



GOVERNMENT POLYTECHNIC, KOLHAPUR

(An Autonomous Institute of Government of Maharashtra)

Curriculum Document

CURRICULUM: MPECS-2020

(Outcome Based Curriculum)

for

DIPLOMA IN INFORMATION TECHNOLOGY

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Information Technology Programme
Government Polytechnic, Kolhapur

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SECTION - I

**CURRICULUM PHILOSOPHY
AND
STRUCTURE**

1. CURRICULUM DEVELOPMENT : INTRODUCTION AND PROCESS OF DEVELOPMENT OF OUTCOME BASED CURRICULUM

Curriculum Design and Development :

Curriculum is an absolute instructional and effective instrument designed with a student centered approach. It incorporates systematic method of teaching learning process. It is a sequence of planned academic activities; on completion of which the desired programme outcomes are expected to be attained in the student. The curriculum and the course contents are expected to motivate the students to acquire desired level of knowledge and skills. An emphasis and an attempt has been made in the curriculum to get a perfect blending of theoretical concepts and actual requirements of industry. Keen attention has been provided to make it more structured by incorporating the valuable suggestions of industrial experts of PBOSSs and feedback by the field and academic professionals. An overview of systematic and scientific mode of implementation and evaluation has also been pondered; consequently a practicable model of it has been achieved. It incorporates specific guidelines and assessment criteria for theory/practical/oral modes of evaluation. Specification table for each course has been provided to prepare question paper justifying meticulous coverage.

Curriculum philosophy :

The impacts of globalization and rapid changes in the engineering science and technology have been a great cause of comprehensive and noticeable change in engineering fraternity, hence the institutions. Only way to incorporate such a transformation, is to modify the curriculum, preserving the consistency of engineering education. Frequent review and feedback from the experts and the freedom of autonomous status of the institution have encouraged to undertake relevant changes in the curriculum to make it versatile. Consequently the desired competencies and skills are transformed amongst the students in pursuing their

preparedness to cope up with the global changes. It aims to promote self reliance and satisfaction of acquiring modern engineering concepts and multi capabilities within the students to make them model technicians.

“Curriculum is an educational program designed and implemented to achieve specified programme outcomes”

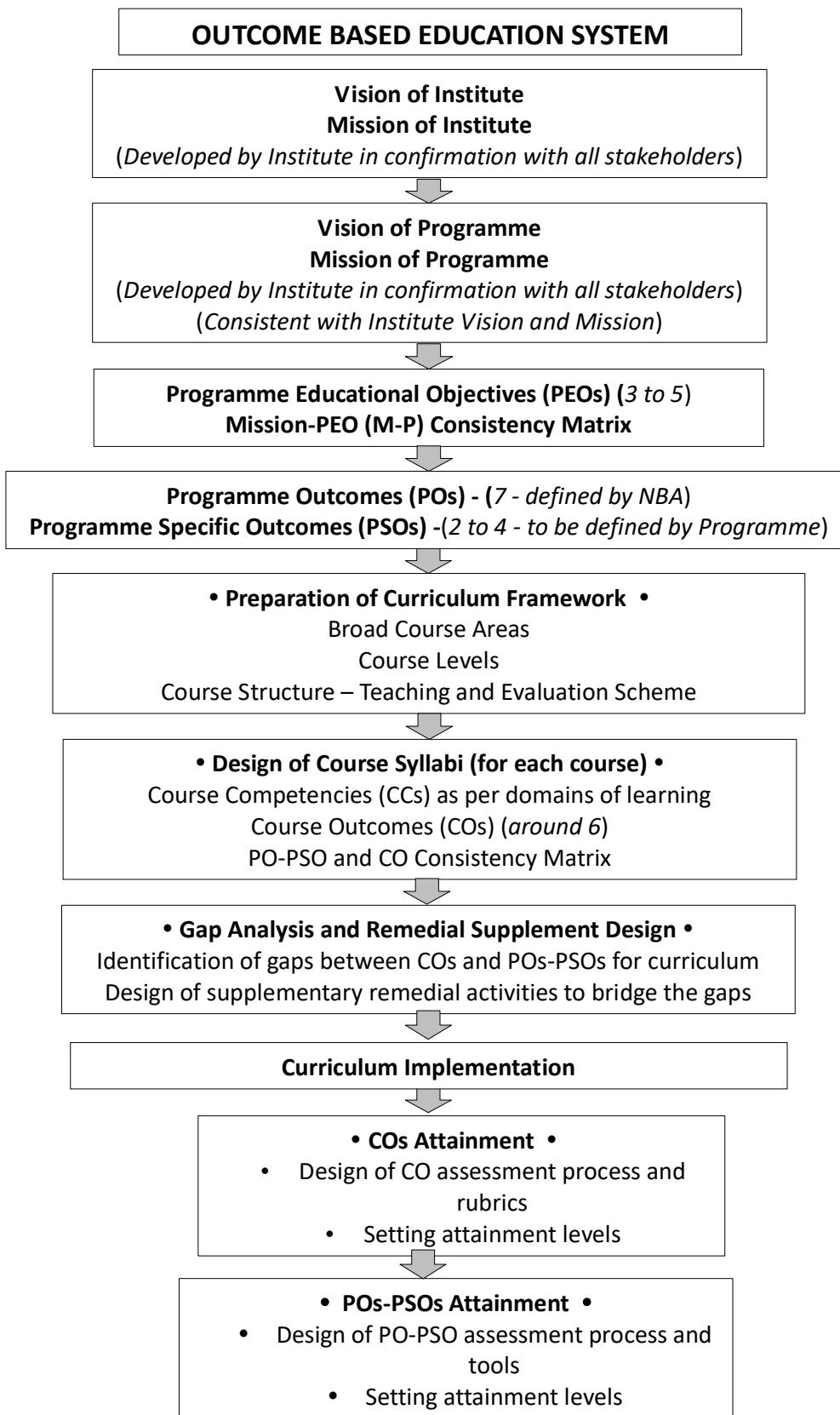
Hence, in a broad sense, a curriculum incorporates the following :

- To define the purpose of education
- To accept systematic planning methods
- To confirm implementation strategies
- To identify and to incorporate needs of industries
- To follow the policy directives
- To cope-up with social concerns
- To aim at personality development of students
- To allow future developments and challenges in emerging science and technology.

Outcome-based Curriculum

Outcome based curriculum is the curriculum based on the concepts of outcome-based education (OBE) philosophy. India is a permanent signatory of the Washington Accord - the international agreement among bodies responsible for accrediting engineering programmes with the National Board of Accreditation (NBA) as the national authority for accrediting degree and diploma programmes in engineering in India. Hence as per the accreditation criteria of the NBA, the curriculum of the Institute is expected to be outcome based.

Outcome Based Education (OBE) is an educational approach in which all the activities of an education system are based on attainment of pre-defined learning outcomes of student. The approach is to be included in the following three aspects of education system :i) Curriculum Design, ii) Curriculum Implementation, iii) Students' Evaluation. The flow diagram shown below summarizes the elements of Outcome-based Education System. The glossary of terms used in academic autonomy and OBE are provided for reference.



Glossary of terms related to Outcome Based Education

Outcome-Based Education (OBE) - It is an educational approach in which all the activities of an education system are based on attainment of pre-defined learning outcomes of student.

The approach is to be included in the following three aspects of education system :i) Curriculum Design, ii) Curriculum Implementation, iii) Students' Evaluation

Washington Accord and NBA - It is an International Agreement among bodies responsible for accrediting undergraduate engineering degree programmes. Established in 1989, the signatory countries as of 2014 are Australia, Canada, Taiwan, Hong Kong, India, Ireland, Japan, Korea, Malaysia, New Zealand, Russia, Singapore, South Africa, Sri Lanka, Turkey, the United Kingdom and the United States. National Board of Accreditation (NBA), India has become the permanent signatory member of the Washington Accord on 13th June 2014.

The membership of Washington Accord is an international recognition of the quality of undergraduate engineering education offered by the member country and is an avenue to bring it into the world class category. It encourages and facilitates the mobility of engineering graduates and professionals at international level.

NBA accreditation is a quality assurance scheme for higher technical education in India.

The Washington Accord covers engineering degrees and diploma under outcome-based education approach.

Vision of Institute - It is a statement that defines concisely the aspirations to be achieved in the near future by the Institute

Mission of Institute - It is a set of statements that defines the broad steps to be executed to achieve the vision of the Institute

Vision of Programme - It is the vision statement for a particular educational programme (like Civil Engineering Programme, Mechanical Engineering Programme, etc.). Programme Vision should be consistent with the Institute vision

Mission of Programme - It is the set of statements that define the broad steps to be executed to achieve the vision of the educational programme

Programme Educational Objectives (PEOs) - It is a set of 3 to 5 statements defining the objectives to be attained in order to execute the mission

Programme Outcomes (POs) - It is a set of ten generic outcomes, stated by NBA, expected from any engineering diploma-holder in India

Programme-specific Outcomes (PSOs) – It is a set of 2 to 4 outcomes to be defined by the programme under consideration in addition to the POs

Course Outcomes (COs) – It is a set of about 6 outcomes, expected to be attained by student on learning a course. Course Outcomes shall be defined in curriculum for each course. Course outcomes are worded using action verbs like solve, explain, calculate, compare, distinguish, describe, draw, etc.

Mission-PEO Consistency Matrix – It is a matrix showing degree of consistency of PEOs with mission

PO-CO Consistency Matrix – It is a matrix showing degree of consistency of COs with POs and PSOs

Competency – It is the set of specific abilities, categorized as cognitive, psychomotor and affective domains of learning, from which course outcomes statements are derived

Cognitive domain – It is the set of abilities related to thinking

Bloom's Revised Taxonomy of Cognitive Domain : It is a six-level cumulative hierarchy of cognitive abilities in the order of increasing complexity as follows :

Remembering > Understanding > Applying > Analyzing > Evaluating > Creating

Psychomotor Domain : It is the set of abilities related to physical and psychological skills

Taxonomy of Psychomotor Domain : It is a six-level cumulative hierarchy of cognitive abilities in the order of increasing complexity as follows :

Perception > Set > Guided response > Mechanism > Adaptation > Origination

Affective Domain : It is the set of abilities related to attitudinal development

Taxonomy of Affective Domain : It is a five-level cumulative hierarchy of affective abilities in the order of increasing complexity as follows :

Receiving > Responding > Valuing > Organizing > Characterizing

Educational Technology : It is the systematic study of theoretical foundations and material tools to facilitate learning

Glossary of terms used in Academic Autonomy and MPECS

Academic Autonomy – It is the freedom and responsibility offered to the Institute by the Government to attain high quality standards in the following three dimensions :

- i) Design of own curricula
- ii) Conduct of own examinations
- iii) Award of own diploma

Multi-point Entry and Credit System (MPECS) - It is a system of education in which student can be admitted at different entry levels of qualification and he is offered *credits* along with marks on passing in a course

Credits - It is the number of weekly instructional hours provided for a course in the curriculum

Programme - It is the particular branch of Engineering in which Diploma is awarded. e.g. Civil Engineering Programme, Mechanical Engineering Programme, etc.

Curriculum - It is a document providing plan of the complete academic activity to be conducted by student for award of Diploma in a Programme in tune with the vision of the Institute

Course - It is a particular subject defining study and evaluation unit of the curriculum. e.g. Applied Mechanics, Engineering Drawing-1, etc.

Syllabus - It is the complete academic information regarding a particular course in a curriculum

Course Registration (CR) - It is the procedure to be carried out by every student at the beginning of every semester in which he/she has to declare the courses he/she is going to study in that semester as per academic time table of the Institute. The registration is to be done as per *Rules of Registration* of the Institute.

Examination Registration (ER) - It is the procedure to be carried out by every student at the beginning of every semester in which he/she has to declare the courses in which he/she is going appear for examination in that semester as per examination time table of the Institute. The registration is to be done as per *Rules of Registration* of the Institute.

Curriculum MPECS-2020 - It is the Curriculum of the Institute revised in the year 2020. It is applicable to the students admitted since 2020

Programme Department - It is the department of the Institute offering Diploma in a particular Programme. e.g. Civil Engineering Department, Mechanical Engineering Department, etc.

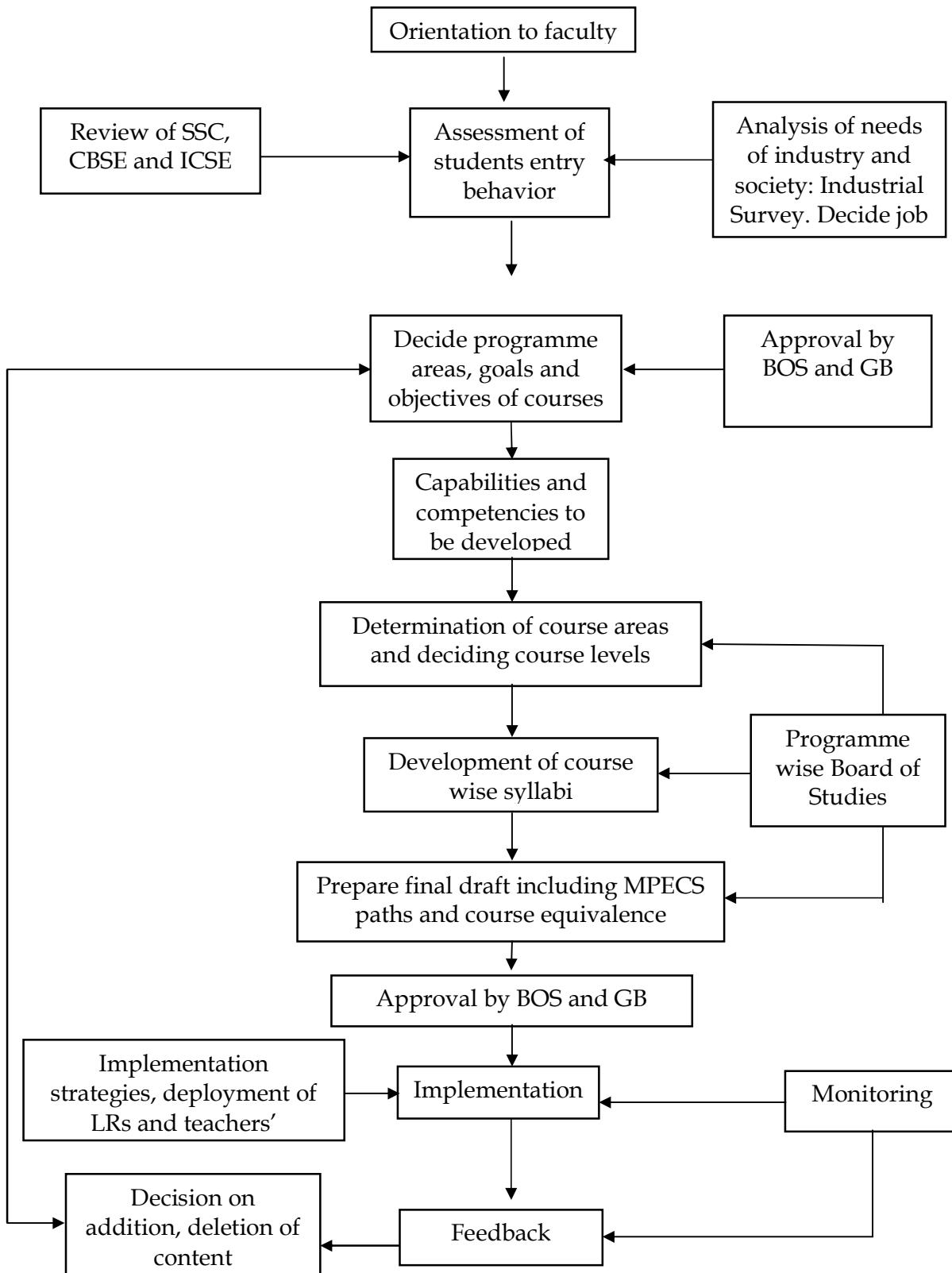
Programme Dean - He/she is the Head of Department of a Programme Department

Allied Department - It is department that does not award diploma and contributes to curriculum implementation of many Programmes. e.g. Applied Mechanics Department, Workshop Department, Science Department, English Department, Mathematics Department, etc.

Academic Autonomy and MPECS at Government Polytechnic, Kolhapur -

- Year of award of academic autonomy : 1992
- Year of award of MPECS and Flexibility : 1994
Government Polytechnic, Kolhapur is the first Government Polytechnic in Maharashtra to have been awarded academic autonomy
- Bodies and Cells under Academic Autonomy :
 - i) Governing Body
 - ii) Board of Studies
 - iii) Programme-wise Boards of Studies
- Examination Committee Curriculum Revisions under Autonomy : 1992, MPECS-2001, MPECS-2006, MPECS-2010, MPECS-2013, MPECS-2016, MPECS-2020
- Award of Diploma in *Convocation Ceremony* every year

Curriculum Development Model :



2. VISION, MISSION, PROGRAMME EDUCATIONAL OBJECTIVES (PEOs), PROGRAMME OUTCOMES (POs) AND PROGRAMME-SPECIFIC OUTCOMES (PSOs)

Vision of Institute :

Institute of high recognition developing competent technicians for quality services or entrepreneurship to cater the needs of industry and society.

Mission of Institute :

- To educate and train in multi-disciplinary multi-level programmes to develop technicians and skilled manpower having global competency
- To ensure employability, encourage entrepreneurship, promote lifelong learning
- To inculcate in the students the qualities of a good citizen at individual, social and professional level
- To provide quality management system with focus on effective student-centric education
- To utilize faculty expertise and Institute infrastructure to render quality consultancy services

Vision of Programme:

Programme with high recognition catering needs of Information Technology industry in tune with the nation's mission for Digital India.

Mission of Programme:

- To pursue excellence in areas of Information Technology keeping pace with the latest developments.
- To educate and train students to design, develop and test software systems.
- To develop the spirit of team work, innovation and professionalism
- To cultivate attitude of lifelong learning

Programme Educational Objectives (PEOs):

- Engage in continuous learning by upgrading skills in Information Technology and solve real life & professional problems with the knowledge of fundamental science and engineering concepts.

- Select/develop and apply appropriate techniques and IT tools for the design & analysis of the systems.
- Apply engineering and communication skills to analyze complex problems to design and implement the feasible solutions.

Programme Outcomes (POs)

- 1. Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
- 2. Problem analysis:** Identify and analyse well-defined engineering problems using codified standard methods.
- 3. Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.
- 4. Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.
- 5. Engineering practices for society, sustainability and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.
- 6. Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
- 7. Life-long learning:** Ability to analyze individual needs and engage in updating in the context of technological changes.

Programme Specific Outcomes (PSOs)

- 1. Design and Development:** Analyze the problem, design algorithm, identify and define computing requirements to its solutions and implement software using suitable platform.
- 2. Networking and Database Management:** Configure and administer database servers / network servers to support business environments.

Job profiles and related Competencies for the diploma holder

Competencies:

- ✓ To create leaders, trend-setters for the next generation of the IT Industry.
- ✓ To carry out research and development in IT and its applications.
- ✓ To offer state-of-art information technology education, and imparting skills for building leading-edge and innovative IT applications.
- ✓ To train individuals who would contribute substantially to the ambitious IT goals of the country.

Job Titles:

- ✓ Software engineer
- ✓ Technical support
- ✓ Network engineer
- ✓ Web developer
- ✓ Software tester

3. OVERVIEW AND SALIENT FEATURES OF CURRICULUM: MPECS-2020

3.1 Overview of Curriculum MPECS-2020

Total No. of Credits	180
No. of courses offered	Total 44
	Theory 28
Max. no. courses in a semester	08
Total Maximum Marks	4500
Courses in Level IV and V	No. 16
	Credits 65
	Marks 1700
Courses in Level I	No. 11
	Credits 46
	Marks 1075
Courses in Level II	No. 5
	Credits 9
	Marks 150
Courses in Level III	No. 12
	Credits 60
	Marks 1575
*Courses in Level IV	No. 7
	Credits 37
	Marks 1000
*Courses in Level V	No. 7
	Credits 28
	Marks 700
%Ratio of Th:Pr	Marks-wise 58:42
	Credit-wise 52:48
No. of Allied Courses	03
Optional Courses	No. of courses 04
	Options/course 1/3
No. of Practical Exams	Internal 9
	External 11
No. of Orals	Internal 9
	External 4

Diploma shall be awarded on the basis of marks obtained in Level IV and Level V courses.

3.2 Salient Features of Curriculum MPECS-2020

Addition and deletion of Courses with respect to MPECS-2016 :

1. Computer Fundamentals is replaced to Introduction to IT System.
2. Computer Peripheral & Hardware Maintenance is added as new course and replaced for Computer architecture and Maintenance.
3. Software Testing course made as compulsory course in the curriculum. Student can test any programs ,software, their projects.
4. Entrepreneurship and Start-ups new course is added in the curriculum for all programmes. This will enable the institutes to actively engage students in innovation and entrepreneurship related activities. Large number of students to work on new ideas and convert them into successful enterprises.
5. Management Information System course is added in the curriculum as per suggestion given in PBOS meeting. Students will learn how to manage various information systems so that they best serve the needs of managers, staff and customers. Students will learn how to create systems for finding and storing data and they learn about computer databases, networks, computer security and lots more.
6. Android Mobile Application development is made as compulsory course. Students can develop mobile apps for mobile operating systems.
7. Technical writing is added as a new course. Student will able to write technical documents such as project report using latex.
8. Client Side Scripting using Java Script is added as new elective course. Student will able to learn scripting techniques using Java script, node JS, angular JS, and new techniques in java script.
9. Internet Of Things is added as new elective course. Internet of Things (IoT) is the next big thing. Right from our homes to our cars to our cities, everything is being connected and the technology of IoT is right in the middle of it. Students will be able to learn applications and use of IOT.
10. Ethical Hacking and Digital Forensics is added as new elective course. Students will be able to gain the ability to do ethical hacking. Students will be

able to do the recovery and investigation of material found in digital devices, often in relation to computer crime.

11. Python Programming is added as new compulsory course. Students will learn to use Python for developing desktop GUI applications, websites and web applications and to analyze Data.
12. Emerging Trends in IT is added as new elective course. Students will be able to learn Recent and emerging trends in IT AI , Block Chain Technology Digital marketing, Virtual and Augmented Reality etc.
13. Mobile Communication is added as new elective course. This Course is to expose the students to the most recent technological developments in Mobile communication systems.
14. Advance Database Management System is added as new elective course. This course gives an introduction to methods and theory for advance techniques for databases.
15. Linux Administration is added as new elective course. Students will learn to leverage the flexibility and scalability of your Linux OS to meet your organization's critical and ongoing IT needs.

Removed Courses

1. Generic Skills course is removed and some content will be covered in communication skills and non exam non credit courses.
2. Instead of Professional Practices ,Sports and Yoga is introduced.
3. Linux course is deleted .Linux basic practical's are added in Operating System course. One new linux administration course is added to explore networking with Linux OS.
4. Computer Graphics , System Programming, Distributed System courses are removed.
5. Industrial Org and Management is removed. Instead of IOM, MIS is introduced as it covers learning about various managing various Information systems as per suggestion given by PBOS members.

Major modifications in Course Contents with respect to MPECS-2016:

1. Introduction to IT System course theory exam is removed. As this policy is decided for all programmes according to guidelines taken from AICTE.
2. Digital Electronics & Microprocessor course is merged into one curriculum.
3. Programming using .NET contains C# and ASP.NET in MPECS 2020 curriculum.

Changes in Implementation Strategy and Treatment with respect to MPECS-2016:

1. Term Work is removed for all levels.
2. Total 4500 marks. Level 4 and 5 are – 1700 . These are changes in marks.
3. Internship 1- Industrial training (4 weeks) is made compulsory for students and will be assessed in semester 5.
4. Internship 2 - Industrial training (3 weeks) is made compulsory for students and will be assessed in semester 6.
5. Emphasis is given on practical work and practical examination as per guidelines by Director, MSBTE, and Mumbai.

