To understand basic concept of solar energy radiations
2. To understand principle and working of solar flatplate collectors, concentrating collectors, solar distillation etc.
3. To understand principles of solar thermal power generation solar thermal power generation using Stirling cycle, Brayton cycle

### **Course Content:**

#### **Unit I**

Historical background, importance and application of solar Energy

The sun, solar constant spectral distribution of extraterrestrial radiation; earth sun angles; angle of incidence of beam radiation, pyranometers and pyrheliometer measurement of duration of sunshine; solar radiation data, attenuation of solar radiation by the atmosphere.

#### **Unit II**

Electromagnetic radiation; black and grey body concept, Planck's law and wien's displacement law sky radiation, heat transfer coefficients, optical properties of materials.

Absorptance and emittance; Kirchoff's law reflection from surfaces, relationship among absorptance emittance and reflectance; selective surfaces

Reflection of radiation; absorption of radiation optical properties of cover systems, transmittance of diffuse radiation, transmittance-absorptance product; absorbed solar radiation

#### **Unit III**

General description of flat plate collectors Basic energy balance equation, temperature distributors in flat plate collectors; Overall heat transfer coefficient temperature distribution between tubes and collector, efficiency factor, collector heatremoval factor, collector geometric collector performance; method of testing

#### **Unit IV**

Focusing Collectors, Solar disk and theoretical solar images, Collector configurations, concentration ratio orientation and sun tracking systems, characteristics of focusing collectors, thermal performance of focusing collectors

## **Unit V**

Types of energy storage, characteristics and capacity of storage systems, solar ponds

Introduction, principles of solar thermal power generation solar thermal power generation using Stirling cycle, Brayton cycle

Solar refrigeration and air conditioning various methods of power generation

### **Course Outcomes:**

1. Students will be able to understand concept of solar radiation and principle and working of various solar radiation measuring instruments
2. Student will be able to design and model various solar energy related devices.
3. Student will be able to learn about the designing of solar flat plate and concentrating collectors.

### **Text Books:**

1. Solar Engineering of Thermal Processes by J.A.Duffic & W.A.Beckman, Pub.: John Wiley & Sons

### **Reference Books:**

1. Solar Energy by H.P.Garg & J.Prakash, Pub.Tata Mc Graw Hill
2. Solar Energy Principles of Thermal Collection and storage by S.P.Sukhatme, Pub. : McGraw Hill Education (India) Pvt. Ltd.
3. Principles of Solar Engineering by F.Kreith & J.F.Kreider

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Experimental Methods in Thermal Science (TME-469)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. S.S. Bhandari
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-469</b>	<b>Experimental Methods in Thermal Science</b>	<b>3(2-0-2)4</b>
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### **Course Objective:**

1. To understand the principles of measurement systems and static and dynamic characteristics of measurement systems.
2. To understand the basic principles of pressure, temperature, force and torque measurement.
3. To understand the principle of optical measurement techniques in thermal science.

### **Course Content:**

#### **Unit I**

**Introduction:** Experiments versus simulation, Experiments versus measurements, Why conduct experiments, Details of an experimental setup, Principles of similarity; Global versus local measurements; Static versus dynamic calibration.

**Design of experiments:** Issues related to probe selection, factorial design, design of experiments based on sensitivity function and uncertainty analysis. Examples related to (a) determining the duration of the experiment and (b) choosing between steady state and transient techniques. Forward versus inverse measurements, Examples related to wake survey, drag coefficient, and heat transfer coefficient.

#### **Unit II**

**Uncertainty analysis** Nomenclature: precision versus accuracy, measurement errors, sampling, A/D conversion, attenuation, phase lag, signal-to-noise ratio, calibration. scatter, central limit theorem, 95% confidence interval, normal and Student's-t distribution, data outlier detection, uncertainty, combining elemental errors, error propagation.

**Temporal response of probes and transducers:** Measurement system model, system response, amplitude response, frequency response, zeroth, first and second order systems; examples of thermocouple response and U-tube manometer. Probe compensation in the frequency domain.

#### **Unit III**

**Probes and transducers:** Pressure - pressure transducers; noise measurement Velocity pitot static tube (low as well as high speeds), 5-hole probe, Hotwire anemometer, CCA, CTA, Laser Doppler velocimetry, Particle image velocimetry. Temperature measurement: thermocouples, RTD, thermister, infrared thermography, Heat flux measurement

#### **Unit IV**

**Refractive index based optical measurement techniques:** Introduction to lasers, interference, Interferometry, fringe analysis; Schlieren and shadowgraph techniques; Image analysis using ray tracing technique; Holography

**Measurements based on light scattering:** Absorption spectroscopy, shadow formation, Mie scattering, Rayleigh, Raman and other scattering methods.

