

	VELALAR COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)	CREDIT SUMMARY
		UG
		R - 2018
Department	Computer Science and Engineering	
Programme	B.E (CSE)	
	Summary Credits	

Semester / Category	I	II	III	IV	V	VI	VII	VIII	Total	%	AICTE Norms (%)
HS	3	3					3		9	5.56	5% to 10%
BS	11	8	4	4					27	16.67	15% to 20%
ES	8	8	4		4				24	14.81	15% to 20%
PC			11	19	12	14	7		63	38.89	30% to 40%
PE					3	6	3	6	18	11.11	10% to 15%
OE					3		3		6	3.70	5% to 10%
PSI						3	2	10	15	9.26	10% to 15%
TOTAL	22	19	19	23	22	23	18	16	162		

Basic Sciences (BS)

Professional Elective (PE)

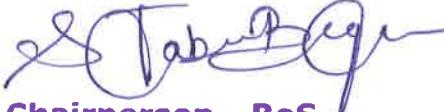
Humanities and Social Sciences (HS)

Open Elective (OE)

Professional Core (PC)

Project work Seminar Internship (PSI)

Engineering Science (ES)



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Dept. of CSE - VCET**



**VELALAR COLLEGE OF ENGINEERING AND
TECHNOLOGY (Autonomous)**

CURRICULUM

UG

R - 2018

Department

Computer Science and Engineering (CS)

Programme

B.E - CSE

Semester

1

Sl.No	Category	Course Code	Course Title	Hours / Week			Credit	Max. Marks			
				L	T	P		CA	SE	Tot.	
THEORY											
1	HS	18 EN	T 1 1	Communicative English - I	3	0	0	3	40	60	100
2	BS	18 MA	T 1 1	Engineering Mathematics - I	3	1	0	4	40	60	100
3	BS	18 PH	T 1 1	Engineering Physics	3	0	0	3	40	60	100
4	BS	18 CY	T 1 1	Engineering Chemistry	3	0	0	3	40	60	100
5	ES	18 CS	T 1 1	Problem Solving and Python Programming	3	0	0	3	40	60	100
6	ES	18 ME	C 1 1	Engineering Graphics	2	0	4	4	40	60	100

PRACTICALS

7	BS	18 PH	L 1 1	Physics and Chemistry Laboratory - I	0	0	2	1	60	40	100
8	ES	18 CS	L 1 1	Problem Solving and Python Programming Laboratory	0	0	2	1	60	40	100
9	MC	18 MC	T 0 1	Value Education for Youth Empowerment	0	0	2	0	100	0	0
Total Credits for Sem					1			22			

Semester

2

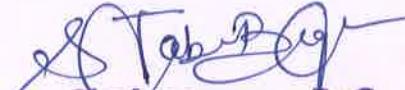
Sl.No	Category	Course Code	Course Title	Hours / Week			Credit	Max. Marks		
				L	T	P		CA	SE	Tot.

THEORY

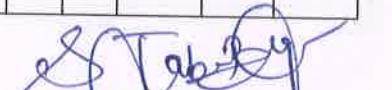
1	HS	18 EN	T 2 1	Communicative English - II	3	0	0	3	40	60	100
2	BS	18 MA	T 2 1	Engineering Mathematics - II	3	1	0	4	40	60	100
3	BS	18 PH	T 2 2	Physics for Information Sciences	3	0	0	3	40	60	100
4	ES	18 EE	T 2 1	Basics of Electrical and Electronics Engineering	3	0	0	3	40	60	100
5	ES	18 IT	T 2 1	Programming in C	3	0	0	3	40	60	100

PRACTICALS

6	BS	18 PH	L 2 1	Physics and Chemistry Laboratory – II	0	0	2	1	60	40	100
7	ES	18 IT	L 2 1	C Programming Laboratory	0	0	2	1	60	40	100
8	ES	18 EE	L 2 2	Engineering Practices Laboratory	0	0	2	1	100	0	100
9	MC	18 MC	T 0 2	Environmental Science and Engineering	2	0	0	0	100	0	100
Total Credits for Sem					2			19			


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Semester			3												
Sl.No	Category	Course Code			Course Title				Hours / Week			Credit	Max. Marks		
									L	T	P		CA	SE	Tot.
THEORY															
1	BS	18	MA	T	3	2	Discrete Mathematics	3	1	0	4	40	60	100	
2	PC	18	CS	T	3	1	Object Oriented Programming using Java	3	0	0	3	40	60	100	
3	PC	18	CS	T	3	2	Data Structures	3	0	0	3	40	60	100	
4	ES	18	CS	C	3	1	Digital Principles and System Design	3	0	2	4	40	60	100	
5	PC	18	IT	T	3	2	Computer Architecture	3	0	0	3	40	60	100	
PRACTICALS															
6	PC	18	CS	L	3	1	Object Oriented Programming Laboratory	0	0	2	1	60	40	100	
7	PC	18	CS	L	3	2	Data Structures Laboratory	0	0	2	1	60	40	100	
8	MC	18	MC	T	0	3	Essential English For Professionals	0	0	2	0	100	0	100	
Total Credits for Sem								3			19				
Semester			4												
Sl.No	Category	Course Code			Course Title				Hours / Week			Credit	Max. Marks		
									L	T	P		CA	SE	Tot.
THEORY															
1	BS	18	MA	T	4	5	Probability and Statistics	3	1	0	4	40	60	100	
2	ES	18	CS	T	4	1	Database Management Systems	3	0	0	3	40	60	100	
3	PC	18	CS	T	4	2	Software Engineering	3	0	0	3	40	60	100	
4	PC	18	IT	T	4	1	Operating Systems	3	0	0	3	40	60	100	
5	PC	18	IT	T	4	2	Design and Analysis of Algorithms	3	1	0	4	40	60	100	
6	PC	18	CS	C	4	1	Object Oriented Analysis and Design	3	0	2	4	40	60	100	
PRACTICALS															
7	PC	18	CS	L	4	1	Database Management Systems Laboratory	0	0	2	1	60	40	100	
8	PC	18	IT	L	4	1	Operating Systems Laboratory	0	0	2	1	60	40	100	
9	MC	18	MC	T	0	4	Professional Communication	0	0	2	0	100	0	100	
Total Credits for Sem								4			23				
Semester			5												
Sl.No	Category	Course Code			Course Title				Hours / Week			Credit	Max. Marks		
									L	T	P		CA	SE	Tot.
THEORY															
1	PC	18	CS	T	5	1	Computer Networks	3	0	0	3	40	60	100	


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2	PC	18	CS	T	5	2	Web Programming	3	0	0	3	40	60	100
3	PC	18	CS	T	5	3	Theory of Computations	3	1	0	4	40	60	100
4	ES	18	EE	C	5	1	Microprocessor and Microcontroller	3	0	2	4	40	60	100
5	PE						Professional Elective - I	3	0	0	3	40	60	100
6	OE						Open Elective - I	3	0	0	3	40	60	100

PRACTICALS

7	PC	18	CS	L	5	1	Computer Networks Laboratory	0	0	2	1	60	40	100
8	PC	18	CS	L	5	2	Web Programming Laboratory	0	0	2	1	60	40	100
9	MC	18	MC	T	0	5	Aptitude and Logical Reasoning	0	0	2	0	100	0	100
10	MC	18	MC	T	0	9	Communication Skills Laboratory	0	0	2	0	100	0	100
					Total Credits for Sem					5	22			

Semester

6

Sl.No	Category	Course Code	Course Title	Hours / Week			Max. Marks		
				L	T	P	Credit	CA	SE

THEORY

1	PC	18	CS	T	6	1	Artificial Intelligence	3	0	0	3	40	60	100
2	PC	18	CS	T	6	2	Compiler Design	3	1	0	4	40	60	100
3	PC	18	IT	T	6	1	Mobile Application Development	3	0	0	3	40	60	100
4	PC	18	CS	T	6	3	Internet of Things	3	0	0	3	40	60	100
5	PE						Professional Elective - II	3	0	0	3	40	60	100
6	PE						Professional Elective - III	3	0	0	3	40	60	100

PRACTICALS

7	PC	18	IT	L	6	1	Mobile Application Development Laboratory	0	0	2	1	60	40	100
8	PSI	18	CS	L	6	1	Mini Project	0	0	6	3	60	40	100
9	MC	18	MC	T	0	6	Professional Ethics for Engineers	2	0	0	0	0	100	100
10	MC	18	MC	T	0	7	Arithmetic And Analytical Ability	0	0	2	0	100	0	100
					Total Credits for Sem					6	23			

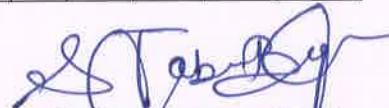
Semester

7

Sl.No	Category	Course Code	Course Title	Hours / Week			Max. Marks		
				L	T	P	Credit	CA	SE

THEORY

1	HS	18	IT	T	7	1	Economics and Management for Engineers	3	0	0	3	40	60	100
2	PC	18	CS	T	7	1	Network Security	3	0	0	3	40	60	100
3	PC	18	CS	T	7	2	Machine Learning	3	0	0	3	40	60	100



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4	PE				Professional Elective - IV	3	0	0	3	40	60	100
5	OE				Open Elective - II	3	0	0	3	40	60	100

PRACTICALS

6	PC	18	CS	L	7	1	Network Security Laboratory	0	0	2	1	60	40	100
7	PSI	18	CS	L	7	2	Internship /Value Added Practical Courses	0	0	4	2	100	0	100
8	MC	18	MC	T	0	8	Indian Constitution and Traditional Knowledge	2	0	0	0	0	100	100
							Total Credits for Sem	7			18			

Semester 8

Sl.No	Category	Course Code	Course Title	Hours / Week			Credit	Max. Marks		
				L	T	P		CA	SE	Tot.

THEORY

1	PE	18				Professional Elective - V	3	0	0	3	40	60	100
2	PE	18				Professional Elective - VI	3	0	0	3	40	60	100

PRACTICALS

3	PSI	18	CS	L	8	1	Project work	0	0	20	10	60	40	100
							Total Credits for Sem	8			16			
							Total Credits				162			


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Sl.No	Category	Course Code	Course Title					Hours / Week			Credit	Max. Marks		
								L	T	P		CA	SE	Tot.

PROFESSIONAL ELECTIVES

PROFESSIONAL ELECTIVE - I (SEMESTER - V)

1	PE	18	CS	E	0	1	Agile Software Development	3	0	0	3	40	60	100
2	PE	18	CS	E	0	2	Distributed Systems	3	0	0	3	40	60	100
3	PE	18	CS	E	0	3	Software Testing	3	0	0	3	40	60	100
4	PE	18	CS	E	0	4	Advanced Database Systems	3	0	0	3	40	60	100

Sl.No	Category	Course Code	Course Title					Hours / Week			Credit	Max. Marks		
								L	T	P		CA	SE	Tot.

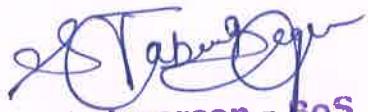
PROFESSIONAL ELECTIVE - II (SEMESTER - VI)

1	PE	18	CS	E	0	5	Business Intelligence	3	0	0	3	40	60	100
2	PE	18	IT	E	0	9	Data Warehousing and Data Mining	3	0	0	3	40	60	100
3	PE	18	IT	E	1	2	Service Oriented Architecture	3	0	0	3	40	60	100
4	PE	18	EC	E			Digital Image Processing	3	0	0	3	40	60	100

Sl.No	Category	Course Code	Course Title					Hours / Week			Credit	Max. Marks		
								L	T	P		CA	SE	Tot.

PROFESSIONAL ELECTIVE - III (SEMESTER - VI)

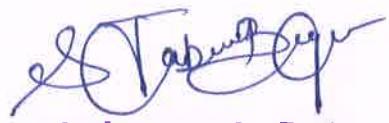
1	PE	18	CS	E	0	6	Multimedia systems	3	0	0	3	40	60	100
2	PE	18	CS	E	0	7	Software Quality Management	3	0	0	3	40	60	100
3	PE	18	CS	E	0	8	Cloud Computing	3	0	0	3	40	60	100
4	PE	18	IT	E	0	3	User Interface Design	3	0	0	3	40	60	100


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Sl.No	Category	Course Code			Course Title			Hours / Week			Credit	Max. Marks		
								L	T	P		CA	SE	Tot.
PROFESSIONAL ELECTIVE - IV (SEMESTER - VII)														
1	PE	18	CS	E	0	9	Information Retrieval	3	0	0	3	40	60	100
2	PE	18	CS	E	1	0	Software Defined Networks	3	0	0	3	40	60	100
3	PE	18	IT	E	1	3	Data Analytics	3	0	0	3	40	60	100
4	PE	18	CS	E	1	1	Building Enterprise Applications	3	0	0	3	40	60	100

Sl.No	Category	Course Code			Course Title			Hours / Week			Credit	Max. Marks										
								L	T	P		CA	SE	Tot.								
PROFESSIONAL ELECTIVES																						
PROFESSIONAL ELECTIVE - V (SEMESTER - VIII)																						
1	PE	18	CS	E	1	2	High Performance Computing	3	0	0	3	40	60	100								
2	PE	18	CS	E	1	3	Information security	3	0	0	3	40	60	100								
3	PE	18	CS	E	1	4	Block Chain Technology	3	0	0	3	40	60	100								
4	PE	18	BM				Biology for Engineers	3	0	0	3	40	60	100								

Sl.No	Category	Course Code			Course Title			Hours / Week			Credit	Max. Marks									
								L	T	P		CA	SE	Tot.							
PROFESSIONAL ELECTIVES																					
PROFESSIONAL ELECTIVE - VI (SEMESTER - VIII)																					
1	PE	18	IT	E	1	4	Ad hoc and Sensor Networks	3	0	0	3	40	60	100							
2	PE	18	IT	E	1	5	Soft Computing	3	0	0	3	40	60	100							
3	PE	18	IT	E	1	6	Cyber Forensics	3	0	0	3	40	60	100							
4	PE	18	CS	E	1	5	Parallel Programming	3	0	0	3	40	60	100							


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Sl.No	Category	Course Code	Course Title	Hours / Week			Credit	Max. Marks		
				L	T	P		CA	SE	Tot.
OPEN ELECTIVES										
1	OE	18	CS	O	0	1	PC Hardware and Troubleshooting	3	0	0
2	OE	18	CS	O	0	2	Web Design and Management	3	0	0
3	OE	18	CS	O	0	3	Knowledge Management	3	0	0
4	OE	18	CS	O	0	4	Green Computing	3	0	0
								3	40	60
									100	100



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Preamble:

Communicative English is a life skill necessary for all students of Engineering and Technology. The course Communicative English-I aims at developing Communication Skills in English essential for the learner to handle English language for a variety of everyday purposes through acquisition of basic grammar and vocabulary along with necessary listening, speaking, reading and writing skills.