Following Non exam non-credit courses are introduced as per the guidelines by AICTE Curriculum

- i)Environmental Science – Non Credit courses
- ii)Essence of Indian Traditional Knowledge – Non credit courses
- iii)Indian Constitution – Non credit courses

Following Non exam course is introduced as per the guidelines by AICTE Curriculum

Sports and Yoga – 2 credits

4. TEACHING AND EXAMINATION SCHEME (LEVEL-WISE)

S N	Name of Course	Course Code	Cours e Abbre v- iation	Level	Pre-requi -site Cour se	Teaching Scheme (hours per week)			Examination Scheme (marks)				
						Th	Pra ct./ Dr g./ Tu t	Cre dit s	Th	TS	Pr	Or	Total
Level 1: Foundation Courses													
1	Engineering Physics	CCG102	GPHB	1	NIL	03	02	05	80	20	50I		150
2	Engineering Chemistry	CCG104	GCHB	1	NIL	03	02	05	80	20	50I		150
3	Basic Mathematics	CCG105	GBMT	1	NIL	03	01(T)	04	80	20	--		100
4	Engineering Mathematics	CCG118	GEMT	1	CCG1 05	03	01(T)	04	80	20	--		100
5	Engineering Graphics	CCG109	GEGR	1	NIL	02	02	04	--	--	75E		75
6	Sports & Yoga	CCG117	GSPY	1	NIL	--	02	02	--	--	--		--
7	C Programming	ITG101	GCPR	1	NIL	03	04	07	80	20	50E		150
8	Web Page Designing	ITG102	GWPD	1	NIL	02	02	04	40	10	50I		100
9	Elements of Practical Electricity	ITG103	GEPE	1	NIL	01	02	03	--	--	--	50I	50
10	Basic Electronics	ITG104	GBTX	1	NIL	02	02	04	40	10	--	50I	100
11	Computer Peripheral & Hardware Maintenance	ITG105	GCPM	1	NIL	02	02	04	40	10	50I		100
						24	22	46	520	130	325	100	1075
Level 2 : Life Skills and Professional Skills Courses													
12	Introduction to IT System	CCG201	GITS	2	NIL	02	02	04	--	--	50I		50
13	Communication Skills in English	CCG203	GCMS	2	NIL	03	02	05	40	10	50I		100
14	Environmental Science	CCG204	GEVS	2	NIL	02	--	00	--	--	--		--
15	Essence of Indian Traditional Knowledge	CCG205	GITK	2	NIL	02	--	00	--	--	--		--
16	Indian Constitution	CCG206	GINC	2	NIL	02	--	00	--	--	--		--
		150				05	4	9	40	10	100		150
Level 3: Basic Technology Courses													
17	Applied Mathematics	ITG301	GAPA	3	CCG10 5& CCG11 8	03	01 (T)	04	80	20	--	--	100
18	Digital Electronics & Microprocessor	ITG302	GDTE	3	ITG104	04	02	06	80	20	--	50I	150
19	Data Communication	ITG303	GDTC	3	NIL	03	01 (T)	04	80	20	--	25E	125
20	OOP using C++	ITG304	GCPP	3	NIL	03	02	05	80	20	50E	--	150
21	Database Management System	ITG305	GDBM	3	NIL	03	02	05	80	20	50E	--	150
22	Computer Network	ITG306	GCON	3	NIL	03	02	05	80	20	--	50E	150
23	Operating System	ITG307	GOPS	3	NIL	03	02	05	80	20	--	50I	150

S N	Name of Course	Course Code	Course Abbreviation	Level	Pre-requisite Course	Teaching Scheme (hours per week)			Examination Scheme (marks)				
						Th	Pract./ Dr g./ Tu t	Credit s	Th	TS	Pr	Or	Total
24	Software Engineering	ITG308	GSOE	3	NIL	03	01 (T)	04	80	20		25I	125
25	Programming using .Net	ITG309	GPRD	3	NIL	02	04	06	--	--	100 E		100
26	Data Structure	ITG310	GDST	3	ITG101 /ITG304	03	02	05	80	20	50E		150
27	Java Programming	ITG311	GJAP	3	NIL	03	04	07	80	20	50E	--	150
28	Elective - 1			3	NIL	02	02	04	--	--	75I		75
	Total					35	25	60	800	200	375	200	1575
Level 4: Applied Technology Courses													
29	Network Administration	ITG401	GNAD	4	ITG306	03	02	05	80	20	--	50E	150
30	Software Testing	ITG402	GSOT	4	ITG308	03	02	05	80	20	--	50I	150
31	Information Security	ITG403	GIFS	4	NIL	03	02	05	80	20	--	25I	125
32	Python Programming	ITG404	GPYH	4	NIL	03	04	07	80	20	75E	--	175
33	Advanced Java Programming	ITG405	GAJP	4	ITG311	01	04	05	--	--	100E	--	100
34	Mobile Application Development	ITG406	GMAP	4	ITG311	03	02	05	80	20	50E		150
35	Elective - 2			4	NIL	03	02	05	80	20	50I		150
	Total					19	18	37	480	120	275	125	1000
Level 5: Diversified Technology Courses													
36	Entrepreneurship and Start-ups	CCG501	GESU	5	NIL	02	02	04				50I	50
37	Internship 1 (4 weeks- After FOURTH Semester During Summer Vacation)	CCG502	GINO	5	--	--	--	03	--	--	50E	--	50
38	Internship 2 (3 weeks- After FIFTH Semester During Winter Vacation)	CCG503	GINT	5	--	--	--	02	--	--	50E	--	50
39	Project - I	ITG501	GPRO	5	NIL	00	02	02	--	--	--	50I	50
40	Project - II	ITG502	GPRT	5	ITG501	00	04	04	--	--	100E	--	100
41	Management Information System	ITG503	GMIS	5	NIL	03	00	03	80	20	--	--	100
42	Technical Writing	ITG504	GTWR	5		--	02	02			50I		50
43	Elective - 3			5		03	00	03	80	20	--	--	100
44	Elective - 4			5		03	02	05	80	20	--	50E	150
	Total					11	12	28	240	60	250	150	700

5. OPTIONAL COURSES FOR ELECTIVES

S N	Name of Course	Course Code	Course Abbrev ia-tion	Level	Pre-requi-site Cour se	Teaching Scheme (hours per week)			Examination Scheme (marks)					
						T h	Prac t./ Drg. / Tut oria l	Cre dits	T h	T S	Pr	Or	Tot al	
Elective - 1														
28 A	Multimedia & Animation Techniques	ITG312	GMMT	3	NIL	02	02	04			75I			75
28 B	Client Side scripting using Java Script	ITG313	GCJS	3	NIL	02	02	04			75I			75
28 C	Internet Of Things	ITG314	GIOT	3	NIL	02	02	04			75I			75
Elective - 2														
35 A	Ethical Hacking and Digital Forensics	ITG407	GEHF	4	NIL	03	02	5	80	20	50I	--	150	
35B	Web Development using PHP	ITG408	GWET	4	NIL	03	02	05	80	20	50I	--	150	
35 C	Object Oriented Modeling and Design	ITG409	GOOM	4	NIL	03	02	5	80	20	50I	--	150	
Elective - 3														
43 A	Cyber Law	ITG505	GCYL	5	NIL	3	0	3	80	20	--	--	100	
43 B	Emerging Trends in IT	ITG506	GEMT	5	NIL	3	0	3	80	20	--	--	100	
43 C	Mobile Communication	ITG507	GMOC	5	NIL	3	0	3	80	20	--	--	100	
Elective - 4														
44 A	Cloud Computing	ITG508	GCLC	5	NIL	3	2	5	80	20	--	50 E	150	
44 B	Advance Database Management System	ITG509	GADBM	5	NIL	3	2	5	80	20	--	50 E	150	
44 C	Linux Administration	ITG510	GLIA	5	ITG3 07	3	2	5	80	20	--	50 E	150	

6. PATH-WISE COURSE STRUCTURES:

Path-1: Students admitted to First Year - X std. and X Std. Tech

S N	Name of Course	Course Code	Course Abbr.	Level	Prerequisite Course	Teaching Scheme (hours per week)			Examination Scheme (Marks)				
						Th	Pr/T ut /Dr g.	Credit	Th	TS	Pr	Or	Total
Semester 1													
1	Engineering Physics	CCG102	GPHB	1	NIL	03	02(P)	05	80	20	50 I	--	150
2	Basic Mathematics	CCG105	GBMT	1	NIL	03	01(T)	04	80	20	--	--	100
3	Engineering Graphics	CCG109	GEGR	1	NIL	02	02(D)	04	--	--	75E	--	75
4	Introduction to IT System	CCG201	GITS	2	NIL	02	02(P)	04	--	--	50I	--	50
5	Elements of Practical Electricity	ITG103	GEPE	1	NIL	01	02(P)	03	--	--	--	50I	50
6	Web Page Designing	ITG102	GWPD	1	NIL	02	02(P)	04	40	10	50I	--	100
7	Basic Electronics	ITG104	GBTX	1	NIL	02	02	04	40	10	--	50I	100
Total						15	13	28	240	60	225	100	625
Semester 2													
8	Engineering Chemistry	CCG104	GCHB	1	NIL	03	02(P)	05	80	20	50I	--	150
9	Engineering Mathematics	CCG118	GEMB	1	CCG105	03	01(T)	04	80	20	--	--	100
10	C Programming	ITG101	GCPR	1	NIL	03	04(P)	07	80	20	50E	--	150
11	Computer Peripheral & maintenance	ITG105	GCPM	1	NIL	02	02	04	40	10	50I	--	100
12	Environmental Science(NC)	CCG204	GEVS	2	NIL	02	--	00	--	--	--	--	--
13	Communication Skills in English	CCG203	GCMS	2	NIL	03	02(P)	05	40	10	50I	--	100
14	Sports & Yoga	CCG117	GSPY	1	NIL	--	02(P)	02	--	--	--	--	--
Total						16	13	27	320	80	200	--	600
Semester 3													
15	Applied Mathematics	ITG301	GAPA	3	CCG105 & CCG118	03	01(T)	04	80	20	--	--	100
16	Digital Electronics & Microprocessor	ITG302	GDTE	3	ITG104	04	02(P)	06	80	20		50I	150
17	Data Communication	ITG303	GDTC	3	NIL	03	01(T)	04	80	20	--	25E	125
18	OOP using C++	ITG304	GCPP	3	NIL	03	02(P)	05	80	20	50E		150
19	Database Management System	ITG305	GDBM	3	NIL	03	02(P)	05	80	20	50E		150
20	Elective- 1			3	NIL	02	02(P)	04	--	--	75I		75
Total						18	10	28	400	100	175	75	750
Semester 4													
21	Computer Network	ITG306	GCON	3	NIL	03	02(P)	05	80	20	--	50E	150
22	Java Programming	ITG311	GJAP	3	NIL	03	04(P)	07	80	20	50E		150
23	Software Engineering	ITG308	GSOE	3	NIL	03	01(T)	04	80	20		25I	125
24	Programming using .Net	ITG309	GPRD	3	NIL	02	04(P)	06	--	--	100E		100

S N	Name of Course	Course Code	Course Abbr.	Level	Prerequisite Course	Teaching Scheme (hours per week)			Examination Scheme (Marks)				
						Th	Pr/T ut /Dr g.	Credit	Th	TS	Pr	Or	Total
25	Data Structure	ITG310	GDST	3	ITG101 /304	03	02(P)	05	80	20	50E		150
26	Operating System	ITG307	GOPS	3	NIL	03	02(P)	05	80	20	--	50I	150
27	Essence of Indian Traditional Knowledge	CCG205	GITK	2	--	02	--	00	--	--	--	--	--
Total						17	15	32	400	100	200	125	825

Internship Industrial Training Phase- I of 4 weeks.

Semester 5													
28	Network Administration	ITG401	GNA D	4	ITG306	03	02	05	80	20	--	50 E	150
29	Python Programming	ITG404	GPYH	4	NIL	03	04	07	80	20	75E		175
30	Information Security	ITG403	GIFS	4	NIL	03	02	05	80	20	--	25 I	125
31	Advanced Java Programming	ITG405	GAJP	4	ITG311	01	04	05	--	--	100 E		100
32	Management Information System	ITG503	GMIS	5	NIL	03	00	03	80	20	--	--	100
33	Project – I	ITG501	GPRO	5	NIL	00	02	02	--	--		50I	50
34	Elective – 2			4		03	02	05	80	20	50I		150
35	Internship 1 (4 weeks- After FOURTH Semester During Summer Vacation)	CCG502	GINO	5	--	--	--	03	--	--	50E	--	50
Total						16	16	32	400	100	275	125	900

Internship Industrial Training Phase- II of 3 weeks.

Semester 6													
36	Entrepreneurship and Start-ups	CCG501	GESU	5	NIL	02	02(P)	04	--	--	--	50 I	50
37	Indian Constitution	CCG206	GINC	2	--	0 2	--	00	--	--	--	--	--
38	Software Testing	ITG402	GSOT	4	ITG308	03	02	05	80	20	--	50I	150
39	Mobile Application Development	ITG406	GMAP	4	ITG311	03	02	05	80	20	50E		150
40	Technical Writing	ITG504	GTWR	5		--	02	02				50I	
41	Project - II	ITG502	GPRT	5	ITG501	00	04	04	--	--	100 E	--	100
42	Elective – 3			5		03	00	03	80	20	--	--	100
43	Elective – 4			5		03	02	05	80	20	--	50E	150
44	Internship 2 (3 weeks- After FIFTH Semester During Winter Vacation)	CCG503	GINT	5	--	--	--	02	--	--	50E	--	50
Total						14	14	28	320	80	250	150	800

PATH-2 : STUDENTS ADMITTED DIRECTLY TO SECOND YEAR

S N	Name of Course	Course Code	Course Abbreviation	L e v e l	Pre-requisite Course	Teaching Scheme (hours per week)			Examination Scheme (Marks)				
						Th	Pract. /Drg. /Tut	C red	T h	T S	Pr	Or	Tot al
Semester 3													
15	Applied Mathematics	ITG301	GAPA	3	CCG10 5& CCG11 8	3	1	4	80	20	--	--	100
16	Digital Electronics & Microprocessor	ITG302	GDTE	3	NIL	4	2	6	80	20		50I	150
17	Data Communication	ITG303	GDTC	3	NIL	3	1	4	80	20	--	25E	125
18	OOP using C++	ITG304	GCPP	3	NIL	3	2	5	80	20	50E		150
19	Database Management System	ITG305	GDBM	3	NIL	3	2	5	80	20	50E		150
20	Elective- 1			3		2	2	4	--	--	75I	--	75
<i>Bridge Courses</i>													
	C Programming	--	--	--	--	2	1	--	--	--	--	--	--
	Basic Mathematics	--	--	--	--	1	--	--	--	--	--	--	--
Semester 4													
21	Computer Network	ITG306	GCON	3	NIL	3	2	5	80	20	--	50E	150
22	Java Programming	ITG311	GJAP	3	NIL	3	4	7	80	20	50E		150
23	Software Engineering	ITG308	GSOE	3	NIL	3	1	4	80	20		25I	125
24	Programming using .Net	ITG309	GPRD	3	NIL	2	4	6	--	--	100 E		100
25	Data Structure	ITG310	GDST	3	ITG101 /304	3	2	5	80	20	50E		150
26	Operating System	ITG307	GOPS	3	NIL	3	2	5	80	20	--	50I	150
27	Essence of Indian Traditional Knowledge	CCG205	GITK	2	--	0 2	--	0 0	--	--	--	--	--
<i>Bridge Courses</i>													
	Engineering Mathematics	--	--	--	--	1	--	--	--	--	--	--	--
<i>Internship Industrial Training Phase- I of 4 weeks.</i>													
Semester 5													
28	Network Administration	ITG401	GNAD	4	ITG306	03	02	05	80	20	--	50E	150
29	Python Programming	ITG404	GPYH	4	NIL	03	04	07	80	20	75E		175
30	Information Security	ITG403	GIFS	4	NIL	03	02	05	80	20	--	25I	125
31	Advanced Java Programming	ITG405	GAJP	4	ITG311	01	04	05	--	--	100 E		100
32	Management Information System	ITG503	GMIS	5	NIL	03	00	03	80	20	--	--	100
33	Project - I	ITG501	GPRO	5	NIL	00	02	02	--	--		50I	50
34	Elective - 2			4		03	02	05	80	20	50I		150
35	Internship 1 (4 weeks- After FOURTH Semester During Summer Vacation)	CCG502	GINO	5	--	--	--	03	--	--	50E	--	50
	Total					16	16	32	40 0	100	275	125	900

Semester 6														
36	Entrepreneurship and Start-ups	CCG501	GESU	5	NIL	02	02(P)	04	--	--	--	50I	50	
37	Indian Constitution	CCG206	GI NC	2	--	02	--	00	--	--	--	--	--	
38	Software Testing	ITG402	GSOT	4	ITG308	03	02	05	80	20	--	50I	150	
39	Mobile Application Development	ITG406	GMAP	4	ITG311	03	02	05	80	20	50 E		150	
40	Technical Writing	ITG504	GTWR	5		--	02	02			50I		50	
41	Project - II	ITG502	GPRT	5	ITG501	00	04	04	--	--	10 0E	--	100	
42	Elective - 3			5		03	00	03	80	20	--	--	100	
43	Elective - 4			5		03	02	05	80	20	--	50E	150	
44	Internship 2 (3 weeks- After FIFTH Semester During Winter Vacation)	CCG503	GINT	5	--	--	--	02	--	--	50 E	--	50	
Total						14	14	28	320	80	25 0	150	800	

First year courses Exempted for DSY entry & Credits allotted

Semester 1														
1	Engineering Physics	CCG102	GPHB	1	NIL	3	2(P)	0 5	80	20	50 I	--	150	
2	Basic Mathematics	CCG105	GBM T	1	NIL	3	1(T)	4	80	20	--	--	100	
3	Engineering Graphics	CCG109	GEGR	1	NIL	2	2(D)	4	--	--	75 E	--	75	
4	Introduction to IT System	CCG201	GITS	2	NIL	2	2(P)	4	--	--	50I	--	50	
5	Elements of Practical Electricity	ITG103	GEPE	1	NIL	1	2(P)	3	--	--	--	50I	50	
6	Communication Skills in English	CCG203	GCMS	2	NIL	3	2(P)	5	40	10	50I	--	100	
7	Sports & Yoga	CCG117	GSPY	1	NIL	--	2(P)	2	--	--	--	--	--	
Semester 2														
8	Engineering Chemistry	CCG104	GCHB	1	NIL	3	2(P)	5	80	20	50I	--	150	
9	Engineering Mathematics	CCG118	GEMB	1	CCG10 5	3	1(T)	4	80	20	--	--	100	
10	C Programming	ITG101	GCPR	1	NIL	3	4(P)	7	80	20	50 E	--	150	
11	Web Page Designing	ITG102	GWPD	1	NIL	2	2(P)	4	40	10	50I	--	100	
12	Basic Electronics	ITG104	GBTX	1	NIL	2	2	4	40 (O L)	10	--	50I	100	
13	Computer Peripheral & maintenance	ITG105	GCPM	1	NIL	2	2	4	40	10	50I	--	100	
14	Environmental Science(NC)	CCG204	GEVS	2	NIL	2	--	00	--	--	--	--	--	

Note : Separate *Supplementary Input Sessions* for necessary content of First Year courses shall be designed and arranged for these students so as to bridge the gap of FY courses

Path 3 -BRANCH CHANGE PATH STRUCTURE

S N	Name of Course	Course Code	Course Abbreviation	L e v e l	Pre-requisite Course	Teaching Scheme (hours per week)			Examination Scheme (Marks)					
						Th	Pract./ Drg./ Tut	Cr ed	T h	T S	Pr	Or	Tot al	
Semester 3														
15	Applied Mathematics	ITG301	GAPA	3	CCG10 5& CCG11 8	3	1	4	80	20	--	--	100	
16	Digital Electronics & Microprocessor	ITG302	GDTE	3	NIL	4	2	6	80	20		50I	150	
17	Data Communication	ITG303	GDTC	3	NIL	3	1	4	80	20	--	25E	125	
18	OOP using C++	ITG304	GCPP	3	NIL	3	2	5	80	20	50E		150	
19	Database Management System	ITG305	GDBM	3	NIL	3	2	5	80	20	50E		150	
20	Elective- 1			3		2	2	4	--	--	75I	--	75	
<i>Additional FY Courses</i>														
	Web Page Designing	ITG102	GWPD	1	NIL	02	02(P)	04	40	10	50I	--	100	
Semester 4														
21	Computer Network	ITG306	GCON	3	NIL	3	2	5	80	20	--	50E	150	
22	Java Programming	ITG311	GJAP	3	NIL	3	4	7	80	20	50E		150	
23	Software Engineering	ITG308	GSOE	3	NIL	3	1	4	80	20		25I	125	
24	Programming using .Net	ITG309	GPRD	3	NIL	2	4	6	--	--	100 E		100	
25	Data Structure	ITG310	GDST	3	ITG101 /304	3	2	5	80	20	50E		150	
26	Operating System	ITG307	GOPS	3	NIL	3	2	5	80	20	--	50I	150	
27	Essence of Indian Traditional Knowledge	CCG205	GITK	2	--	0 2	--	0	--	--	--	--	--	
<i>Additional FY Courses</i>														
	C Programming	ITG101	GCPR	1	NIL	03	04(P)	07	80	20	50 E	--	150	
Semester 5														
28	Network Administration	ITG401	GNAD	4	ITG306	3	2	5	80	20	--	50E	150	
29	Python Programming	ITG404	GPYH	4	NIL	3	4	7	80	20	75 E		175	
30	Information Security	ITG403	GIFS	4	NIL	3	2	5	80	20	--	25I	125	
31	Advanced Java Programming	ITG405	GAJP	4	ITG311	1	4	5	--	--	10 0E		100	
32	Management Information System	ITG503	GMIS	5	NIL	3	0	3	80	20	--	--	100	
33	Project - I	ITG501	GPRO	5	NIL	0	2	2	--	--		50I	50	
34	Elective - 2			4		3	2	5	80	20	50I		150	
Semester 6														
35	Entrepreneurship and Start-ups	CCG501	GE SU	5	NIL	2	2 (P)	0 4	--	--	--	50I	50	
36	Indian Constitution	CCG206	GI NC	2	--	0 2	--	0 0	--	--	--	--	--	
37	Software Testing	ITG402	GSOT	4	ITG308	3	2	5	80	20	--	50I	150	

38	Mobile Application Development	ITG406	GMAP	4	ITG311	3	2	5	80	20	50 E		150
39	Technical Writing	ITG504	GTWR	5		--	2	2			50I		50
40	Project - II	ITG502	GPRT	5	ITG501	0	4	4	--	--	10 0E	--	100
41	Elective - 3			5		3	0	3	80	20	--	--	100
42	Elective - 4			5		3	2	5	80	20	--	50E	150

7. EXEMPTIONS FOR COURSES

Eligibility for Exemptions for First and Second Semester Courses of MPECS-2020 for students admitted on X-pass basis

S N	Name of Course	Course Code	Whether eligible for exemption ? (Yes / No)				
			XII Science	XII Tech.	XII MCVC	XII Voc.	ITI
1	Engineering Physics (CE/ME/MT)	CCG101	YES	YES	No	No	No
2	Engineering Physics (EE/IE/ET/IT)	CCG102	YES	YES	No	No	No
3	Engineering Chemistry (CE/ME/MT)	CCG103	No	No	No	No	No
4	Engineering Chemistry (EE/IE/ET/IT)	CCG104	No	No	No	No	No
5	Basic Mathematics	CCG105	YES	YES	No	YES	No
6	Engineering Mathematics (CE/ME/MT)	CCG118	YES	YES	No	YES	No
7	Engineering Drawing -1 (CE/ME/MT)	CCG107	No	YES	No	No	No
8	Engineering Drawing -2 (CE/ME/MT)	CCG108	No	YES	No	No	No
9	Engineering Graphics (EE/IT/IE/ET)	CCG109	No	YES	No	No	No
10	Applied Mechanics	CCG110	No	No	No	No	No
11	Workshop Practices-1 (CE)	CCG111	No	YES	YES	YES	YES
12	Workshop Practices-1 (ME/MT)	CCG112	No	YES	YES	YES	YES
13	Workshop Practices (EE)	CCG113	No	YES	YES	YES	YES
14	Workshop Practices (IE/ET)	CCG114	No	YES	YES	YES	YES
15	Workshop Practices -2 (CE)	CCG115	No	YES	YES	YES	YES
16	Workshop Practices -2 (ME/MT)	CCF116	No	YES	YES	YES	YES
17	Engineering Mathematics (EE/IE/ET/IT)	CCG118	YES	YES	No	YES	No
18	Communication Skills in English	CCG203	No	No	No	No	No

Note : The above eligibility is subject to condition that the student has secured at least 40 % marks in the respective subject. Students seeking exemption for any other subjects should contact Academic Coordinator / Controller of Examinations.