## Unit V

**Data acquisition systems:** Analog input-output communication, analog to digital converter, static and dynamic characteristic of signals, Bits, Transmitting digital numbers, resolution, quantization error, signal connections, single and differential connections, signal conditioning. Digital signal processing compared with digital image processing signal conditioning. Review of numerical techniques: interpolation; curve fitting (regression), integration, differentiation, root finding, solving a system of linear algebraic equations. Treatment of periodic data; Fourier analysis, FFT algorithm; Inverse FT; Nyquist criterion. Numerical aspects of FFT; probability density function; auto- and cross correlations

**Course Outcomes:** Upon completion of this course, the students will be able to understand static and dynamic characteristics of instruments

1. Upon completion of this course, the students will be able to understand various systems related to measurement of mechanical parameters and design the measurement system for the same.
2. Upon completion of this course, the students will be able to understand the basic concepts of design of experiments, data acquisition system, refractive index based measurement techniques.

## References Book

1. T.G. Beckwith and N.L. Buck, *Mechanical Measurements*, Addison-Wesley, MA (USA), 1969.
2. E.O. Doeblin, *Measurement Systems*, McGraw-Hill, New York, 1986.
3. R.J. Goldstein (Editor), *Fluid Mechanics Measurements*, Hemisphere Publishing Corporation, New York, 1983; second edition, 1996.
4. F. Mayinger, Editor, *Optical Measurements: Techniques and Applications*, SpringerVerlag, Berlin, 1994.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Computational Fluid Dynamics and Heat Transfer (TME-470)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. S.S. Bhandari
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

**Course Objective:**

1. The aim of the course is to build a solid foundation in computational heat transfer exposing students to the numerical methods to solve conduction, convection and radiation problems.
2. Rigorous treatment of governing equations and solution procedures for the three modes will be provided, along with solution of practical problems.

**Course Content:**

**Unit I**

Introduction to Computational Fluid Dynamics and Principles of Conservation: Computational Fluid Dynamics: What, When, and Why?, CFD Applications, Numerical vs Analytical vs Experimental, Modeling vs Experimentation, Fundamental principles of conservation, Reynolds transport theorem, Conservation of mass, Conservation of linear momentum: Navier-Stokes equation, Conservation of Energy, General scalar transport equation.

**Unit II**

Classification of Partial Differential Equations and Physical Behaviour: Mathematical classification of Partial Differential Equation, Illustrative examples of elliptic, parabolic and hyperbolic equations, Physical examples of elliptic, parabolic and hyperbolic partial differential equations.

**Unit III**

Fundamentals of Discretization: Discretization principles: Preprocessing, Solution, Postprocessing, Finite Element Method, 3 Finite difference method, Well posed boundary value problem,Possible types of boundary conditions, Conservativeness, Boundedness, Transportiveness, Finite volume method (FVM), Illustrative examples: 1-D steady state heat conduction without and with constant source term.

**Unit IV**

Discretization of Unsteady State Problems: 1-D unsteady state diffusion problems: implicit, fully explicit and Crank-Nicholson scheme.

**Unit V**

Solution of Systems of Linear Algebraic Equations: Criteria for unique solution, infinite number of solutions and no solution, Solution techniques for systems of linear algebraic equations: Elimination, Iteration and Gradient Search method, Elimination method: Forward

elimination and backward substitution, Assessment of number of computations, L-U decomposition technique, Tridiagonal matrix algorithm (TDMA): Thomas algorithm, Illustrative examples, Norm of a vector, Norm of a matrix, Some important properties of matrix norm, Error analysis of elimination methods, Iteration methods: Jacobi's method and Gauss Siedel method, Generalized analysis of the iterative methods, Sufficient condition for convergence, Rate of convergence, Scarborough criteria of sufficient condition for convergence in Gauss Siedel Method, Illustrative examples of Jacobi's method and Gauss Siedel method, Relaxation methods, Preferential characteristics of iterative methods, Multigrid method, Line by line TDMA, ADI(Alternating direction implicit) method, Gradient search methods: Steepest descent method and Conjugate gradient method

### **Course Outcomes:**

1. After completing the course, the students will be able to formulate and analyze a computational heat transfer problem involving any of the three modes of heat transfer.
2. The students will be able to obtain exact solutions for the temperature variation using numerical methods where possible or employ approximate methods .
3. The students will be able to design and simulate heat transfer problems such as heat exchangers, fins, aerofoil, complex geometry flow and heat transfer problems.