Course Outcomes: Upon completion of the course, students will be able to :

1. Use a wide range of vocabulary in oral and written communication.
2. Use correct grammatical structures in speaking and writing.
3. Write clear and coherent informal Passages.
4. Follow different kinds of spoken excerpts and distinguish relevant from irrelevant information, grasp proper sentence pattern and vocabulary through reading
5. Give short informal presentations and participate in classroom discussions

UNIT 1 VOCABULARY

6

Synonyms and Antonyms- Single Word Substitutes - Use of Abbreviations and Acronyms-Homonyms and Homophones-Business Vocabulary - Commonly Confused Words- Collocation - British and American Vocabulary- Word formation

UNIT 2 GRAMMAR

9

Comparative Adjectives - Modals -Phrasal Verbs -Tenses – Connectives-Impersonal Passive Voice -Types of Questions -Mechanics of Writing (Editing) -Direct and Indirect Speech- Numerical Adjectives - Gerunds and Infinitives- Expressions of Purpose- Conditional Sentences- Same Word Used as Different Parts of Speech –Subject Verb Agreement

UNIT 3 INFORMAL WRITING

5

Letter Writing - Informal Letters - Dialogue Writing -Informal Dialogues – Essay Writing-Informal Essays

Movie/Book Reviews

UNIT 4 LANGUAGE ENHANCEMENT THROUGH LISTENING & READING

9

Listening Comprehension -Listening for General Ideas- Listening to You Tube Documentaries - Listening for Specific Information- Listening for Details-Listening for Vocabulary-BBC Learn English Videos -Reading Comprehension- Understanding General and Specific Information -Sign Post Words-Jumbled Sentences - Finding Topic Sentences and Supporting Arguments - Reading for Vocabulary-Reading News Papers

UNIT 5 LANGUAGE ENHANCEMENT THROUGH SPEAKING

16

Introduction to IPA-Syllable, Stress, Intonation, etc., -Conversation Starters- Describing Places, People, Things and Pictures -Self Introduction - Narrating Personal Experiences and Incidents-Informal Group Discussions

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Sanjay Kumar and Pushp Lata, "Communication Skills" 2nd Edition, Oxford University Press, New Delhi, 2017
2. Raman, Meenakshi and Sangeetha Sharma, "Technical Communication: English Skills for Engineers", 1st Edition, Oxford University Press, New Delhi. 2008.

REFERENCES:

1. Department of English, Anna University, "Mindscapes: English for Technologists and Engineers", 1st Edition, Orient Black Swan, Chennai. 2012
2. Dhanavel, S.P, "English and Communication Skills for Students of Science and Engineering", 1st Edition, Orient Black Swan, Chennai. 2011
3. Rizvi, Ashraf. M, "Effective Technical Communication", 2nd Edition, Tata McGraw-Hill, New Delhi, 2018.

e-RESOURCES:

1. <http://www.usingenglish.com>
2. <https://www.khanacademy.org/humanities/grammar>

Preamble:

The course aims at achieving conceptual understanding of topics such as Matrix Algebra and Calculus. The syllabus is designed to provide the skills for modeling engineering problems and understand the role of single variable and multivariables in the discipline of engineering and computer science.

Course Outcomes: Upon completion of the course, students will be able to:

1. Evaluate Eigenvalues, eigenvectors and diagonalization of symmetric matrices.
2. Use limit definition, understand differentiation and integration methods.
3. Compute curvature, centre of curvature, evolute and envelope of curves.
4. Express functions of two variables in Taylor's series and compute Jacobians, maximum and minimum values.
5. Apply multiple integrals to determine area in cartesian and polar coordinates and volume in cartesian co ordinates.

UNIT 1 MATRICES

9+3

Characteristic equation – Eigen values and Eigenvectors of a real matrix – Properties of Eigenvalues and Eigenvectors – Statement and application of Cayley Hamilton Theorem – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT 2 CALCULUS

9+3

Representation of functions – Mathematical Models – New Functions from Old Functions – Graphing Calculators and Computers – The Limit of a Function – Calculating Limits Using the Limit Laws – Continuity – Exponential Growth and Decay – Hyperbolic Functions – Areas and Distances – The Definite Integral – The Fundamental Theorem of Calculus – Improper Integrals.

UNIT 3 GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS

9+3

Curvature – Radius, Centre and Circle of curvature in Cartesian and Parametric form - Evolute – Envelope of family of curves with one and two parameters – Evolute as the envelope of normals – Properties of Evolute and Envelope.

UNIT 4 FUNCTIONS OF SEVERAL VARIABLES

9+3

Partial derivatives – Total derivative – Differentiation of implicit functions – Jacobian- Properties – Taylor's series expansion for functions of two variables – constrained Maxima and Minima – Lagrange's multipliers with single constraint.

UNIT 5 MULTIPLE INTEGRALS

9+3

Double integrals in Cartesian and Polar co ordinates- Change of order of Integration – Change of variables from Cartesian to Polar co ordinates – Area as a double integral in Cartesian and Polar form – Volume as a triple integral in Cartesian co ordinates

TOTAL : 60 PERIODS**TEXT BOOKS:**

1. Grewal B.S., "Higher Engineering Mathematics" 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015.
[Sections 1.1, 1.2, 1.3, 1.4, 2.2, 2.3, 2.5, 3.8, 3.11, 5.1, 5.2, 5.3 and 7.8].

REFERENCES:

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, 26th Reprint, New Delhi, 2016
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
3. N.P.Bali,Manish Goyal, "Engineering Mathematics",Lakshmi Publications(PVT) Ltd,4 th edition,2014

e-RESOURCES:

1. <http://nptel.ac.in/courses/111105035/> "Advanced Engineering Mathematics", Prof. Pratima Panigrahi, Indian Institute of Technology, Kharagpur
2. <http://nptel.ac.in/courses/122104017/> " Mathematics-I", Prof. S.K. Ray, Indian Institute of Technology, Kanpur

Preamble:

Ultrasonics forms the basis of Sonar and in the field of medicine for both diagnostics and therapeutic applications. Mechanical properties of Engineering materials are explored for industrial applications such as construction of bridges and railway wagons. Particle and wave nature of quantum particles form the basis of quantum computers. The virtues of lasers are explored in applications such as holography, computers, space satellites and medicines.

Course Outcomes: Upon completion of the course, students will be able to:

- 1 Demonstrate the knowledge of wave optics in propagation of light waves in optical fibers in communications system.
- 2 Explain the production of Ultrasonics and its NDT techniques in scanning methods, medical applications.
- 3 Describe the Elastic property of solid materials and thermal conductivity of solids in industrial applications.
- 4 Explore the dual nature of light waves with quantum theory on Black body radiation and Schrodinger's wave equations.
- 5 Demonstrate the knowledge on Nd-YAG, CO₂, Semiconductor lasers in industrial applications of welding, heat treatment, cutting, medical treatment and holography.

UNIT 1 WAVES AND OPTICS

9

Classification of waves-wave equation-(qualitative)-Typical and General wave equation-qualitative analysis of phase and group velocities of waves-Differential equation of simple harmonic motion-Forced oscillations -analysis and classification of damped oscillations through differential equations-coherent sources and incoherent sources.

Superposition principle of Waves- Illustrations-Principle and propagation of light in optical fibers-numerical aperture and acceptance angle-Types of optical fibers (material, refractive index, mode-Application of optical fibers.

UNIT 2 ULTRASONICS

9

Introduction – Production techniques- Magnetostriction effect- Piezoelectric effect - Piezoelectric generator- detection of ultrasonic waves - properties – cavitations - velocity measurement – acoustic grating - Industrial applications – drilling, welding, soldering and cleaning – SONAR - non destructive testing – pulse echo system, through transmission and reflection modes - A,B and C scan - medical applications - sonograms.

UNIT 3 MECHANICAL AND THERMAL PROPERTIES

9

Elasticity – Stress-strain diagram and its uses – factors affecting elastic modulus and tensile strength. Torsional stress and deformations – twisting couple – torsion pendulum: theory and experiment – bending of beams. Bending moment – cantilever, Young's Modulus by Uniform and non-uniform bending: theory and experiment – I-shaped girders.

Modes of heat transfer -thermal conductivity- Specific heat-Newton's law of cooling - Forbe's and Lee's disc method: theory and experiment- thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters

UNIT 4 MODERN PHYSICS

9

Wave- particle duality, de-Broglie matter waves, Davisson-Germer experiment, Heisenberg uncertainty principle and its applications, Black body radiation – Planck's theory (derivation) – deduction of Wien's displacement law and Rayleigh – Jeans' law from Planck's theory — Matter waves – concept of operator-Eigen value and Eigen function- Physical significance of wave function -Schrodinger's time independent wave equation — Particle in a one dimensional box ,qualitative explanation on wave equation and energy value in three dimensional box.

UNIT 5 LASER

9

Introduction – principle of spontaneous emission and stimulated emission, population inversion, pumping. Einstein's coefficients - derivation. Types of lasers- Nd-YAG-CO₂, Semiconductor lasers (homojunction & heterojunction) – Industrial applications - lasers in welding, heat treatment, cutting- medical applications- holography-construction and reconstruction-Safety classes of laser.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Gaur R.K. and Gupta S.L., "Engineering Physics", 8th Edition, Dhanpat Rai publishers, 2009.
2. Mani Naidu S., "Engineering Physics", 2nd Edition, Pearson Publishing, 2011.

REFERENCES

1. Serway and Jewett, "Physics for Scientists and Engineers with Modern Physics", 9th Edition, Thomson Brooks Cole, 2013
2. Young H.D., Freedman R.A. and Ford A.L., "Sears and Zemansky's University Physics with Modern Physics", 13th Edition, Pearson India, 2013.
3. Tipler P.A. and Mosca G.P., "Physics for Scientists and Engineers with Modern Physics", 6th Edition, W.H.Freeman, 2007.

e-RESOURCES:

1. <http://nptel.ac.in/courses/115101003> , "Atomic and Molecular Physics" – Dr. T. Kundu, IIT Bombay.
2. <https://www.khanacademy.org/science/physics/quantum-physics>

Waseem

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**Chairperson - BoS
Dept. of Maths- VCET**

J. Tabudero
**Chairperson - BoS
Dept. of CSE - VCET**

Preamble:

The study of water technology enables engineers to acquire skills to make the simple design calculation of drinking water as well as industrial water treatment. Electrochemistry and corrosion explain the fundamentals, corrosion prevention, identification and implementation for solving electrochemical and corrosion problems. The study of energy storage devices exposes some of the most commonly used energy storage technologies. Instrumental methods and analysis describe basic concepts and promote to solve real analytical problems. Studies of Nanochemistry span many areas as assemblies significant new structures like nanowire, nanotube and lab-in-chip devices.

Course Outcomes: Upon completion of the course, students will be able to:

1. Discuss the characteristics of different methods adopted to purify water.
2. Explain the mechanism of corrosion and its control.
3. Demonstrate the knowledge of analytical techniques using spectroscopy.
4. Explain the types, fabrication and engineering applications of polymers .
5. Describe the synthesis, properties and applications of nanomaterials.

UNIT 1 WATER TECHNOLOGY

9

Hardness – types, estimation by EDTA method, Boiler troubles – scale, sludge, priming, foaming, caustic embrittlement and boiler corrosion, Internal conditioning - carbonate, phosphate and calgon conditioning, External conditioning – zeolite and demineralisation process, Desalination – reverse osmosis method.

UNIT 2 ELECROCHEMISTRY AND CORROSION

9

Electrochemistry –cell terminology, EMF series. Corrosion – chemical (corrosion by O₂, H₂ and liquid-metal) and electrochemical corrosion (H₂ evolution and absorption of O₂), Corrosion control – sacrificial anode, Impressed current method and electroless plating.

Application of electrochemistry-primary battery (alkaline battery), secondary battery (lead acid battery) and fuel cell (H₂-O₂ fuel cell)

UNIT 3 INSTRUMENTAL METHODS AND ANALYSIS

9

Basic principles – Beer-lamberts law, instrumentation with block diagram and applications of calorimetry (estimation of Fe²⁺), UV-Visible spectroscopy, infrared spectroscopy and flame photometry (estimation of sodium).

UNIT 4 HIGH POLYMERS

9

Polymers – classification (based on molecular forces-thermoplastics and thermosetting plastics), polymerisation – types, mechanism (Free radical only), Compounding and fabrication – compression, injection, Composites-definition, types, polymer matrix composites-FRP only.

Real time applications of thermoplastics (PVC, Teflon), thermosetting plastics (nylon, epoxy resin)

UNIT 5 NANO CHEMISTRY

9

Basics – distinction between molecules, nanoparticles and bulk materials, Nanoparticles – nano cluster, nano rod, nanotube (CNT) and nanowire, Synthesis – top down process (laser ablation and electro-deposition), bottom up process (thermolysis – hydrothermal, solvothermal), Nanoparticles –properties and applications.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. P.C Jain and Monika Jain, "Engineering Chemistry", 16th edition,DanpatRai publishing company (P) Ltd, New Delhi, 2015
2. N. Krishnamurthy, P. Vallinayagam and D. Madhavan, "Engineering Chemistry", 3rd edition. PHI Learning PVT., LTD, New Delhi, 2014.

REFERENCES:

1. S.S.Dara, "A Text book of Engineering Chemistry", 12th Edition, S.Chand & Company Ltd., New Delhi, 2010.
2. "Engineering chemistry", 2nd edition, Wiley India private Ltd. New Delhi, 2014.
3. V.R.Gowariker, N.V.Viswanathan and Jayadevsreedhar, "Polymer Science" 2nd edition, New age International publishers, New Delhi, 2015.

e-RESOURCES:

1. <http://nptel.ac.in/courses/113104061/> , "Environmental Degradation of Materials" - Dr.KalloMondal, Department of Metallurgy and Material Science, IIT Kanpur
2. <http://nptel.ac.in/courses/113105028/> , "Science and Technology of Polymers"- Prof.B.Adhikari, Department of Metallurgical & Materials Engineering,IITKharagpur

H. Uni

Preamble:

Python is easy to use, powerful, and versatile, making it a great choice for beginners and experts alike. Python's readability makes it a great first programming language — it allows you to think like a programmer and not waste time understanding the mysterious syntax that other programming languages can require. The syntax in Python helps the programmers to do coding in fewer steps. Python is widely used in bigger organizations because of its multiple programming paradigms.