8. COURSE EQUIVALENCE FOR PREVIOUS MPECS

Name of the course	Course code	Name of the course	Course code	Name of the course	Course code	Name of the course	Course code	Name of the course	Course code
MPECS 2006		MPECS 2010		MPECS 2013		MPECS 2016		MPECS 2020	
Generic Skill	R101	Generic Skill	X101	Generic Skills	CCE201	Generic Skills	CCF2 01	NIL	NIL
Communication Skill	R102	Communication Skill	X106	Communication Skills	CCE202	Communication Skills	CCF2 02	Communication Skills in English	CCG203
Applied Physics - I	R103	Basic Physics	X102	Engineering Physics	CCE102	Engineering Physics	CCF1 02	Engineering Physics	CCG102
Applied Physics - II	R104	Applied Physics	X108	Engineering Physics	CCE102	Engineering Physics	CCF1 02	Engineering Physics	CCG102
Applied Chemistry	R105	Applied Chemistry	X103	Engineering Chemistry	CCE104	Engineering Chemistry	CCF1 04	Engineering Chemistry	CCG104
Elements of Pract. Elect.	R106	Elements of Pract. Elect.	IF 103	Elements of Pract. Electricity	ITE110	Elements of Pract. Electricity	ITF10 3	Elements of Practical Electricity	ITG103
Basic Mathematics	R107	Basic Mathematics	X104	Basic Mathematics	CCE105	Basic Mathematics	CCF1 05	Basic Mathematics	CCG1 05
Engineering Mathematics	R108	Engineering Mathematics	X110	Engineering Mathematics	CCE106	Engineering Mathematics	CCF1 06	Engineering Mathematics	CCG118
Engineering Drawing	R109	Engineering Drawing	IF101	Engineering Graphics	CCE109	Engineering Graphics	CCF1 09	Engineering Graphics	CCG109
Intro. To Elect. Devices	IT113	Basic Electronics	IF104	Basic Electronics	ITE108	NIL	NIL	Basic Electronics	ITG104
Intro. To Elect. Circuits	IT110	Basic Electronics	IF104	Basic Electronics	ITE108	NIL	NIL	Basic Electronics	ITG104
Computer Funda. & App.	R111	Computer Fundamentals	IF 102	Computer Fundamentals	ITE103	Computer Fundamentals	ITF10 1	Introduction to IT System	CCG201
C Programming	IT112	C Programming	IF105	C Programming	ITE104	C Programming	ITF10 2	C Programming	ITG101
		Web Page Design	IF106	Web Page Design	ITE107	Web Page Designing	ITF10 3	Web Page Designing	ITG102
Computer Workshop	IT114	Computer Fundamentals	IF102	Computer Fundamentals	ITE103	NIL	NIL	NIL	NIL
Applied Mathematics	IT201	Applied Mathematics	IF201	Applied Mathematics	ITE301	Applied Mathematics	ITF30 1	Applied Mathematics	ITG301
Digital Electronics	IT202	Digital Electronics	IF202	Digital Electronics	ITE302	Digital Electronics	ITF30 2	NIL	NIL
Analog & Digital Comm.	IT203	Analog & Digital Comm.	IF203	NIL	NIL	NIL	ITF30 5	NIL	NIL
OOPS Using C++	IT204	OOPS Using C++	IF204	OOP using C++	ITE304	OOP using C++	ITF30 4	OOP using C++	ITG304
Personality Development	IT205	Personality Development	IF 205	Professional Practices	CCE203	Professional Practices	CCF2 03	NIL	NIL
DBMS	IT206	DBMS	IF206	DBMS	ITE305	DBMS	ITF30 5	DBMS	ITG305
Computer Network	IT207	Computer Network	IF207	Computer Network	ITE306	Computer Network	ITF30 6	Computer Network	ITG306
Operating System	IT208	Operating System	IF208	Operating System	ITE307	Operating System	ITF30 7	Operating System	ITG307

System Programming	IT209	System Programming	IF209	System Programming	ITE310	System Programming	ITF31 3	NIL	NIL
Visual Basic	IT210	Programming usingVB.NET	IF210	NIL	NIL	NIL	NIL	NIL	NIL
Microprocessor	IT 211	Microprocessor	IF 211	Microprocessor	ITE311	Microprocessor	ITF31 1	NIL	NIL
Computer Archi. & Main.	IT 212	Computer Archi. & Main.	IF212	Computer Archi. & Main.	ITE308	Computer Archi. & Main.	ITF30 8	Computer Peripheral & Maintenance	ITG105
Higher Math's	R228	Higher Math's	R213	Higher Mathematics	ITE312	NIL	NIL	NIL	NIL
		Computer Graphics	IF213	Computer Graphics	ITE313	Computer Graphics	ITF31 2	NIL	NIL
Network Administration	IT301	Network Administration	IF301	Network Administration	ITE401	Network Administration	ITF40 1	Network Administration	ITG401
Software Engineering	IT302	Software Engineering	IF302	Software Engineering	ITE402	Software Engineering	ITF40 2	Software Engineering	ITG308
Data Structure	IT303	Data Structure	IF303	Data Structure	ITE403	Data Structure	ITF31 0	Data Structure	ITG310
Internet Technology	IT304	Internet Technology	IF308	Internet Technology	ITE408	NIL	NIL	NIL	NIL
		Software Testing	IF309	Software Testing	ITE409	Software Testing	ITF40 8	Software Testing	ITG402
		Adv. Microprocessor	IF310	NIL	NIL	NIL	NIL	NIL	NIL
Web Technology	IT305	Web Technology	IF304	Web Technology	ITE404	Web Technology	ITF40 4	NIL	NIL
Career &Enter. Develop.	IT401	Career & Enter. Develop.	IF411	NIL	NIL	NIL	NIL	Entrepreneurship and Start-ups	CCG5 01
Java Programming	IT402	Java Programming	IF306	Java Programming	ITE406	Java Programming	ITF40 6	Java Programming	ITG311
		Adv. Java Programming	IF307	Adv. Java Programming	ITE407	Adv. Java Programming	ITF40 7	Advanced Java Programming	ITG405
Linux	IT403	Linux	IF305	Linux	ITE405	Linux	ITF40 5	NIL	NIL
Project	IT404	Project	IF401	Project - I & Project- II	ITE501 & ITE502	Project - I & Project- II	ITF50 2& ITF50 3	Project - I & Project- II	ITG501 & ITG502
MOC	IT405	Mobile Communication	IF402	MOC	ITE507	Mobile Communication	ITF50 4	Mobile Communication	ITG507
Distributed System	IT406	Distributed System	IF403	Distributed System	ITE508	Distributed System	ITF50 5	NIL	NIL
Ecommerce	IT407	Ecommerce	IF404	Ecommerce	ITE509	NIL	NIL	NIL	NIL
Management of Info. Sys.	IT408	Management of Info. Sys.	IF405	MIS	ITE503	NIL	NIL	Management Information System	ITG503
Mgmt. of Info. Tech.	IT409	Management of Info. Tech.	IF406	NIL	NIL	NIL	NIL	NIL	NIL

		Management	IF407	NIL	NIL	NIL	NIL	NIL	NIL
		Multimedia Techniques	IF408	Multimedia Techniques	ITE504	Multimedia Techniques	ITF410	Multimedia & Animation Techniques	ITG312
		Computer Security	IF409	NIL	NIL	NIL	NIL	NIL	NIL
				Information Security	ITE505	Information Security	ITF403	Information Security	ITG403
		OOMD	IF410	OOMD	ITE506	OOMD	ITF508	Object Oriented Modeling and Design	ITG409
				Env. Studies	CCE204	NIL	NIL	Environmental Science(NC)	CCG204
				Data Comm.	ITE303	Data Comm.	ITF303	Data Communication	ITG303
				Prog. Using .NET	ITE309	Prog. Using .NET	ITF309	Programming using .Net	ITG309
				PHP	ITE410	PHP	ITF409	Web Development using PHP	ITG408
								Digital Electronics and Microprocessor	ITG302
								Sports & Yoga	CCG117
								Essence of Indian Traditional Knowledge	CCG205
								Indian Constitution	CCG206
								Multimedia & Animation Techniques	ITG312
								Linux Administration	ITG510
								Mobile Application Development	ITG406
								Technical Writing	ITG504
								Client Side scripting using Java Script	ITG313
								Internet Of Things	ITG314
								Ethical Hacking	ITG407

							and Digital Forensics	
							Python Programm ing	ITG404
							Cyber Law	ITG505
							Emerging Trends in IT	ITG506
						Cloud Computing	ITF50 6	Cloud Computin g
							Advance Database Managem ent Systems	ITG509

PROFORMAS FOR EVALUATION OF TERM WORK, ORALS AND PRACTICALS

PROFORMA - I
GOVERNMENT POLYTECHNIC,KOLHAPUR
Performance for Final Assessment of PRACTICAL / ORAL
FOR COURSES OF FIRST AND SECOND SEMESTER (Without Micro-Projects)
By Internal & External Examiner
(For Course having ONLY PRACTICAL / ORAL)

Course Code & Course Name:-

Programme:-

Summer/Winter Exam-20 Date:-

**Internal Examiner
Signature:-
Name:-
Institute:-**

**External Examiner
Signature:-
Name:-
Institute:-**

PROFORMA-II
GOVERNMENT POLYTECHNIC,KOLHAPUR
Performance for Final Assessment of PRACTICAL / ORAL
FOR COURSES OF FIRST AND SECOND SEMESTER (Without Micro-Projects)
By Internal Examiner
(For Course having ONLY PRACTICAL / ORAL)

Course Code & Course Name:- _____

Programme:-_____

Summer/Winter Exam-20 _____ Date:- _____

Internal Examiner

Signature:-

Name:-

Institute:-

PROFORMA - III
GOVERNMENT POLYTECHNIC,KOLHAPUR
Performance for Final Assessment of PRACTICAL / ORAL
FOR COURSES OF THIRD TO SIXTH SEMESTER (With Micro-Projects)
By Internal & External Examiner
(For Course having ONLY PRACTICAL / ORAL)

Course Code & Course Name:-

Programme:- _____

Summer/Winter Exam-20 Date:-

Internal Examiner

Signature:-

Name:-

Institute:-

External Examiner

Signature:-

Name:-

Institute:-

PROFORMA-IV
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SECTION - II

SYLLABI OF COURSES

(LEVEL-WISE)

LEVEL-I FOUNDATION COURSES

COURSE ID: 1

Course Name : ENGINEERING PHYSICS(EE/IE/IT/ET)
Course Code : CCG102
Course Abbreviation : GPHB

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Nil
Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	03	05
Practical	02	

Evaluation Scheme:

Component	Progressive Assessment		Semester end		Total
	Theory	Practical*	Theory	Practical*	
Duration	Average of two tests of 20 marks each	Practical assignment (CA)*	One Skill Test (2 hours) *	One paper (3 hours)	One practical (2 hours)*
Marks	20	25	25	80	50 I 150

* Assessment as per pro-forma II

I – Internal Examination

2. RATIONALE:

Physics is the foundation of engineering and technology. The development of all engineering areas requires good understanding of fundamental principles in physics. Studying physics develops scientific methodology and technical aptitude in the students. Applications of principles of physics in engineering fields create interest and motivate the students.

3. COMPETENCY:

Apply principles of Physics to solve engineering problems as follows:

Cognitive: i) Understanding and applying principles and laws of Physics to simple practical problems/ situations. ii) Observing iii) Classifying iv) Interpreting

Psychomotor: Handling of instruments, apparatus and tools

Affective: Skill of i) working in team ii) curiosity, interest and self-confidence

4. COURSE OUTCOMES:

CCG102-1 Estimate errors in measurement of physical quantities.

CCG102-2 Select proper material in engineering industry by analysis of its physical properties

CCG102-3 Use basic principles of wave motion for related engineering applications

CCG102-4 Apply principles of optics, electricity to solve engineering problems

CCG102-5 Express importance of Lasers, X-rays and nanotechnology.

CCG102-6 Apply principles of fiber optics for related engineering applications

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and COs	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/ development of solutions	PO 4 Engineering Tools, experimentation and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1	PSO2
<i>Competency: Apply principles of Physics to solve engineering problems.</i>	3	1	1	2	1	1	2		
CCG101-1	3	1	1	2	-	1	2		
CCG101-2	3	1	1	2	1	1	2		
CCG101-3	3	1	1	2	1	1	2		
CCG101-4	3	1	2	2	2	1	2		
CCG101-5	3	1	1	1	2	1	1		
CCG102-6	3	1	1	1	1	1	2		

5. CONTENT:

A) LABORATORY WORK : Laboratory work shall consist of the following :

Minimum 10 required (* represents as experiments to be carried out compulsory and 02 experiments should be from the remaining list)

List of Laboratory experiments and related skills to be developed: (Each experiment 02 hours)

Sr. No.	Title of Experiment	Skills to be developed	Course Outcome
*1	To measure internal and external dimensions of hollow cylinder by using Vernier Caliper	i) Going through safety measures required ii) Determine least count and zero error in the measuring instrument. iii) Measuring internal and external dimensions of given objects iv) Handling the measuring instruments for measuring depth, thickness etc. v) Tabulating observations and calculations vi) Interpreting results	CCG102-1
*2	To measure the diameter of bob and thickness of plate by using Vernier Caliper	i) Going through safety measures required ii) Determine least count and zero error in the measuring instrument. iii) Measuring dimensions of given objects iv) Handling the measuring instruments for measuring depth, thickness etc. v) Tabulating observations and calculations vi) Interpreting results	CCG102-1
*3	To measure the diameter of bob and thickness of plate by using Micrometer screw gauge	i) Going through safety measures required ii) Determine least count and zero error in the measuring instrument. iii) Measuring dimensions of given objects iv) Handling the measuring instruments for measuring depth, thickness etc. v) Tabulating observations and calculations vi) Interpreting results	CCG102-1
*4	To determine the viscosity of liquid by Stokes method.	i) Going through safety measures required ii) Measuring diameter of steel ball using micrometer screw gauge. iii) Measuring terminal velocity of steel ball in the liquid column. iv) Use of stop watch for measurement of time. v) Tabulating observations and calculations vi) Interpreting results	CCG102-2
5	To determine the buoyancy force on a solid immersed in a liquid	i) Going through safety measures required ii) Measuring dimensions of given solid using vernier caliper or micrometer screw gauge. iii) Measuring the volume of liquid collected iv) Tabulating observations and calculations v) Interpreting results	CCG102-2
*6	To measure unknown resistance of wire by Ammeter - Voltmeter method.	i) Going through safety measures required ii) Drawing the circuit diagram of the required experiment. iii) Connecting the instruments as per circuit diagram. iv) Measuring the value of potential difference & current in the circuit. v) Tabulating observations and calculations vi) Interpreting results	CCG102-4

*7	To verify Snell's law using glass slab	i) Going through safety measures required ii) Drawing necessary ray diagram iii) Measuring angles of incidence and refraction iv) Tabulating observations and calculations v) Interpreting results	CCG102-4
*8	To determine refractive index of prism by pin method	i) Going through safety measures required ii) Removing parallax between images and pins iii) Measuring the angle of refraction correctly iv) Drawing path of refracted ray through prism v) Drawing $i-\delta$ graph vi) Tabulating observations and calculations vii) Interpreting results	CCG102-4
9	To study Total Internal Reflection using glass slab	i) Going through safety measures required ii) Drawing necessary ray diagram iii) Measuring angles of incidence and refraction iv) Tabulating observations and calculations v) Interpreting results	CCG102-4
10	To determine velocity of sound by resonance tube	i) Going through safety measures required ii) Adjusting the resonating length by discriminating resonating sound from sound produced by the tuning fork. iii) Measuring internal diameter of resonating tube using vernier caliper iv) Drawing inference & confirming Law $nL = \text{constant}$ v) Tabulating observations and calculations v) Interpreting results	CCG102-3
11	To determine the acceleration due to gravity by 'g' by simple pendulum	i) Going through safety measures required ii) Measuring length of pendulum iii) Finding least count of stopwatch iv) Measuring periodic time with the help of stop watch v) Tabulating observations and calculations v) Interpreting results	CCG102-3
*12	To measure unknown resistance by Wheatstone's meter bridge.	i) Going through safety measures required ii) Drawing the circuit diagram for the experiment iii) Connecting the resistances as per circuit diagram. iv) Finding the correct position of null point & measuring correct balancing lengths on Meter bridge. v) Tabulating observations and calculations v) Interpreting results	CCG102-4
13	To verify series law of resistances by Wheatstone's meter bridge.	i) Going through safety measures required ii) Drawing the circuit diagram for series connections of the resistances. iii) Connecting the resistances for series method as per circuit diagram. iv) Finding the correct position of null point & measuring correct balancing lengths on Meter bridge. v) Tabulating observations and calculations v) Interpreting results	CCG102-4
14	To parallel law of resistances by Wheatstone's meter bridge.	i) Going through safety measures required ii) Drawing the circuit diagram for parallel connections of the resistances. iii) Connecting the resistances for parallel method as per circuit diagram. iv) Finding the correct position of null point & measuring	CCG102-4

	correct balancing lengths on Meter bridge. iv) Tabulating observations and calculations v) Interpreting results	
15	To be added by the subject teacher as per requirement	

B) THEORY :**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG102-1 Estimate errors in measurement in Physical quantities</i>			
1	UNITS AND MEASUREMENT 1.1 Unit, Physical Quantities : Fundamental and Derived Quantities and their units 1.2 Systems of units : CGS, MKS, FPS and SI 1.3 Errors , Types of errors : Instrumental, Systematic and Random error, Estimation of errors : Absolute, Relative and percentage errors 1.4 Significant figures 1.5 Simple Numerical problems	06	10
<i>Course Outcome CCG102-2 Select proper material in engineering industry by analysis of its physical properties</i>			
2	ELASTICITY 2.1 Definitions of elasticity, plasticity, rigidity, deforming force, restoring force 2.2 Stress, Strain and their types 2.3 Elastic Limit, Statement of Hooke's law, modulus of elasticity and its types 2.4 Relation between Y, K and η (No derivation) 2.5 Ultimate stress, breaking stress, Working stress, Factor of safety 2.6 Applications of elasticity 2.7 Simple Numerical problems	06	10
3	VISCOSITY 3.1 Definition and meaning of viscosity, velocity gradient 3.2 Newton's law of viscosity, Coefficient of viscosity 3.3 Stokes law 3.4 Derivation of expression for coefficient of viscosity of liquid by Stokes method 3.5 Applications of viscosity. No numericals on above topic	06	08

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG102-3 Use basic principles of wave motion for related engineering applications</i>			
4	WAVE MOTION 4.1 Definitions of periodic motion, Linear S. H. M. 4.2 Parameters of linear SHM : Amplitudes, Period, Frequency and Phase 4.3 Characteristics of linear SHM 4.4 Concept and definition of wave 4.5 Parameters of wave- Frequency, periodic time, phase and wavelength 4.6 Types of waves (transverse and longitudinal) and their characteristics 4.7 Free and forced oscillations 4.8 Phenomenon of resonance and its applications No numericals on above topic	06	12
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG102-4 Apply principles of optics, electricity to solve engineering problems</i>			
5	PROPERTIES OF LIGHT 5.1 Refraction of light 5.2 Laws of Refraction of Light, Snell's law 5.3 Refraction through glass prism 5.4 Derivation of prism formula 5.5 Dispersion & Dispersive Power (in terms of angles of deviation only) 5.6 Simple Numerical problems	06	08
6	ELECTRICITY 6.1 Concept of electric current , resistance 6.2 Ohm's law, Specific resistance 6.3 Resistances in series and parallel. 6.4 Wheatstone's Network and Meter Bridge. 6.5 Simple Numerical problems	06	10
<i>Course Outcome CCG102-5 Express the importance of Lasers, X-rays and nanotechnology.</i>			

7	MODERN PHYSICS 7.1 LASER 7.1.1 Introduction of LASER 7.1.2 Properties of laser 7.1.3 Spontaneous and stimulated emission 7.1.4 Population inversion and optical pumping 7.1.5 Applications of LASER No numericals on above topic 7.2 X-RAYS 7.2.1 Nature and properties of x-rays. 7.2.2 Production of x-rays by Coolidge tube 7.2.3 Applications of x-rays No numericals on above topic 7.3 INTRODUCTION TO NANOTECHNOLOGY 7.3.1 Definition of nanoscale, nanometer, nanoparticle 7.3.2 Definition and examples of nanostructured materials 7.3.3 Applications of nanotechnology in electronics, automobile, textile, space, medicine, cosmetics and environment No numericals on above topic	08 (03)	14 (06)
<i>Course Outcome CCG102-6 Apply principles of fiber optics for related engineering applications</i>			
8	FIBER OPTICS 8.1 Optical communication link 8.2 Principle of optical fiber (TIR) 8.3 Structure of optical fiber 8.4 Propagation of light in optical fiber 8.5 Advantages of optical fibers over conventional metal conductors 8.6 Applications of optical fibers No numericals on above topic	04	08

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

6. Specification table for setting question paper for semester end theory examination:

Section no./ Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total marks
		Remember	Understand	Application		
I/1	Units and Measurement	2	4	4	CCF102-1	10
I/2	Elasticity	2	2	6	CCF102-1	10
I/3	Viscosity	2	2	4	CCF102-2	08
I/4	Wave motion	4	8	-	CCF102-3	12
II/5	Properties of light	2	2	4	CCF102-4	08
II/6	Electricity	2	2	6	CCF102-4	10
II/7	Modern Physics	4	4	6	CCF102-5	14
II/8	Fiber Optics	2	4	2	CCF102-6	08
	Total	20	28	32		80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

7. ASSESSMENT CRITERIA FOR PRACTICAL WORK AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical work :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per given criteria

Domain	Particulars	Marks out of 25
Cognitive	Understanding	05
	Observations, calculations & Result table	05
Psychomotor	Operating Skills	05
	Neat & complete circuit Diagram / schematic Diagram.	05
Affective	Discipline and punctuality Decency and presentation	5
TOTAL		25

ii) Progressive Skill Test :

One mid-term Progressive Skill Test of 25 marks shall be conducted as per criteria given below

Criteria for Continuous Assessment of Practical work and Progressive skill Test :

Sr. No.	Criteria	Marks allotted
1	Neat & complete circuit Diagram / schematic Diagram.	05
2	Observations & Result Table	05
3	Sample Calculations with relevant Formulae.	05
4	Proper Graphs & Procedure / workmanship Safety measures	05
5	Oral Based on Practical Work	05
Total		25

b) Criteria for assessment at semester end practical exam :

Every student has to perform one practical within 2 hours at semester end practical exam which shall be assessed as per following criteria.

Sr. no	Criteria	Marks allotted
1	Preparedness for practical	10
2	Correct figures / diagrams	10
3	Observation tables	10
4	Result table / calculations / graphs	10
5	Safety / use of proper tools	10
Total		50

8. INSTRUCTIONAL STRATEGIES :

Instructional Methods :

1. Lectures cum Discussions 2. Regular Home Assignments. 3.
Laboratory work

Teaching and Learning resources:

1. Chalk board 2. Video clips 3. Slides 4. Item Bank 5. Charts

9. REFERENCE MATERIAL :

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	Narlikar	Text book of Physics for class XI & XII (Part-I, Part-II)	N.C.E.R.T Delhi
2.	P.V.Naik.	Engineering Physics	Pearson Edu. Pvt. Ltd, New Delhi.
3	Narkhede, Pawar, Sutar	Concepts in Physics, Vol. I & II.	Bharti Bhawan Ltd, New Delhi.
4	Walker, Halliday, Resnick	Principles of Physics.	Wiley Publication. , New Delhi.
5	B.L. Theraja	Engineering Physics	S. Chand Publishers – New Delhi
6	Beiser	Concept of modern physics	Tata Mc-Graw Hill
7	E. Zebro Wski	Physics for Technicians	Tata Mc-Graw Hill
8	V. Rajendran	Engineering Physics	Tata McGraw-Hill Publications

b) Websites

- i) <http://www.physicsclassroom.com>
- ii) <http://scienceworld.wolfram.com/physics/>
- iii) <http://physics.about.com/>
- iv) <http://nptel.ac.in/course.php?disciplineId=115>
- v) <http://nptel.ac.in/course.php?disciplineId=104>
- vi) www.fearofphysics.com
- vii) www.science.howstuffworks.com

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COURSE ID: 2

Course Name : ENGINEERING CHEMISTRY(EE/IE/IT/ET)
Course Code : CCG104
Course Abbreviation : GCHB

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : <nil>
Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	03	05
Practical	02	

Evaluation Scheme:

Component	Progressive Assessment		Semester end		Total
	Theory	Practical	Theory	Practical*	
Duration	Two tests (1 hour each)	One Skill Test (2 hours)	One paper (3 hours)	One practical (2 hours)	
Marks	20 each	25	80	50 I	150

* Assessment as per pro-forma II..

I – Internal Examination

2. RATIONALE:

This course provides knowledge of chemical properties of materials and selection of appropriate material for specific applications in the field of engineering. Study of different polymers, insulators or dielectrics, adhesives and their applications in electrical appliances, electronic industries etc., study of corrosion and methods of prevention will make students realize importance of care and maintenance of machines and equipments. The contents of this subject are designed to enhance student's reasoning capacity and capabilities in solving challenging problems in engineering field.

3. COMPETENCY:

Apply principles of advanced chemistry to solve engineering problems.

Cognitive: Understanding concepts of chemistry for applications in the area of engineering.

Psychomotor:

- i) Sketching and labeling the diagrams for extraction of copper
- ii) Experimentally analyzing the water samples for preparing portable water by different methods.
- iii) Preparing chart of showing percentage, composition, properties and industrial applications of solders.
- iv) Handling & use of glassware & chemicals.

Affective: i) Accuracy ii) Safety iii) Punctuality iv. Attitude.

4. COURSE OUTCOMES

CCG104-1 Understand the application of basic concepts in chemistry.

CCG104-2 Apply the knowledge of electrochemistry in industry for electroplating and electro-refining.

CCG104-3 Interpret the reasons of corrosion & remedies by using appropriate techniques.

CCG104-4 Select the relevant catalyst for given application.

CCG104-5 Select insulators, adhesive, composite materials, Plastic & rubber for different applications in the field of engineering

CCG104-6 Use relevant water treatment process to solve industry problems.

CCG104-7 Select proper type of cell based on the requirement in electrical/ electronic and computer engineering.

CCG104-8 Understand the method of extraction of copper.

CCG104-9 Select proper type of alloys, solders for various purposes.