### **References book**

1. Anderson, D.A., Tennehill J.C., and Pletecher R.H., Computational Fluid Mechanics and Heat Transfer, Hemisphere, 1984.
2. Patankar, S.V. Numerical Heat Transfer and Fluid Flow, Hemisphere, 1980.
3. Versteeg, H.K. & Malalasekera, W. An introduction to computational fluid Dynamics: The Finite Volume Method, Adison Wesley-Longman, 1995.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Fatigue Creep and Fracture (TME-472)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	H. Pre-requisite <b>Nil</b> I. An introductory survey of knowledge represented by the department <b>No</b> J. An introductory survey of a special area of knowledge <b>No</b> K. A further development of course <b>No</b> L. An introductory survey of a special area of knowledge represented by some other department <b>No</b> M. A summarizing or integrated course <b>No</b> N. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. P.C. Gope
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-472</b>	<b>Fatigue Creep And Fracture</b>	<b>3(2-0-2)4</b>
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### **Course Objective:**

1. To understand the design against fatigue, fracture & Creep.

### **Unit I**

Design philosophy : (i) Infinite life, (ii) Safe life, (iii) Fail safe and (iv) Damage tolerant design concepts. Fatigue Design : Cyclic stress and stress reversals, Fatigue and progressive fracture, Endurance limit, Fatigue Tests : Cantilever and Beam type of Fatigue Tests, Axial Fatigue Tests. Influence of mean stress on fatigue : Gerber, Goodman and soderberg's criteria. Effect of compressive cyclic stress on fatigue. Fatigue design formula for axial, bending, torsional and combined loading. Fatigue controlling factors: Effect of frequency, Temperature, size, form, stress concentration factors, Notch, sensitivity & surface conditions, residual stresses.

### **Unit II**

Improvement of fatigue strength' by chemical/metallurgical processes such as ritriding, flame hardening, case carburizing. Fatigue strength enhancement by mechanical work : cold rolling, peening, shot peening. Effect of environment : Corrosion Fatigue, Concept of cumulative fatigue damage Fracture Mechanics : Ductile and brittle fracture Theoretical cohesive strength of metasl, Griffith Theory of brittle Fracture, Oruron's modification to Griffith Theory.

### **Unit III**

Modes of fracture : Mode I, II and III, fatigue creek growth Behaviour of metals, Linear Elastic Fracture Mechanics (LEFM), Stress Intensity Factor(SIF), Stress field near the crack tip, Critical SIF and Fracture Toughness, Experimental determination of fracture toughness  $K_{IC}$ , COD gauges and standard ASTM Tests. Strain Energy Release Rates (SERR), Elasto-Plastic Fracture Mechanics (EPFM), Plastic zone size and its evaluation, J-Integral Method.

### **Unit IV**

Creep Analysis : Definition, Constant stress and constant, strain creep tests. Uniaxial creep tests : Baily's Power Law, Creep relaxation : strain hardening and time hardening creep relaxation. Introduction to Creep bending and deflection of simple problems.

### **Course Outcomes:**

1. To understand the fundamental of logic loading.
2. To understand the fundamental of fracture Machines.

3. To understand the fundamental of creep.

#### **Text Books:**

1. George E. Dieter, Mechanical Metallurgy, - Mc Graw Hill, NY, 1988
2. Joseph Marin, Mechanical Behaviour of Engg. Materials, - Prentice Hall of India, 1966
3. Stephens, R.I. and Fuchs, H.O., Metal Fatigue in Engg. , - Wiley, NY 2001
4. Finnie, I. and Heller, W.R., Creep of Engg. Materials, - Mc Graw Hill Book Co., 1959
5. Prasant Kumar, Fracture Mechanics

#### **Reference Books:**

1. L.S. Srinath, Advanced Mechanics of Materials, - Tata Mc Graw Hill Ltd., ND, 2009.
2. Norman E, Dowling, Mechanical Behaviour of Materials, - Prentice Hall, NJ, 1999.
3. Lessells, J.M., strength and resistance of materials, - John wiley & sons, 1954
4. Peterson, R.E., Stress Concentration Design Factors,- John Wiley & Sons, 1953
5. Meguid, S.A., Fracture Mechanics,- John Wiley & Sons, 1996
6. Kare Hellan, Introduction to Fracture Mechanics, - Mc Graw Hill Book Co., 1985

#### Experiments

1. Fracture testing standards
2. Testing sample preparation
3. Rotating Bending Fatigue testing
4. Crack growth experiments on different materials
5. Creep testing
6. Fracture surface analysis

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Tribology (TME-474)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. Neeraj Bisht
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

## **Course Objective:**

1. To understand the theory of lubrication
2. To understand friction, wear and tribological aspects of Machine components
3. To understand types of bearing

## **Unit I**

Introduction : Lubricant and lubrication, Types of bearings, properties and testing of lubricants, Basic equations: Generalized Reynolds equation, Flow and Shear Stress, Energy equation, Equation

of state Hydro dynamic lubrication : Mechanism of pressure development and load carrying capacity, Plane-slider bearing, Idealized slider bearing with a pivoted shoe, Step bearing, Idealized journal bearing. – infinitely long journal bearing, Petroffs equation for a lightly loaded bearing, narrow bearing,

## **Unit II**

Friction and wear of metals: Theories of friction, surface contaminants, wear mechanisms, Adhesive Wear, Abrasive Wear, Corrosive Wear, Fretting Wear. Effect of sliding speed on friction, classification and mechanism of wear, Wear resistant materials.