Course Outcomes: Upon completion of the course, students will be able to:

1. Develop algorithms, flowcharts and pseudo codes for a given problem.
2. Develop Python programs using decision control statements for solving given problems.
3. Develop functions, modules and packages using Python for solving given problems.
4. Write programs using string handling features in Python for solving given problems.
5. Create Python programs using list, tuple, dictionaries and sets to solve given problems.

UNIT 1 INTRODUCTION

9

Generation, Characteristics and Classification of Computers – Organization of Computers – Problem Solving Strategies – Program Design Tools: Algorithms, Flowcharts and Pseudocodes – Types of Errors.

UNIT 2 DATA TYPES AND CONTROL STATEMENTS

9

Features of Python – Literal Constants – Variables and Identifiers – Data Types – Input operation – Comments – Reserved words – Indentation – Operators and Expressions – Expressions in Python – Operations on Strings – Type conversion – Decision Control Statements: Selection / Conditional Branching – Loop Structures / Iterative Statements – Nested Loops – break – continue – pass – else statements.

UNIT 3 FUNCTIONS, MODULES AND PACKAGES

9

Need for functions – Function definition – Function call – Variable Scope and lifetime – return statement – function arguments : required, keyword, default and variable length arguments – Lambda functions – recursive functions – modules – packages in Python – Standard library modules – function redefinition.

UNIT 4 STRING, LIST AND SET

9

String manipulations – String formatting – built in methods and functions – slice operation – string comparison and iteration. List: Basic list operations – nested lists – cloning lists – List methods – Looping in lists. Sets: Creating sets – set operations.

UNIT 5 TUPLES , DICTIONARY AND FILES

9

Tuples: Creating and accessing values – Basic Tuple operations – Tuple assignment – tuples returning multiple values – nested tuples. Dictionary: Creating and Accessing values – Sorting – Looping – Dictionary functions and methods. File: Types of files – opening, closing, reading and writing files.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (<http://greenteapress.com/wp/think-python/>)
2. Reema Thareja, "Python Programming using Problem Solving Approach", Oxford University Press, 2017.

REFERENCES:

1. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2", Network theory ltd., 2011.
2. John V Guttag, —Introduction to Computation and Programming Using Python“, Revised and expanded Edition, MIT Press , 2013.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Interdisciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

e-RESOURCES:

1. <https://swayam.gov.in/course/4178-spoken-tutorial-python-english>, "Introduction to Python", Prof. Prabhu Ramachandran, IIT Bombay.
2. https://onlinecourses.nptel.ac.in/noc18_cs21, "Programming, Data Structures And Algorithms Using Python", Prof. Madhavan Mukund, IIT-Bombay.

Preamble:

The knowledge of Engineering graphics is essential for the Engineering graduates in proposing new product designs through drawings and interpreting data from existing drawings. Engineering Design inculcates into an Engineer the creativity and knowledge on various aspects to be considered while designing and realizing the functional products and processes. This course deals with Engineering curves, orthographic and pictorial projections, sectional views and development of surfaces.

Course Outcomes: Upon completion of the course, students will be able to:

1. Draw the various conic sections and Engineering curves.
2. Sketch the orthographic views from given pictorial views and projections of lines.
3. Draw the projections of planes and solids kept in various positions.
4. Sketch sectioned views of solids and development of surfaces.
5. Draw the isometric and perspective projections of simple solids.

UNIT 1 INTRODUCTION AND PLANE CURVES

12

Importance of graphics in Engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lines, lettering and dimensioning-Basic geometrical constructions. (PRACTICE ONLY AND NOT FOR EXAMINATIONS).

Curves used in Engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – Construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

UNIT 2 PROJECTION OF POINTS, LINES AND FREE HAND SKETCHING

12

Orthographic projection- principles-Principal planes-First angle projection- Projection of points in four quadrants - End point projection of straight lines (only First angle projections) inclined to both the principal planes -Determination of true lengths and true inclinations by rotating line method.

Visualization concepts- Free hand sketching – Conversion of Isometric view to orthographic views.

UNIT 3 PROJECTION OF PLANE SURFACES AND SOLIDS

12

Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

Projection of simple solids- Cube, prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane and parallel to the other by rotating object method.

UNIT 4 SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

12

Sectioning of above solids in simple vertical position when cut by a cutting plane which is inclined to one of the reference planes and perpendicular to the other – Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solids in simple vertical position – Cube, prisms, pyramids, cylinder and cone.

UNIT 5 ISOMETRIC AND PERSPECTIVE PROJECTIONS

12

Principles of isometric projection – Isometric scale –Isometric projections of simple solids - Prisms, pyramids, cylinder and cone- Combination of two solid objects in simple vertical position.

Perspective projection of simple solids-Cube, prisms, pyramids, cylinder and cone, by visual ray method when axis is either parallel or perpendicular to ground plane.

TOTAL : 60 PERIODS

TEXT BOOKS:

- 1 Venugopal K and Prabhu Raja V., "Engineering Graphics", New Age International (P) Ltd, 13th Edition, 2015.
- 2 Jeyapoovan T. , "Engineering Graphics with AUTOCAD", Vikas Publishing House Pvt., Ltd., 7th Edition, 2015.

REFERENCES:

- 1 Bhatt N.D., Panchal, V.M. and Ingle P.R., "Engineering Drawing", Charotar Publishing House Pvt. Ltd., 53rd Edition, 2014.
- 2 Parthasarathy N.S. and Vela Murali, "Engineering Drawing", Oxford University Press, 1st Edition, Second Impression 2015.
- 3 Luzzader W..J. and Duff J.M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.

e-RESOURCES:

1. <http://nptel.ac.in/courses/105104148>, "Engineering Graphics" - Dr. Nihar Ranjan Patra , IIT Kanpur
2. <http://cfd.annauniv.edu/webcontent.htm>, "Engineering Graphics" - Dr. Velamurali

Preamble: In the present course related to the lab, understanding of physics concepts applied in optics, thermal and properties of matter has been developed. The necessary practical skills in the determination of water quality parameters and strength of acid has been explored.

Course Outcomes:

1. Experiment and determine the physical characteristics of given solid materials.
2. Experiment and determine the velocity of ultrasonic waves through water medium.
3. Experiment and determine the optical property of light sources.
4. Experiment and determine alkalinity, total, temporary & permanent hardness of water
5. Experiment and determine the strength of acids in a mixture and conduct conductometric titration of strong acid Vs strong base.

PHYSICS LABORATORY – I (Any Five Experiments)

LIST OF EXPERIMENTS

1. (a) Determination of Wavelength, and particle size using Laser
(b) Determination of acceptance angle in an optical fiber.
2. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
3. Determination of wavelength of mercury spectrum – spectrometer grating
4. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
5. Determination of Young's modulus by Non uniform bending method
6. Determination of Planck's constant by photocell method

CHEMISTRY LABORATORY – I

LIST OF EXPERIMENTS

1. Determination of alkalinity in water sample
2. Determination of total, temporary and permanent hardness of water by EDTA method.
3. Determination of iron content of the water sample using spectrophotometer (1,10-phenanthroline /thiocyanate method).
4. Determination of iron content of the given solution using a potentiometer
5. Determination of strength of acid using conductivity meter.

TOTAL : 30 PERIODS

- Laboratory classes on alternate weeks for Physics and Chemistry.

Deepti Devi

Chairperson - BoS
Dept. of Physics - VCET

N. Ami

Chairperson - BoS
Dept. of Chemistry - VCET

VCET/R-2018/SYLL/B.E-CS/I-VIII SEMESTERS

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S. T. Subbarao
Chairperson - BoS
Dept. of Maths- VCET

S. T. Subbarao
Chairperson - BoS
Dept. of CSE - VCET

Preamble:

Python is a dynamic and powerful programming language that focuses on code readability. The Python language has diversified application in the software development companies such as in gaming, web frameworks and applications, language development, prototyping, graphic design applications, etc. This provides the language a higher plethora over other programming languages used in the industry.

Course Outcomes: Upon completion of the course, students will be able to:

1. Create documents, presentationslides and perform data manipulations using Libre Office packages for a given scenario.
2. Write, test and debug simple programs using expressions and statements in Python.
3. Develop programs with conditionals, loops, functions and packages using Python for a given problem.
4. Apply suitable data structure in Python for a real world problem.
5. Create and manipulate files using Python.

LIST OF EXPERIMENTS

1. Study of basic commands in Linux OS.
2. Creating document, presentation slides and performingmathematical calculations using Libre Office packages.
3. Solving problems using algorithm and flowchart.
4. Python statements to check variable validity, data types and expression evaluation.
5. Programs to implement decision control statements.
6. Programs to implement functions.
7. Programs to implement modules and packages.
8. Programs for string handling functions.
9. Programs to implement list, set, tuple and dictionary.
10. Programs for file handling.

SOFTWARE

- Python 3 interpreter for Linux environment
- Jupyter Notebook IDE
- Raptor Tool
- Libre Office Packages

TOTAL: 45 PERIODS

Preamble:

- To develop the understanding as physical health and factors for strengthening life force.
- To expose the students on to areas of mediation and impart the knowledge on social virtues and morals.

Course Outcomes: Upon completion of the course, students will be able to:

1. Demonstrate the knowledge on physical health
2. Discuss the various factors for strengthening life force
3. Classify mind waves and explain the benefits of meditation
4. Explain individual and social virtues
5. Identify and explain the importance of morals.

UNIT 1 Physical Health

6

SKY – Introduction – Education as a means for youth empowerment – Greatness of Education – Yoga for Youth Empowerment – Simplified Physical Exercises: Explanation – Hand, Leg, Breathing and Eye exercises – Kapalabathi, Makarasana, Massaging, Acupressure and Relaxation practices – Yogasanas- Explanation – Benefits.

UNIT 2 Strengthening Life Forces

6

Reasons for Diseases : Natural Reasons (Hereditary, Planetary Position, Natural Calamities and Climatic changes) – Artificial Reasons (Food, Thought, Deed). Philosophy of Kayakalpa: Physical Body –Life Force – Biomagnetism – Mind. Maintaining Youthfulness – Postponing Aging – Transformation of Food into seven Body constituents.

UNIT 3 Wellness of Mind

6

Classification of Mind Waves – Beta, Alpha, Theeta, Delta – Agna Meditation – Benefits. Shanthi Mediation – Benefits. Thuriya Meditation – Benefits. Blessing and its Benefits: Auto Suggestion – Blessing the family and others – Blessings the World – Divine Protection.

UNIT 4 Virtues

6

Individual Virtues : Self Control – Self Confidence – Speaking Truth – Contentment – Humility – Mind Control. Tolerance – Adjustment – Sacrifice – Forgiveness. Cleanliness (Body, Dress, Surrounding)-External, Mental, Inner Cleanliness. **Societal Virtues :** Ahimsa – Services, Patriotism – Equality, Respecting the parents and elders – Caring for them – Respecting Teachers. Punctuality – Time Management.

UNIT 5 Morals

6

Importance of introspection: I and Mine (Ego, Possessiveness), Six Temperaments: Greed – Anger – Miserliness – Immoral Sexual Passion – Inferior Superior complex – Vengeance. Maneuvering the Six Temperaments: Contentment – Tolerance – Charity – Chastity – Parity – Forgiveness. Five important Benefits of Meditation: Perspicacity – Magnanimity – Adaptability – Receptivity – Creativity. (Enhancing memory) (Effective Examination Preparation)

TOTAL : 30 PERIODS

TEXT BOOKS:

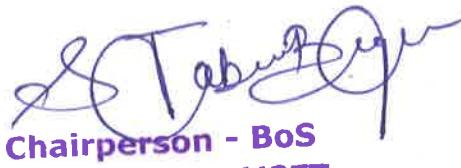
1. “Yoga for Youth Empowerment” compiled by Vethathiri Maharishi Institute for Spiritual and Institutional Education, Aliyar, Pollachi, 1st Edition 2016.
2. “Yoga for Human Excellence”, compiled by Vethathiri Maharishi Institute for Spiritual and Institutional Education, Aliyar, Pollachi 1st Edition 2009.

e-RESOURCE:

1. www.online.vethathiri.edu.in “online in (Virtual) Programme on Yoga and Human Excellence”.



Chairperson - BoS
Dept. of Maths- VCET



Chairperson - BoS
Dept. of CSE - VCET

Preamble:

Communicative English is a life skill necessary for all students of Engineering and Technology. The course Communicative English-II aims at developing Communication Skills in English essential for expressing the ideas through speaking and writing in different social, academic and professional contexts.

Course Outcomes: Upon completion of the course, students will be able to:

1. Start, maintain and close a conversation in a variety of contexts including formal/informal and telephonic conversation.
2. Use structurally correct expressions and conversations.
3. Speak fluently using phrasal verbs and Idiomatic Expressions by recognizing and rectifying own pronunciation and intonation problems.
4. Speak fluently using a wide range of vocabulary.
5. Communicate effectively by using business correspondence structures.

UNIT 1 EFFECTIVE SPEAKING -BASIC LANGUAGE CHUNKS

10

Conversational Starters – Closing a Conversation - Greeting and Leave Taking - Introducing Oneself - Introducing Others - Making Request - Offering Help - Expressing Gratitude -Extending Invitation - - Conveying Wishes - Encouraging Words -Seeking Permission – Granting Permission-Making Complaints - Seeking Apology - Making Interruption - Expressing Possibility- Expressing Agreement and Disagreement - Expressing Hesitation -Asking for Directions and Giving Directions - Giving Instructions- Questions and Expressions with Time – Checking for Understanding -Showing Interest -Expressing Likes and Dislikes

UNIT 2 EFFECTIVE SPEAKING –ADVANCED LANGUAGE CHUNKS

10

Expressing Personal Opinion - Expressing Feelings - Accepting Responsibility - Giving Clarifications - Tag Questions - Giving Comments – Giving Advice – Making Suggestions- –Making Comparisons – Analyzing Problems- Exploring Options – Making Classifications and Elaborations - Speaking Hypothetically-- Discussing Plans-Making Negotiations-Making Presentations-Telephone Etiquette - Telephone Conversation

UNIT 3 EFFECTIVE SPEAKING - PHRASAL VERBS AND IDIOMATIC EXPRESSIONS

3

Most useful Phrasal Verbs related to Self-Introduction-Idiomatic Expressions related to Person, Time and Action

UNIT 4 EFFECTIVE SPEAKING – VOCABULARY ENRICHMENT

10

Talking about Abilities – Travel – Shopping – Climate -Commuting – Distance – Food – Occupation – Parties and Festivals – Daily Routine – Clothing – Hobbies – Favorites- Family – Buying and Selling- Schedules and Plans

NIT 5 BUSINESS WRITING

12

Writing Instructions - Recommendations - Checklist - Tour Itinerary -Writing Slogans - E- mail Writing - Single Line Definitions - Process Description – SMS - Transcoding Graphics - Bar Chart, Flow Chart, Pie Chart and Tables - Business Letters - Calling for Quotations, Placing Orders, Letter of Complaint, Letter of Clarification - Agenda and Meeting Minutes - Cover Letter with Résumé - Report Writing - Accident Report, Industrial Visit Report, Survey Report and Feasibility Report- Summary Writing.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. Sanjay KumarandPushp Lata, "Communication Skills" 2nd Edition, Oxford University Press, New Delhi.2017.
2. J.K.Gangal, "A Practical Course in Spoken English" 1st Edition PH1 Learning Private Limited, Delhi,2014.