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and COs	PO 1 Basic& Discipline specific knowledge	PO 2 Problem analysis	PO 3 Design/development of solutions	PO 4 Engineering Tools, Experimentation & Testing	PO 5 Engineering practice for society, sustainability & environment	PO 6 Project management	PO 7 Life-long learning	PSO1 Electrical equipment	PSO2 Electrical power systems
Competency: Apply principles of advanced chemistry to solve engineering problems	3	3	3	3	2	2	2	2	2
CCG104-1	3	3	3	2	-	-	1	2	2
CCG104-2	3	3	2	3	1	1	2	2	2
CCG104-3	3	3	3	2	2	1	1	3	3
CCG104-4	3	2	2	1	1	1	2	1	1
CCG104-5	3	2	2	1	2	1	1	2	2
CCG104-6	3	3	3	2	2	1	1	2	3
CCG104-7	3	3	2	2	3	1	1	2	2
CCG104-8	3	3	3	2	3	1	1	3	3
CCG104-9	3	3	2	2	1	-	-	2	2

5. CONTENT:

A. LABORATORY WORK

Lab work shall consist of the following:

Laboratory experiments and related skills to be developed:

Sr. No.	Title of Experiment	Skills/Competencies to be developed	Course Outcome
1	Introduction to Chemistry laboratory	Awareness of chemicals, glasswares & instruments used in chemistry laboratory	CCG103-1
2	Volumetric analysis of solution.	Molecular weight, equivalent weight, acidity, basicity normality of solution. Awareness of different types of titrations, use of indicators	CCG103-1
3	Preparation of 1 N, 0.5 N & 0.1 N Solutions of different chemicals like NaOH, HCl, Oxalic acid, FeSO ₄ , etc.	Skill of weighing, handling Glassware & measuring solutions	CCG103-1
4	Titration of strong acid and strong bases (HCl X NaOH)	Skills of determining accurate end point of titration & development of measurement skills.	CCG103-1
5	Titration of strong acid, strong base & weak acid (HCl X NaOH X H ₂ C ₂ O ₄ .H ₂ O	Skills of determining accurate end point of titration & development of measurement skills.	CCG103-1
6	Titration of weak base , strong acid & strong base (Na ₂ CO ₃ X H ₂ SO ₄ X KOH	Skills of determining accurate end point of titration & development of measurement skills.	CCG103-1
7	Estimation of chloride content in water by Mohr' s method	Measurement skill utilization of practical data for testing & estimation	CCG103-5
8	Determination of amount of Ca and Mg ions present in given sample of water by E.D.T.A method	Measurement skill utilization of practical data for testing & estimation	CCG103-5
9	Estimation of viscosity of oils by Ostwald's method	Measurement skill utilization of practical data for testing & estimation	CCG103-1
10	Estimation of Ca in limestone.	Measurement skill utilization of practical data for testing & estimation	CCG103-5
11	Titration of KMnO ₄ & FeSO ₄ (Redox titration)	Skills of determining accurate end point of titration & development of	CCG103-6

		measurement skills.	
12	Estimation of % of Fe in given sample of steel	Measurement skill utilization of practical data for testing & estimation	CCG103-6
13	Determination of alkalinity of water	Measurement skill utilization of practical data for testing & estimation	CCG103-6

B: THEORY :**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG104-1 Understand the application of basic concepts in chemistry.</i>			
1	ATOMIC STRUCTURE AND CHEMICAL BONDING <ul style="list-style-type: none"> 1.1 Atom :Fundamental particles, Nature of atom 1.2 Atomic Number, Mass Number, Isotopes and isobars 1.3 Bohr's theory of atom 1.4 Statement of Hund's rule of maximum multiplicity, Pauli's exclusion principle Aufbau's principle 1.5 Lewis and Langmuir's concept of stable electronic configuration 1.6 Electovalency and Co-valency 1.7 Formation Of electrovalent compounds- NaCl, CaCl₂. 1.8 Formation of Covalent compounds-H₂O, CO₂ 	05	08
<i>Course Outcome CCG104-2 Apply the knowledge of electrochemistry in industry for electroplating and electro-refining.</i>			
2	ELECTROCHEMISTRY <ul style="list-style-type: none"> 2.1 Definitions- Conductor, Electrolyte, Electrode, Ionisation, Electrolysis. 2.2 Arrhenius Theory Of Ionisation 2.3 Degree of Ionisation & Factors affecting degree of ionisation. 2.4 Electrolysis of molten NaCl. 2.5 Electrolysis of CuSO₄ solution by using Cu-electrodes 2.6 Industrial applications of electrolysis <ul style="list-style-type: none"> 2.6.1 Electroplating 2.6.2 Electro refining of Cu 	05	08

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG104-3 Interpret the reasons of corrosion & remedies by using appropriate techniques.</i>			
3.	CORROSION AND PROTECTIVE COATING <ul style="list-style-type: none"> 3.1 Definition & types of corrosion 3.2 Dry or Atmospheric corrosion , Oxide Film Formation & its types ,Factors affecting atmospheric corrosion 3.3 Wet or electrochemical corrosion 3.4 Factors influencing immersed corrosion 3.5 Methods of protection of metal from corrosion - Hot dipping (Galvanizing & Tinning) ,Metal spraying, Metal cladding, Cementation or sherardizing 	04	06
<i>Course Outcome CCG103-4 Select the relevant catalyst for given application.</i>			
4	CATALYSIS <ul style="list-style-type: none"> 4.1 Definition. 4.2 Types of Catalysts with example. <ul style="list-style-type: none"> - Homogenous catalyst. - Heterogenous catalyst 4.3 Promotors. 4.4 Negative catalysis. 4.5 Autocatalysis. 	02	04
<i>Course Outcome CCG104-5 Select insulators, adhesive, composite materials, Plastic & rubber for different applications in the field of engineering</i>			
5	CHEMISTRY OF NONMETALLIC ENGINEERING MATERIALS <p>5.1 INSULATORS</p> <ul style="list-style-type: none"> 5.1.1 Definition & Characteristics of insulator 5.1.2 Preparation, properties & uses of glass wool, Thermocole. <p>5.2 COMPOSITE MATERIALS</p> <ul style="list-style-type: none"> 5.2.1 Definition, 5.2.2 Classification, Properties & Application of composite materials <p>5.3 PLASTICS</p> <ul style="list-style-type: none"> 5.3.1 Definition of Polymer, Polymerization. 5.3.2 Types of polymerization – Addition & Condensation polymerization. 5.3.3 Classification of plastic - Thermosoftening & 	08	14

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	<p>thermosetting plastic.</p> <p>5.3.4 Engineering properties & applications of plastic.</p> <p>5.4 RUBBER</p> <p>5.4.1 Elastomer</p> <p>5.4.2 Drawbacks of Natural rubber.</p> <p>5.4.3 Vulcanization of rubber.</p> <p>5.4.4 Engineering properties & uses of rubber.</p> <p>5.5 ADHESIVES</p> <p>5.5.1 Definition of adhesives.</p> <p>5.5.2 Characteristics of good adhesive.</p> <p>5.5.3 Properties of adhesive.</p>		
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG104-6 Use relevant water treatment process to solve industry problems.</i>			
6	<p>WATER</p> <p>6.1 Impurities in natural water</p> <p>6.2 Hard water & Soft water</p> <p>6.3 Hardness of water- Temporary & Permanent</p> <p>6.4 Reactions of hard water with soap</p> <p>6.5 Disadvantages of hard water for domestic & Industrial purpose - Textile Industry, Sugar Industry, Paper Industry Dying Industry.</p> <p>6.6 Sterilization of water - Chlorination -by Cl₂, bleaching powder, chloramine with chemical reactions</p> <p>6.7 Ion Exchange method to remove total hardness of Water.</p>	08	12
<i>Course Outcome CCG104-7 Select proper type of cell based on the requirement in electrical/electronic and computer engineering.</i>			

7	CELL AND BATTERIES 7.1 Definition of Electrochemical cell, Battery, Charge, Discharge, Closed Circuit Voltage, Electrochemical couple, Internal resistance, Open Circuit Voltage, Separator, E.M.F. 7.2 Classification of Batteries such as – Primary & Secondary Batteries 7.3 Construction, Working and Applications of a Primary Cell such as Dry Cell , Secondary Cell such as Lead Acid Storage Cell 7.4 Charging and Discharging of Lead Acid Storage Cell 7.5 Hydrogen-Oxygen fuel cell, its chemical reactions &advantages 7.6 Introduction of solar cell	05	10
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Course Outcome CCG104-8 Understand the method of extraction of copper.

8	METALLIC CONDUCTORS 8.1 Occurrence of metals 8.2 Distinction between mineral & ore 8.3 Definition of flux, Gangue & Slag 8.4 Steps involved in metallurgy-Flow chart Concentration of ores – Physical Methods 1. Gravity Separation Method 2. Electromagnetic separation 3. Froth floatation method Chemical Methods 1. Calcination 2. Roasting 8.6 Important ores of copper Metallurgy of copper-Extraction of copper from copper pyrites by concentration , roasting, smelting , Bessemerisation ,Electrorefining 8.7 Physical properties & uses of Copper.	08	14
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Course Outcome CCG104-9 Select proper type of alloys, solders for various purposes.

9	SOLDERS 9.1 Definition of alloy , classification of alloys & purposes of making alloy 9.2 Composition, properties & applications of	03	04
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	9.2.1 Soft solder. 9.2.2 Tinmann's solder, 9.2.3 Brazing alloy , 9.2.4 Plumber's solder 9.2.5 Rose metal 9.2.6 Woods metal .		
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

6. ASSESSMENT CRITERIA FOR LAB WORK AND PRACTICAL EXAMINATION**c) Assessment Criteria for Lab work :****Specification table for setting question paper for semester end theory examination :**

Section / Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total marks
		Remember	Understand	Application		
I / 1	Atomic structure	06	02	-	CCG104-1	08
I / 2	Electrochemistry	02	02	04	CCG104-2	08
I / 3	Corrosion &protective coating	02	02	02	CCG104-3	06
I/4	Catalysis	02	02	-	CCG104-4	04
I/5	Chemistry of nonmetallic engg. materials	04	06	04	CCG104-5	14
II//6	Water	04	04	04	CCG104-6	12
II/7	Cell & Batteries	04	04	02	CCG104-7	10
II/8	Metallic conductors	06	06	02	CCG104-8	14
II/9	Solders	02	02	-	CCG104-9	04
	Total					80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

7. Criteria for Continuous Assessment of Practical work

d) Assessment Criteria for Term work :

i) Continuous Assessment of Practical Assignments :

Every practical assignment shall be assessed for 25 marks as per given criteria.

Domain	Particulars	Marks out of 50
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	10
	Writing skills	10
Affective	Discipline and punctuality	10
	Timeliness and accuracy	10
TOTAL		50

ii) Progressive Skill Test :

One mid-term Progressive Skill Test of 25 marks shall be conducted as per criteria given below

Criteria for Continuous Assessment of Practical work and Progressive skill Test :

Domain	Particulars	Marks out of 50
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Writing skills	05
Affective	Discipline and punctuality	05
	Timeliness and accuracy	
TOTAL		25

Final marks of term work shall be awarded as per *Assessment Pro-forma II*.

e) Criteria for assessment at semester end practical exam :

Every student has to perform one practical within 2 hours at semester end practical exam which shall be assessed as per following criteria.

Sr. no	Criteria	Marks allotted
1	Preparedness for practical	10
2	Correct figures / diagrams	10
3	Observation tables	10
4	Result table / calculations / graphs	10
5	Safety / use of proper tools	10
	Total	50

Progressive Skill Test:

One mid-term *Progressive Skill Test* of 25 marks as per following criteria.

Domain	Particulars	Marks out of 50
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
	Writing skills	05
Affective	Discipline and punctuality Timeliness and accuracy	05
TOTAL		25

Final marks of term work shall be awarded as per *Assessment Pro-forma II*.

8. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Demonstrations
2. Classroom practices
3. Home Assignments
4. Discussion.

Teaching and Learning resources :

1. Chalk board
2. LCD presentations
3. Audio presentations
4. Item Bank
5. Charts.

9. REFERENCE MATERIAL :**a) Books / IS Codes**

Sr. No.	Author	Title	Publisher
1.	Jain & Jain	Engineering chemistry	Dhanpatrai publishing co.
2.	S. C. Rangawala	Engineering materials	Engineering publication
3.	Jain & Agarwal	Metallurgical Analysis	Agarwal publications
4.	O. P. Khanna	Material science & technology	Khanna publication on 2006
5.	Rollason	Metallurgy for Engineers	ASM publication
6.	J. C. Kuriacose	Chemistry in Engineering & Vol. 1 & 11	-
7.	P. C. Jain	Chemistry of Engineering Materials	-
8	S. S. Dara	A text of Engineering Chemistry	-
9.	R.Gopalan, D.Venkappa	Engineering Chemistry	Vikas Publishing House.

b) Websites

- viii) www.substech.com
- ix) www.kentchemistry.com
- x) www.chemcollective.org
- xi) www.wqa.org
- xii) www.chemistry_teaching.com

COURSE ID: 3

Course Name : BASIC MATHEMATICS(CE/ME/EE/MT/IE/ET/IT)
Course Code : CCG105
Course Abbreviation : GBMT

1. TEACHING AND EVALUATION SCHEME :

Pre-requisite Course(s) : < nil >

Teaching Scheme :

Scheme component	Hours / week	Credits
Theory	03	04
Tutorial	01	

Evaluation Scheme :

Component Details and Duration	Progressive Assessment		Term End		Total
	Theory	Tutorials	Theory	Practical	
	Average of two tests of 20 marks each	As mentioned in the syllabus	Term End Theory Exam (03 hours)	NIL	
Marks	20	--	80	--	100

2. RATIONALE:

Mathematics is an important prerequisite for the development and understanding of engineering and technological concepts. For an engineer and technologist, knowledge of mathematics is an effective tool to pursue and master the applications in the engineering and technological fields. Algebra provides the language and abstract symbols of mathematics. The topics Matrices and Determinants are helpful for finding optimum solution of system of simultaneous equations which are formed in the various branches of engineering using different parameters. Trigonometry is the study of triangles and angles. Contents of this subject will form foundation for further study in mathematics.

3. COMPETENCY:

Apply principles of Basic Mathematics to solve mathematical problems as follows -

1. **Cognitive** : To understand the mathematical concepts
2. **Psychomotor**: Proper handling of scientific calculator
3. **Affective** : Attitude of accuracy, punctuality, proper reasoning and presentation

4. COURSE OUTCOMES(CO'S) :

- CCG105-1:** To solve given problems based on laws of logarithm.
- CCG105-2:** To solve simultaneous equations using Cramer's rule & find area of triangle.
- CCG105-3:** To resolve a given function into partial fractions.
- CCG105-4:** To learn algebra of matrices & hence find Adjoint & Inverse of a given matrix.
- CCF105-5:** To memorize and solve problems using trigonometric formulae.

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

:

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and COs	PO 1 Basic & Discipline specific knowledge	PO 2 Problem analysis	PO 3 Design/development of solutions	PO 4 Engineering Tools,Experimentation and Testing	PO 5 Engineering practices for society,sustainability & environment	PO 6 Project Management	PO 7 Life - long learning	PSO1 Plan & Design	PSO2 Construction & Maintenance
Competency: Apply principles of Basic Mathematics to solve mathematical problems	3	2	1	3	-	-	3		
CCG105-1:	3	2	1	2	-	-	3		
CCG105-2:	3	2	1	2	-	-	3		
CCG105-3:	3	2	2	2	-	-	3		
CCG105-4	3	2	2	2	-	-	3		
CCG105-5:	3	2	2	3	-	1	3		

6.CONTENT :

A) **TUTORIALS:** Note - Tutorials are to be used to get enough practice

Sr.No	Topics	Tutorial Content (10 problems in each tutorial)
1	Logarithm	Solve simple problems of Logarithms based on definition and laws
2	Determinants	Solve problems on determinant to find area of triangle, and solution of simultaneous equations by Cramer's rule
3	Partial Fractions	To resolve given function into partial fraction using appropriate method.
4	Matrices	Examples on addition, Subtraction and Multiplication of Matrix

5	Matrices	To find Adjoint ,Inverse of a given matrix.
6	Trigonometric Ratios and Identities	Examples on conversion of degree to radian and vice versa, simple examples on trigonometry.
7	Allied Angles	Solve examples on Allied angles
8	Compound Angles	Solve examples on Compound angles
9	Factorization & De-factorization angles	Solve examples on Factorization & De-factorization formulae
10	Inverse Trigonometric Ratios	Solve examples on principle value and Inverse trigonometric functions

B) THEORY:**Section I**

Sr. No.	Topics / Sub-topics	Lecture s (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG105-1 : To solve given problems based on laws of logarithm.</i>			
1	Logarithm 1.1 Concept & laws of logarithm 1.2 Simple examples based on laws of logarithm	4	6
<i>Course Outcome CCG105-2 : To solve simultaneous equations using Cramer's rule</i>			
2	Determinants 2.1 Definition of nth order determinant 2.2 Expansion of second and third order determinants 2.3 To solve simultaneous equations having 3 unknowns using Cramer's Rule 2.4 Consistency of equations using Determinants 2.5 Area of Triangle by determinant method	04	06
<i>Course Outcome CCG105-3 : To resolve a given function into partial fractions</i>			
3	Partial Fractions 3.1 Definition of rational, proper and improper fractions	06	12
<i>Course Outcome CCG105-4 : To learn algebra of matrices & hence find Adjoint & Inverse of a given matrix</i>			

4	Matrices 4.1 Definition of a matrix, Types of matrices 4.2 Algebra of matrices 4.3 Equality of two matrices, Transpose of a matrix 4.4 Minor and Co-factor of an element of a matrix 4.5 Adjoint and Inverse of a matrix	10	16
	Total	24	40
<p>1.Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.</p> <p>2.In each topic, corresponding applications will be explained</p>			

Section II

Sr. No.	Topics / Sub-topics	Lecture s (Hours)	Theory Evaluation (Marks)
<p><i>Course Outcome CCG105-5 : To memorize and solve problems using trigonometric formulae.</i></p>			
5	Trigonometric Ratios and Identities 5.1 Fundamental Identities(Simple examples) 5.2 Definition of radian measure 5.3 Conversion of degree into radian and vice versa of standard angles	02	04
6	Trigonometric ratios of Compound and Allied Angles 6.1 Proofs of sine ,cosine and tan of (A+B) and (A-B)	06	08
7	Trigonometric ratios of Multiple Angles 7.1 Proofs of sine, cosine and tangent of 2θ , 3θ 7.2 Examples	05	10
8	Factorization and Defactorization Formulae 8.1 Proofs of above formulae 8.2 Examples	04	08
9	Inverse Trigonometric Ratios 9.1 Definition 9.2 Principle value 9.3 Proof of standard formulae 9.4 Examples	07	10
	Total	24	40
<p>1.Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.</p> <p>2.In each topic corresponding applications will be explained</p>			

7. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION :

Topic No.	Name of topic	Distribution of marks (level wise)			Total Marks
		Knowledge	Comprehension	Application	
1	Logarithm	2	-	4	06
2	Determinants	-	2	4	06
3	Partial Fractions	2	2	8	12
4	Matrices	2	2	12	16
5	Trigonometric Ratios and Identities	2	-	2	04
6	Allied Angles	2	2	4	08
7	Compound Angles	2	-	8	10
8	Factorization & De-factorization angles	2	-	6	08
9	Inverse Trigonometric ratios	2	2	6	10
TOTAL		16	10	54	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

8. INSTRUCTIONAL STRATEGIES :

Instructional Methods:

1. Lectures cum Demonstrations
2. Tutorials

Teaching and Learning resources:

1. Chalk board
2. Item Bank
3. MSBTE videos

9. REFERENCE MATERIAL :
a) Books:

Sr. No.	Author	Title	Publisher
1.	G.V. Kumbhojkar	A Text Book on Engineering Mathematics (First Year Diploma)	Phadake Prakashan, Kolhapur
2.	B.S. Grewal	Higher Engineering Mathematics	Khanna Publication, New Delhi
3.	H.K.Das	Higher Engineering Mathematics	S.Chand Publication, New Delhi
4.	Patel, Rawal and others	Basic Mathematics	Nirali Prakashan, Pune
5.	P.M. Patil and Others	Basic Mathematics	Vision Prakashan, Pune
6.	S. S. Shastry	Engineering Mathematics	Prentice Hall of India
7.	Sameer Shaha	Basic Mathematics	Tech Max Publication

b) Website

- i) www.khanacademy.org
- ii) www.easycalculation.com
- iii) www.math-magic.com

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COURSE ID :4

Course Name : ENGINEERING MATHEMATICS. (EE/IE/ET/IT)
Course Code : CCG118
Course Abbreviation : GEMB

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : CCG105 Basic Mathematics

Teaching Scheme :

Scheme component	Hours / week	Credits
Theory	03	04
Practical	01	

Evaluation Scheme :

Component Details and Duration	Progressive Assessment		Term End		Total
	Theory	Assignments	Theory	Practical	
	Average of two tests of 20 marks each	As mentioned in the syllabus	Term End Theory Exam (03 hours)	---	
Marks	20	--	80		100

2. RATIONALE:

This subject is an extension of Basic mathematics of first semester and a bridge to further study of applied mathematics. The knowledge of mathematics is useful in other technical areas. Differential calculus has applications in different engineering branches. For example, concepts such as bending moment, curvature, maxima and minima. Numerical methods are used in programming as an essential part of computer engineering. In Metrology and quality control statistical methods are used to determine the quality and suitability of components. Engineering mathematics lays the foundation to understand technical principles in various fields.

3. COMPETENCY:

Apply principles of Engineering Mathematics to solve Engineering problems as follows-

- 1.Cognitive** : Understanding and applying principles of Engineering Mathematics to Engineering problems
- 2. Psychomotor:** a) Use of co-ordinate geometry in animation, autocad, computer graphics etc.
b) Proper handling of calculator.
- 3. Affective** : Attitude of accuracy, punctuality, presentation, visualization.

4. COURSE OUTCOMES(CO'S) :

CCG118-1 : To understand and solve examples of complex numbers.

CCG118-2 : To solve problems on two dimensional co-ordinate geometry for straight line.

CCG118-3 : To find approximate solution of algebraic equations and simultaneous equations by various methods.

CCG118-4 : To find limits of different types of functions using various methods.

CCG118-5 : To solve the problems of maxima, minima and geometrical applications.

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and COs									
	PO 1 Basic & Discipline specific knowledge	PO 2 Problem analysis	PO 3 Design / development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life -long learning	PSO1 Plan & Design	PSO2 Construction & Maintenance
Competency: Apply principles of Engineering Mathematics to solve Engineering problems	3	2	2	2	1	-	3		
CCG118-1 :	3	2	2	2	1	-	3		
CCG118-2 :	3	2	2	2	1	-	3		
CCG118-3 :	3	2	2	2	3	-	3		
CCG118-4 :	3	2	2	2	1	-	3		
CCG118-5 :	3	2	2	2	3	-	3		

5. CONTENT:

B. TUTORIALS: Note - Tutorials are to be used to get enough practice

Sr No.	Topic	Tutorial Content (10 problems in each tutorial)
1	Complex Number	Solve problems based on algebra of complex numbers & De-movier's theorem
2	Straight line	Examples on different forms of straight line.
3		Examples on to find perpendicular distance of a point from a line, angle between two lines, intersection of lines.
4	Numerical solution of Algebraic & simultaneous Equations	Numerical solution of algebraic equations.
5		Numerical solution of simultaneous equations
6	Functions	Examples on value of functions, Odd & Even functions , Composite functions
7	Limits	Evaluation of limits by Factorization, Rationalization, Simplification, Infinity method
8	Differentiation	To find derivatives by product rule, quotient rule, Chain rule, Inverse function, Implicit function
9	Differentiation	To find derivatives of Parametric function, Logarithmic function, Derivatives of second order
10	Applications of Derivatives.	To find equation of Tangent, Normal & To find Maxima and Minima of a function.

B) THEORY:**SECTION I**

Sr. No.	Topics / Sub-topics	Lecture s (Hours)	Theory Evaluation (Marks)
<i>Course outcome CCG118-1 : To understand and solve examples of complex numbers.</i>			
1	Complex Number 1.1 Definition ,Algebra of complex numbers, simple examples 1.2 Polar form, Exponential form 1.3 De- Moivre's theorem	06	10
<i>Course outcome CCG118-2 : To solve problems on two dimensional co-ordinate geometry for straight line.</i>			
2	The Straight line 2.1 Slope, intercepts & various methods of finding slope 2.2 Conditions for two straight lines to be parallel and Perpendicular to each others 2.3 Various forms of equations of straight line 2.4 Perpendicular distance of a point from a line 2.5 Distance between two parallel lines 2.6 Angle between two straight lines 2.7 Intersection of two straight lines & the equation of line passing through this point of intersection	06	10
<i>Course outcome CCG118-3 : To find approximate solution of algebraic equations and simultaneous equations by various methods.</i>			
3	Numerical solution of Algebraic Equations 3.1 Bisection Method Regula- Falsi Method	06	10
4	Numerical solution to simultaneous equations 4.1 Jacobi's Method 4.2 Gauss-Seidel method .	06	10
	Total	24	40

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course outcome CCG118-4: To find limits of different types of functions using various methods.</i>			
5	Functions 5.1 Definition and Concept of function 5.2 Definition of Odd & Even functions, Explicit & implicit functions, Composite functions, Parametric functions 5.3 Value of a function 5.4 Examples on value of functions, Odd & Even functions , Composite functions	04	06
6	Limits 6.1 Definition 6.2 Limits of algebraic functions by factorization, simplification, rationalization ,Limit as $x \rightarrow \infty$	05	08
<i>Course outcome CCG118-5: To solve the problems of maxima, minima and geometrical applications.</i>			
7	Differentiation 7.1 Definition, Derivative of standard functions (without proof), 7.2 Derivative of sum, difference, product and quotient of two or more functions 7.3 Derivative of composite functions 7.4 Derivative of Inverse functions 7.5 Derivative of Implicit functions 7.6 Derivative of Parametric functions 7.8 Derivative of exponential and logarithmic functions 7.9 Logarithmic differentiation 7.10 Differentiation of second order	12	20
8	Applications Of Derivatives 8.1 Geometrical meaning of derivative (To find equation of Tangent and normal) 8.2 Maxima and minima of functions	03	06
	Total	24	40
1. Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only. 2. In each topic corresponding applications will be explained			

6. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

Topic No.	Name of topic	Distribution of marks (level wise)			Total Marks
		Knowledge	Comprehension	Application	
1	Complex Number	4	2	4	10
2	Straight line	2	2	6	10
3	Numerical solution of Algebraic Equations and simultaneous Equations	2	2	16	20
4					
5	Functions	2	-	4	6
6	Limits	2	2	4	8
7	Differentiation	4	4	12	20
8	Applications Of Derivatives	--	--	6	6
Total		16	12	52	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

7. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Demonstrations
2. Tutorials

Teaching and Learning resources:

1. Chalk board
2. Item Bank
- 3.MSBTE videos

8. REFERENCE MATERIAL:

a) Books:

Sr. No.	Author	Title	Publisher
1	G.V. Kumbhojkar	Engineering Mathematics III	Phadake Prakashan, Kolhapur
2	B.S. Grewal	Higher Engineering Mathematics	Khanna Publication, New Delhi
3	H.K.Das	Higher Engineering Mathematics	S.Chand Publication, New Delhi
4	Patel, Rawal and others	Engineering Mathematics	Nirali Prakashan, Pune
5	P.M.Patil and Others	Engineering Mathematics	Vision Prakashan, Pune
6	Mathematics for Polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan
7	Sameer Shaha	Engineering Mathematics	Tech-Max Publication, Pune
8	A.M. Vaidya	Applied Mathematics	Central Techno, Publication

b) Websites:

- i) www.khanacademy.org
- ii) www.easycalculation.com
- iii) www.math-magic.com

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COURSE ID: 5

Course Name	: ENGINEERING GRAPHICS (EE/IT/IE/ET)
Course Code	: CCG109
Course Abbreviation	: GEGR

1. TEACHING AND EVALUATION SCHEME :

Pre-requisite Course(s) : <nil>

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	02	04
Practical	02	

Evaluation Scheme :

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical *	
Details of Evaluation	--	i. . Progressive assessment of practical work for 25 marks is to be carried out by course teacher	--	i. External Practical Exam (2 Hrs) for 50marks. Assessment by internal & external examiners -	
Marks	--	--	--	75 E	75

* *Assessment as per Pro-forma – I*

E-External Examination

2. RATIONALE :

Engineering Graphics is one of the ways of communication among engineering professionals. It describes scientific facts, concepts, principles and techniques of drawing in any engineering fields to express the ideas and conveying the instructions which are use for carrying out tasks at work place. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects. This subject is useful in developing, drafting and sketching skills of students. So it is necessary to all programmes.