## **Unit III**

Oil flow and thermal equilibrium - Heat balance of lubricants. Hydrostatic Bearing : Principles, Component of hydrostatic lubrication , Hydrostatic circular thrust bearing , calculation of pressure, load carrying capacity, flow rate , power loss in bearing due to friction.

## **Unit IV**

Concept of gas lubricated bearing, Concept of Elastohydrodynamic lubrication, Design and selection of antifriction bearing

## **Course Outcomes**

1. Students will understand the lubricants and lubrication theory
2. Understand the lubrication theory of different bearings
3. Understand friction wear of bearings

## **Text Books**

1. Introduction to Tribology of Bearing , B.C .Majumdar , S. Chand & Co

## **Reference Books**

1. Fundamentals of Tribiology , Basu S K., Sengupta A N., Ahuja B. B., , PHI 2006
2. Basic Lubrication theory, A. Cameron, John Wiley & sons

3. Lubrication Fundamentals, D.M.Pirro and A.A.Wessol, CRC Press
4. Theory and Practice of Lubrication for Engineers, Fuller, D., New York company 1998

### **Practicals**

1. To study about viscosity of automotive lubricants
2. Study of antifriction bearing
3. Study of hydrodynamic
4. Wear testing of Material and there characterization
5. Scanning electro microscopepick study

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Design of Refrigeration Systems (TME-476)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Dr. A.K. Pratihar
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

<b>PEL</b>	<b>TME-476</b>	<b>Design of Refrigeration Systems</b>	<b>3(2-0-2)4</b>
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### **Course Objectives:**

1. To familiarize students with the design of refrigeration and air conditioning system components and to understand complete performance of these systems
2. To make students able to design condenser, evaporator and capillary tube
3. To make students able to understand heat transfer in air conditioning equipment and to design air conditioning ducts
4. To make students able to calculate cooling loads of buildings

### **Course Content:**

Review of vapour compression systems, multistage or compound compression, Performance characteristics of compressors, modeling of heat exchangers, design of condensers, expansion devices, capillary tube, design of evaporators, complete vapour compression system, review of psychrometric processes in air-conditioning, design of air conditioning apparatus, air conditioning duct design, load calculations and applied psychometrics

### **Detailed Course Description**

#### **Unit-1**

Review of vapor compression refrigeration cycle; multistage or compound compression. Flash gas removal and inter-cooling. Complete multistage compression system, multi-evaporator systems, cascade systems, Performance characteristics of reciprocating compressors, rotary compressors, centrifugal compressors. Modeling of heat exchangers, heat transfer in condensers, design of ondensers, Wilson Plot

#### **Unit-2**

Expansion valve, types; thermostatic expansion valve, automatic expansion valve, capillary tube characteristics and its design. Evaporators; types, heat transfer in evaporators, design, heat transfer augmentation techniques, Complete vapour compression system and its performance characteristics

#### **Unit-3**

Review of psychrometric processes in air-conditioning equipment, enthalpy potential, heat transfer in cooling and dehumidifying coils, air washer, atmospheric cooling towers, air handling system, air conditioning duct design; equal friction method, velocity reduction method, static regain method.

#### **Unit-4**

Load calculations and applied psychometrics; internal heat gains, system heat gains, cooling load and heating load estimation, RSHF, GSHF, ESHF, ADP and dehumidified air quantity

### **Course Outcome**

After studying this course, a student will be able to understand the complete performance of a vapour compression type refrigeration and air conditioning system.

He will also be able to design various components of a refrigeration and air conditioning system

**Text Book**

1. Refrigeration and Air-Conditioning by C.P. Arora, Tata McGraw Hill, 3<sup>rd</sup> Edition

**Reference Books**

1. Refrigeration and Air-Conditioning by Stoecker W.F. and Jones, J.W., McGraw Hill International Edition
2. ASHRAE Hand Book of Fundamentals

Practical

1. To design a shell and tube type water cooled condenser
2. To design an air cooled condenser
3. To design a flooded type refrigerant evaporator
4. To design a dry expansion type refrigerant evaporator
5. To design a capillary tube.
6. To design air-conditioning duct.
7. To design cooling and dehumidifying coil.
8. To calculate cooling load of a building.