REFERENCES:

1. Dr K Elango, Dr. Veena Selvam, Dr. Sujatha Priyadarshini, "Resonance English for Engineers and Technologists".Cambridge University Press, 1st Edition, Foundation Books,New Delhi, 2013.
2. Dr.Mahendra Sarawat, "Speak English Fluently" UpkarPrakashan Publishers, 1st Edition,Agra,2010.
3. S.Sumant,Joyce Pereira, "Technical English",Vijay Nicole imprints Private Limited,1st EditionChennai,2017.

e-RESOURCES:

1. <https://www.fluentu.com/Blog/english/english-small-talk/>
2. <http://www.britishcouncil.com>

Preamble:

Vector calculus is a form of mathematics that is focused on the integration of vector fields. An Engineer should know the Transformations of the Integrals, as Transformation of Line Integral to surface and then to volume integrals. Complex Integration approach is very useful to evaluate many improper integrals of a real variable. The Laplace transform method is a powerful method for solving linear ODEs and corresponding initial value problems as well as systems of ODEs arising in Engineering. The knowledge of transformations is to create a new domain in which it is easier to handle the problem that is being investigated.

Course Outcomes: Upon completion of the course, students will be able to:

1. Apply the concepts of vector calculus in Vector Differentiation and Vector integration.
2. Represent the analytic functions using conformal mapping and bilinear transformation.
3. Classify the singularities and evaluate complex integration.
4. Solve linear differential equations with constant and variable coefficients and also solve Simultaneous first order ODE.
5. Solve differential equations using Laplace Transforms.

UNIT 1 VECTOR CALCULUS

Vector Differentiation: Gradient, divergence and curl – Directional derivative – Irrotational and Solenoidal vector fields – Vector integration: Line, Surface and Volume Integrals -Green's theorem in a plane, Gauss Divergence theorem and Stokes' theorem (excluding proofs) – Simple applications involving squares, rectangles, cubes and rectangular parallelepipeds.

UNIT 2 ANALYTIC FUNCTIONS

Functions of a complex variable – Analytic functions: Necessary conditions – Cauchy-Riemann equations and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions by Milne's method – Conformal mapping:

$w = z+k$, kz , $1/z$ and bilinear transformation.

UNIT 3 COMPLEX INTEGRATION

Statement and applications of Cauchy's integral theorem and Cauchy's integral formula (excluding proof) – Taylor's and Laurent's series expansions – Singularities – Residues – Cauchy's residue theorem(excluding proof) – Application of residue theorem to evaluate real definite integrals as contour integrals around unit circle and semi-circle (excluding poles on the real axis)

UNIT 4 ORDINARY DIFFERENTIAL EQUATIONS

Linear higher order differential equations with constant coefficients – Method of variation of Parameters – Cauchy's and Legendre's linear differential equations – Simultaneous first order linear differential equations with constant coefficients.

UNIT 5 LAPLACE TRANSFORMS

Laplace transform: Sufficient conditions – Transform of elementary functions – Basic Properties – Transforms of derivatives and integrals of functions — Transform of periodic functions

Inverse Laplace transform: Standard results – Statement of Convolution theorem and its applications – Initial and final value theorems – Solution of linear second order ODE with constant coefficients using Laplace transformation techniques.

TOTAL : 60 PERIODS

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, 43rd Edition, New Delhi, 2014.
2. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, 26th Reprint, New Delhi, 2016

REFERENCES:

1. Kreyszig Erwin, "Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Veerarajan T., "Engineering Mathematics (I Year)", 3 rd Edition, Tata McGraw Hill Publishing Company, Delhi, 12.
3. P.Kandasamy, K.Thilagavathy, K.Gunavathy, "Higher Engineering Mathematics", S.Chand & Co Ltd, Chennai,2016.

e-RESOURCES:

1. <http://nptel.ac.in/courses/122107036/> "Mathematics-II", Prof. Tanuja Srivastava, Department of Mathematics, Indian Institute of Technology, Roorkee.
2. <http://nptel.ac.in/courses/122107037/> "Mathematics – III", Prof. Dr. P. N. Agrawal , Indian Institute of Technology, Roorkee

Preamble:

Knowledge about the electronic structure of metals and semiconductors has manifested as a technology to design materials of desired properties. The knowledge of magnetic materials, superconductors and optical behavior of materials form the basis of solid state devices. Nanomaterials are envisioned in self-replicating robots at the molecular scale, in engines of creation.

Course Outcomes: Upon completion of the course, students will be able to:

1. To understand the behaviour of conducting materials based on classical and Quantum theory.
2. Gaining the knowledge on semiconductors with their carrier concentration and hall effect.
3. To understand the types of magnetic material and applications of superconducting materials.
4. Understanding the functioning of optical materials for optical data storage.
5. Familiarize the synthesis of nanomaterials and their various characterization techniques,

9

UNIT 1 CONDUCTING MATERIALS

Conductors – Classical free electron theory of metals – Electrical and thermal conductivity -Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory –Fermi distribution function – Effect of temperature on Fermi function – Density of energy states –Carrier concentration in metals.

9

UNIT 2 SEMICONDUCTING MATERIALS

Intrinsic semiconductor – Carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – Electrical conductivity – Band gap determination –Types of semiconductor- Derivation of carrier concentration in n-type and p-type semiconductor– Variation of Fermi level with temperature and impurity concentration — Hall effect – Determination of Hall coefficient – Applications.

9

UNIT 3 MAGNETIC AND SUPERCONDUCTING MATERIALS

Origin of magnetic moment – Bohr magneton – Comparison of dia, Para and Ferro magnetism –Domain theory – Hysteresis – Soft and hard magnetic materials – Antiferromagnetic materials.

Superconductivity : Properties – Type I and type II superconductors –BCS theory of superconductivity(qualitative) – High T_c superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

9

UNIT 4 OPTICAL MATERIALS

Classification of optical materials – Absorption in metals, insulators & Semiconductors (concept only)- carrier generation and recombination processes-LED's – Organic LED's – Polymer light emitting materials – Plasma light emitting devices— Laser diodes – Optical data storage techniques

UNIT 5 SYNTHESIS AND CHARACTERIZATION OF NANOMATERIALS

9

Nanomaterials: Introduction- properties – Classification of synthesis routes - Ball milling – Sol gels –Chemical Vapour Deposition (CVD) – Applications of Nanomaterials. Carbon nanotubes: Fabrication – Arc method – Pulsed Laser Deposition (PLD) – Chemical Vapour Deposition (CVD) - Properties and applications – Characterization technique – Powder X-ray diffractometer – Microscopic techniques: Introduction to Electron microscope– Scanning Electron Microscope (SEM)– Transmission Electron Microscope (TEM).

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. Palanisamy P.K, "Materials Science", 2nd Edition, Scitech publications (India) Pvt. Ltd., Chennai, 2007.
2. S.O.Pillai "Solid State Physics",6th Edition,New Age International(P) Ltd,Publishers New Delhi,2010.

REFERENCES:

1. Balasubramaniam R, "Callister's Materials Science and Engineering", 2nd Edition, Wiley-India 2014.
2. Charles P. Poole and Frank J.Owens, "Introduction to Nanotechnology", 1st Edition, Wiley, Delhi, 2007.
3. Donald A.Neamen, "Semiconductor Physics and Devices: Basic Principles",3rd Edition, Tata McGraw-Hill, 2012

e-RESOURCES:

1. <http://nptel.ac.in/courses/122102008> , "Materials Science" – Dr. S. K. Gupta, IIT Delhi
2. <https://www.khanacademy.org/science/physics/magnetic-forces-and-magnetic-fields>

Preamble:

The study of biodiversity reflects the extent of the interest of a nation in its natural resources and heritage, which is considered as a crucial portion of the national wealth. Since India is one of the twelve mega-diversity centre of the earth, much emphasis should be put on understanding, preserving and utilizing the biodiversity of our biotic resources. Environmental protection is an important issue for society today as scientific research provides evidence of increasing global warming, ozone depletion and higher levels of pollution. Engineers should learn how to design, develop and evaluate structures, equipment and systems to provide practical solutions to problems caused by pollution, exploitation of natural resources and population explosion.

Course Outcomes: Upon completion of the course, students will be able to:

- 1 Discuss the conservation of biodiversity, ecosystem and their importance in the environment.
- 2 Enumerate the role of human beings in maintaining a green environment.
- 3 Demonstrate the knowledge of precious resources of the environment and their various impacts.
- 4 Identify and explain the various socioeconomic problems and solutions for combating them.
- 5 Describe the various methods to maintain sustainable development for future generation.

UNIT 1 ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

9

Environment: Definition, necessity of environmental study.**Ecosystem:** Definition, Characteristics, Classification, Structural and functional components – Producers, Consumers and Decomposers; Energy flow; Characteristic features, structure and function of (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystem (River and Ocean).**Biodiversity:** Introduction, Definition, Types - Genetic, Species and Ecosystem diversity, Value of biodiversity – productive use, social, ethical and aesthetic values, India as a mega-diversity nation, Hot spots of biodiversity in India, Threats to biodiversity – Habitat loss, Poaching of wildlife, Endangered and endemic species, Conservation of biodiversity – In-situ and Ex-situ conservation of biodiversity.

Field study of common plants, insects, birds.

Activity: Study of the ecosystem structure of Thindal hill

UNIT 2 ENVIRONMENTAL POLLUTION AND DISASTER MANAGEMENT

9

Environmental Pollution: Definition; Sources, Effects and Control measures of (a) Air pollution (b) Water pollution (c) Noise pollution (d) Soil pollution; Solid waste management – Components, Effects and Control measures of municipal solid wastes; Role of an individual in pollution prevention.**Disaster Management:** Types, causes and control measures of Flood, Drought, Earthquake, Cyclone, Landslides and Tsunami.

Case studies – Chernobyl nuclear disaster, Fukushima nuclear disaster, Minamata disaster and Bhopal gas tragedy.

Field study of the local polluted site – Urban / Rural / Industrial / Agricultural.

Activity: (i). E- waste collection within the campus and separation.

(ii). Waste collection and incineration

UNIT 3 NATURAL RESOURCES

9

Forest Resources: Uses and over-exploitation; deforestation-causes & effects.**Water Resources:** Uses and over-utilization of surface and ground water, Benefits and problems of dams, Impacts of dams on forests and tribal people.**Food Resources:** World food problems, overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

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Role of an individual in conservation of natural resources.

Case studies – chipko movement, Sardarsarovar Narmada river project, Endosulfan tragedy in Kerala.

Field study of the local area to document environmental assets – river / forest / grassland / hill / mountain.

Activity: Tree plantation and maintenance within the campus

UNIT 4 ISSUES AND ENVIRONMENT PROTECTION ACTS

9

Social Issues: From unsustainable to sustainable development, Urbanisation and urban problems related to energy. Water conservation-Rain water harvesting and watershed management.

Environmental Issues: Causes & Consequences of Climatic change, Global warming, Acid rain, Ozone layer depletion.

Environmental Protection Acts: Functions of State and Central Pollution Control boards, Air (Prevention and Control of Pollution) act, Water (Prevention and control of Pollution) act, Forest conservation act.

Activity: Small group meetings about water management, promotion of recycled use, generation of less waste, avoiding electricity waste.

UNIT 5 POPULATION AND HUMAN HEALTH

9

Population: Population growth – Worldwide scenario and the factors affecting population growth; Population explosion, Family welfare program - Importance and components.

Human Health: Role of Information Technology in environment and human health, human rights, value education, HIV/AIDS, Women and child welfare.

Activity: Poster making events

TOTAL : 45 PERIODS

TEXT BOOKS:

- 1 Benny Joseph, 'Environmental Science and Engineering', 3rdreprint (2015), McGraw Hill Education (India) Pvt Ltd., New Delhi.
- 2 P. Yoganathan & Dr. R. Kumaravelan, 'Environmental Science and Engineering', 2nd edition, reprint (2017), Scitech Publication (India) Pvt. Ltd., Chennai.

REFERENCES:

- 1 Gilbert M.Masters, 'Introduction to 'Environmental Engineering and Science', 2nd edition (2004), Prentice Hall of IndiaPvt. Ltd.
- 2 Rajagopalan. R, 'Environmental Studies-From Crisis to Cure', 2nd edition (2013), Oxford University Press.
- 3 Dharmendra S. Sengar, 'Environmental law', Fourth print (2014), PHI Learning Pvt. Ltd., New Delhi.

e-RESOURCES:

- 1 <http://freevideolectures.com/Course/3039/Population-and-Society> , "Population and Society" – Prof.A.K.Sharma, Department of Humanities and Social Sciences, IIT Kanpur.
- 2 http://onlinevideolecture.com/?course_id=712 - "Environmental Air Pollution" – Prof. Mukesh Sharma, Department of Civil Engineering, IIT Kanpur.



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Preamble:

The study of biodiversity reflects the extent of the interest of a nation in its natural resources and heritage, which is considered as a crucial portion of the national wealth. Since India is one of the twelve mega-diversity centers of the earth, much emphasis should be put on understanding, preserving and utilizing the biodiversity of our biotic resources. Environmental protection is an important issue for society today as scientific research provides evidence of increasing global warming, ozone depletion and higher levels of pollution. Engineers should learn how to design, develop and evaluate structures, equipment and systems to provide practical solutions to problems caused by pollution, exploitation of natural resources and population explosion.