COMPETENCY: Read, draw & Interpret the engineering drawing of simple objects.

Cognitive :Understand various drawing procedures.

Psychomotor :Produce engineering drawing from the given problem.

Affective :Attitude of using i) Procedures ii) Practices iii) Drawing Instruments iv) Accuracy v) Drafting Skill

3. COURSE OUTCOMES:

CCG109-1 Understand various fundamentals in engineering drawing.

CCG109-2 Produce the projection of point, lines & planes inclined to one reference plane.

CCG109-3 Produce orthographic drawing from given pictorial view.

CCG109-4 Produce sectional orthographic drawing from given pictorial view.

CCG109-5 Visualize & draw accordingly the pictorial view by correlating the given views.

4. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and COs	Programme outcome POs and PSO's								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO3 Design/ development of solutions	PO 4 Engineering Tools, Experimentation & testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long learning	PSO1 Work in mfg& service sector	PSO 2 Start entrepreneurial activity
Competency: Read, draw & Interpret the engineering drawing of simple objects.	-	-	-	-	-	-	-	-	-
CCG109-1	3	-	-	-	-	-	-	-	-
CCG109-2	3	-	-	1	1	-	-	-	-
CCG109-3	3	-	1	-	-	-	-	-	-
CCG109-4	3	-	2	-	1	-	1	1	1
CCG109-5	3	-	1	-	-	-	1	2	-

5.PRACTICAL:

LIST OF PRACTICAL:

Sr No.	Title of Practical Exercise	Skills / Competencies to be developed	Course Outcome
1	Lines and Lettering (1 Sheet)	To develop drawing skill	CCG109-1
2	Projections of line (1 Sheet)	To develop drawing ability in Projections of line	CCG109-2
3	Projections of Planes (1 Sheet)	To develop drawing ability in Projections of Planes	CCG109-2
4	Orthographic & Sectional orthographic projection one problem each (1 Sheet)	To develop drawing ability to draw Orthographic projection and sectional orthographic projection	CCG109-3 & CCG109-4
5	Isometric Drawing (1 Sheet) Isometric views & Isometric Projections of one object each	To develop ability to draw Isometric Drawing	CCG109-5

6.CONTENT :**A) THEORY :****SECTION -I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG109-1 Understand various fundamentals in engineering drawing</i>			
1	INTRODUCTION TO ENGINEERING DRAWING <ul style="list-style-type: none"> 1.1 Drawing Instruments and their uses 1.2 Standard sizes of drawing sheets 1.3 Letters and numbers (single stroke vertical) 1.4 Convention of lines and their applications 1.5 Dimensioning technique as per SP-46 (Latest Edition) 1.6 Types and applications of chain, parallel and Co-ordinate dimensioning 	06	10
<i>Course Outcome CCG109-2 Produce the projection of point, lines& planes inclined to one reference plane</i>			
2	PROJECTION OF POINT AND LINES <ul style="list-style-type: none"> 2.1 Projection of points when point is in first quadrant Only 2.2 Projection of Line inclined to one Reference plane and Parallel to other Reference Plane (Both ends of line should be in first quadrant) 	06	06
<i>Course Outcome CCG109-2 Produce the projection of point, lines& planes inclined to one reference plane.</i>			
3	PROJECTION OF PLANES <ul style="list-style-type: none"> 3.1 Projection of Planes of Circular , Square, Triangular,Rectangular Shapes Inclined to One Reference Plane and perpendicular to other Reference Plane. (Planes in First Quadrant Only) 	04	06

SECTION II

<i>Course Outcome CCG109-3 Produce orthographic drawing from given pictorial view.</i>			
4	ORTHOGRAPHIC PROJECTION <ul style="list-style-type: none"> 4.1 Introduction of Orthographic Projection-First and Third angle Projection Method 4.2 Conversion of Pictorial view into Orthographic Views. (First angle Projection Method Only) 4.3 Dimensioning Technique as per SP-46 	06	08

	(Simple objects only)		
Course Outcome CCG109-4 Produce sectional orthographic drawing from given pictorial view.			
5	Sectional Views. 5.1 Types of sections 5.2 Conversion of pictorial view into sectional Orthographic views. (First Angle Projection Method only) (Simple objects only)	04	08
Course Outcome CCG 109-5 Visualize & draw accordingly the pictorial view by correlating the given views.			
6	Isometric Projection 6.1 Introduction 6.2 Isometric Axis 6.3 Isometric scale 6.4 Drawing of Isometric view and Projection. 6.5 Conversion of Orthographic Views into Isometric view/projection (Simple objects including rectangular, cylindrical objects, representation of slots on sloping as well as plane surfaces)	06	12
	Total	32	50
Semester end Practical exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Specification table for setting question paper for semester end Practical examination:

Topic No.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
1	Introduction To Engineering Drawing	04	02	04	10
2	Projection of Point And Lines	02	02	02	06
3	Projection of Planes	02	02	02	06
4	Orthographic projection	02	02	04	08
5	Sectional Views.	02	02	04	08
6	Isometric Projection	04	02	06	12
	TOTAL	16	12	22	50

Semester end external practical exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

ASSESSMENT CRITERIA FOR TERM WORK**Continuous Assessment of Drawing Practical**

Every practical Sheet shall be assessed for **25** marks as per criteria given below:

Sr No.	Criteria	Marks allotted
1	Attendance	05
2	Preparedness	05
3	Correctness and understanding	10
4	Line work and neatness	05
	Total	25

INSTRUCTIONAL STRATEGIES :**Instructional Methods :**

1. Lectures cum Demonstrations
2. Classroom practices

Teaching and Learning resources :

1. Chalk board
2. LCD presentations
3. Audio presentations
4. Computer, printer etc.
5. Question Bank

a) Reference Books

Sr. No.	Author	Title	Publisher
1.	N. D. Bhatt	Engineering Drawing	Charotar Publishing House 2010
2.	Amar Pathak	Engineering Drawing	Dreamtech Press, 2010
3.	D.Jolhe	Engineering Drawing	Tata McGraw Hill Edu., 2010
4.	M.B.Shah, B.C.Rana	Engineering Drawing	Pearson, 2010
5.	K. Venugopal	Engineering Drawing and Graphics + AutoCAD	New Age Publication, Reprint 2006
6.	IS Code, SP - 46	Engineering Drawing Practice	--

b) Web References :

- 1)<http://www.design-technology.info/IndProd/drawings/>
- 2)<http://graphicalcommunication.skola.edu.mt/syllabus/engineering-drawing/>
- 3)http://en.wikipedia.org/wiki/Engineering_drawing
- 4)<http://www.engineeringdrawing.org/>
- 5)http://www.teachengineering.org/view_activity
- 6)<http://www.howtoread.co.in/2013/06/how-to-read-ed.html>
- 7) <http://www.slideshare.net/akhilrocker143/edp>
- 8) <http://www.24framesdigital.com/pstulpule>

COURSE ID:06

Course Name : SPORTS & YOGA
Course Code : CCG117
Course Abbreviation : GSPY

1. TEACHING SCHEME:

Pre-requisite Course(s) : <nil>

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	NIL	02
Practical	02	

Evaluation Scheme :

Mode of Evaluation	Progressive Assessment		Term End			Total
	Theory	Practical	Theory	Practical *	TW	
Marks	Non Exam Credit Course (N.A.)					

2. RATIONALE:

Nowadays, Yoga and Sports have become an integral part to lead healthy life. Considering the need of society and industry, this course has been designed with theoretical foundation and practical demonstration. The main objective of the course is to acquire natural tranquility and steadiness of the mind. For acquiring mastery and perfection in Yoga and Sports, consistent practice is necessary.

3. COMPETENCY : Apply principles of Yoga and Sports in daily life.

COGNITIVE : Understanding and applying principles of Yoga and Sports in various situations.

AFFECTIVE : Attitude of i) Perfection, ii) Confidence and iii) Presentation.

PSYCHOMOTOR : i) Use of correct Yoga posture. ii) Practice of correct breathing. iii) Practice team work.

4. COURSE OUTCOMES:

On successful completion of the course the students will be able to:

CCG117-1: Practice Physical activities and Yoga for strength, flexibility, and relaxation.

CCG117-2: Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.

CCG117-3: Learn breathing exercises and healthy fitness activities

CCG117-4: Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.

CCG117-5: Perform yoga movements in various combination and forms.

- CCG117-6: Assess current personal fitness levels.
- CCG117-7: Identify opportunities for participation in yoga and sports activities.
- CCG117-8: Develop understanding of health-related fitness components: cardio respiratory endurance, flexibility and body composition etc.
- CCG117-9: Improve personal fitness through participation in sports and yogic activities.
- CCG117-10: Develop understanding of psychological problems associated with the age and lifestyle.
- CCG117-11: Demonstrate an understanding of sound nutritional practices as related to health and physical performance.
- CCG117-12: Assess yoga activities in terms of fitness value.
- CCG117-13: Identify and apply injury prevention principles related to yoga and physical fitness activities.
- CCG117-14: Understand and correctly apply biomechanical and physiological principles related to exercise and training.

COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

:

[Note : Correlation levels :1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and CoS									
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1	PSO2
Competency Apply principles of Yoga and Sports in daily life	3	2	3	-	2	2	2		
CCG117-1	2	2	2	-	-	-	-		
CCG117-2	3	2	3	-	2	-	2		
CCG117-3	2	2	3	-	2	2	1		
CCG117-4	2	2	2	-	2	-	2		
CCG117-5	2	2	2	-	-	-	-		
CCG117-6	2	2	3	-	2	-	-		
CCG117-7	3	2	3	-	2	2	2		
CCG117-8	2	2	2	-	-	-	-		
CCG117-9	3	2	3	-	2	-	2		
CCG117-10	2	2	3	-	2	2	1		
CCG117-11	2	2	2	-	2	-	2		
CCG117-12	2	2	2	-	-	-	-		
CCG117-13	2	2	3	-	2	-	-		
CCG117-14	2	2	2	-	-	-	-		

5. CONTENT:

Sr. No.	Topics / Sub-topics
1	INTRODUCTION TO PHYSICAL EDUCATION <ul style="list-style-type: none"> o Meaning & definition of Physical Education o Aims & Objectives of Physical Education o Changing trends in Physical Education
2	PHYSICAL FITNESS, WELLNESS & LIFESTYLE <ul style="list-style-type: none"> O Meaning & Importance of Physical Fitness & Wellness o Components of Physical fitness o Components of Health related fitness o Components of wellness o Preventing Health Threats through Lifestyle Change o Concept of Positive Lifestyle
3	INTRODUCTION TO ASHTANG YOG <ul style="list-style-type: none"> o Meaning & Importance Yam, Niyam, Aasan, Pranayam, Pratyahar, Dharana, Dhyan & Samadhi
4	POSTURES <ul style="list-style-type: none"> o Meaning and Concept of Postures. o Causes of Bad Posture. o Advantages & disadvantages of weight training. o Concept & advantages of Correct Posture. o Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis. o Corrective Measures for Postural Deformities
5	YOGA <ul style="list-style-type: none"> o Meaning & Importance of Yoga o Elements of Yoga o Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas o Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Shashankasana) o Relaxation Techniques for improving concentration - Yog-nidra
6	PRANAYAM & ITS TYPES <ul style="list-style-type: none"> o Meaning & Importance of Pranayam o Breathing Exercises : Slow & Fast, Kapalbhati 1.Nadishodhan (Anulom- Vilom) 2.Sheetali 3.Sitkari 4.Ujjayi 5.Bhramari 6.Bhastrika
7	YOGA & LIFESTYLE

	<ul style="list-style-type: none"> o Asanas as preventive measures. o Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana. o Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardha Matsyendrasana. o Back Pain: Tadasana, Ardha Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana. o Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottanasana, Pavan Muktasana, Ardha Matsyendrasana. o Asthma: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottanasana, Matsyasana.
8	SUN SALUTATION (SURYANAMASKAR) <ul style="list-style-type: none"> o Meaning and concept of Suryanamaskar o Postures o Use of breathing techniques and Mantras
9.	YOGASAN <ul style="list-style-type: none"> o Meaning and Importance of Yogasan o Types of Yogasan : Naukasana, Dhanurasana, Garudasana, Virasan, Sarvangasan, Matsyasan, Parighasan, Ushtrasan, Hansasan & Mayurasan
10	PRAYER <ul style="list-style-type: none"> o Meaning and Importance of Prayer o Omkar Chanting o Meditation & Mudras
11.	PSYCHOLOGY & SPORTS <ul style="list-style-type: none"> o Definition & Importance of Psychology in Physical Edu. & Sports o Define & Differentiate Between Growth & Development o Adolescent Problems & Their Management o Emotion: Concept, Type & Controlling of emotions o Meaning, Concept & Types of Aggressions in Sports. o Psychological benefits of exercise. o Anxiety & Fear and its effects on Sports Performance. o Motivation, its type & techniques. o Understanding Stress & Coping Strategies.
12.	SPORTS / GAMES <p>Following sub topics related to any one Game/Sport of choice of student out of:</p> <p>Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc.</p> <ul style="list-style-type: none"> o History of the Game/Sport. o Latest General Rules of the Game/Sport.

	<ul style="list-style-type: none"> o Specifications of Play Fields and Related Sports Equipment. o Important Tournaments and Venues. o Sports Personalities. o Proper Sports Gear and its Importance.
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6. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

NO THEORY EXAMINATION

7. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION :

NO PRACTICAL EXAMIATION

8. INSTRUCTIONAL STRATEGIES:

A. INDUSTRIAL EXPOSURE:

SN	Mode of Exposure	Topic
1.	Visit to nearest Yoga & Sports Centre	Syllabus

B. Instructional Methods:

1. Lectures and Demonstrations with Practices
2. Yoga room & Ground Practices

C. Teaching and Learning Resources:

1. LCD Projector
2. Visual Streaming

9. REFERENCE MATERIAL:

Books :

1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Light on Yoga: The Classic Guide to Yoga by the World's Foremost Authority Paperback - by [B.K.S. Iyengar](#)
4. Light on the Yoga Sutras of Patanjali Kindle Edition by [B. K. S. Iyengar](#)
5. Yoga For Sports: A Journey Towards Health And Healing Kindle Edition by [BKS Iyengar](#)

* * *

COURSE ID : 07

Course Name : C Programming
Course Code : ITG101
Course Abbreviation : GPCR

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme :

Scheme component	Hours / week	Credits
Theory	3	7
Practical	4	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End Examination		Total
	Theory	Practical	Theory Examination Examination	Practical Examination (External)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours) --	As per Proforma-II	
Marks	20	--	80	50E	150

2. RATIONALE:

This course is designed to develop programming attitude and attract the interest of the students in the C Language. C is a very powerful, widely used, efficient and compact, which combines features of high-level language and low-level language. It is used in many scientific programming situations. It forms the core of the modern languages Java and C++. Almost every set up in software Engineering domain chooses C as a first priority programming language. It acts as a backbone for object oriented programming.

3. COMPETENCY

Apply concepts of C Programming to solve engineering problems as follows :

Cognitive :Understanding and implementing concepts of procedural programming

Psychomotor :i) Operating Computer system efficiently

Affective :Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES :

ITG101-1 Identify C expressions with character set and operators.

ITG101-2 Apply decision making and branching and looping constructs in programming.

ITG101-3 Implement user defined functions.

ITG101-4 Implement one dimensional and two dimensional arrays.

ITG101-5 Implement library functions for string handling.

ITG101-6 Write C programs using structures and pointers to implement real life examples.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and COs	PO								PSO2 Database and Network management
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/development of solutions	PO 4 Engineering Tools, experimentation and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1 Design and development	
Competency: Apply concepts of C Programming to solve engineering problems	3	3	3	2	2	2	1	3	-
ITG101-1	2	1	2	2	2	1	1	-	-
ITG101-2	2	3	3	3	2	1	1	2	-
ITG101-3	2	2	3	3	1	1	1	2	-
ITG101-4	2	2	3	3	1	1	1	2	-
ITG101-5	2	2	2	3	2	1	1	2	-
ITG101-6	2	2	3	3	2	1	1	3	1

6. LABORATORY WORK:

Laboratory experiments and related skills to be developed :

(Practicals marked in * are compulsory and others are optional)

Sr. No.	Title of Experiment	Skills to be developed	Course Outcome
01 *	Study of Flowcharts and Algorithm	<ul style="list-style-type: none"> • Understanding an Algorithm • Understanding the Flowchart • Study of various Flowchart Symbols • To draw Flowchart on any Practical routine 	ITG101-1
02 *	Character set and Operators, Valid and invalid identifiers, variables and constants	<ul style="list-style-type: none"> • study of character set of C language • Various types of operator and their use • identifier, variables, constant, Keyword • Rules for valid variables, identifiers, constants. • Identify valid and invalid variables, • keywords, identifiers, constants 	ITG101-1
03 *	Study of .C. Expressions	<ul style="list-style-type: none"> • Study of simple programming structure and Standard Header file • Understanding expression • Conversion of mathematical Expression in .C. • Identify valid and invalid C expressions. • Use of library functions 	ITG101-1
04 *	Input and output Functions	<ul style="list-style-type: none"> • Standard Input function- scanf() • Standard Output function- printf() • Syntax and use of scanf() and printf() function with example 	ITG101-1

05 *	<p>Decision Making and branching using if, if-else structure</p> <p>Write program to:</p> <ul style="list-style-type: none"> (i) Determine whether a given year is a leap year or not. (ii) Determine whether a string is palindrome. 	<ul style="list-style-type: none"> • necessity of control structure • If statement - syntax and flowchart • If-else statement - syntax and flowchart • Nested if..else - syntax and flowchart • Else..if ladder - syntax and flowchart • Program based on if statement 	ITG101-1 To ITG101-2
06 *	<p>Study of switch statement</p> <p>Write programs to :</p> <ul style="list-style-type: none"> (i) Print day of week by taking number from 1 to 7 . <p>Print a student's grade by accepting percent marks.</p>	<ul style="list-style-type: none"> • use of switch statement • Syntax and flowchart of switch statement. • significance of break statement in switch case • use of default statement in switch case • Program using switch statement 	ITG101-1 To ITG101-2
07*	Study of conditional and unconditional branching	<ul style="list-style-type: none"> • conditional and unconditional branching • syntax and use of go to statement • use of forward and backward jumping • break statement • continue statement • Program based on goto, continue and break statement 	ITG101-1 To ITG101-2
08 *	<p>Study of for Statement-</p> <p>Write a program to</p> <ul style="list-style-type: none"> (i) Find sum of digits of a given number. (ii) Generate multiplication table up to 10 for numbers 1 to 5. 	<ul style="list-style-type: none"> • definition of loop • syntax and flowchart of for loop • execution of for loop • nested for loop • Program based on for loop 	ITG101-1 To ITG101-2
09	<p>Write a program to :</p> <ul style="list-style-type: none"> (iii) Find Fibonacci series for given number. (iv) Write a program to produce the following output: 	<ul style="list-style-type: none"> • Exit control and Entry control loop • syntax and flowchart of while loop • execution of while loop • program based on while 	ITG101-2

	<table border="0"> <tr><td></td><td>1</td><td></td></tr> <tr><td>2</td><td></td><td>3</td></tr> <tr><td></td><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td></td><td>8</td><td>9</td></tr> <tr><td></td><td></td><td></td><td>10</td></tr> </table>		1		2		3		4	5	6	7		8	9				10	loop	
	1																				
2		3																			
	4	5	6																		
7		8	9																		
			10																		
10*	Study of while loop and do while loop	<ul style="list-style-type: none"> • Exit control and Entry control loop • syntax and flowchart of while loop • execution of while loop • program based on while loop • Exit control and Entry control loop • syntax and flowchart of do_while loop • execution of do_while loop • program based on do_while loop 	ITG102-1 To ITG101-2																		
11*	Study of function Write a program to- (i)To check whether a number is prime or not (ii)Find factorial of number using recursion	<ul style="list-style-type: none"> • Understanding function • function declaration or prototype • syntax to defne a function • function call • function parameters • function return value • Program using functions 	ITG101-2 To ITG101-3																		
12 *	Study of an array <ul style="list-style-type: none"> • Develop a Program to: Sort list of 10 numbers. 	<ul style="list-style-type: none"> • Understanding and use of an array • syntax to declare and initialize an array • read and print the elements of an array • access a particular element of an array • programs based on arrays 	ITG101-1, ITG101-2, ITG101-3, ITG101-4.																		
13 *	Study of two dimensional array Write a program for – (i) storing elements in a matrix and printing it (ii) Write a program for printing sum of two matrices	<ul style="list-style-type: none"> • Understanding and use of two dimensional array • Syntax to declare and initialize a 2-D array • read and print the elements of 2-D array • access a particular element of 2-D array • Program based on 2-D 	ITG101-2, ITG101-3, ITG101-4.																		

		array	
14*	Study of strings and string manipulation functions i)Program to find string length ii)Program to reverse string iii)Program to concatenate two strings	<ul style="list-style-type: none"> • Understanding string • declaration and initialization of string • reading and printing a string from and to terminal. • String- handling Functions - strcmp(), strlen(), strcpy(), strcat(), strupr(), strlwr(), strrev() • Programs on strings and string handling functions 	ITG101-2, ITG101-3, ITG101-4, ITG101-5.
15*	Study of Structure (i) Create a structure called library to hold details of a book viz. accession number, title of the book, author name, price of the book, and flag indicating whether book is issued or not. Fetch some sample data and display the same.	<ul style="list-style-type: none"> • Understanding and syntax of structure • size of structure • declaration and initialization of structure • declaring a structure variable • accessing members of structure • array as a member of structure • Program based on structure and arrays in structure 	ITG101-2, ITG101-3, ITG101-4, ITG101-6
16*	Study of Arrays of Structure	<ul style="list-style-type: none"> • syntax of arrays of structure • accessing members of structure • Program based on array of structure 	ITG101-2, ITG101-3, ITG101-4, ITG101-6
17*	Study of Pointer	<ul style="list-style-type: none"> • Understanding pointer • basic difference between variable and pointer • declaration of pointer • Initializing pointer variable • program to access address of variable 	ITG101-2

7. CONTENT:**B. THEORY:****SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG101 - 1 Identify C expressions with character set and operators.</i>			
1	C FUNDAMENTALS 1.1 History of c 1.2 C character set 1.3 Identifiers & Keywords, 1.4 Data types 1.5 Variables 1.6 Declarations 1.7 Constants 1.8 Expressions 1.9 C Instructions 1.10 The first C program 1.11 Compilation & Execution	04	06
2	OPERATORS& DATA INPUT AND OUTPUT FUNCTIONS 2.1 Operators 2.1.1 Arithmetic Operators 2.1.2 Assignment Operator 2.1.3 Unary operators 2.1.4 Relational & Logical Operators, 2.1.5 Conditional & Comma Operator 2.2 Input and Output Library Functions 2.2.1 printf() 2.2.2 scanf() 2.2.3 getchar() 2.2.4 putchar() 2.2.5 gets() 2.2.6 puts()	04	10
<i>Course Outcome ITG101 -2 Apply decision making and branching and looping constructs in programming.</i>			

3	CONTROL STATEMENTS 3.1 Decision making and branching 3.1.1 if Statement(if, if-else, if-else ladder, nested if-else) 3.1.2 Switch, break, continue, goto statement 3.2 Decision making and looping 3.2.1 While, do – while, for Statements 3.2.2 Nested loops	08	12
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Course Outcome ITG101 -3 Implement user defined functions

4	FUNCTIONS 4.1 Defining a Function, Accessing a function, 4.2 Passing arguments to a Function(call by value and call by reference), Specifying argument data types 4.3 Scope and lifetime of variables 4.4 Function prototypes 4.5 Category of function(No argument no return value, argument with no return value, No argument with return value, argument with return value) 4.6 Recursion	08	12
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Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
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Course Outcome ITG101 -4 Implement one dimensional and two dimensional arrays.

5.	ARRAYS 5.1 Defining an array, 5.2 One dimensional array, Declaration and Initialization of Arrays, 5.3 Two Dimensional Arrays Declaration and Initialization of Arrays, 5.4 Passing arrays to a function	08	14
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Course Outcome ITG101 -5 Implement library functions for string handling.