## **PROPOSAL FOR A NEW COURSE**

1.	College	College of Technology, Pantnagar
2.	Department	Mechanical Engineering
3.	Title of the Course & Course No.	<b>Nano Engineering Materials (TME-475)</b>
4.	Catalogue Description	Attached
5.	To be offered	B.Tech. Mechanical Engineering
6.	Credits	<b>3(2-0-2)4</b>
7.	Is this a new Course	Yes
8.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
9.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
10.	Relation to other courses	A. Pre-requisite <b>Nil</b> B. An introductory survey of knowledge represented by the department <b>No</b> C. An introductory survey of a special area of knowledge <b>No</b> D. A further development of course <b>No</b> E. An introductory survey of a special area of knowledge represented by some other department <b>No</b> F. A summarizing or integrated course <b>No</b> G. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
11.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
12.	The course will not replace my existing courses	New Course
13.	The courses will not require additional staff over and above	Not required
14.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
15.	Topical outline : Lecture	Attached
16.	Practical:	Yes
17.	Text Book and supplementary reading	Attached
18.	Classroom, Laboratory and other facilities:	Required facilities exist
19.	Would the introduction of this courses required additional staff:	No
20.	Proposed by	Mrs. Sakshi Chauhan
21.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

**Course Objective**

1. Characterisation and properties will provide an overview of nanomaterials including their properties.
2. The hierarchical development from nano to macro length scale and its adaptation in nature will be discussed.
3. Understanding the change in crystal structure and defects, including thermodynamics of nano materials.
4. Structural phase, microstructural and mechanical characterization will also be dealt briefly.

**Unit I**

Overview of Nanostructures and Nano-materials, Classification, crystalline nano-materials and their defects

**Unit II**

Multiscale hierarchical structural built out of nanosized building blocks, Nano materials in nature: Nacre, Gecko, Teeth

**Unit III**

Surfaces and interface in nanostructure, ceramic interface, grain boundaries in nanocrystalline materials, defects associated with interface

**Unit IV**

Deformation behaviour of nanomaterials, Fracture and creep, Nano-mechanics and Nano-tribology, basic thermodynamics of Nanomaterials

**Unit V**

Overview of properties of nanomaterials, Electrical, Magnetic and optical properties

**Course Outcome:**

1. The course is aimed to have an overview of nano materials. The students will develop an understanding of nano materials and their classification.

2. The students will also analyse various crystal structure and their defects as one goes from bulk to nano length scale.
3. Various properties such as electrical, magnetic and optical will be analysed in the light of material application

**Text Books:**

1. Nanomaterials, nanotechnologies and design: An introduction to Engineers and architects , D. Michael Ashby, Paulo Ferreira, Daniel L. Schodek, Butterworth-Heinemann 2009

**Reference Books:**

1. Handbook of Nanophase and Nanostructural Materials (in four volumes), Eds: Z.L. Wang, Y. Liu, Z. Zhang, Kluwer Academic 2003

## **PROPOSAL FOR A NEW COURSE**

22.	College	College of Technology, Pantnagar
23.	Department	Mechanical Engineering
24.	Title of the Course & Course No.	<b>Product Innovation and Design (TME-480)</b>
25.	Catalogue Description	Attached
26.	To be offered	B.Tech. Mechanical Engineering
27.	Credits	<b>3(2-0-2)4</b>
28.	Is this a new Course	Yes
29.	Curricular purpose of the course	To educate the students about the fundamental laws of mechanics and oscillations.
30.	General educational purpose	A. General Education <b>Yes</b> B. Department specialization <b>Yes</b> C. Students Research <b>Yes</b> D. Outgrowth of instructors research Program <b>No</b>
31.	Relation to other courses	H. Pre-requisite <b>Nil</b> I. An introductory survey of knowledge represented by the department <b>No</b> J. An introductory survey of a special area of knowledge <b>No</b> K. A further development of course <b>No</b> L. An introductory survey of a special area of knowledge represented by some other department <b>No</b> M. A summarizing or integrated course <b>No</b> N. In your judgment does this course overlap to a considerable extent with any other course <b>No</b>
32.	What are the urgent reasons why this course be offered at this present time	Proposed syllabus is mandatory to be implemented as per AICTE norms
33.	The course will not replace my existing courses	New Course
34.	The courses will not require additional staff over and above	Not required
35.	What is the exact place of this course in the development of the educational program of your department	Core course for B.Tech. Mechanical Engineering students
36.	Topical outline : Lecture	Attached
37.	Practical:	Yes
38.	Text Book and supplementary reading	Attached
39.	Classroom, Laboratory and other facilities:	Required facilities exist
40.	Would the introduction of this courses required additional staff:	No
41.	Proposed by	Dr. P.C. Gope
42.	Approved by	Dr. P.C. Gope, Head, MED, Course curriculum committee and BOFT

**Course Objective:**

1. To developed creative thinking for product innovation.

**Course Content :**

**Unit I**

Need for Innovation and design, User Innovation, Introduction to product and Product Design, Difference between Product development and product design.