Course Outcomes: Upon completion of the course, students will be able to:

1. Compare and contrast structure and function of forest and marine ecosystem to conserve biodiversity.
2. Analyze the sources, effects, control measures of air and water, solid waste management to maintain green environment.
3. Describe overexploitation of forest, overutilization of water and environmental impacts related to food resources to preserve environment.
4. Explain human health, environment and disaster management through information technology.
5. Discuss air and water act to solve environmental issues of climatic change.

UNIT 1 ECOSYSTEM AND BIODIVERSITY MANAGEMENT

6

Importance of environmental studies-Ecosystem-Definition, Characteristics, structure and functions of Forest and Ocean ecosystem.Biodiversity-Definition, Significance, Values of biodiversity, Threats to biodiversity-Habitat loss and poaching, Biodiversity conservation-In-situ (Biosphere and National park), Ex-situ (Gene bank and Seed bank)

UNIT 2 ENVIRONMENTAL POLLUTION

6

Pollution- Definition causes and effects of Air and Water. Control strategies-Air pollution- (Catalytic converter,Cyclone separator). Water pollution-waste water treatment (Primary, Secondary and Tertiary Treatment). Solid waste-Source and generation of solid waste, Methods of disposal- Sanitary land fill,Incineration and composting.

UNIT 3 NATURAL RESOURCES

6

Forest Resources: Functions of forest, deforestation-causes, consequences and steps to prevent deforestation.

Water Resources: over-exploitation of surface and ground water, Benefits and problems of dams on forests and tribal people. Food Resources: Environmental impacts related to food resources –Effects of modern agriculture (fertilizer and pesticide problems),water logging and salinity.

UNIT 4 ROLE OF IT AND DISASTER MANAGEMENT

6

Role of IT in environment-Remote Sensing and GIS application,Global positioning system, Environmental data base. Role of IT in human health – EHR, Medical Transcription, Endoscopy, Automated dispensing machine (ADM), Teleconference, Picture archiving and Communication System (PACS) method. Disaster management-Cause, effects and mitigation of Flood, Cyclone, Earthquake, Tsunami

UNIT 5 SOCIAL ISSUES AND ENVIRONMENTAL LEGISLATION

6

Social Issues: Climate change- Global warming, Ozone layer depletion,Water conservation-Rain water harvesting (Roof top method). Legislation- Function of State and Central pollution control Board (Air and Water).

TOTAL : 30 PERIODS

TEXT BOOKS:

1. Dr.ArunLuiz T, 'Environmental Science and Engineering', 1st edition (2017), VK publications.
2. P.Yugananth&Dr. R. Kumaravelan,'Environmental Science and Engineering', 2nd edition, reprint (2017),Scitech Publication (India) Pvt. Ltd., Chennai.

REFERENCES:

1. Benny Joseph, 'Environmental Science and Engineering', 3rd reprint (2015), McGraw Hill Education (India) PvtLtd.,New Delhi.
2. Gilbert M.Masters, 'Introduction to 'Environmental Engineering and Science', 2nd edition (2004), Prentice Hall of IndiaPvt. Ltd.

e-RESOURCES:

1. <https://nptel.ac.in/courses/105104099/4> "Types and forms of Air Pollutants" – Prof. Mukesh Sharma,Department of Civil Engineering, IIT Kanpur.
2. <https://nptel.ac.in/courses/105104183/8> -"Introduction to natural hazards(Flood and Tsunami)- Prof.Javed Malik, Department of Civil Engineering,IIT Kanpur


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Preamble:

The course covers the fundamentals of basic electrical circuit parameters of both ac and dc circuits and the characteristics of motors and generators. The basics of semiconductor devices and logic gates provides the necessary initiative for the students to acquire the knowledge in basic electronics.

COURSE OUTCOMES: Upon completion of the course, students will be able to:

- 1 Analyze the various DC circuits and find the circuit parameters.
- 2 Describe the principles of AC fundamentals.
- 3 Illustrate the construction and working principle of DC machines.
- 4 Explain the basics of semiconductor devices and its applications.
- 5 Explain the basics of Number systems and Logic gates.

UNIT 1 ELECTRICAL CIRCUITS – DC

9

Definition of Electrical Circuit Parameters - voltage – current - power and energy. Elements of DC Circuits - DC voltage / Current Sources. Calculation of Resistance and Current in series and parallel circuit- Star-Delta transformation of Resistance. Ohm's Law, Kirchhoff's Laws and its applications - Simple Problems in Mesh and Nodal analysis. Construction and working principle of Permanent Magnet Moving Coil Instruments.

UNIT 2 ELECTRICAL CIRCUITS – AC

9

AC Circuit Terminologies - RMS and Average value of Sinusoidal waveform – Form Factor - Peak Factor - Power Factor - Definition of impedance and admittance – Phasor diagram - Analysis of R, L, C, RL, RC, RLC circuits. Construction and working principle of Moving iron Instruments. Introduction to Three phase system - Star and Delta Connection.

UNIT 3 ELECTRICAL MACHINES

9

Review of Laws of Electromagnetic Induction – Fleming's Right and Left hand rules – Lenz's law. DC Generator - Construction - Working principle - Characteristics of DC Shunt Generator. DC Motor - Construction - Working principle – Characteristics and applications of DC Shunt Motor - AC transmission and distribution system (Single line diagram).

UNIT 4 SEMICONDUCTOR DEVICES AND APPLICATIONS

9

PN junction Diode and its Characteristics - Zener Diode and its Characteristics – Half and Full wave Rectifiers – Voltage regulation. Bipolar Junction Transistor - CE configuration and its characteristics – BJT as an amplifier.

UNIT 5 DIGITAL ELECTRONICS

9

Boolean Algebra - Theorems and Laws - De-Morgan's theorem – Logic Gates – Universal Gates - Implementation of Boolean functions. Binary Arithmetic - Addition – Subtraction – Multiplication - Division – BCD addition - Half adder and Full adder circuits.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. Muthusubramanian R and Salivahanan S, "Basic Electrical and Electronics Engineering", McGraw Hill Education, 1st Edition, 2014. .
2. Mittle V N and Aravind Mittal, "Basic Electrical engineering", McGraw Hill Education, 2nd Edition, 2006.

REFERENCES:

1. V.K.Mehta and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand & Company Ltd, 2015.
2. Sedha R.S., "Applied Electronics", S.Chand & Company Ltd, 2006.
3. Thomas L.Floyd., "Digital Fundamentals", Pearson Education, Prentice Hall, Tenth Edition, 2010.

E-RESOURCES:

1. NPTEL, <http://nptel.ac.in/courses/117106101/>, "Basic Electrical Circuits", Prof. Nagendra Krishnapura, IIT, Madras.
2. NPTEL, <http://nptel.ac.in/downloads/108105053/>, "Basic Electrical Technology", Prof. Dr. L. Umanand, IIS, Bangalore.
3. NPTEL, <http://nptel.ac.in/courses/117103063/>, "Basic Electronics", Dr. Chitralekha Mahanta, IIT, Guwahati.

Preamble :

The understanding of characteristics of solids and liquids and properties of semiconducting materials has been explored. The practical skills in the instrumental methods for quantitative estimation of metal ions content has been the main focus.

Course Outcomes:

1. Experiment and determine the physical characteristics of given solid material.
2. Experiment and determine the Energy band gap of the given semiconducting materials.
3. Experiment and determine the physical characteristics of given liquid.
4. Experiment and estimate the amount of Cu ions present in the solution of titrimetry.
5. Experiment and estimate the amount of metal ions present in the solution using analytical Instruments

PHYSICS LABORATORY II
(Any Five Experiments)

LIST OF EXPERIMENTS

1. Determination of Young's modulus by uniform bending method.
2. Determination of band gap of a semiconductor.
3. Determination of coefficient of viscosity of a liquid – Poiseuille's method.
4. Determination of thickness of a thin wire – Air wedge method.
5. Determination of rigidity modulus – Torsion pendulum.
6. Determination of Hysteresis of a ferromagnetic material –Deflection magnetometer

CHEMISTRY LABORATORY II

LIST OF EXPERIMENTS

1. Determination of Dissolved Oxygen content of waste water sample by Winkler's method
2. Determination of chloride content of wastewater sample by Argentometric method.
3. Determination of acid strength in waste water using pH meter.
4. Estimation of dissolved metal ions present in wastewater using flame photometer.
5. Estimation of dissolved metal ions(copper) present in wastewater byEDTA method.

TOTAL : 30 PERIODS

- Laboratory classes on alternate weeks for Physics and Chemistry.

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VCET/R-2018/SYLL/B.E-CS/I-VIII SEMESTERS

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Preamble:

The students are given the introduction upon the basics of computer which comprises of the study of Motherboard and interfacing components and operating system. They were given the practice for assembling a PC, assembling RAM in a motherboard, assembling hard disk drive in a cabinet, assembling CD/DVD ROM in a cabinet, establishing data connection and fixing wires. The basic knowledge of electrical and electronics is mandatory and it is practiced with the wiring experiments and by verification of the basic logic gates.

Course Outcomes: Upon completion of the course, students will be able to:

1. Study the basics of personal computer and also its interfacing components.
2. Install and update windows and Linux operating systems.
3. Explain basics of Computer assembly and configuration and also system installation with different softwares.
4. Construct various types of domestic wiring and measure the various electrical parameters.
5. Develop and test circuits with active elements and verify truth table of logic gates.

LIST OF EXPERIMENTS**COMPUTER**

- 1) Study and identification of standard desktop personal computer.
- 2) Study of Motherboard and interfacing components.
- 3) Install, upgrade and configure Windows operating systems.
- 4) Install, upgrade and configure Linux operating systems.
- 5) Computer Assembly and Configuration : Steps for assembling a PC, assembling RAM in a motherboard, assembling hard disk drive in a cabinet, assembling CD/DVD ROM in a cabinet, establishing data connection and fixing wires.
- 6) System Installation: Steps for installing different softwares (including antivirus software, printer and scanner software).

ELECTRICAL AND ELECTRONICS**ELECTRICAL**

- 7) Residential house wiring using switches, fuse, indicator and lamps.
- 8) Fluorescent lamp wiring.
- 9) Stair case wiring.
- 10) Reading of voltage, current, power, energy and other parameters with 1 phase digital energy meter
- 11) Measurement of earth resistance

ELECTRONICS

- 12) Identification and Study of Electronic components and equipments – Resistors, capacitors, inductors, colour coding and measurement.
- 13) Measurement of AC signal parameters (peak-peak, RMS value, period, frequency) using CRO.
- 14) Verification of the truth tables of logic gates: AND, OR, XOR and NOT.
- 15) Construction of Half Wave and Full Wave Rectifiers and study their output waveforms.
- 16) Soldering practice – Using general purpose PCB.

TOTAL : 45 PERIODS

Preamble:

This course aims at giving adequate exposure to students on the principles of procedural programming language. The course introduces the computational thinking and make the students develop C programs using basic programming constructs to solve Engineering problems.

Course Outcomes: Upon completion of the course, students will be able to:

1. Develop C programs for a given problem statement using decision control statements.
2. Analyze linear, binary searching algorithms and bubble sorting algorithm for a given problem statement using arrays.
3. Build modules for a given problem and synthesize a complete program in C language using functions and pointers.
4. Compare and contrast structure, union and enumerated datatypes for a program using C language.
5. Develop C programs to store and process the given data using files.

UNIT 1 BASICS OF C PROGRAMMING

9

Introduction to Programming – Introduction to C - Structure of C program – Compilation and Execution - C Tokens –Keywords, Variables, Constants - Data Types – Input/output statements - Operators: Precedence and Associativity - Expressions – Type Conversion and Typecasting - Decision control and Looping statements.

UNIT 2 ARRAYS AND STRINGS

9

Introduction to Arrays: Declaration, Initialization – One dimensional array –Linear Search, Binary Search, Bubble Sort. Two dimensional arrays – Matrix Operations (Addition, Multiplication and Transpose) – Strings - String operations: length, compare, concatenate, copy, reverse – Array of Strings.

UNIT 3 FUNCTIONS AND POINTERS

9

Introduction to functions – User-defined functions - Function prototype, function definition, function call – Parameter passing: Pass by value, Pass by reference - Recursion. Pointers – Declaration – Pointer expression and Pointer arithmetic – Arrays and pointers –Function Pointers.

UNIT 4 STRUCTURES, UNION AND ENUMERATED DATA TYPES

9

Structure - Nested structures – Pointer and Structures – Array of structures – Structure and Functions – Union - Example Programs using structures and Unions – Enumerated Data types.

UNIT 5 FILE PROCESSING

9

Introduction to Files – Using Files in C – Reading and writing Files using fscanf and fprintf – Functions for selecting a record - Command line arguments - Storage classes – Pre-processor directives - Dynamic memory allocation.

TEXT BOOKS:**TOTAL: 45 PERIODS**

1. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", 3rd Edition, Oxford University Press, 2013.

REFERENCES:

1. Yashavant P. Kanetkar, "Let Us C", 13th edition, BPB Publications, New Delhi, 2011.
2. Herbert Schildt, "C: The Complete Reference", 4th edition, McGraw Hill, New Delhi, 2000.
3. Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.

e-RESOURCES:

1. <http://nptel.ac.in/courses/106104128/>, "Introduction to Programming", Prof. Satyadev Nandakumar, IIT-Kanpur.
2. <http://www.nptel.ac.in/courses/106102066/>, "Introduction to Problem Solving and Programming", Dr. S. Arun Kumar, IIT- Delhi.

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C PROGRAMMING LABORATORY

For the candidate admitted in the year from 2019 – 20
(Common to B.E / B.Tech. – CS & IT Programmes)

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Preamble:

This laboratory course provides hands on training for the students to learn the problem solving techniques using C programming language.

Course Outcomes: Upon completion of the course, students will be able to:

1. Develop and test the C program to solve a given problem statement using suitable data types, decision making and control statements.
2. Develop and test the C program to process the given list or table of data and reproduce the array according to the expected result.
3. Develop and test the C program for the given problem statement using structure, union and functions.
4. Develop and test the C programs using pointers to access arrays, functions and allocate memory using dynamic memory management functions.
5. Develop and test the C programs to store and process the given data using files.