6	CHARACTERS & STRINGS 6.1 The char data type, using character variables, using string 6.2 Declaring and initializing string variables, 6.3 Reading strings from terminal 6.4 Writing Strings to screen, putting strings together. 6.5 Comparison of two strings 6.6 String-handling Functions - strcmp(), strlen(), strcpy(), strcat(), strupr(), strlwr(), strrev()	06	12
Course Outcome ITG101 -6 Write C programs using structures and pointers to implement real life examples.			
7	Structures and Pointers 7.1 Simple structures (Defining & declaring structures, accessing structure members) 7.2 Complex structures (structures that contain arrays) 7.3 Arrays of structure, Initializing structure, 7.4 Understanding pointers, declaring pointer variable, initialization of pointer variable, accessing address of a variable 7.5 Programs related to accessing address of a variable	10	14
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

8. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

Section / Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total marks
		Remember	Understand	Application		
I / 1	C Fundamentals	2	2	2	ITG101-1	06
I / 2	Operators & Data Input and Output Functions	4	4	2	ITG101-1	10
I / 3	Control Statements	4	4	4	ITG101-2	12
I / 4	Functions	4	4	4	ITG101-3	12
II / 5	Arrays	4	4	6	ITG101-4	14
II / 6	Characters & Strings	4	4	4	ITG101-5	12
II / 7	Structures, Unions and Pointers	4	4	6	ITG101-6	14
TOTAL		26	26	28		80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

9. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION

a) Assessment Criteria for Term work :

i) Continuous Assessment of Practical Assignments :

Every practical assignment shall be assessed for 25 marks as per following criteria :

Domain	Particulars	Marks out of 50
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
Affective	Discipline and punctuality	05
	Decency and presentation	05
TOTAL		25

i) Progressive Skills Test :

Criteria for Progressive skill Test :

Sr. No.	Criteria	Marks allotted
1	Attendance	5
2	Preparedness for practical	4
3	Algorithm	4
4	Flow chart	4
5	C program	4
6	Logical Approach	4
	Total	25

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1	Technical Ability	10
2	Logical Approach	10
3	Flowchart and Algorithm	10

4	Programming Skill	10
5	Presentation	10
	Total	50

Assessment at semester end practical exam as per Pro-forma II.

10. INSTRUCTIONAL STRATEGIES:

Instructional Methods :

- 1) Lectures and discussions.
- 2) Laboratory experiences and laboratory interactive sessions.
- 3) Time bound assignments.

Teaching and Learning resources:

1. Books
2. Transparencies
3. Power Point Presentation
4. Self-learning

11. REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title
1.	E.Balgurusamy	Programming in ANSI C
2.	Yashwant Kanetkar	Let us C
3	Gottfried	Programming with C
4	kerninghan& Ritchie	The C Programming language

b) Websites

- ✓ www.cprogramming.com
- ✓ www.learn-c.org
- ✓ www.tutorialspoint.com/cprogramming

COURSE ID:08

Course Name	: WEB PAGE DESIGNING
Course Code	: ITG102
Course Abbreviation	: GWPD

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	2	4
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End Examination			Total
	Theory	Practical	Theory Examination	Term Work	Practical Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 10 marks	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (2 hour)	--	As per Proforma-II	
Marks	10	--	40	--	50I	100

2. RATIONALE:

World Wide Web is the basic technology for hosting websites on web and HTML is the medium for creating web pages. HTML is This course aims at designing and developing web pages. It introduces web page design using HTML5 and also give emphasis on learning Cascading Style Sheets (CSS). This course enables students to design static web sites and host it on Internet/Intranet.

3. COMPETENCY

Design static website

Cognitive: i)Design and write code simple web pages.

ii)Describe characteristics of CSS for effective formatting web pages.

Psychomotor : i) Surfing different types of web sites. ii) Implementation of different types of websites.

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG102-1: Use structure tags, basic tags of HTML.

ITG102-2: Create list and link html documents to a webpage.

ITG102-3: Design a webpage using images, multimedia.

ITG102-4: Organize content using table and frames and form in a webpage.

ITG102-5: Develop and publish website with CSS, HTML5 new elements, bootstrap on internet.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and Cos discipli ne specific knowle dge	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipli ne specific knowle dge	PO 2 Proble m Analysi s	PO 3 Design / Develo pment of solutio ns	PO 4 Engineerin g Tools, Experimen tation and Testing	PO 5 Engineering Practices for society, sustainabilit y and Environmen t	PO 6 Project Manage ment	PO 7 Life- long Learnin g	PSO1 Design and developme nt	PSO2 Database and Network management
Competency: Design static website	2	2	2	2	1	1	2	2	1
ITG102-1:	2	2	1	1	1	-	2	2	-
ITG102-2	2	2	1	1	1	1	1	2	-
ITG102-3:	2	2	3	3	1	-	-	2	2
ITG102-4:	2	2	2	2	1	-	2	2	-
ITG102-5:	3	2	2	2	1	--	2	2	1

6. LABORATORY WORK:

Laboratory experiments and related skills to be developed :

(Practicals marked in * are compulsory and others are optional)

Sr. No .	Title of Experiment	Skills to be developed	Course outcome
1*	Create a simple web page using structure tags	1.To write code of a simple web page using HTML	ITG102-1
2*	Design a web page and apply block level tags and HR tags.	1.To apply various block level tags in web pages. 2.Create a web page for displaying a paragraph using block level tags, HR tags.	ITG102-1
3*	Create a web page and apply text level tags.	Create a Web Page using Text level tags and Special Characters	ITG102-1
4*	To include Lists in web page	Create a web page for implementing different types of Lists. 1.Ordered List 2.Unordered List	ITG102-2
5*	Design webpage with various hyperlinks	To add hyperlinks - 1.To document in the same folder. 2.To document in the different folder. 3. To document on the web. 4.To specific section within the document. 5. To set colors for hyperlinks, active links and visited link	ITG102-2
6*	Create webpage to include images with different alignments	1. To understand concept of various attributes of tag. 2. To use image as a hyperlink	ITG102-3
7*	Design webpage using MARQUEE tag and embed tag.	Apply multimedia effect to a webpage.	ITG102-3
8*	To create HTML table, format contents in a table cells and span the rows and columns.	1. To understand use of <TABLE> tag and its attributes. 2. Apply formatting contents in tables on web page 3 Apply colors in tables on web page 4. Merging cells in tables on web page	ITG102-4
9*	Create basic frames using different attributes And design a web page using iframe tag	1.To understand use of frames in layout of web page. 2. Apply <iFRAME> tag and its attributes	ITG102-4

10*	To create a basic login form using form controls	1. To understand use of <FORM> element and its attributes. 2. Apply form input controls like text field, password field and multiple line text field controls. 3. To use pull down menu in web pages 4. To use buttons in web pages	ITG102-4
11*	To use table to layout form with the different form controls and generalized buttons.	1. To understand concept of <TABLE> tag and its attributes. 2. Apply table tags to layout form with different form controls	ITG102-4
12*	To create web page and apply style sheet properties (Font, text and box properties)	1. To understand the concept of style sheet. 2. Adding style sheets to a document, linking to a Style Sheet, embedding and importing style sheets. 3. Use font, text and box properties of style sheets	ITG102-5
13	Design webpage using HTML5 semantic elements and html5 graphics and canvas elements	1. Use HTML5 semantics: Marking Text, Indicating Dates and Time, Inserting Figures, Specifying Navigation 2. Apply HTML5 Graphic and Multimedia Element <SVG> , <canvas>, <audio>, <Video>	ITG102-5
14	Create a webpage using bootstrap	Apply bootstrap for creating webpage.	ITG102-5
15	Install web server and publish website.	Install a web server and publish a website on Intranet.	ITG102-5
16*	Development of Mini Project(Static website) Host this website on free hosting servers.	1. Development of static informative websites as per user requirement. For example- 1) Website for Hotel 2) Website for Universities, Tourism	ITG102-5

7. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG102-1: Use structure tags, basic tags of HTML.</i>			
1	INTRODUCTION TO HTML <p>1.1 Terminologies used in Web Design: WWW, Web site, Web page, Web Server, Web Browser, Search Engine, URL, Domain, Hyperlink</p> <p>1.2 HTML History, Components of HTML: Tags – closed tags and open tags, Attributes, Elements</p> <p>1.3 Structure Tags: !DOCTYPE, HTML, HEAD, TITLE, BODY tags</p> <p>1.4 Block Level Elements : Headings, Paragraphs, Breaks, Divisions, Centered Text, Block Quotes, Preformatted text, Address.</p> <p>1.5 Text Level Elements : Bold, Italic, Teletype, Underline, Strikethrough, Superscript, subscript.</p> <p>1.6 Colors and Backgrounds-</p> <ul style="list-style-type: none"> • The text color: color attribute of FONT tag, text attribute of BODY tag. • Background color: bgcolor attribute of BODY tag. • Background images: background attribute of BODY tag. <p>1.7 Horizontal Rules, Special characters(HTML Symbols), Adding comments, The Meta tag</p>	06	8
<i>Course Outcome ITG102-2: Create list and link html documents to a webpage</i>			
2	CREATING LISTS & LINKING HTML DOCUMENTS <p>2.1 Ordered, Unordered Lists: tag and its attributes</p> <p>2.2 Definition Lists tag and Nested Lists</p> <p>2.3 URL : Types of URLs, Absolute URLs, Relative URLs</p> <p>The Anchor Tag and its attributes, Changing link colors: link, alink, vlink attributes of BODY tag.</p> <p>2.4 Linking :</p> <p>2.4.1 To document in the same folder</p> <p>2.4.2 To document in the different folder.</p>	04	06

	2.4.3 To document on the web. 2.4.4 To specific section within the document. 2.4.5 Inserting E-mail links		
Course Outcome ITG102-3: Design a webpage using images, multimedia.			
3	IMAGES AND MULTIMEDIA 3.1 Image formats : gif,bmp, jpeg, png 3.2 The inline image: an IMG tag, alternate text, image alignment, HSPACE, VSPACE, wrapping text, height and width of images. 3.3 Image as a link, Image maps 3.4 Text animation with MARQUEE element 3.5 Using EMBED tag to add multimedia	04	06

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITG102-4: Organize content using table and frames and form in a webpage.			
4	TABLES & FRAMES 4.1 Creating basic tables: TABLE, TR, TH, TD tags. 4.2 Formatting tables: border, cellspacing, cellpadding, width, height, align, bgcolor attributes. 4.3 Adding captions: CAPTION tag. 4.4 Formatting contents in the table cells : align, valign, bgcolor, height, width, nowrap attributes. 4.5 Spanning rows and columns: rowspan and colspan attributes. 4.6 Types of Frames with their of attributes, Creating frames: FRAMESET tag - rows, cols, iframe tag with attribute	04	06
5	FORMS 5.1 Creating basic form: FORM tag, action and method attributes. 5.2 Form fields: Single line text field, password field, multiple line text area, Radio buttons, check boxes. 5.3 Pull down menus: SELECT and OPTION tags. 5.4 Buttons: Submit, Reset and generalized buttons. 5.5 Formatting technique: Using table to layout form.	04	04
Course Outcome ITG102-5: Develop and publish website with CSS, HTML5 new elements, bootstrap on internet.			
6	STYLE SHEETS 6.1 Adding style to the document: Linking to style sheets, Embedding style Sheets, Using inline style.	04	04

	6.2 Style sheet properties: font, text, box, color and background properties. 6.3 Selectors: CLASS rules, ID rules. 6.4 Text in stylesheet using table layout.		
7	HTML 5 , BOOTSTRAP and Hosting Web site 7.1 Introducing HTML5: features, removed old elements list, new elements list with features, new attributes in HTML5, adding semantics: Marking Text, Indicating Dates and Time, Inserting Figures, Specifying Navigation 7.2 HTML5 Graphic and Multimedia Element <SVG> , <canvas>, <audio>,<Video> 7.3 Introduction to bootstrap, advantages, sample program using bootstrap 7.4 Publishing the site, Installing and configuring web server, Outsourcing web hosting, Virtual Hosting	06	06

8. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

Section / Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total marks
		Reme mber	Understa nd	Applic ation		
I / 1	INTRODUCTION TO HTML	2	2	4	ITG102-1	8
I / 2	CREATING LISTS & LINKING HTML DOCUMENTS	2	2	2	ITG102-2	6
I / 3	IMAGES AND MULTIMEDIA	--	2	2	ITG102-3	6
II/ 4	TABLES & FRAMES	2	2	2	ITG102-4	6
II / 5	FORMS	--	2	4	ITG102-4	4
II/6	STYLE SHEETS	--	2	2	ITG102-5	4
II/7	HTML 5 , BOOTSTRAP AND HOSTING WEB SITE	2	2	2	ITG102-5	6
TOTAL		8	14	18	----	40

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

9. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION

a) Assessment Criteria for Term work :

i) Continuous Assessment of Practical Assignments :

Every practical assignment shall be assessed for 25 marks as per following criteria :

Domain	Particulars	Marks out of 50
Cognitive	Understanding	05
	Application	05
Psychomotor	Operating Skills	05
Affective	Discipline and punctuality	05
	Decency and presentation	05
TOTAL		25

b) Progressive Skills Test :

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	02
3	Neat & complete Diagram.	04
4	Observations & computer handling skill	02
5	Use of toolbar, menu bar and short cut keys.	04
6	Logical thinking and approach	04
7	Oral Based on Lab work and completion of task	04
TOTAL		25

Assessment at semester end practical exam as per Pro-forma II.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Technical ability	20
2.	Communication skill	10
3.	Logical approach	20
	TOTAL.	50

10. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

11. REFERENCE MATERIAL:**a) Books/ Codes**

S. No.	Title of Book	Author	Publication
1.	HTML and XHTML – The complete reference	Powell, Thomas	Tata McGraw Hill, New Delhi, 2014, ISBN: 9780070701946
2.	Learning Web Design	Robbins	O'Reilly, London, 2012 ISBN 10:1-4493-1927-0
3.	Teach Yourself HTML & CSS in 24 Hours	SAMS	Pearson Education Publication, New Delhi, 2015, ISBN: 978-672336140
4.	HTML,XHTML and CSS	Bohem, Anne	Murach's Publication, New York, 2013, ISBN 13: 978-1890774578
5.	HTML 5 Black Book(second edition)	DT Editorial services	Dreamtech Publication, New Delhi, ISBN: 978-9350040959

b) Websites

- i. <http://www.w3schools.com/html>
- ii. <https://www.tutorialspoint.com/html/index.htm>
- iii. <http://www.html.net/>
- iv. <http://www.2createawebsite.com>
- v. <http://webdesign.about.com>

COURSE ID: 9

Course Name : ELEMENTS OF PRACTICAL ELECTRICITY
Course Code : ITG103
Course Abbreviation : GEPE

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	1	3
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End Examination			Total
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	--	i. 25 marks for each practical ii. One PST of 25 marks	--	--	As per Proforma-II	
Marks	--	--	--	--	50I	50

2. RATIONALE:

A person working in any field needs to be aware of the mode / ways of application of electricity in his field. He must be well conversant with the basic skills of maintaining the supply system to the machines used by him. This becomes much more important for an information technologist as this reduces his dependence on others for trivial works of electricity to be carried out such as replacing the fuse, calculating the load, inspecting a power supply, deciding wiring systems along with the components & load requirements etc.

This course arms the candidate with basic knowledge & skills in using electricity and related components for his machines such as computers and related device.

3. COMPETENCY:

Maintain the computer electric supply network in healthy condition.

Cognitive:

- i) Understand the charge and electromagnetism.
- ii) State the basic laws related to electrical engineering.

Psychomotor: Use the basic electrical components in various applications.

Affective: Attitude of i) Punctuality ii) Accuracy iii) Safety iv) precision.

4. COURSE OUTCOMES:

ITG103-1: Use basic principles of electrical engineering related to computer supply systems.

ITG103-2: Use relevant supply system and electrical component for computer.

ITG103-3: Install proper wiring for computers and earthing for it.

ITG103-4: Use the measuring instruments in computer laboratories.

ITG103-5: Use the relevant computer peripheral motors and transformer.

5. COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

PO →	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P O 7	P S O 1	PS O2
CO ↓	Basic and discipline specific knowledge	Problem Analysis	Design/Development Tools, experiment of solutions	Engineering Tools, experiences for society, sustainability and environment	Engineering practices for society, sustainability and environment	Project Management	Lifelong Learning	Desire and motivation	Databasing and Network management
COMPONENTS CY-Apply Fundamental knowledge of electrical engineering and maintain computer network in healthy condition	3	2	2	2	2	1	3	2	-
ITG103-1	3	3	-	3	1	-	3	-	-
ITG103-2	3	1	2	3	2	2	3	1	-
ITG103-3	3	-	3	3	1	-	3	1	1
ITG103-4	3	-	2	3	1	-	3	-	-
ITG103-5	3	2	-	2	2	-	3	-	-

6. LABORATORY WORK:

Laboratory experiments and related skills to be developed:

Sr. N o.	Title of Experiment	Skills to be developed	Course outcome
1.	Verify Ohm's law.	. Connect the various components as per the circuit diagrams by using wires.	ITG103-1
2.	Verify Kirchhoff's current law	. Connect the various components as per the circuit diagrams by using wires. . Verify theoretical and practical reading.	ITG103-1
3.	Verify Kirchhoff's voltage law	. Connect the various components as per the circuit diagrams by using wires. . Verify theoretical and practical reading.	ITG103-1
4.	Calculate the resistance and inductance of given coil using Voltmeter, Ammeter & Multimeter.	. Connection of component . Measurement of various parameter.	ITG103-2 and ITG103-1
5.	Measure power of single phase circuit using Wattmeter.	. Connection of component . Measurement of various parameter. . Circuit function.	ITG103-4 And ITG103-1
6.	Prepare specification of SMPS, Inverter, UPS (any one)	. Preparation of sheet . Sort data . Working	ITG103-2
7.	Verify Faraday's law of electromagnetic induction.	. Working information . Circuit function	ITG103-5
8	To study the transformer in laboratory.	. Identify various parts of transformer . Working principle	ITG103-5
9	Visit to Earthing arrangement of Lab/Institute	. Testing of equipment . Connection of instrument	ITG103-2 To ITG103-4
10	Basic Components of Energy Bill- Connected load, sanctioned load, Billed demand, power factor, energy rates applicable	. Analysis . Collecting information	ITG103-4

7. CONTENT:

Sr. No.	Topics / Sub-topics	Lectures (Hours)
<i>Course Outcome ITG103-1 Use basic principles of electrical engineering related to computer supply systems</i>		
1	FUNDAMENTAL- 1.1 Concept of charge and electric current 1.2 Heating and magnetic effect of electric current 1.3 Application of the above in computing devices such as HD, FD, CD (Photo effect). 1.4 Ohm's law. 1.5 Resistance -Symbol and properties.	2
2	D.C CIRCUITS/DEVICE 2.1 Voltage and current source. 2.2 Kirchoff's laws. 2.3 Maximum Power transfer theorem.	2
<i>Course Outcome ITG103-2 Use relevant supply system and electrical component for computer.</i>		
3	A.C Circuits/Devices. 3.1 Concept of alternating quantity. 3.2 Cycle, Frequency, Period, Phase , Max.value, RMS value 3.3 Inductance and capacitance -symbol and properties 3.4 Concept of power factor. 3.5 Concept of lagging and leading.	2
4	Electrical Supply system. 4.1 D. C. systems. 4.2 Single phase A.C. 4.3 Stabilizers (specification selection) 4.4 SMPS (specification selection) 4.5 Inverters (specification selection) 4.6 UPS - online & offline (specification selection)	2
<i>Course Outcome ITG103-3 Install proper earthing for computers .</i>		
5	EARTHING 5.1 Protective devices for the systems. 5.2 Importance of Earthing for equipment's. 5.3 Components of Earthing systems. 5.4 Implementation of Earthing systems.	2
<i>Course Outcome ITG103-4 Use the measuring instruments in computer laboratories.</i>		
6	MEASURING INSTRUMENTS 6.1 Voltmeter, Ammeter, Multimeter- applications. 6.2 Wattmeter, (Power measuring circuits for single load) 6.3 Energy meter, - application (1 phase).	1

Sr. No.	Topics / Sub-topics	Lectures (Hours)
Course Outcome ITG103-5 Use the relevant computer peripheral motors and transformer		
7	SINGLE PHASE TRANSFORMER 7.1 Faraday's laws of electromagnetic induction. 7.2 Working principle of transformer. 7.3 Parts & Construction of small transformer. 7.4 Application for the above.	2
8	ELECTRIC MOTOR 8.1 Motors used in computers & related peripherals such as stepper motors etc. 8.2 Introduction to single phase induction motors along with their applications.	2

8. PROGRESSIVE SKILLS TEST :

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
4	Observations & handling of instrument.	05
7	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma II.

9. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive session

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials
4. Virtual lab

10. REFERENCE MATERIAL:**a) Books / Codes**

Sr. No.	Author	Title	Publisher
1.	B. L. Theraja A. K. Theraja	A Text Book of Electrical Technology Vol-I (Basic Electrical Engg)	S. Chand and Co.
2.	V. N. Mittle	Basic Electrical Engg.	Tata McGraw-Hill
3.	V.K.Mehta	Electrical Technology	S. Chand and Co.

b) Websites

- i) www.electrical4u.com
- ii) www.vlab.co.in
- iii) www.circuitglobe.com

COURSE ID: 10

Course Name : BASIC ELECTRONICS
Course Code : ITG104
Course Abbreviation : GBTX

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : <nil>

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	02	04
Practical	02	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Exam*	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 10 marks	(i) 25 marks for each practical (ii)One PST of 25 marks	Term End Theory Exam (2 hours)	Term End Oral Exam	
Marks	10	--	40	50 I	100

* I-Internal Assessment *Assessment at semester end oral exam as per Pro-forma II.

2. RATIONALE:

In today's world most of the consumer appliances are based on electronic circuits and devices. The foundation for working of computer or any of its peripherals are based on electronics. This course has been designed to develop skills to understand and test simple electronic components and circuits. After studying this course students will develop an insight to identify, build and troubleshoot simple electronic circuits.

3. COMPETENCY :

Maintain electronic circuits in computer systems comprising of discrete electronics components

Cognitive : Identify and illustrate the operation of basic electronics devices.

Psychomotor : Maintain and operate simple basic electronics circuit.

Affective : Attitude of i) Identify ii) Draw iii) Operate v) Test

4. COURSE OUTCOMES :

ITG104-1: Identify electronic component in electronic circuits

ITG104-2: Identify and handle semiconductor diodes.

ITG104-3: Examine and operate DC regulated power supply.

ITG104-4 : Identify and illustrate use bipolar junction transistor in electronic circuits

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note : Correlation levels :1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency : Maintain electronic circuits in computer systems comprising of discrete electronics components	3	-	-	2	2	1	3	2	-
ITG104-1	2	-	-	-	-	-	2	1	-
ITG104-2	3	-	-	2	2	2	3	2	-
ITG104-3	3	-	-	2	-	1	2	2	-
ITG104-4	3	-	-	2	2	1	3	1	-

6.CONTENT:

SUGGESTED PRACTICAL'S/ EXERCISE

Practical Exercises and related skills to be developed:

The following practical exercises shall be conducted as practicals and assess the student for attainment of the competency (any 12 experiments).The experiments numbered from 11 onwards can be demonstrated by using simulation software or virtual labs.