**Unit II**

Need/Problem Identification, User study by contextual enquiry, Questionnaire study, Interview techniques, Persona and scenario mapping, Product Study and market study, Design Brief.

**Unit III**

Creative techniques and tools for Concept generation, concept evaluation

**Unit IV**

Importance of Human factors in product design, Physical Ergonomics principles and issues, Ergonomic assessment tool, Cognitive issues in product design.

**Unit V**

Product prototyping/ model making work flow, tools and techniques for model making and prototyping, introduction to prototype driven innovation, Overview of materials and processes

**Unit VI**

Evaluation tools and techniques for User-Product interaction

**Learning outcomes**

1. applying different innovation models and product design
2. identifying and evaluate innovation sources
3. understanding users and their needs and how products can create value to users
4. understanding the key actors and resources involved in product innovation

**Practicals/ Experimental work**

1. On Design Thinking Skills
2. Identifying Customer Needs
3. Product Specifications
4. Applied Creativity

5. Prototyping
6. Design for Services
7. Product Architecture
8. Financial Analysis
9. Design for Environment
10. Product Development Processes

**Suggestive Books :**

1. Eppinger, S., & Ulrich, K.(2015). Product design and development. McGraw-Hill Higher Education.
2. Green, W., & Jordan, P. W. (Eds.). (1999).Human factors in product design: current practice and future trends. CRC Press.
3. Sanders, M. S., & McCormick, E. J. (1993). Human factors in engineering and design. McGRAW-HILL book company.
4. Roozenburg, N. F., & Eekels, J. (1995). Product design: fundamentals and methods (Vol. 2). John Wiley & Sons Inc.

## Syllabus /Catalogue Description:

This is the fundamental course for the engineering branches. This course contains various methods of manufacturing and techniques which is more economical and sophisticated for particular product .This course contain major part in practice or practical hour, which is mainly use for all mechanical production in industries like foundry shop, welding shop, fitting shop, black smithy, machine shop, fabrication shop.

## Course Content:

### Unit I

General introduction of workshop, Safety Precautions, Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods. Properties of materials, types of materials.

Introduction to various carpentry tools, materials, types of wood, and their characteristics and defects of wood. Processes or operations in wood working. Applications of wood working. Engineering uses of timber, seasoning and preservation.

### Unit II

Scope of molding, characteristics of mould materials, types of sands green and dry sand molding methods. Foundry terminology, introduction of pattern, types, materials, allowances, Gateing system, Casting processes, Classification, types of casting, equipment and tools used. solidification process, common casting defects. applications of casting.

### Unit III

Introduction to welding, types of welding, Oxyacetylene gas welding, types of flames, welding techniques and equipment. Principle of arc welding, equipment and tools. Soldering and Brazing. General applications of welding in Engineering.

### Unit IV

Introduction to Common machine tools, lathe machine, Main operations, parts, tools used on lathe. Cutting tool materials and geometry of single point cutting tool, tool signature. Introduction to Shaper, Planer, drilling and milling – Principle specifications, operations tools etc.

### Unit V

Introduction to fitting work, scope and applications. Introduction to Smithy tools and operations. forging operations, types, and tools, applications of forging.

## Text /Reference Books:

1. Production Technology by R.K. Jain and S. C. Gupta.

2. A course in workshop Technology. Volume 1 and 2. By B.S. Raghuvanshi
3. Hazra, Choudhari S K and Bose S K. 1982. Elements of Workshop technology (Vol. I and II). Media Promoters and Publishers Pvt.Ltd., Mumbai.
4. Chapman W A J. 1989. Workshop Technology (Part I and II). Arnold Publishers (India) Pvt. Ltd., AB/9 Safdarjung Enclave, New Delhi.
5. Raghuvamshi B S. 1996. A Course in Workshop Technology (Vol. I and II). Dhanpat Rai and Sons, 1682 NaiDarak, New Delhi.

### **List of Experiments:**

1. Preparation of simple joints: Cross half Lap joint; Preparation of Dovetail joint
2. Introduction to tools and measuring instruments for fitting;
3. Introduction to welding equipment, processes tools, their use and precautions;
4. Jobs on ARC welding – Lap joint, butt joint; T-Joint and corner joint in Arc welding;
5. Gas welding Practice – Lab, butt and T-Joints;
6. Mould making using one-piece pattern and two pieces pattern;
7. Demonstration of mould making using sweep pattern, and match plate patterns;
8. Introduction to metal casting equipment, tools and their use;
9. Introduction to machine shop machines and tools; Demonstration on Processes in machining and use of measuring instruments;
10. Practical jobs on simple turning, step turning; Practical job on taper turning, drilling and threading;
11. Operations on shaper and planer,
12. Changing a round MS rod into square section with forging.