LIST OF EXPERIMENTS

1. C programs that involve basic data types, looping and decision statements.
2. C programs using one dimensional and two dimensional arrays.
3. C programs for String manipulation operations.
4. C programs using Functions
 - Parameter passing
 - Library functions
 - Math functions
 - Recursion
5. C programs using structures and union.
6. C programs using Pointers
 - Pointer arithmetic
 - Arrays and functions using pointers.
7. C programs for basic file operations to copy the content from one file to another using fscanf and fprintf functions.
8. C programs using dynamic memory allocation.
9. Developing applications using C
 - Payroll Processing
 - Banking Application
 - Quiz software

TOTAL: 45 PERIODS

Preamble:

Discrete Mathematics is a branch of mathematics involving discrete elements that uses algebra and arithmetic. It is increasingly being applied in the practical fields of computer science. Propositional calculus is a formal system whose expressions represent formal objects which can be used in the design of combinational digital circuits. The predicate logic is a part of artificial intelligence which is applicable in the field of robotics, medicine and it is used in intelligent database in order to solve some complex problems. Combinatorics is a fundamental mathematical discipline which provides a foundation in counting techniques that can be applied to algorithm analysis. Graph is a formal way to represent a network. Many problems in computer system can be analyzed using models based on graphs. Concepts of algebraic structures, Lattices and Boolean Algebra provide the background essential to the study of finite state machines, switching theory and logic design.

Course Outcomes: Upon completion of the course, students will be able to:

1. Construct and check the validity of mathematical arguments using propositional calculus and predicate calculus
2. Compute combinatorial problems by applying Pigeonhole Principle, Permutations and Combinations and solve Linear Recurrence Relations using Generating functions
3. Determine whether the graphs are Hamiltonian and/or Eulerian and check Isomorphism between graphs
4. Classify the given algebraic structures as Groups, Rings or Fields by using the properties of algebraic structures
5. Classify the given posets as Lattices or Boolean Algebra by using the properties of Lattices

UNIT 1 MATHEMATICAL LOGIC

9+3

Propositions – Logical connectives – Compound propositions - Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contra positive – Logical equivalences and implications – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference. Predicates – Statement functions – Theory of inference.

UNIT 2 COMBINATORICS

9+3

Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions – Inclusion and exclusion principle and its applications.

UNIT 3 GRAPHS

9+3

Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT 4 ALGEBRAIC STRUCTURES

9+3

Algebraic systems – Semi groups and monoids - Groups – Subgroups – Homomorphism's – Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.

UNIT 5 LATTICES AND BOOLEAN ALGEBRA

9+3

Partial Ordering – Posets – Lattices as Posets – Properties of Lattices – Lattices as Algebraic Systems – Some special Lattices – Boolean Algebra – Definitions and Examples.

TOTAL (L:45+T:15): 60 PERIODS

TEXT BOOKS:

1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", 7th Edition, Tata Mc Graw Hill Private Limited, New Delhi, Special Indian Edition, 2014.
2. Tremblay J.P. and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata Mc Graw Hill Pub. Co. Ltd, New Delhi, 43rd Reprint, 2013. (For Unit 5 – Sections : 4.1.1 to 4.1.3, 4.1.5 and 4.2.1)

REFERENCES:

1. Ralph.P.Grimaldi., "Discrete and Combinatorial Mathematics: An Applied Introduction", 5th Edition, Pearson Education(Singapore) Private Limited, New Delhi, 8th Impression 2016.
2. Thomas Koshy., "Discrete Mathematics with Applications", Elsevier Academic Press, UK, Reprinted 2014.
3. Narsingh Deo, "Graph Theory with Applications to Engineering and Computer Science", PHI Learning Private Limited, Delhi, 2016.

e-RESOURCES:

1. <http://nptel.ac.in/courses/106106094/1>, "Propositional Logic", <http://nptel.ac.in/courses/106106094/3>, "Predicate Calculus" and <https://nptel.ac.in/courses/106106094/40> "Lattices" Dr.Kamala Krithivasan, Department of Computer Science and Engineering, Indian Institute of Technology, Madras.
2. <http://nptel.ac.in/courses/111107058/20>, "Graph Theory", and <http://nptel.ac.in/courses/111107058/38>, "Introduction to Recurrence Relations", Dr.Sugata Gangopadhyay, Department of Mathematics, Indian Institute of Technology, Roorkee.

Preamble:

Java is an object oriented programming language with a higher level of security and portability. Platform independent feature of java makes it a write once, run anywhere language. Java multithreading feature makes it possible to write program that can do many tasks simultaneously. It uses a strong memory management, an automatic garbage collection, exception handling and also type checking mechanism which makes it a popular programming language.

Course Outcomes: Upon completion of the course, students will be able to:

1. Write a Java program for the given problem statement using operator, arrays, classes and methods.
2. Develop solution for a given problem using Inheritance and Packages to achieve reusability and implement exception handling code to handle the run time errors.
3. Develop a Java code for the given problem statement using String handling functions and I/O streams.
4. Design an applet for a given scenario to embed dynamic content in the web page.
5. Develop a simple GUI application for a given scenario using AWT components and to access the backend Database using JDBC.

UNIT 1 OVERVIEW OF JAVA

9

Concepts of Object Oriented Programming – An Overview of Java – Data types, Variables and Arrays – Operators – Control statements – Classes – Methods.

UNIT 2 INHERITANCE AND EXCEPTION HANDLING

9

Inheritance: Basics – Super keyword – Method Overriding – Dynamic Method dispatch – Abstract classes – final keyword- Packages and Interfaces: Packages – Access protection – Importing Packages – Interfaces - Exception Handling.

UNIT 3 STRING HANDLING AND I/O

9

Multithreading - String Handling: String Constructors – Special String Operations – Character Extraction – String comparison – Searching and Modifying a String – String Buffer – String Tokenizer Input/output: The Stream Classes – The Byte Streams – The Character Streams – Serialization.

UNIT 4 APPLET

9

The Applet Class: Basics – Applet Architecture – Skeleton – Simple Applet Display Methods – Repainting – HTML APPLET tag – Passing Parameters to the Applet – Audio Clip and Applet Stub Interface.

UNIT 5 AWT AND EVENT HANDLING

9

Introducing the AWT: AWT Classes – Window Fundamentals. Using AWT Controls, Layout Managers and Menus. Event Handling – Delegation Event Model – Event Classes – Event Listener Interfaces - JDBC Programming.

TEXT BOOKS:**TOTAL: 45 PERIODS**

1. Herbert Schildt, "Java - The Complete Reference", Eighth Edition, McGraw-Hill Education, 2011.
2. Rajkumar Buyya, S Thamarai Selvi, Xingchen Chu, "Object Oriented Programming with Java – Essentials and Applications", McGraw-Hill Education, 2009.

REFERENCES:

1. Kathy Sierra, Bert Bates, "Head First Java", Second Edition, O'Reilly Media, 2005.
2. "Java 6 Programming Black Book", Kogent Learning Solutions Inc., 2007
3. Cay S. Horstmann, Gray Cornell, "Core Java Volume – I Fundamentals", Ninth Edition, Pearson Education, 2013.

e-RESOURCES:

1. <http://www.nptelvideos.com/video.php?id=1471&c=15>.
2. <http://nptel.ac.in/courses/106105084/30>, Java Programming, Prof. Indranil Sengupta, IIT kharagpur.

Preamble:

A data structure is an arrangement of data in computer's memory in such a way that it could make the data quickly available to the processor for required calculations. A data structure should be seen as a logical concept that must address two fundamental concerns. Lists, arrays, stacks, queues, heaps, trees, and graphs are the more commonly used data structures.

Course Outcomes: Upon completion of the course, students will be able to:

1. Develop list ADT for a given list or table using array and linked list implementation by ensuring the ordering of data elements.
2. Create stack and queue ADT for a given list using array and linked list implementation and apply specific ADT for a given application.
3. Construct a tree for a given list of data by ensuring tree properties and analyze inorder, preorder, postorder traversal for a constructed tree.
4. Implement a suitable shortest path algorithm for a given graph such that the sum of the edges weights is minimum.
5. Apply a suitable searching and hashing algorithms for a given list of data considering the size and ordering of data.

UNIT 1 LISTS

Abstract Data Types (ADT) – List ADT – Array-Based Implementation – Linked List Implementation– Singly

Linked Lists- Circularly Linked Lists -Doubly-Linked Lists – Applications of Lists.

UNIT 2 STACKS AND QUEUES

Stack ADT – Queue ADT – Circular Queue – Applications of Stacks and Queues.

UNIT 3 TREES

Preliminaries - Binary Trees - Binary Tree Traversal - Binary Search Trees- Expression Trees - AVL

Trees-Binary Heap - Heap Sort.

UNIT 4 GRAPHS

Definitions–Graph Traversal- Topological Sort– Shortest-Path Algorithms: Unweighted Shortest Paths-

Dijkstra's Algorithm– Minimum Spanning Tree– Prim's and Kruskal's Algorithms– Undirected Graphs.

UNIT 5 SEARCHING AND HASHING

Searching: Linear Search – Binary Search. Hashing – General idea-Hash Function- Separate

Chaining – Open Addressing: Linear Probing – Quadratic Probing- Double Hashing.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2015.
2. Richard F. Gilberg, and Behrouz A. Forouzan, "Data Structures - A Pseudocode Approach with C", Second Edition, Thomson Brooks/cole, 2011.

REFERENCES:

1. Reema Thareja, "Data Structures Using C", First Edition,Oxford University Press, 2011.
2. ISRD Group, "Data Structures Using C", First Edition, McGraw Hill Education (India) Private Limited, New Delhi, 2007.
3. Data Structures through C, Yashwant Kanetkar, BPB Publications.

e-RESOURCES:

1. <http://www.nptel.ac.in/courses/106102064>, Introduction to data structure, Mr.Varma, IIT Bombay.
2. <http://nptel.ac.in/courses/106102064>, Video Lectures, Data Structures and Algorithms, IIT Delhi.

Preamble :

This course aims at giving adequate exposure to students on the design and analysis of logic circuits. The course is intended to understand different kinds of number representation and its conversion. It helps the student to acquire knowledge on the concepts of combinational and sequential logic circuits and simulate digital logic circuits using Verilog HDL.

Course Outcomes: Upon completion of the course, students will be able to:

1. Represent a number in bases like Binary, Decimal, Octal and Hexadecimal and convert a numeral from one base to another base.
2. Design logic circuits by reducing the Boolean expression using K-map and Tabulation minimization techniques and implement them using Universal logic gates.
3. Design Adders, Subtractor, Code Converters, Encoder, Decoder, Multiplexer and Demultiplexer by deriving logical expressions using K-Map.
4. Design sequential logic circuits to implement shift registers and counters using Flipflops.
5. Design combinational and sequential circuits using PROM, PLA and PAL and simulate digital circuits using Verilog HDL.

UNIT 1 NUMBER SYSTEMS AND LOGIC GATES

9

Number Systems—binary, decimal, octal and hexadecimal number systems. Number Base conversions- Binary Arithmetic—Binary Codes—Classification of binary codes—Logic Gates.

UNIT 2 BOOLEAN ALGEBRA

9

Boolean Algebra -Basic Theorems and properties—De-Morgan's Theorem—Principle of Duality—Truth tables and Boolean expression - Minimization of Boolean expressions using Boolean Theorems—Minterm—Maxterm—Sum of Products (SOP)—Product of Sums (POS)—Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods (Two, Three, Four and Five variables)—Don't care conditions - NAND and NOR Implementations.

UNIT 3 COMBINATIONAL LOGIC CIRCUITS

9

Combinational circuits - Design procedure—Half Adder and Full Adder- Half Subtractor and Full Subtractor—Parallel adder/ Subtractor- Code converters-Binary to gray code convertor- Gray to binary code convertor-BCD to Excess-3 code convertor- Encoder—Decoder- Multiplexer- Demultiplexer.

UNIT 4 SEQUENTIAL LOGIC CIRCUITS

9

Sequential circuits—Latches - Flip flops—Realization of one flip flop using other flip flop - Analysis and design of clocked sequential circuits - State reduction and State assignment - Shift registers—Counters—Design of Counters.

UNIT 5 MEMORIES AND HDL

9

RAM and ROM - Programmable logic devices (PLDs) – PROM – PLA - PAL - Introduction to Verilog Hardware Description Language (HDL)—Verilog HDL for combinational circuits, Verilog HDL for Sequential Circuits.

List of Experiments

1. Verification of De-Morgan's theorems using digital logic gates.
2. Design and implementation of Half Adder, Full Adder and binary to gray code converter.
3. Design and implementation of multiplexers/ Demultiplexers.
4. Design and implementation of Synchronous counters.
5. Simulation of combinational and sequential circuits using Verilog HDL.

TOTAL : (L:45+P:15) 60 PERIODS

TEXT BOOKS:

1. Morris Mano M. and Michael D. Ciletti, "Digital Design", 5th Edition, Pearson Education, New Delhi, 2013.
2. Charles H. Roth Jr, "Fundamentals of Logic Design", 7th Edition, Jaico Publishing House, Mumbai, 2014.

REFERENCES:

1. Thomas. C. Bartee, "Digital Computer Fundamentals", 6th Edition, Tata McGraw- Hill, New Delhi, 2011.
2. Anil K. Maini, "Digital Electronics: Principles and Integrated Circuits", 1st Edition, Wiley-India, New Delhi, 2008.
3. Kharate G. K., "Digital Electronics", Oxford University Press, 2010
4. Donald D. Givone, "Digital Principles and Design", First Edition, Tata McGraw Hill, New Delhi, 2011.

e-RESOURCES:

1. <http://nptel.iitm.ac.in/courses/117106086>; "Digital Circuits and Systems-video", Prof.S.Srinivasan, IIT -Madras.
2. <http://www.satishkashyap.com/2012/02/digital-electronic-circuits-by-shouri.html>, "Digital Electronics", Dr.Shouri Chatterjee, IIT- Delhi.

Preamble:

Computer Architecture equips students' knowledge on principles of computer design, instruction set design concepts, performance enhancements, performance comparisons and design and implementation of high performance computing systems. It imparts the concept of parallelism and different memory technologies in hierarchical memory systems.

Course Outcomes: Upon completion of the course, students will be able to:

1. Analyze the performance and describe the instruction set using different addressing modes for a given computer architecture and organization.
2. Describe the arithmetic operations involving addition, subtraction, division, multiplication and floating point number operations for a given computer organization.
3. Construct the datapath and describe the effect of data hazard, control hazard for a given pipeline processor.
4. Describe the memory hierarchy and analyze the operation of cache memory for a given computer organization.
5. Compare the standard I/O interfaces and data transfer techniques to access I/O devices for the given computer system.