“ * ” Indicates compulsory experiments to be conducted

S r N o .	Title of Practical Exercise	Skills / Competencies to be Developed	Course Outcome
1. *	Identification electronic equipments in basic electronics laboratory	1) Identify different electronic equipments. 2) Operate DMM, power supply, CRO, function generation. 3) Illustrate the use of breadboard	ITG104-1
2. *	Test different types of resistors.	1) Identify different types of resistor 2) Find value of different types of resistor	ITG104-1
3. *	Test different types of capacitors.	1) Identify different types of capacitors 2) Find value of different types of capacitors	ITG104-1
4. *	Test different types of inductors.	1) Identify different types of inductors 2) Find value of different types of inductors	ITG104-1
5. *	Test the performance of PN junction diode	1) Build the circuit as per circuit diagram 2) Record the measured readings in observation table 3) Draw the forward & reverse characteristics	ITG104-2
6. *	Test the performance of zener diode	1) Build the circuit as per circuit diagram 2) Record the measured readings in observation table 3) Draw the forward & reverse characteristics	ITG104-2
7. *	Test Zener voltage regulator for given voltage	1) Build the circuit as per circuit diagram 2) Record the readings in observation table	ITG104-2
8. *	Test the half wave circuits on breadboard	1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the	ITG104-3

		setting of VOLT/DIV 3) Record readings measured in observation table	
9. *	Test the full wave center-tapped circuit on breadboard	1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV 3) Record readings measured in observation table	ITG104-3
10. *	Test the full wave bridge circuit on breadboard	1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV 3) Record readings measured in observation table	ITG104-3
11. *	Test the full wave bridge circuit on breadboard with π -filter	1) Construct the circuit as per circuit diagram 2) Record the waveform displayed on the oscilloscope according to the setting of VOLT/DIV 3) Record readings measured in observation table and calculate ripple factor	ITG104-3
12.	Test various blocks of DC regulated power supply.	1) Build circuit as per circuit diagram or Identify the blocks in assembled DC power supply 2) Test the output at various points.	ITG104-3
13.	Test the performance of Regulator IC's: IC's 78XX, 79XX.	1) Build the circuit as per circuit diagram 2) Record the reading in observation table	ITG104-3
14.	Identify transistor configuration	1) Identify the transistor configuration 2) Interpret the circuit working	ITG104-4
15. *	Test the working of the assembled BJT amplifier in CE mode	1) Construct the circuit as per circuit diagram 2) Record the reading in observation table. 3) Sketch the graph of input & output waveforms.	ITG104-4

THEORY :**SECTION-I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG104-1 Identify electronic component in electronic circuits</i>			
01	Electronics components (R,L,C) 1.0 Components-discrete, non discrete, Active, passive 1.1 Resistor: 1.1.1 Working Principle of Resistor 1.1.2 General Symbol, Unit 1.1.3 Types of resistors (No description) 1.1.3 Resistors general specifications-Maximum voltage rating, power rating ,temperature coefficient , tolerance ,ohmic range, operating Temperature 1.1.4 Resistor colour coding with three, four, five Bands 1.1.5 Applications 1.2 Capacitor 1.2.1 General Symbol, Unit 1.2.2 Working Principle of capacitor 1.2.3 Classification of capacitors (No description) 1.2.4 Color code of capacitor 1.2.4 Applications 1.3 Inductor 1.3.1 General Symbol, Unit 1.3.2 Inductor specifications -self inductance ,mutual inductance 1.3.3 Types of inductor (No description) 1.3.4 Colour Coding of capacitor 1.3.4 Applications	04	06

<i>Course Outcome ITG104-2 Identify and handle semiconductor diodes.</i>			
2	Semiconductor Diode 1.0 Conductor , Insulator, semiconductor 1.0.1 Band theory 1.0.2 Intrinsic semiconductor : Si , Ge 1.0.3 Doping 1.0.4 Extrinsic semiconductor : P type , N type 1.1 P.N. junction diode – Ge & Si 1.1.1 Constructional features. 1.1.2 Operating principle. 1.1.3 Characteristics. 1.1.4 Applications. 1.2 Zener diode 1.2.1 Constructional features. 1.2.2 Operating principles. 1.2.3 Characteristics 1.2.5 Applications: Zener as voltage regulator	10	12
<i>Course Outcome ITG104-3 Examine and operate DC regulated power supply.</i>			
3.	DC regulated power supply 3.0 Rectifiers: 3.0.1 Definition: Rectification, rectifier 3.0.2 Need of rectification 3.0.3 Classification of rectifier 3.1 Half wave rectifier and full wave rectifier (Center-tapped and bridge) 3.1.1 Circuit diagram and waveforms 3.1.2 Operation 3.1.3 Parameters its definition and values for corresponding rectifier- (i) Average output voltage and current (ii) Ripple factor (iii) Rectifier efficiency (iv) Peak Inverse Voltage (v) Transformer Utilization Factor 3.1.4 Comparison of rectifier 3.2 Filter - 3.2.1 Need of filter 3.2.2 Types of filter- (i) Shunt capacitor (ii) Series inductor (iii) LC Filter (iv) CLC filter 3.2.2 Operation of each filter w.r.t full wave	12	14

	bridge Rectifier only 3.3 Voltage Regulators 3.3.1 Need of regulators 3.3.2 Block diagram of Regulated power supply 3.3.2 IC 78xx & IC 79xx series of voltage Regulators:- Features, Pin diagram and Applications		
Course Outcome ITG104-4 Identify and illustrate use bipolar junction transistor in electronic circuits			
4	Bipolar Junction Transistor(BJT) 4.0 BJT-.Types, symbols 4.1 Construction of BJT. 4.2 Operating principles of NPN transistor 4.3 Transistor configurations & Modes of operation 4.4 Switching action of transistor 4.5 Applications of transistor 4.6 Need of Transistor Biasing 4.6.1Types of biasing (only types, no description) 4.7 Single stage amplifier 4.7.1 Circuit Diagram 4.7.2 Working (Function of each component) 4.7.3 Applications	06	08
	Total	32	40
	Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only		

7. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total Marks
		Remember	Understand	Application		
1	Electronics Components	02	02	02	ITG104-1	06
2	Semiconductor Diode	02	04	06	ITG104-2	12
3	DC regulated power supply	02	04	08	ITG104-3	14
4	Bipolar Junction Transistor	02	02	04	ITG104-4	08
	Total >>	08	12	20		40

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

8. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

b) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Preparation for practical	05
Psychomotor	Operating skills	05
	Observation/Result	05
Affective	Discipline and punctuality	05
	Procedure/Safety	05
	Measures/Presentation	
TOTAL		25

ii) Progressive Skill Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma II*.

Sr. No.	Criteria	Marks allotted
1	Neat & complete circuit Diagram / schematic Diagram.	05
2	Observations & Result Table	05
3	Sample Calculations with relevant Formulae.	05
4	Proper Graphs & Procedure / workmanship Safety measures	05
5	Oral Based on Term Work	05
	Total	25

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical within 3 hours at semester end practical exam which shall be assessed as per following criteria.

Sr. no	Criteria	Marks allotted
1	Preparedness for practical	10
2	Correct figures / diagrams	10
3	Observation Table	10
4	Result / calculations / graphs	10
5	Safety / use of proper tools / workmanship	10
Total		50

*Assessment at semester end practical exam as per Pro-forma II.

9. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions 2. Regular Home Assignments. 3. Laboratory work

Teaching and Learning Resources:

1. Chalk board 2. Video clips 3.PPT 4. Item Bank 5. Charts

10. REFERENCE MATERIAL :**a) Books / Journals / IS Codes**

Sr. No.	Author	Title	Publisher
1.	V. K. Mehta	Principles of Electronics	S.Chand
2.	B. L. Theraja	Basic Electronics	S.Chand
3.	R.S.Sedha	A text book of Applied Electronics	S.Chand
4.	G. K. Mithal	Applied Electronics	Khanna Publication
5.	A. Motershed	Electronics Devices & Circuits	PHI Publication
6.	Malvino	Electronics Principles	McGraw Hill
7.	Bell, Devid	Fundamental of Electronics Devices and circuits	Oxford University

b) Websites

- i. www.nptel.iitm.ac.in
- ii. www.learningaboutelectronics.com
- iii. www.futurlec.com
- iv. www.bis.org.in
- v. www.electrical4u.com
- vi. www.cadsoft.io
- vii. www.electronics-tutorials.com

* * *

COURSE ID: 11

Course Name : COMPUTER PERIPHERAL AND HARDWARE MAINTENANCE
Course Code : ITG105
Course Abbreviation : GCPM

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : CCG201

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	2	4
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Total		
	Theory	Practical	Theory Examination	Practical Examination (Internal)	Total
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 10 marks	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (2 hour)	As per Proforma-II	
Marks	10	--	40	50I	100

2. RATIONALE:

Computers play a vital role in various fields like business, academics, defense, budget, research, engineering, medicine. In the present Industrial & commercial environment, the technician is expected to use computers skillfully.

This course is intended to make students comfortable with computing environment - Understanding Computer Hardware, Learning basic computer skills, basic application software tools, basic knowledge and applications of Internet and Cyber security awareness.

3. COMPETENCY

Apply Fundamental knowledge of computer system to work with simple applications.

Cognitive: i) State the basic parts of a computer system and relationships among component.

ii) Describe characteristics and functions of CPU's, motherboard, RAM, Storage devices

Psychomotor: i) Identify computer system and Network ii) Create word documents, spreadsheets and presentation

Affective: Attitude of i) Precision ii) Accuracy iii) Safety iv) Punctuality

4. COURSE OUTCOMES:

ITG105-1: Identify basic components and their specification of a computer system.

ITG105-2: Troubleshoot Input / Output devices.

ITG105-3: Troubleshoot common motherboard problem .

ITG105-4: Partition/Format Hard disk drive .

ITG105-5: Diagnostic fault and troubleshoot PC.

ITG105-6 : Test and maintain Power supply problems.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
“-” : no correlation]

Competency And COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/ development of solutions	PO 4 Engineering Tools, experimentation and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Apply fundamental knowledge of computer system to work with simple applications.	2	2	1	2	2	1	3	1	2
ITG105-1	2	3	1	1	2	-	2	-	2
ITG105-2	2	3	-	2	2	1	2	-	2
ITG105-3	2	3	-	2	2	1	2	-	2
ITG105-4.	2	-	-	1	2	1	3	1	1
ITG105-5	2	3	-	2	2	1	3	-	2
ITG105-6	2	3	-	2	3	1	3	1	

6.CONTENT:**A) SUGGESTED PRACTICAL'S/ EXERCISE**

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
1.*	Identify Desktop, Laptops and servers by its specification	1. Identify different types of Desktops and Laptops and server configuration	ITG105-1
2.*	Installation of INPUT/OUTPUT devices and configure device driver for printer and scanners	1. Install keyboard, mouse, scanner using USB or PS-2 connector. 2. Install driver software for a printer, Scanner 3. Set up a printer & scanner Scan a page, print a test page. 4. Share printer in network	ITG105-2
3.*	Troubleshoot I/O devices	Troubleshoot problems related 1. Mouse 2. Keyboard 3. Monitor	ITG105-2
4.*	Layout of Motherboard	1. Identify various Motherboard Components 2. Observe various Motherboard Chips 3. Observe Bus Structure and identify buses	ITG105-3
5.*	Identify and Installation Of RAM	1. Identify and Installation of SDRAM 2. Identify and Installation of DDR2 3. Identify and Installation of DDR3	ITG105-3
6.*	Troubleshooting Problems of System Board	1. Identify various problems of components of system board and troubleshoot any one problem.	ITG105-3
7.*	Troubleshooting Hard disk problems	1. Troubleshoot various problems during hard disk installation	ITG105-4
8.*	Configure BIOS setup.	1. Install and configure BIOS setup(set boot device priority).	ITG105-5
9.*	Install SMPS	1. Identify component of SMPS 2. Install SMPS	ITG105-6
10.*	Assemble and Disassemble of PC	1. Identify and installation of components of PC	ITG105-6

11.*	Installation of Windows Operating System (Windows7 or Windows 8 or Windows10)	1. Identify the Operating system 2. Installation of operating system 3. Partition and format Hard Disk	ITG105-4,6
12.*	Undertake Preventive maintenance of PC using simple tools	1. Preventive maintenance tools for Desktop, Laptop.	ITG105-6

7. MAJOR EQUIPMENT / INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will be used in uniformity in conduct of experiments , as well as aid to procure equipment by authorities concerned.

Sr. No	Equipment Name with broad specification
1	Laptop , Computer system with all necessary components like : mother board , random access memory (RAM), read-only memory (ROMS), Graphics cards, sound cards, internal hard disk drives. DVD drive, Network interface card
2	LC D/DLP Projector
3	Mouse :Mechanical. Optical. Opto-Mechanical
4	Dot Matrix Printer, Laser Printer, inkjet Printer
5	Bluetooth based wireless mouse and keyboard any other device
6	Computer maintenance kit
7	Logic probe , logic pulsar , current tracer
8	Operating system
9	Power supply
10	Diagnostic software
11	Vacuum cleaner / Blower

8. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lecture s (Hours)	Theory evaluation Marks
<i>Course Outcome ITG105-1: Identify components and their specification of a computer system.</i>			
1	COMPUTER HARDWARE <ul style="list-style-type: none"> 1.1 Introduction to Computers:-Desktop Computers, Tablets, Laptop, 1.2 Types Of Computers:- Supercomputer, Mainframe. 1.3 Server : Features descriptions and applications. 1.4 Types of Servers : Application Servers , Client Servers, FTP Servers, Proxy Servers, Virtual Servers. 	04	04
<i>Course Outcome ITG105-2: Troubleshoot Input / Output devices.</i>			
2	I/O AND STORAGE DEVICES (*Tip : All Hardware devices should be Latest version) <ul style="list-style-type: none"> 2.1 Keyboard: Types of Key switches(), Types of Keyboard – wired and wireless. 2.2 Mouse: types of mouse : wired and wireless , working of : Opto-mechanical , Optical ,Touchpad mouse. 2.3 Scanner : Types of scanner : Flat Bed , Sheet fed, OCR , Barcode , QR code scanner. Block diagram and working of QR code scanner. 2.4 Monitor : Types – CRT, LCD ,LED 2.5 Printer: Types of Printer, Block diagram and Specifications: Dot matrix , Inkjet ,Laser printer. 2.6 Modem: Internal and External Modem - Block diagram and Specifications. 2.7 Troubleshooting of I/O devices : Keyboard , Mouse, Webcam, Monitor, Speaker, Scanner , Printer, LCD Projector . 	08	10
<i>Course Outcome ITG105-3: Troubleshoot common motherboard problem .</i>			
3	MOTHERBOARD & ITS COMPONENTS <ul style="list-style-type: none"> 3.1 Motherboard : Components , Layout , Connections ,Types , Features. 3.2 Introduction to System clock , Cache Memory 3.3 Troubleshooting problems of Motherboard 3.4 Motherboard Selection Criteria 	04	06
	Sub Total	16	20

Sr. No.	Topics / Sub-topics	Lecture s (Hours)	Theory evaluation Marks
SECTION II			
<i>Course Outcome ITG105-4: Partition/Format Hard disk drive .</i>			
4	HARD DRIVES <ul style="list-style-type: none"> 4.1 Introduction : Hard Disk Drive 4.2 Hard Disk Structure : Heads, Tracks, Sectors, Cylinders, Clusters, Landing Zone, MBR, Zone bit recording 4.3 Working of Hard disk drive 4.4 Hard Disk Interfaces: IDE/ PATA, SATA, SCSI, USB and IEEE 1394 (Fire wire), RAID, Solid State Drive (laptop). 4.5 File System: FAT16, FAT32, NTFS, Unix file system, EXT4 	06	06
<i>Course Outcome ITG105-5: Diagnostic fault and troubleshoot PC</i>			
5	PROCESSOR AND BIOS <ul style="list-style-type: none"> 5.1 Processor : Types of processors , common features , Different levels of Cache(L1,L2,L3) ,System bus, clock speed. 5.2 Multi-Core Processors : Introduction : Dual core processor architecture , Multi-core processor architecture (Latest Multi-core processor). 5.3 BIOS: Basic Input Output Services, BIOS interaction, Date and Time, Boot setting configuration, Password security 5.4 Diagnostic software for troubleshooting PC 	06	08
<i>Course Outcome ITG105-6 :Test and maintain Power supply problems.</i>			
6	POWER SUPPLY <ul style="list-style-type: none"> 6.1 SMPS: Block diagram and working of SMPS 6.2 Power problems: Blackout, Brownout, surges and spikes 6.3 Uninterrupted Power Supply: Characteristics of UPS, Types of UPS- Online and Offline 6.4 Troubleshooting of Power Supply 6.5 Preventive Maintenance of Power Supply 	04	06
SubTotal		16	20
Total		32	40

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Total Marks
		Remember	Understand	Application	
1	Computer Hardware	02	02	-	04
2	I/O And Storage Devices	02	04	04	10
3	Motherboard & Its Components	02	02	02	06
4	Hard Drives	02	02	02	06
5	Processor And Bios	02	02	04	08
6	Power Supply	02	02	02	06
	Total >>	12	14	14	40

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

b) Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

c) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
TOTAL.		50

*Assessment at semester end practical exam as per Pro-formaIII

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials
4. Computer Hardware parts.

12. REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	James K. L.	The computer hardware installation , interfacing troubleshooting and maintenance	PHI Learning , New Delhi , 2014 ISBN : 978-81-203-4798-4
2.	Minasi, Mark	The complete PC upgrade and maintenance guide	BPB Publication , New Delhi ISBN : 978-81-265-0627-9
3.	P.K.Sinha	Computer Fundamentals	BPB Publication

b) Websites

- iv) <http://www.gcflearnfree.org/computerbasics/>
- v) <https://www.instructables.com/id/Computer-Assembly/>
- vi) https://www.tutorialspoint.com/computer_fundamentals/computer_motherboard.htm#
- vii) <https://www.youtube.com/watch?v=hWB2UHCT0dw>

LEVEL-II
LIFE SKILLS ,PROFESSIONAL
SKILLS AND NON CREDIT
COURSES

COURSE ID :12**Course Name : INTRODUCTION TO IT SYSTEM(CE/ME/EE/MT/IE/ET/IT)****Course Code : CCG201****Course Abbreviation : GITS****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme:**

Scheme component	Hours / week	Credits
Theory	2	4
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End Examination			Total
	Theory	Practical	Theory Examination	Term Work	Practical Examination (Internal)	
Details of Evaluation	--	. 25 marks for each practical . One PST of 25 marks	--	--	As per Proforma-II	
Marks	--	--	--	--	50I	50

2. RATIONALE:

Computers play a vital role in various fields like business, academics, defense, budget, research, engineering, medicine. In the present Industrial & commercial environment, the technician is expected to use computers skillfully.

This course is intended to make students comfortable with computing environment - Understanding Computer Hardware, Learning basic computer skills, basic application software tools, basic knowledge and applications of Internet and Cyber security awareness.

3. COMPETENCY:

Apply Fundamental knowledge of computer system to work with simple applications.

Cognitive: i) State the basic parts of a computer system and relationships among component.

ii) Describe characteristics and functions of CPU's, motherboard, RAM, Storage devices

Psychomotor: i) Identify computer system and Network ii) Create word documents, spreadsheets and presentation

Affective: Attitude of i) Precision ii) Accuracy iii) Safety iv) Punctuality

4. COURSE OUTCOMES:

CCG201-1: State basic components & applications of a computer system.

CCG201-2: Classify system and application software of a computer system.

CCG201-3: Design files of word processors, spreadsheets, presentation software, and database

application

CCG201-4: Describe importance of Internet and cyber law.

5. COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial

(High), “-” : no correlation]

PO →	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO1	PSO2
CO ↓	Basic and discipline specific knowledge	Problem Analysis	Design/Development of solutions	Engineering Tools, experimentation and testing	Engineering practices for society, sustainability and environment	Project Management	Lifelong Learning	Desire and dedication	Database and Network management
COMPENTENCY -Apply Fundamental knowledge of computer system to work with simple applications	3	1	3	2	2	1	3	2	1
CCG201-1	3	0	0	2	1	-	2	-	-
CCG201-2	3	1	0	2	1	0	2	-	-
CCG201-3	3	3	3	3	2	1	-	2	1
CCG201-4	3	0	0	2	3	-	3	-	1

6. LABORATORY WORK:**Laboratory experiments and related skills to be developed:**

Sr . N o.	Title of Experiment	Skills to be developed	Course outcome
1.	Identify system unit ,connections of internal components and input/output devices.	<ul style="list-style-type: none"> Identify different components inside the CPU cabinet. Identify input/output and storage devices.. 	CCG201 -1
2.	Manage files and folders.	<ul style="list-style-type: none"> Create, copy, rename, delete, move files and folders. 	CCG201 -1
3.	Install and configure device driver for printer and scanners	<ul style="list-style-type: none"> Install driver software for a printer, Scanner Set up a printer & scanner Scan a page, print a test page 	CCG201 -1 & CCG201 -2
4.	Identify configuration of OS & Computer system.	<ul style="list-style-type: none"> Understanding the concept of system and application software. Use start icon, taskbar, Recycle Bin, My Computer icon,The Recycle Bin and deleted files Creating shortcuts on the desktop 	CCG201 -2
5.	Creating and Editing a word document	<ul style="list-style-type: none"> Use of menus and submenus. Type and format the text matter in paragraphs. Set up page size, margins Insert headers and footers, bullets. Use of borders and shading Format picture, word-art, text box etc. Typing text in multi-columns <p>Use of equation editor</p>	CCG201 -3
6.	Inserting table and Mail-Merge	<ul style="list-style-type: none"> Insert, format Table. Sort data in table Mail-Merge: Create main document and data source Merge the main document and data source. Merge to file and merge to 	CCG201 -3

		print.	
7.	Creating and Editing a Spreadsheet	<ul style="list-style-type: none"> • Use of menus and submenus. • Creating a table in worksheet. • Insert formulas, IF condition and functions. • Apply sort, filter and data validations. • Set up page size, margins.& set the print area. 	CCG201 -3
8	Creating and editing a presentation.	<ul style="list-style-type: none"> • Insert new / duplicate slides • Create objects on a slide and use general editing operations. • Use of different views in presentation • Apply standard templates for slides. <p>Use preset animation, slide transition and Prepare speaker notes.</p>	CCG201 -3
9	Apply advance features of slide-show	<ul style="list-style-type: none"> • Use of custom animation effect • Use of action buttons on slides • Rehearse time-setting of slide show 	CCG201-3
10	Internet Basics	<ul style="list-style-type: none"> • Check internet connections & its properties. • Configure Browser settings and use browser. • Use search engines. • Visit various website ,Digital India portals (state and national portals) and college portals 	CCG201-4
10	Making use of Internet (Email, virus protection.)	<ul style="list-style-type: none"> • Register for e-mail ID. • Communicate with others using e-mail • Installation, use of Anti-virus software, 	CCG201-4
11	Mini Project	<ul style="list-style-type: none"> • Mini Project based presentation, database & spreadsheet handling, word processing skills. 	CCG201-1 to -4

7. CONTENT:

Sr. No.	Topics / Sub-topics	Lectures (Hours)
<i>Course Outcome CCG201-1: State basic components & applications of a computer system.</i>		
1	<p>INTRODUCTION TO COMPUTERS</p> <p>1.1 Introduction to Information Technology</p> <p>1.2 Basic computer components:- Block of Computer System, I/O Unit, CPU, ALU, Memory Unit.</p> <p>1.3 Internal System Components:- Processor, Motherboards, RAM, ROM, Graphics Cards, Sound Cards, HDD, SSD (Introduction to latest devices for all above points)</p> <p>1.4 External System Components:- Introduction to <u>Input Devices</u>- Keyboards, mouse, joystick, pen , scanners, (Introduction to latest types)</p> <p><u>Output Devices</u>-Monitors, Projectors, Speakers, Printers (Introduction to latest types)</p> <p>1.5 Secondary Storage Devices:- CD/DVD , USB/ Flash Dives, External Hard Disks (Introduction to latest types)</p> <p>1.6 Applications of IT -Education, Medical, ,Computer application in Offices, data analysis ,accounting, Investment, inventory control, graphics, database management, Instrumentation, Airline and railway ticket reservation, robotics, artificial intelligence, military, design and research work, financial transaction terminals.</p>	6
<i>Course Outcome CCG201-2: Classify system and application software of a computer system.</i>		
2	<p>INTRODUCTION TO SOFTWARE</p> <p>2.1 Types of software</p> <p>2.1.1 System software - Introduction to Operating System(Various Examples of Desktop and Mobile Operating Systems), Device Drivers, Device Manager</p> <p>2.1.2 Application Software: Terminology, Examples - Word Processing , Spreadsheets, Presentation tool, Image & Video Editing Software, Database Management applications</p>	4
<i>Course Outcome CCG201-3: Design files of word processors, spreadsheets, presentation software, and database application.</i>		
3	<p>WORD PROCESSING AND SPREAD SHEETS:</p> <p>3.1 Creating and Editing a Document</p> <p>3.1.1 Changing Layout of a Document(Design, Margins , Page Orientation, Borders, Themes, Watermark)</p> <p>3.1.2 Inserting Elements to Word Documents(Shapes Charts, Image, Header Footer, Page number)</p>	8

Sr. No.	Topics / Sub-topics	Lectures (Hours)
	3.1.3 Working with Tables 3.1.4 Mail Merge 3.2 Creating and Editing a Spreadsheet 3.2.1 Changing Layout of a Spreadsheet (Design, Margins , Page Orientation, Borders,) 3.2.2 Inserting Elements to Spreadsheet (Shapes Charts, Image, Header Footer, Page number) 3.2.3 Working with Formulas and Data Validation 3.2.4 Working with Sorting and Filtering	
4	PRESENTATION AND DATABASE: 4.1 Creating and Editing a Presentation 4.1.1 Changing Layout of a Presentation (Slide Design, Orientation, Themes, Animation) 4.1.2 Inserting Elements to Presentation (Shapes Charts, Image, Header Footer, Page number) 4.1.3 Preparing Slide Show 4.2 Creating and Editing a Database	6
<i>Course Outcome CCG201-4: Describe importance of Internet and cyber laws.</i>		
5	COMPUTER NETWORKS 5.1 Basic elements of a communication system 5.2 Introduction to Digital & Analog data 5.3 Types of Networks : LAN, MAN, WAN 5.4 Virus, Types of Viruses, Virus Protection	4
6	INTERNET & CYBER LAWS 6.1 Internet basic terminology – Web page , Web site, WWW, HTTP, HTML, 6.2 Client, server concepts 6.3 Introduction to ISP with example 6.4 Various examples of Browsers, Search Engines 6.5 Awareness about Digital India portals (state and national portals) and college portals. 6.6 Introduction to Cyber Law 6.7 Information Technology Act of India 2000, 2008	4

8. PROGRESSIVE SKILLS TEST :

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	02
3	Neat & complete Diagram.	04
4	Observations & computer handling skill	02
5	Use of toolbar, menu bar and short cut keys.	04
6	Logical thinking and approach	04
7	Oral Based on Lab work and completion of task	04
TOTAL		25

Assessment at semester end practical exam as per Pro-forma II.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Technical ability	20
2.	Communication skill	10
3.	Logical approach	20
TOTAL.		50

9. INSTRUCTIONAL STRATEGIES:

InstructionalMethods:

1. Lectures cum Discussions
2. Regular HomeAssignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
- 2.Slides(PPT)
3. Self-learning Online Tutorials

10. REFERENCE MATERIAL:**a) Books / Codes**

Sr. No.	Author	Title	Publisher
1.	Sanjay Saxena	A first course in Computers 2003 edition	Vikas Publishing House Pvt Limited
2.	Anita Goel	Computer Fundamentals	Pearson Education India
3.	Sudipto Das	A Complete Guide to Computer Fundamentals	Laxmi Publications
4.	P.K.Sinha	Computer Fundamentals	BPB Publication

b) Websites

- i. https://www.tutorialspoint.com/computer_fundamentals/index.htm
- ii. <http://kvsecontents.in/computer-fundamentals>
- iii. <https://www.javatpoint.com/computer-fundamentals-tutorial>
- iv. https://www.tutorialspoint.com/information_security_cyber_law/quick_guide.htm
- v. https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

COURSE ID: 13

Course Name : COMMUNICATION SKILLS IN ENGLISH
Course Code : CCG203
Course Abbreviation : GCMS

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : <nil>

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	03	05
Practical	02	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End			Total
	Theory	Practical	Theory	Practical *	TW	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 10 marks	One Mid-Term Skill Test(2 hrs)	Term End Theory Exam (02 hours)	Term End Practical Internal Exam (02 hours)	As per Proforma II.	
Marks	10	--	40	50I	--	100

* Practical Examination to be conducted by internal examiner (course teacher) and external examiner (course teacher of different class from the Institute) and marks to be entered as per Proforma II.