## Syllabus /Catalogue Description:

The course will help students to understand the concepts of machining, tool life, metal cutting, cutting tools and finishing operations. They will also develop skill related to advance research in this field.

## Topical Outline:

### Unit-I

Introduction to Engineering and Technology, Importance of Manufacturing, Economic Considerations in Manufacturing, Technological Considerations in Manufacturing, Socioeconomic Factors, Some Technical Concepts. Cutting Tool Materials, Surface Treatments of Cutting Tools, Cutting Tool Failure, Tool Wear Measurement, Cutting Tool Life, Tool Life Equation and Factors affecting Tool Life, Machinability, Thermal Aspects in Metal Cutting, Measurement of Tool Tip Temperature, Cutting Fluid.

### Unit-II

Types of Chips Produced in Metal Cutting, Types of Metal Cutting, Cutting Speed, Feed and Depth of Cut, Factors Affecting Cutting Speed, Feed and Depth of Cut, Mechanism of Chip Formation, Thick Shear Zone and Thin Shear Plane Models of Metal Cutting, Piispanen's Idealized Card Deck Model of Cutting, Shear Plane Angle and its Measurement, Shear Strain and Shear Strain Rate in Metal Cutting, Mechanics of Metal Cutting, Merchant's Cutting Force Diagram, Prediction of Shear Plane Angle, Cutting Power and Energy Consumed in Metal Cutting, Energy Consumption in Metal Cutting, Dynamometer.

### Unit-III

Basics of general purpose machines tools, Hand tools Vs Machine Tools, Definition of a machine tool, types of machine tools, Lathe: Principle of working, types of lathe, specification of lathe, parts of a lathe, lathe operations, lathe accessories, thread terminology, Types of thread, Methods of manufacturing screw threads, thread cutting on lathe machine.

Drill, types of drill, elements of a twist drill, Cutting speed, feed & depth of cut in drilling. Tool holding devices on a drill. Drilling and allied operations. Originating a true hole by drilling and allied operations, Boring and its advantages over drilling Boring Machines, Boring tools.

### Unit-IV

Shaper and it's working principle, size of a shaper, construction of a mechanical shaper, classification of shapers, difference between mechanical & hydraulic shapers, quick return

mechanisms of shapers, cutting tools used on shapers, shaper operations, speed, feed and depth of cut in shaper.

Slotter machine, differences between a shaper and a slotter, principal parts of a slotter, slotter size, slotter operations, types of slotters.

Planer machine and differences between a shaper & a planer, types of planers, parts of a planer, size of a planer, work holding devices on planer, planer tools, speed, feed & depth of cut in planer operations.

Milling machine and advantages of milling over other conventional machining operations, types of milling machines, construction of a column & knee type of milling machine, mechanisms of milling machines, cutting speed, feed and depth of cut in milling, size of a milling machine, milling cutters, work holding devices on milling machines, milling machine attachments, basic milling processes, milling operations, Indexing head & its types, Indexing methods, Helical milling.

## **Unit-V**

Gear and types of gears, gear tooth forms and their relative advantages and disadvantages, gear tooth nomenclature, gear manufacturing processes, gear shaping & gear hobbing, worm gear manufacture. Grinding, types of grinding machines, types of grinding operations, important terms related to grinding Abrasive types, types of bonds, grinding wheel identification, selection of grinding wheel, manufacturing of grinding wheel. Honing & honing tool, honing machines, advantages & disadvantages of honing, applications of honing.

Lapping & lapping operation, methods of lapping, mechanism of lapping, advantages and disadvantages of lapping. applications of lapping. Super finishing and differences between super finishing and honing, super finishing machines. applications of super finishing. Broaching definition, broach, tool material, special features of broaching, classification of broaches, broaching machines, factors affecting design of a broach tool, advantages & disadvantages of broaching. applications of broaching. Importance of studying the economics of machining, criteria used for analyzing economics of machining, optimization of cutting speed & feed for minimum cost for a single pass turning operation based on the minimum cost per component criterion, the maximum production rate criterion & the maximum profit rate criterion.