UNIT 1 BASIC STRUCTURE OF COMPUTERS

Functional Units – Basic Operational Concepts– Bus Structures - Instruction Set Architecture–RISC – CISC – Instructions and Instruction Sequencing– Addressing modes– Performance and Metrics. 9

UNIT 2 ARITHMETIC OPERATIONS

Addition and Subtraction – Design of Fast Adders – Signed operand Multiplication – Fast Multiplication - Integer Division – Floating Point Numbers and Operations. 9

UNIT 3 PROCESSOR AND CONTROL UNIT

Basic concepts –Role of Cache Memory – Pipelining Performance – Types of Hazards- Data hazards – Instruction Hazards (prediction) – Data path and Control Considerations. 9

UNIT 4 MEMORY SYSTEMS

Memory hierarchy – Speed , Size and Cost – Semiconductor RAM – ROM–Cache Memory – Mapping FUNCTIONS – Replacement Algorithms – Measuring Cache Performance. 9

UNIT 5 I/O ORGANIZATION

Accessing I/O devices – Programmed Input / Output – Interrupts – Direct Memory Access –Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB). 9

TEXT BOOKS:

1. V.CarlHamacher, ZvonkoVaranescic and SafwatZaky, "Computer Organization", 5th Edition, McGraw-Hill Inc, 2012.

REFERENCES:

1. David A. Patterson and John L. Hennessy, "Computer organization and design", Morgan Kauffman/ Elsevier, 5th Edition, 2014.
2. M. Morris Mano, "Computer System Architecture", 3rd Edition Pearson Education, 2017
3. William Stallings "Computer Organization and Architecture", 10th Edition, Pearson Education, 2015.

e-RESOURCES:

1. <http://nptel.ac.in/courses/106102062/1>, "Computer Architecture", Prof. Anshul Kumar, IIT- Delhi.
2. <http://nptel.ac.in/courses/106105033/6>, "High Performance Computer Architecture", Prof. Ajit Pal, IIT- Kharagpur.

TOTAL : 45 PERIODS

Preamble:

This laboratory course is intended to provide students with opportunities to get hands on training to solve the given problem statements using Java programming language.

- Course Outcomes:** Upon completion of the course, students will be able to:
1. Develop simple Java programs using classes and objects for the given problem.
 2. Implement various Java features like inheritance, interface, polymorphism, packages, exception handling and multithreading to solve the business problems.
 3. Develop a Java code for the given problem statement using String handling functions .
 4. Develop Java applications using an applet for a given scenario to embed dynamic content in the web page.
 5. Develop Java application to access the backend Database using JDBC.

LIST OF EXPERIMENTS

1. Programs to work with Java Classes and Objects
2. Programs to implement overloading & overriding concepts
3. Programs to implement inheritance
4. Programs using interfaces
5. Programs to handle Exceptions
6. Programs for Strings handling
7. Programs to work with package
8. Programs to implement java applets
9. Programs to implement AWT event handling.
10. Implement the following using JDBC connectivity.
 - Payroll processing
 - Banking system
 - Library Information system

TOTAL: 45 PERIODS

18CSL32

DATA STRUCTURES LABORATORY
(Common to B.E/B.Tech. – CS & IT Programmes)

L T P C
0 0 2 1

Preamble:

This laboratory course is intended to provide students with opportunities to get hands on training to implement various data structures like lists, arrays, stacks, queues, heaps, trees, and graphs using C programming language.

Course Outcomes: Upon completion of the course, students will be able to:

1. Implement and test array and linked list to perform insertion, deletion and searching operations using list ADT.
2. Demonstrate the programming skills in design and implementation of non linear data structures.
3. Design an algorithm to search an element for the given data using linear data structure.
4. Develop a solution to the arrange values for a given problem using heap.
5. Design a solution using non-linear data structures for a given real world problems.

LIST OF EXPERIMENTS

1. There are lists where insertion should ensure the ordering of data elements. Since the elements are in ascending order the search can terminate once equal or greater element is found. Implement a singly linked list of ordered integers (ascending/descending) with insert, search and display operations.
2. Program to simulate Stack using array and linked list.
3. Program to simulate Queue using array and linked list.
4. Write a recursive C program, for traversing a binary tree in preorder, in-order and post-order.
5. Write a C program to insert, delete and search for a node in a binary search tree.
6. Write a C program for graph traversals by applying: (a) Breadth First Search. (b) Depth First Search.
7. Consider the motor racing game in which there are n participants. Get the points scored by each participant. Write a program to sort the positions of players in ascending order based on points scored using heap sort and print the highest score.
8. Use linear search technique to search for a character in a given message.
9. A person has registered for voter id, he received a voter number and he need to check whether it exist in the voter list or not. Use binary search in a recursive way to find whether the voter number exist in the list or not.
10. For the given route map with cost of transportation between different cities, find the shortest route from a source to all the other cities using Dijkstra's Algorithm.

TOTAL : 45 PERIODS

18MCT03

ESSENTIAL ENGLISH FOR PROFESSIONALS
(Common to All Branches in Third Semester)

L T P C
0 0 2 0

Preamble :

Communicative English is a life skill necessary for all students of Engineering and Technology. The course Essential English for Professionals aims at enabling the learners to communicate effectively and appropriately in professional contexts by exposing them to situational LSRW tasks.

UNIT 1 LISTENING

Listening to Casual Conversation and TED Talks

6

UNIT 2 READING

Poem – Robert Frost – Road not Taken

8

Essays - Bacon's Essays

UNIT 3 WRITING

Letter Writing – Letters Seeking Permission and Letters Seeking Apology and Letters Requesting Certificates and Paragraph Writing

6

UNIT 4 PRESENTATION

Watching Presentations - Presentation Techniques - JAM and Three Minute Presentation

7

UNIT 5 VERBAL ABILITY

Verbal Analogy - Cloze Test- Idioms and Phrases- Sentence Completion – Concord – Common Errors

3

TOTAL : 30 PERIODS

REFERENCES:

1. Rizvi, Ashraf. M, "Effective Technical Communication", 2nd Edition, Tata McGraw-Hill, New Delhi, 2018.
2. Raman, Meenakshi and Sangeetha Sharma, "Technical Communication: English Skills for Engineers", 1st Edition, Oxford University Press, New Delhi. 2008.

e-RESOURCES:

1. <https://agendaweb.org/listening/audio-books-mp3.html>
2. <https://www.ndtv.com/world-news>
3. <https://www.dw.com/en/tv/s-1452>
4. <https://www.naukri.com/blog/self-introduction-for-interview/>
5. http://www.washington.edu/doit/TeamN/present_tips.html
6. https://nptel.ac.in/courses/pdf_link/109107121/lec52.pdf
7. <http://learnenglishteens.britishcouncil.org/skills/reading>
8. <https://www.bbc.com/bitesize/guides/zphc9j6/revision/1>
9. www.indiabix.com

18MAT45

PROBABILITY AND STATISTICS
(B.E.CSE programme in Fourth Semester)

L T P C
3 1 0 4

Preamble:

Probability theory is an important foundation for computer science field such as machine learning, artificial intelligence, computer graphics and randomized algorithms. Statistics is the language of the uncertainties in the modern information age. It's descriptive and inferential roles not only formulate the basis of the growth of almost all the disciplines of the contemporary world, but also provide an array of non-traditional employment avenues ranging from that of sport analysis to business analysis.

Course Outcomes: Upon completion of the course, students will be able to:

1. Compute moments and moment generating functions of one dimensional random variables and solve the problems involving discrete and continuous distributions.
2. Measure the degree of relationship between the two dimensional random variables using correlation and regression.
3. Test the hypothesis for given small and large samples and determine the Goodness of fit of the sample using Chi-square test
4. Analyze the given samples based on their variance
5. Design, use and interpret control charts for variables and attributes.

UNIT 1 RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS

9+3

Random variables - Discrete and continuous random variables – Moments – Moment generating functions –

Distributions: Discrete distributions – Binomial, Poisson – Continuous distributions –Uniform, Exponential and Normal distributions.

UNIT 2 TWO DIMENSIONAL RANDOM VARIABLES

9+3

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression

UNIT 3 TESTING OF HYPOTHESIS

9+3

Large sample test based on Normal distribution for single mean and difference of means – Small sample tests based on t distributions for testing of means and F distributions for testing of variances – χ^2 test – Contingency table (Test for Independency) – Goodness of fit.

UNIT 4 ANALYSIS OF VARIANCE

9+3

Assumptions, One way and two way classifications - Completely randomized design – Randomized block design –Latin square design.

UNIT 5 STATISTICAL QUALITY CONTROL

9+3

Control charts for measurements (X and R charts) – Control charts for attributes (p,c and np charts)-Tolerance limits – Acceptance sampling .

TOTAL (L:45+T:15): 60 PERIODS

TEXT BOOKS:

1. Ibe.O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 2nd edition 2014.
2. Walpole, S.C., Myers,R.H., Myers.,S.L., and Ye.K., "Probability and Statistics for Engineers and Statistics",9th Edition,Pearson Education India,2013.

REFERENCES:

1. Johnson R.A.,and Gupta.C.B., 'Miller and Freund's Probability and Statistics for Engineers," 8th Edition,Pearson Education India,2015.
2. Peebles. P.Z., "Probability, Random Variables and Random Signal Principles", Tata Mc Graw Hill, 4th Edition, New Delhi, 2002.
3. Veerarajan T., "Probability Statistics and Random Processes with Queueing theory and Queueing Networks", 4th Edition, Tata McGraw Hill Edition, New Delhi, 2015.

e-RESOURCES:

1. <http://nptel.ac.in/courses/111104075/13>, "Analysis of Variance and Design of Experiments, Module-III,Dr.Shalabh,Department of Mathematics and Statistics, Indian Institute of Technology,Kanpur.
2. <http://nptel.ac.in/courses/111105041/40/>, "Probability and Statistics", Prof. Dr. Somesh Kumar, Department of Mathematics, Indian Institute of Technology, Kharagpur.

Preamble:

The course aims to provide an understanding about the fundamentals of database, database system architecture and various database design technique. It also helps to familiarize SQL standards and various SQL operations. An overview of normalization, query optimization and transaction management is also provided.

Course Outcomes: Upon completion of the course, students will be able to:

1. Compare File processing system with Database systems in terms of performance, scalability and data storage for efficient access of data.
2. Design a database schema using E-R model, Relational model and apply relational algebra operations like selection, projection, join and Cartesian product to solve the given problem.
3. Develop SQL queries using aggregate functions, nested sub queries, joins and views for the given problem.
4. Apply suitable normalization and query optimization techniques to normalize the give relation and to optimize the query for efficient access of data.
5. Discuss serialization and concurrency control mechanisms to avoid deadlock problem in transaction processing.

UNIT 1 DATABASE SYSTEMS

8

Overview of File processing system- Purpose of Database System-VIEWS of data—Data Models—Database Languages—Database System Architecture—Database users and Administrator.

UNIT 2 DATABASE DESIGN

9

Database design & E-R Model: Entity–Relationship model (E-R model)—E-R Diagrams—Constraints—Extended E-R features. Introduction to Relational Model: Database schema—Keys- Schema Diagrams – Relational Query languages – Relational Operations.

UNIT 3 SQL

10

SQL Standards—Data types—structure of SQL queries—additional basic operations—set operations—null values—aggregate functions—nested sub queries—modification of the database. Intermediate SQL: Joins—Views—Transactions—Integrity constraints—Authorization. Advanced SQL.

UNIT 4 NORMALIZATION AND QUERY OPTIMIZATION

9

Relational database design: Functional Dependencies -Normalization and its normal forms- Denormalization- Data Storage: RAID – Tertiary Storage – File organization – Organization of records in files. Query Processing - Query optimization.

UNIT 5 TRANSACTION MANAGEMENT

9

Transaction concepts- Transaction recovery-Properties of Transaction-Serializability-Concurrency Control – Locking Mechanisms-Two Phase Commit Protocol-Dead lock. Case study: Database connectivity using SQL.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata McGraw Hill, 2011.

REFERENCES:

1. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
2. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fourth Edition, Pearson / Addison wesley, 2007.
3. Atul Kahate, “Introduction to Database Management Systems”, Pearson Education, New Delhi, 2006.

e-RESOURCES:

1. <http://www.nptelvideos.in/2012/11/database-management-system.html>, Database Management Systems, Dr.S.Srinath, IIT Madras.

Preamble:

Software Engineering is the application of engineering to the development of software in a systematic method. Starting with basic life cycle model concepts, it would discuss requirements specification, design, and testing issues. Large scale software development poses special challenges. This course targets to expose the students to the challenges of large scale software development and would expose the students as to how to overcome those.

Course Outcomes: Upon completion of the course, students will be able to:

1. Develop software product using suitable software process models for the given specification.
2. Analyze the requirements for real-time problem specification and devise a SRS pertaining to industry standards.
3. Design a system model using the appropriate design engineering procedure for a given SRS.
4. Test the software model using black box testing, white box testing, unit testing and integration testing to produce error free product.
5. Estimate the development cost, schedule a risk free work plan for a given project model using appropriate tool.

UNIT 1 SOFTWARE PROCESS AND AGILE DEVELOPMENT 9

Software Process -Software Process models- Waterfall Model-Incremental Process Models -Evolutionary Process Models- Prototyping-Spiral Model- Introduction to Agility-Agile process.

UNIT 2 REQUIREMENTS ANALYSIS AND SPECIFICATION 9

Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management-Classical analysis: Structured system Analysis - Data Dictionary.

UNIT 3 SOFTWARE DESIGN 9

Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design -Architectural styles, Architectural Design - User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components.

UNIT 4 SOFTWARE TESTING 9

Software testing fundamentals-Internal and external views of Testing-white box testing - basis path testing-control structure testing-black box testing- Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing and Debugging.

UNIT 5 PROJECT MANAGEMENT 9

Software Project Management: Estimation – LOC, FP Based Estimation, Make/Buy Decision COCOMO Model – Project Scheduling – Scheduling, Earned Value Analysis Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection - Risk Management-Risk Identification-RMMM Plan-CASE TOOLS.

TEXT BOOKS:

TOTAL : 45 PERIODS

1. Roger S. Pressman, Software Engineering – A Practitioners Approach, Seventh Edition, Mc Graw-Hill International Edition, 2010.
2. Ian Sommerville, Software Engineering, 9th Edition, Pearson Education Asia, 2011.

REFERENCES:

1. Rajib Mall, Fundamentals of Software Engineering, Third Edition, PHI Learning Private Limited, 2009.
2. Pankaj Jalote, Software Engineering, A Precise Approach, Wiley India, 2010.
3. Kelkar S.A., Software Engineering, Prentice Hall of India Pvt Ltd, 2007.

e-RESOURCES:

1. <https://nptel.ac.in/courses/106101061/>
2. <https://nptel.ac.in/downloads/106105087/>

Preamble

The main aim of this course is to introduce the concepts of operating system abstractions, mechanisms and implementations. The course makes the students to develop the optimal solution for CPU scheduling, synchronization and problems and deadlocks. This course will enable the students to apply the appropriate memory, file and disk management technique for effective resource utilization.

Course Outcomes: Upon completion of the course, students will be able to:

1. Outline the structure and functions of Operating Systems for multiuser environment considering Linux process and thread management as a case study.
2. Evaluate the FIFO, SJF, Priority scheduling, Round Robin process scheduling algorithms for a given set of process considering the arrival time, burst time and resources.
3. Analyze the memory allocation techniques and page replacement algorithms for a given reference strings with minimum page fault.
4. Analyze file allocation methods for efficient file organization considering Linux virtual file system as a case study.
5. Evaluate the FIFO, SSTF, SCAN, CSCAN, LOOK, CLOOK disk scheduling algorithms with minimum seek time for a given disk request and analyze the architecture of iOS and Android Mobile Operating Systems.

UNIT 1 OPERATING SYSTEMS AND PROCESS MANAGEMENT

9

Operating System Overview: Objectives and Functions – Evolution of Operating Systems – Computer Organization – Operating System Operations – Services – System Calls – System Programs – Operating System Structure – OS Generation – System Boot. Processes: Process concept – Process scheduling – Operations on processes – Inter process communication – Threads: Overview – Multicore Programming – Multithreading Models. Case Study: Linux Process and Thread Management.

UNIT 2 PROCESS SCHEDULING AND SYNCHRONIZATION

9

CPU Scheduling: Concepts – Scheduling criteria – Scheduling algorithms. Process Synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – Monitors. Deadlocks: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock. Case Study: Linux Scheduling.

UNIT 3 MEMORY MANAGEMENT

9

Main Memory: Background – Swapping – Contiguous memory allocation – Paging – Segmentation. Virtual Memory: Background – Demand paging – Page replacement – Allocation of frames – Thrashing. Case Study: Linux Memory Management.

UNIT 4 FILE SYSTEMS

9

File-System Interface: File concept – Access methods – Directory and disk structure – File-system mounting – Sharing and Protection. File-System Implementation: Structure and Implementation – Directory implementation – Allocation methods – Free-space management. Case Study: Linux Virtual File System.

UNIT 5 I/O SYSTEMS

9

I/O Systems: I/O Hardware - Mass Storage Structure: Overview, Disk Structure and Attachment - Disk Scheduling and Management – Swap-space management – RAID. Mobile OS: iOS and Android – Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System.

TEXT BOOKS:**TOTAL: 45 PERIODS**

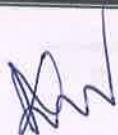
1. Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2013.
2. William Stallings, "Operating Systems – Internals and Design Principles", 7th Edition, Prentice Hall, 2011.

REFERENCES:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Third Edition, Pearson Education, 2009.
2. Harvey M. Deitel, "Operating Systems", Third Edition, Pearson Education, 2004.
3. D M Dhamdhere, "Operating Systems: A Concept-Based Approach", 3rd Edition, Tata McGraw-Hill Education, 2007.

e-RESOURCES:

1. <http://nptel.ac.in/courses/106108101/> "Introduction to operating system", Prof P.C.P. Bhatt , IISc-Bangalore.
2. <https://nptel.ac.in/courses/106106144/2/> "Introduction to operating system", Prof Chester Rebeiro,IIT-Madras.



18ITT42

DESIGN AND ANALYSIS OF ALGORITHMS
(Common to B.E/B.Tech. – CS & IT Programmes)

L T P C
3 1 0 4

Preamble:

This course enables the student to understand various algorithm design techniques, and know how to apply those techniques to various problems. The analysis of various algorithms can be performed and select the best algorithm for solving a problem.

Course Outcomes: Upon completion of the course, students will be able to:

1. Differentiate recursive and non-recursive algorithms using asymptotic notations.
2. Evaluate the performance of Selection sort, Bubble sort, Merge sort, Quick sort, Insertion sort, Heap sort considering input data set properties, running time and code size.
3. Analyze the efficiency of Prim's algorithm, Kruskal's algorithm, Dijkstra's algorithm, Huffman trees, Fractional knapsack problem for a given problem using greedy technique.
4. Categorize Warshall's and Floyd's algorithms, optimal binary search trees, Knapsack problem for a given problem using dynamic programming technique.
5. Illustrate the design strategies for n-Queens problem, Hamiltonian circuit problem, subset sum problem, Knapsack problem, Traveling salesman problem using Backtracking and Branch & Bound technique.

UNIT 1 ALGORITHM ANALYSIS

9+3

Introduction – Notion of Algorithm – Fundamentals of Algorithmic problem Solving – Important Problem types – Fundamentals of the Analysis of Algorithm Efficiency - Analysis Framework – Asymptotic notations and Basic Efficiency Classes - Mathematical Analysis of Recursive and Non-recursive algorithms-Empirical analysis of Algorithms-Algorithm Visualization.

UNIT 2 ANALYSIS OF SORTING AND SEARCHING ALGORITHMS

9+3

Brute Force – Selection Sort and Bubble Sort - Divide and conquer – Merge sort – Quick Sort-Strassen's Matrix Multiplication -Decrease and Conquer – Insertion Sort-Transform and Conquer-Heaps and Heap sort- Analysis of Linear Search and Binary search techniques.

UNIT 3 GREEDY TECHNIQUE

9+3

Introduction to greedy technique - Prim's algorithm - Kruskal's algorithm - Dijkstra's algorithm- Huffman Trees – Fractional Knapsack Problem- Job Sequencing with Deadlines.

UNIT 4 DYNAMIC PROGRAMMING

9+3

Introduction to Dynamic Programming-Computing a Binomial Coefficient-Warshall's and Floyd's Algorithms - Optimal Binary search trees – 0/1 Knapsack Problem and Memory functions-Matrix-chain multiplication.

UNIT 5 BACKTRACKING & BRANCH AND BOUND

9+3

Backtracking- n-Queens problem - Hamiltonian Circuit Problem - Subset Sum problem - Branch and Bound – 0/1 Knapsack problem - Traveling Salesman Problem-Introduction to P, NP and NP-complete Problems.

TOTAL :45+15=60 PERIODS

TEXT BOOKS:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.

REFERENCES:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Second edition, Galgotia Publications, New Delhi, 2010.
2. Donald E. Knuth, "The Art of Computer Programming", Pearson Education, 2009.
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.

e. RESOURCES :

1. <https://nptel.ac.in/courses/106101060/> "Design and analysis of algorithms", Prof. Abhiram Ranade, IIT-Bombay.
2. <http://nptel.ac.in/courses/106106131/>, "Design and analysis of algorithms", Prof.Madhavan Mukund, IIT-Madras.

Preamble :

This course aims at facilitating the student to learn the object orientation on real world problems; analyze and design the problem domain using the principles and practices followed in object oriented problem solving by applying object technology with UML modeling.

Course Outcomes: Upon completion of the course, students will be able to:

1. Create use case documents that capture requirements for a software system.
2. Create class diagrams that model both the domain model and design model of a software system.
3. Create interaction diagrams that model the dynamic aspects of a software system.
4. Address the real world problems by modeling software solutions using UML tools.
5. Apply design patterns that facilitate development and evolution of new models.

UNIT 1 OOAD BASICS

Overview of Object Oriented System Development – Object Basics – OO Themes – Evidence for usefulness of OO Development – OO Modeling – OO History – Inception – The NextGen POS system – The Monopoly Game System. 9

UNIT 2 STATIC MODELING

Use Case Modeling – Relating Use Cases – Include, Extend and Generalization – Elaboration – Domain Models – Finding Conceptual Classes and Description Classes – Associations – Attributes – Domain Model Refinement – Finding Conceptual Class Hierarchies – Aggregation and Composition – UML Activity Diagrams and Modeling 9

UNIT 3 DYNAMIC MODELING

System Sequence Diagrams – Communication Diagrams – Relationship between Sequence Diagrams and Use Cases – Logical Architecture and UML Package Diagrams – Logical Architecture Refinement – UML Class Diagrams – Relationship – Inheritance – Abstract Classes – Polymorphism – Operation Contracts . 9

UNIT 4 DESIGN PATTERNS

Object Oriented Design Methodology – Common Base Class – GRASP: Designing Objects with Responsibilities – Creator – Information Expert – Low Coupling – Controller – High Cohesion – Designing for Visibility – Applying GoF Design Patterns – Creational – Factory Method – Structural – Bridge – Adapter – Behavioural – Strategy – Observer. 9

UNIT 5 IMPLEMENTATION AND APPLICATION

Mapping Design to Code – Forward Engineering – Reverse Engineering – Test Driven Development – Refactoring – UML Tools and UML as Blueprint – UML State Machine Diagrams and Modeling – UML Deployment and Component Diagrams. 9

List of Experiments

Develop a problem statement and SRS document. Identify Use Cases and develop the different UML diagrams.

1. Library management system
2. Banking application
3. Passport automation system
4. Online reservation system
5. Exam registration

TEXT BOOKS:

TOTAL : (L:45+P:15) 60 PERIODS

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005

REFERENCES:

1. Micheal Blaha, James Rumbaugh, "Object-Oriented Modeling and Design with UML", Second Edition, Prentice Hall of India Private Limited, 2007 .
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable object-oriented software", Addison-Wesley, 1995
3. Micheal Blaha, James Rumbaugh, "Object-Oriented Modeling and Design with UML", Second Edition, Prentice Hall of India Private Limited, 2007 .

e-RESOURCES:

1. https://swayam.gov.in/nd1_noc19_cs48/

18CSL41

DATABASE MANAGEMENT SYSTEMS LABORATORY
(Common to B.E/B.Tech. – CS & IT Programmes)

L T P C
0 0 2 1

Preamble:

This laboratory course is intended to provide students with opportunities to get hands on training to create database with SQL queries, Joins, Aggregate functions, Triggers and Exception Handling using Oracle / MySQL.

Course Outcomes: Upon completion of the course, students will be able to:

1. Work with DDL and DML commands to store and manipulate information in the database.
2. Apply the concept of views, indexes, sequences, joins and aggregate functions to perform analysis on data in the database.
3. Develop simple programs using PL/SQL for the given problem.
4. Work with procedure, trigger, exception handling and function to provide solutions for the given problem.
5. Develop real time applications (Banking system, Payroll processing and Library Information system) using SQL.

LIST OF EXPERIMENTS

1. Create a database and work with SQL queries to retrieve information from the database.
2. Create an Employee database to set various constraints.
3. Work with Joins, aggregate functions
4. Creation of database objects: Synonyms, Sequences, Views, Indexes and save point.
5. Study of PL/SQL block.
6. Develop simple programs using PL/SQL.
7. Creation of Procedures.
8. Creation of Functions.
9. Work with Triggers and Exception handling
10. Mini project (Application Development using Oracle / MySQL)
 - Payroll processing.
 - Banking System.
 - Library Information System

TOTAL : 45 PERIODS

Preamble:

The main aim of this course is to implement the concepts of operating system mechanisms and policies. The course makes the students to implement the program that provide the optimal solution for CPU scheduling, synchronization problems and deadlocks. This course will also enable the students to apply the designed module to appropriate memory, file and disk management technique for effective resource utilization.

Course Outcomes: Upon completion of the course, students will be able to:

1. Develop the suitable shell commands to establish user interface with UNIX kernel.
2. Develop C Program to implement CPU scheduling algorithms, deadlock avoidance algorithms and page replacement algorithms for a given set of processes considering arrival time, burst time and resources.
3. Develop C program to implement thread, process synchronization and Inter Process Communication for a given set of processes by using semaphore and shared memory mechanisms
4. Construct a C program to implement file allocation and organization techniques for a given set of files by using sequential, indexed and linked file allocation methods.
5. Develop C Program for memory management by using paging technique.

LIST OF EXPERIMENTS

1. Study and execute the basic commands of UNIX operating system for resource management.
2. Write a C program to implement FCFS, SJF and Round Robin (time quantum=2) CPU scheduling algorithms for process Scheduling.
3. Write a C program to implement the file allocation strategies such as a) Sequential b) Indexed c) Linked for 'n' number of files.
4. Write a C program to implement the process synchronization for producer – consumer problem using semaphore.
5. Write a C program to implement single and two-level directory structure for effective file organization.
6. Write a C program to implement the Bankers Algorithm for deadlock avoidance and detection.
7. Write a C program to implement the FIFO and LRU page replacement algorithm for the following reference string:1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6.
8. Write a C program to implement shared memory between the two-process using Inter Process communication (IPC) primitives.
9. OS uses a paging system with 2Kbytes pages. A given processes uses a virtual address space of 8Kbytes and it is assigned 8Kbytes of physical memory. Write a C program to create page table and implement Paging Technique to find out physical address for the above scenario.
10. Write a C program to create 2 threads named Th1 and Th2 and establish synchronization between two threads using mutex lock.

SOFTWARE

- Linux :Ubuntu / OpenSUSE / Fedora / Red Hat / Debian / Mint OS
- GCC compiler

TOTAL: 45 PERIODS

18MCT04

PROFESSIONAL COMMUNICATION
(Common to All Branches in Fourth Semester)

L T P C
0 0 2 0

Preamble :

Communicative English is a life skill necessary for all students of Engineering and Technology. The course Professional Communication aims at enabling the learners to communicate effectively and appropriately in professional contexts by exposing them to situational LSRW tasks.

UNIT 1	LISTENING	6
Listening to News Bulletins and Documentaries		
UNIT 2	GROUP DISCUSSION	8
Watching Group Discussion videos – Do's and Don'ts of GD – Mock GD		
UNIT 3	READING	6
Letters to Editor Column - Reading News Articles - Biographies of Famous Personalities		
UNIT 4	WRITING	6
IELTS Essay Writing		
UNIT 5	VERBAL ABILITY	4
Verbal analogy - Cloze Test- Idioms and Phrases- Sentence Completion -Error Spotting		

TOTAL : 30 PERIODS

REFERENCES:

1. Rizvi, Ashraf. M, "Effective Technical Communication", 2st Edition, Tata McGraw-Hill, New Delhi, 2018
2. Raman, Meenakshi and Sangeetha Sharma, "Technical Communication: English Skills for Engineers", 1st Edition, Oxford University Press, New Delhi. 2008.

e-RESOURCES:

1. <http://www.slideshare.net/rohitjsh/presentation-on-group-discussion>
2. <https://www.bbc.com/bitesize/guides/zphc9j6/revision/1>
3. <https://www.fresherslive.com/online-test/verbal-ability-test/questions-and-answers>