## **Text /Reference Books:**

5. Lindberg, "Processes and Materials of Manufacture", Prentice hall India (p) Ltd.
6. P.N.Rao, "Manufacturing Technology", TMH Ltd 1998(Revised edition)
7. Serope Kalpakjian, Steven R. Schmid, "Manufacturing Engineering and Technology". (4th Edition), Prentice Hall 2000-06-15 ISBN:0201361310
8. E.PaulDeGarmo, J.T.Black, Ronald A.Khoser, "Materials and Processes in Manufacturing" Wiley; 9 edition (December6, 2002) ISBN:0471033065

## **Lab Experiments**

1. To perform Lathe machine operations : Plain turning, Taper turning, Step turning, Thread cutting, Facing, Knurling, on given specimens.
2. Manufacture a given component on a Capstan Lathe.
3. Spur Gear cutting on a Column and Knee type of Horizontal Milling machine.
4. Cutting of V-groove/ Dove-tail groove/ Rectangular groove on a Shaper machine.
5. To cut a Keyway of given size on an M.S. hub with a Slotter machine.
6. Drilling a true hole on an Upright Drilling machine and Counter-boring this hole to the given size.
7. Grinding a Tapered Cylindrical shaft on a Universal Cylindrical Grinding machine.
8. Grinding a Flat surface of given size on a Vertical spindle reciprocating table surface Grinding machine.
9. To study the construction and working of a Honing tool.
10. To Lap a given workpiece using manual lapping.

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## **Syllabus /Catalogue Description:**

This course contains basic manufacturing techniques or economical job techniques for particular product, and introductory course about finish product like grinding.

### **Topical outline:**

#### **Unit-I**

Lathe Machine, Milling Machine, Drilling Machine, Shaper Machine, Planer Machine; types, operations, Structure, drives, Mechanism, Specifications. Indexing; simple and compound. Machining parameters and their effects; Speed, feed and depth of cut, cutting fluids

#### **Unit-II**

Introduction to tool materials, geometry of single point cutting tool and multipoint cutting tool, milling cutters, Tool signature

#### **Unit-III**

Introduction to sheet metal working, blanking and piercing, types of presses and operation, power hammer. Forming, hot working and cold working, rolling, roll mill arrangements. Extrusion, tube and wire drawing, spinning, stretch forming

#### **Unit-IV**

Welding: Gas welding, Electric arc welding, AC and DC welding machines and their characteristics, flux, electrodes, pressure welding, electric, resistance welding, spot, seam welding, submerged arc welding, thermit welding, TIG, MIG, gas cutting

#### **Unit-V**

Tool economics, cost, volume, profit analysis, tool life introduction. Introduction to advanced machining processes, micro machining, NC, CNC and DNC machines.

## **Text /Reference Books:**

1. Elements of workshop Technology Vol. I and II By Hazra and Chaudhary.
2. Elements of workshop Technology Vol. I and II By B.S Raghualshi.
3. Production technology by R.K Jain.

## **List of Experiments: NIL**

## **Syllabus /Catalogue Description:**

This subject make the student familiar with advanced technology which now a day's used by many industries in the field of design and automation and help the student to understand basic features of automation.

### **Topical outline:**

#### **Unit-I**

Introduction to manufacturing system's concepts, manufacturing automation, flow systems. lines and assemblies, Introduction to CAM; Automated Manufacturing system; Need of automation, Basic elements of automation, Levels of automation, Automation Strategies, Advantages & disadvantages of automation, Historical development and future trends.

#### **Unit-II**

Basic concepts in robotics, introduction, numerical control of machine tools, resolution, accuracy, and repeatability, Position representation, Classification and structure of robotic systems, point-to-point and continuous-path systems, control loops of robotic systems, Classification based on arm geometry, coordinate systems, etc.

#### **Unit-III**

Drives and control systems, hydraulic systems, direct current servomotors, control approaches of robots, elimination of stationary position errors, control loops of CNC systems

Kinematic analysis and coordinate transformation, forward kinematics problem, Inverse kinematics, Denavit-Hartenberg convention, link description, coordinate system linkages, and joint mechanisms, actuator space, joint space and Cartesian space

#### **Unit-IV**

Trajectory interpolators, Introduction, General considerations in path description and generation, Joint space schemes, Cartesian space schemes, Path generation at run Time, Collision free path planning Robot programming, Manual programming, Lead through programming, Programming languages

#### **Unit-V**

Sensors and intelligent robots, introduction to robotic sensors, vision systems, range detectors, assembly-aid devices, force and torque sensors, artificial intelligence Computer integrated manufacturing systems, FMS, CAD/CAM systems, Factory of the future.

Applications of robots, handling, loading and unloading, manufacturing cell, welding assembly, machining. Evaluation and economic justification of robotic systems

### **List of Experiments: NIL**



## **Text /Reference Books:**

1. Robotics for Engineers- Yoran Koren, Publisher- McGraw-Hill International Editions
2. Advances in Robotics, Automation and Control - Editor Jesus Aramburo and Antonio Ramirez Trevino
3. **Automation and Robotics by Juan Manuel Ramos Arreguin - InTech , 2008**
4. **Industrial Robotics: Programming, Simulation and Applications - by Low Kin Huat -InTech , 2006**
5. Robotic Systems - Applications, Control and Programming,- Editor Ashish Dutta