2. RATIONALE:

Communication being an integral part of every personal and professional human activity, communication skills plays a fundamental role in education as well as technology. As a unanimous feedback from the industry in general, technicians need to be specially strengthened in communication skills for their effectiveness in profession and career. Considering the age group and socio-economical background of the students of the Institute, this course has been designed with a skill-oriented content with some necessary theoretical foundation. For mastery and perfection in these skills, consistent practice and integrated application is necessary in all subjects of the Programme.

3. COMPETENCY :

Apply principles of communication to communicate in formal and informal scenario as follows:

Cognitive : Understanding and applying principles of communication in various situations

Affective : Attitude of i) perfection ii) confidence iii) punctuality & iv) aesthetic presentation

Psychomotor : i) Use of correct pronunciation, tone, accent & intonation

ii) writing formal letters, drafts, reports, draft e-mails and prepare technical documents etc.

iii) Use of correct nonverbal code in formal & informal situations

iv) Speaking in formal & informal situations

4. COURSE OUTCOMES :

CCG203-1 Understand the concept of Communication and identify Communication barriers.

CCG203-2 Deliver Speeches to express thoughts, ideas and emotions.

CCG203-3 Write letters, reports, and E-mail in correct language.

CCG203-4 Make effective use of body language & graphical communication.

CCG203-5 Prepare and present simple media aided presentation.

CCG203-6 Prepare and face interview.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note : Correlation levels :1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1	PSO2
Competency : Apply principles of communication to communicate in formal and informal scenario.	3	2	3	-	2	2	2		
CCG203-1	2	2	2	-	-	1	-		
CCG203-2	3	2	3	-	2	-	2		
CCG203- 3	2	2	3	-	2	2	1		
CCG203-4	2	2	2	-	2	-	2		
CCG203-5	2	2	2	-	-	-	-		
CCG203-6	2	2	3	-	2	-	-		

6.CONTENT:**ASSIGNMENTS:****Practical Exercises and related skills to be developed:**

The following practical exercises shall be conducted as practical assignments as given in the *Workbook on Communication Skills* developed by the Institute in practical sessions of batches of about 22 students:

Sr No.	Title of Practical Exercise	Skills / Competencies to be Developed	Course Outcome
1	Characteristics of Communication Process	Analysis of communication process	CCG203-1
2	My Communication Barriers	Self analysis	CCG203-1
3	Oral Communication : Prepared Speech	Preparing and delivery	CC G203-2
4	Oral Communication : Extempore Speech	Creative thinking and speaking	CC G203-2
5	Oral Communication : Conversation	Listening, thinking and speaking	CC G203-2
6	Oral Communication : Group Discussion	Listening, thinking and convincing	CC G203-2
7	Oral Communication : Group Debate	Listening, thinking and convincing	CC G203-2
8	Written Communication : Writing formal Letters	Drafting	CCG203-3
9	Written Communication : Writing Reports	Drafting with comprehension	CCG203-3
10	Written Communication : Drafting of E-mail	Drafting	CCG203-3
11	Written Communication : Technical Writing	Drafting	CCG203-3
12	Non-verbal Communication : Graphic Communication	Graphic skills	CCG203-4
13	Non-verbal Communication : Body Language	Body language	CCG203-4
14	Using Presentation Aids	Preparing Presentation Aids	CCG203-5
15	Interview Techniques	Facing an Interview	CCG203-6

7.THEORY :

Sr. No.	Topics / Sub-topics	Lecture s (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG203-1 Understand the concept of Communication and identify Communication barriers.</i>			
1	INTRODUCTION TO COMMUNICATION 1.1 Definition and Importance of Communication 1.2 Model of communication 1.3 Principles of effective communication 1.4 Types of communication : Formal, Informal, Oral, Written, Verbal, Non Verbal, Horizontal, Upward and Downward. 1.5 Barriers in communication : Physical, Mechanical, Psychological and Language.	10	12
<i>Course Outcome CCG203-2 Deliver Speeches to express thoughts, ideas and emotions.</i>			
2	ORAL COMMUNICATION 2.1 Characteristics of Oral Communication. 2.2 Tone, pronunciation and accents. 2.3 Spoken English: Conversation, Prepared and Extempore speech, Group Discussion and Debate.	08	04
<i>Course Outcome CCG203-3 Write letters, reports, and E-mail in correct language.</i>			
3	WRITTEN COMMUNICATION 3.1 Characteristics of written communication. 3.2 Writing Reports : Accident, Progress & Fall in Production 3.3 Letter Writing : Application with Resume, Enquiry Letter, Complaint Letter and Order Letter. 3.4 E-mail Drafting 3.5 Technical Writing:	12	10
<i>Course Outcome CCG203-4 Make effective use of body language & graphical communication.</i>			
4	NON-VERBAL COMMUNICATION 4.1 Importance of Non-Verbal Communication.	06	06

	4.2 Non Verbal Codes : Proxemics, Chronemics & Artefacts 4.3 Aspects of Body Language : Facial Expressions, Eye Contact, Vocalics, Gestures, Posture, Dress and Appearance & Haptics. 4.4 Graphical Communication : i) Advantages and Disadvantages of Graphical Communication. ii) Tabulation of Data and its depiction in the form of Bar Graphs and Pie Charts		
Course Outcome CCG203-5 Prepare and present simple media aided presentation.			
5	MEDIA AIDED PRESENTATION 5.1 Media aids for presentation: strengths and precautions 5.2 Planning, preparing and making a presentation 5.3 Use of presentation media.	06	04
Course Outcome CCG203-6 Prepare and face Interview			
6	INTERVIEW TECHNIQUES 6.1 Types of Interview 6.2 Advantages of Mock Interview. 6.3 Facing an Interview	06	04
	Total	48	40
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

8. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Course outcome	Total Marks
		Remember	Understand	Application		
1	Introduction to Communication	02	06	04	CCG203-1	12
2	Oral Communication	00	02	02	CCG203-2	04
3	Written Communication	02	02	06	CCG203-3	10
4	Non-verbal Communication	02	02	02	CCG203-4	06
5	Media aided Presentation	00	02	02	CCG203-5	04
6	Interview Techniques	00	02	02	CCG203-6	04
	Total >>	06	16	18		40

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

9. INDUSTRIAL EXPOSURE:

(Included in *Workbook on Communication Skills*)

SN	Mode of Exposure	Topic
1.	Oral and Written Communication Exercises	Industrial situations
2.	Interview Techniques Exercises	Industrial situations

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

d) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Workbook on Communication Skills*.

Domain	Particulars	Marks out of 25
Cognitive	Understanding	06
	Application	06
Psychomotor	Presentation Skills	04
	Drafting skills	05
Affective	Discipline and punctuality	02
	Decency	02
TOTAL		25

ii) Progressive Skill Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given in *Workbook on Communication Skills*

Final marks of practical assignments shall be awarded as per *Assessment Pro-forma II*.

e) Assessment Criteria for Term-end Practical Examination:

Term-end Practical Examination shall be conducted by internal examiner (course teacher) and external examiner (course teacher of different class from the Institute) as per the following criteria.

Item >	Oral	Written	Total	Marks Converted out of
Marks >	25	25	50	25

11. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Demonstrations
2. Classroom practices
3. Self Learning Methods using Language Lab

Teaching and Learning Resources:

1. Chalk board
2. LCD Projector
3. Audio Visual Streaming
4. Item Bank

12. REFERENCE MATERIAL :**a) Books / Journals / IS Codes**

Sr. No.	Author	Title	Publisher
1.	K. Sudhesh	Development of Generic Skills	Nandu Printers & Pub, M'bai
2.	M Ashraf Rizvi	Effective Communication Skills	Tata McGraw-Hill
3.	Burgoon Michael	Human Communication	SAGE Publications Inc.
4.	Sanjay Kumar & Pushp Lata	Communication Skills	Oxford University Press
5.	Barun Mitra	Personality Development & Soft Skills	Oxford University Press
6.	Geoffrey Leech and Jansvartvik	A communicative Grammar of English	Pearson Education ESL
7.	Elizabeth Hiemey	101 ways to better communication	Pustak Mahal
8.	Thomas Huckin and Leslie	Technical Writing and Professional Communication	McGraw Hill College Division

b) Websites

- i) www.clrp.cornell.edu/workshops/pdf/communication_skills-web.pdf
- ii) http://depssa.ignou.ac.in/wiki/images/c/ca/Communication_skills_in_English.pdf
- iii) <http://www.cgg.gov.in/Handbook%20on%20Communication%20Skills.pdf>
- iv) <http://www.stf-media.com/31-0-Presentations.html>
- v) www.speaking-tips.com
- vi) www.notesdesk.com
- vii) www.studylecturenotes.com
- viii) <http://learnenglish.britishcouncil.org/en/content>
- ix) www.languagelabsystem.com

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COURSE ID: 14

Course Name : ENVIRONMENTAL SCIENCE(ME/EE/IE/IT/ET/MT)
Course Code : CCG204
Course Abbreviation : GEVS

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Nil
Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	02	Nil
Practical	-	

2. RATIONALE :

Increase in environmental pollution and depletion of natural resources is causing depletion of ecosystem. Therefore it is necessary to conserve natural resources and to protect the environment. Environmental studies integrates Physical, Chemical and Biological sciences with the study of the environment. It provides interdisciplinary approach to the study of environmental system & gives solutions of environmental problems.

3. COMPETENCY :

Apply knowledge of environmental science to tackle environment related issues.

Cognitive : Understanding, interpreting issues of environment in engineering practices.

Affective : Skill of curiosity, interest and problem solving related to environmental issues.

4. COURSE OUTCOMES :

CCG204-1 Develop public awareness about environment.

CCG204-2 Select alternative energy resources for Engineering Practices.

CCG204-3 Understand &conserve Ecosystem

CCG204-4 Apply techniques to reduce Environmental Pollution.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
 “-” : no correlation]

Competency & CO	Programme Outcomes POs and PSOs							
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/ development of solutions	PO 4 Engineering Tools, experimentation and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1 PSO2
Competency: Apply knowledge of environmental science to tackle environment related issues.	3	2	1	-	3	1	3	
CCG204-1	3	1	1	-	3	1	3	
CCG204-2	3	2	1	-	3	1	3	
CCG204-3	2	1	1	-	2	1	3	
CCG204-4	3	2	2	-	3	2	3	

6. CONTENT :

THEORY :

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG204-1 Develop public awareness about environment.</i>			
1	ENVIRONMENT <ul style="list-style-type: none"> 1.1 Definition, need of environmental studies. 1.2 Segments of environment – Atmosphere, Hydrosphere, Lithosphere, Biosphere. 1.3 Environmental issues – Green house effect, Global warming, Acid rain, Ozone layer depletion. 1.4 Concept of 4R (Reduce, Reuse, Recycle & Recover). 	6	NA

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG204-2 Select alternative energy resources for Engineering Practices.</i>			
2	ENERGY RESOURCES <ul style="list-style-type: none"> 2.1 Renewable, Non-renewable & Cyclic resources. 2.2 Causes & effects of depletion of resources. 2.3 Energy forms (conventional & non-conventional). 2.4 Energy conservation. 2.5 Over use of natural resources & its impact on Environment. 	10	NA

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome CCG204-3 Conserve Ecosystem and biodiversity</i>			
3	ECOSYSTEM <ul style="list-style-type: none"> 3.1 Ecosystem – Definition. 3.2 Division of ecosystem. 3.3 General characteristics of ecosystem. 3.4 Food chain. 	4	NA
<i>Course Outcome CCG204-4 Apply techniques to reduce Environmental Pollution.</i>			
4	ENVIRONMENTAL POLLUTION <ul style="list-style-type: none"> 4.1 Definition of pollution. 4.2 Types – Natural & Artificial (Man made) 4.3 Soil / Land pollution – <ul style="list-style-type: none"> 4.3.1 Causes & effects on environment & lives. 4.3.2 Preventive measures. 4.4 Water pollution – <ul style="list-style-type: none"> 4.4.1 Sources of water pollution. 4.4.2 Effects on environment & lives. 4.4.3 Preventive measures. 4.4.4 BIS water quality standards. 4.4.5 Water conservation. 4.5 Waste water – <ul style="list-style-type: none"> 4.5.1 Generation (Domestic & Industrial). 4.5.2 Impacts. 4.5.3 CPCB norms of sewage discharge. 4.6 Air pollution – <ul style="list-style-type: none"> 4.6.1 Causes. 4.6.2 Effects. 4.6.3 Prevention. 	12	NA

	<p>4.7 Noise pollution –</p> <p>4.7.1 Sources.</p> <p>4.7.2 Effects.</p> <p>4.7.3 Prevention.</p> <p>4.7.4 Noise levels at various zones of the city.</p> <p>4.8 Municipal solid waste, Bio-medical waste & e-waste –</p> <p>4.8.1 Sources.</p> <p>4.8.2 Generation.</p> <p>4.8.3 Characteristics.</p> <p>4.8.4 Effects & methods to manage.</p>		
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7. INSTRUCTIONAL STRATEGIES :

Instructional Methods :

- 1. Lectures cum Discussions 2. Regular Home Assignments.
- 3. Visit to relevant Industries/ Public places

Teaching and Learning resources:

- 1. Chalk board. 2. Video clips. 3. Slides 4. Charts

8. REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	Nazaroff, William, Cohen, Lisa	Environmental engineering science.	Willy, New York, 2000, ISBN 10:0471144940
2.	C.N.R.Rao	Understanding Chemistry	Universities press (India) Pvt. Ltd., 2011
3	Shashi Chawla	A text book of Environmental Studies.	Tata Mc Graw-Hill New Delhi.
4	Arvind Kumar	A text book of Environmental Science.	APH Publishing New Dehli.
5	Rao, C.S.	Environmental Pollution Control and Engineering.	New Age International Publication, 2007, ISBN: 81-224-1835-X

b) Websites

- viii) <http://www.conserve-energy-future.com>
- ix) <http://www.cpcp.gov.in>
- x) <http://www.indiaenvironmentportal.org.in>
- xi) <http://www.eco-prayerl.org>
- xii) <http://www.sustainable development.un.org>
- xiii) <http://www.whatis.techtarget.com>

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COURSE ID:15

Course Name : ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE
Course Code : CCG205
Course Abbreviation : GITK

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : <nil>

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	02	00
Practical	00	

Evaluation Scheme :

Mode of Evaluation	Progressive Assessment		Term End			Total
	Theory	Practical	Theory	Practical *	TW	
Marks	From the assessment of submission on given topics the teacher should evaluate the student and assign him grades as mentioned at ##.					

2. RATIONALE:

The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature. Holistic life style of yogic science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions.

The course is introduced to get knowledge in Indian Philosophical Foundations and to know Indian Languages and Literature and the fine arts in India & their Philosophy. It also aims to explore the Educational system, Science and Scientists of Ancient, Medieval and Modern India.

3. COMPETENCY:

Ability to interpret, connect up and explain basics of Indian traditional knowledge in modern scientific perspective.

Cognitive : Summarize philosophy of Indian culture and Distinguish the Indian languages and literature among difference traditions..

Psychomotor : Acquire the information about the fine arts in India.

Affective : Attitude of Unity in diversity, Tolerance and Universal acceptance, cultural synthesis and values of life.

4. COURSE OUTCOMES :

CCG205-1: Summarize and classify philosophy of Indian culture of ancient, medieval and modern India.

CCG205-2: Distinguish the Indian languages and literature among different traditions.

CCG205-3: Differentiate between Dharma and Religion.

CCG205-4 : Acquire the information about the fine arts in India.

CCG205-5: Study the contribution of education systems of different eras in India.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note : Correlation levels :1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1	PSO2
Competency : Ability to interpret, connect up and explain basics of Indian traditional knowledge in modern scientific perspective.	-	-	-	-	1	-	-	-	-
CCG205-1	-	-	-	-	1	-	-	-	-
CCG205-2	-	-	-	-	1	-	-	-	-
CCG205-3	-	-	-	-	1	-	-	-	-
CCG205-4	-	-	-	-	1	-	-	-	-
CCG205-5	-	-	-	-	1	-	-	-	-

6.CONTENT:

Suggested Assignments:

Practical Assignments and related skills to be developed:

The following practical exercises / assignments shall be conducted and the student should be assessed for attainment of the competency (any 08 assignments).

Sr No.	Title of Practical Exercise	Skills / Competencies to be Developed	Course Outcome
1.	Write the definition of Health according to WHO and describe important components of it.	1) Interpret the definition of Health. 2) Understand different components of Health.	CCG205-1
2.	Give introduction of any one Religious book.	1) Search different religious books. 2) Select a religious book of our own choice and study it.	CCG205-2
3.	Collect information about "Anapansati", the method of meditation. Conduct a session of Anapansati with your family members, submit photographs of the session, and discuss the after effects amongst the meditators.	1) Collect information about meditation methods. 2) Meditate and interpret the mental state before and after the meditation sessions.	CCG205-3
4.	Write an essay on any one Indian traditional festival. Prepare a relevant festival dish and submit a photograph of the dish.	1) Gather the information about Indian traditional festivals. 2) Understand the science and psychology behind the festive culture of India.	CCG205-3
5.	Collect pictures / photographs of any five objects received during the excavation of "Sindhu culture" era and write their descriptions.	1) Search the pictures / photographs of ancient age. 2) Read and interpret information about our heritage.	CCG205-4
6.	Prepare / construct any model (like pair of oxen, figurine of God or human face etc.) from soil, mud, clay or any other material	1) Construct a model using soil. 2) Enjoy the artistic experiences.	CCG205-4
7.	Collect and write information of any five herbal medicinal plants. Grow one of them and submit the photograph.	1) Search herbal medicinal plants and interpret their applications. 2) Grow different types of plants.	CCG205-4
8.	Collect information about "Nalanda University" and write a short-note about it	1) Collect information of Indian ancient universities. 2) Interpret their contribution in	CCG205-5

	with reference to its establishment, progress, contribution, causes of destruction etc.	building India as a nation.	
9.	Write a descriptive note on the role of Indian mathematician in the development of mathematics.	1) Collect information about ancient Indian scientists and mathematicians. 2) Prepare a write-up of great Indian scientists – mathematicians.	CCG205-5
10.	Prepare a role play (in a group of 5 / 6 students) based on "Daily life in Gurukul".	1) Conduct a role play on any topic. 2) Understand value based education and its significance in daily life.	CCG205-5
11.	Write a descriptive note on "Maritime Trade in Ancient India".	1) Gather information about trad in ancient India. 2) Understand the position of India in world trade market and India's contribution in it.	CCG205-4

7. THEORY :**SECTION-I**

Sr. No .	Topics / Sub-topics	Lectures (Hours)
<i>Course Outcome CCG205-1: Understand philosophy of Indian culture of ancient, medieval and modern India.</i>		
1.	Introduction to Indian Philosophy: 1.1 Basics of Indian Philosophy 1.2 culture & civilization 1.3 culture and heritage 1.4 Importance of culture in human literature 1.5 General characteristics of Indian culture – Unity in diversity, Tolerance and Universal acceptance, वसुधैर् कुटुंबकम् (The World is a family), Freedom of worship (रुचीनां वैचित्राद्यजुकुटिलनानापथजुषाम्। नृणामेको गम्यस्त्वमसि पयसामर्णव इव॥), Cultural synthesis- not cultural conflicts, unbroken traditions, 1.6 Indian culture Ancient India, Medieval India, Modern India.	4
<i>Course Outcome CCG205-2: Distinguish the Indian languages and literature among different traditions</i>		

2.	<p>Indian Philosophy & Literature:</p> <p>2.1 Tradition of metaphysical knowledge 2.2 Vedas & Upanishads 2.3 Schools of Vedanta, and other religion Philosophical Literature 2.4 Philosophical Ideas 2.5 The role of Sanskrit 2.6 Significance of scriptures to current society Indian languages and literature of India.</p>	6
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Course Outcome CCG205-3: Differentiate between Dharma and Religion.

3.	<p>Dharma, Religion and Philosophy:</p> <p>3.1 Meaning of Dharma as duties of Human being, (जगतः स्थितिकारणं प्राणिनां साक्षात् अभ्युदयनि:श्रेयसहेतुर्यः स धर्मः, आगमानां हि सर्वेषाम् आचारः श्रेष्ठ उच्यते । आचारप्रभवो धर्मो धर्मादायुर्विवर्धते ॥) 3.2 Dharma and Religion 3.3 Religious Philosophy in ancient India 3.4 Religious Philosophy in Medieval India Religious Reform Movements in Modern India (selected movements only)</p>	6
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Course Outcome CCG205-4 : Acquire the information about the fine arts in India

4.	<p>Indian Fine Arts & Its Philosophy (Art, ,ScienceTechnology & Engineering):</p> <p>4.1 Indian Painting 4.2 Indian handicrafts 4.3 Music, divisions of Indian classic music, modern Indian music 4.4 Dance and Drama 4.5 Indian Architecture - ancient, medieval and modern Science and Technology in Indian, development of science in ancient, medieval and modern Indian.</p>	8
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Course Outcome CCG205-5: Study the contribution of education systems of different eras in India

5.	<p>Education System in India:</p> <p>5.1 The role of "Gurukulas" in Education System 5.2 Value based Education 5.3 Education in ancient, medieval and modern India, aims of education, subjects, languages Science and Scientists of Ancient India, Scientists of Medieval India, Scientists of Modern India.</p>	8
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8. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS

Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per following table.

Domain	Particulars	Marks out of 25
Cognitive	Understanding the objective	05
Psychomotor	Manual work and Observation	10
Affective	Discipline and punctuality	05
	Presentation of concept	05
TOTAL		25

Grade to the students should be allotted as follows:-

Range of continuous assessment marks	Grade
continuous assessment marks > 90	A +
90 = / > continuous assessment marks > 85	A
85 = / > continuous assessment marks > 80	B +
80 = / > continuous assessment marks > 75	B
75 = / > continuous assessment marks > 70	C +
70 = / > continuous assessment marks > 60	C

9. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Collaborative mini projects.
3. Regular Home Assignments.

Teaching and Learning Resources:

1. Chalk board
2. Video clips
- 3.PPT
4. Charts

10. REFERENCE MATERIAL:**a) Books / Journals / IS Codes**

Sr. No.	Author	Title	Publisher
1.	श्रीनिवास हरी दीक्षित	भारतीय तत्त्वज्ञान	अजब पुस्तकालय, कोल्हापूर
2.	S. Radhakrishnan	Indian Philosophy Vol. 1	OUP India ISBN: 9780195698411, 9780195698411 Edition: 2009
3.	Suresh Soni	India's Glorious Scientific Tradition	Prabhat Prakashan ISBN: 9788184300284, 9788184300284
4.	प्रशांत पोळ	भारतीय ज्ञानाचा खजिना	
5.	Krishna Chaitanya	Arts of India	Abhinav Publications, 1987
6.	NCERT	"Position paper on Arts, Music, Dance and Theatre"	ISBN 81-7450-494-X, 2006
7.	Satya Prakash	"Founders of Sciences in Ancient India"	Vijay Kumar Publisher, 1989
8.	Altekar. A. S.	Education in ancient India.	Banaras: Nanda Kishore & Bros. 1948.

b) Websites

- I. [https://nios.ac.in/online-course-material/secondary-courses/indian-culture-and-heritage-\(223\)-syllabus.aspx](https://nios.ac.in/online-course-material/secondary-courses/indian-culture-and-heritage-(223)-syllabus.aspx)
- II. <http://ncert.nic.in/textbook/pdf/heih111.pdf>

* * *

COURSE ID:16

Course Name : INDIAN CONSTITUTION
Course Code : CCG206
Course Abbreviation : GINC

1. TEACHING SCHEME:

Pre-requisite Course(s) : <nil>

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	02	NIL
Practical	NIL	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End			Total
	Theory	Practical	Theory	Practical *	TW	
Marks	From the assessment of submission on given topics the teacher should evaluate the student and assign him grades as mentioned at #.					

2. RATIONALE:

The course is designed to have basic knowledge of our Constitution, Its formation and process of forming the constitution and its importance. Also it is expected that the student should at least know the political system of nation, state, district and village also.

The judiciary system is also important part in the life of person and it is expected that the diploma student must at least know the system and its provisions in brief.

3. COMPETENCY :

Ability to understand, connect up and explain basics of Indian constitution, Indian Politics and Indian judiciary in brief.

Cognitive : Understand philosophy of Indian Constitution and Politics.

Psychomotor : Acquire the information about Politics, Judiciary and constitutional provisions.

Affective: Know the provisions of constitutions and legal process of changing the provisions in constitutions, political impacts on human life and provisions in judiciary and their importance.

4. COURSE OUTCOMES :

- CCG206-1:** Understand philosophy of Indian constitution.
CCG206-2: Know the formation process of state and central Government.
CCG206-3: Concept of Union Territory and provisions.
CCG206-4 : Indian Politics .
CCG206-5: Study the Judiciary system in India.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note : Correlation levels :1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1	PSO2
Competency : Understand philosophy of Indian constitution	0	1	1	0	1	1	2		
CCG206-1:	1	0	1	0	1	1	2		
CCG206-2:	0	1	1	1	2	1	2		
CCG206-3:	0	1	1	1	1	1	2		
CCG206-4 :	0	0	1	1	2	2	2		
CCG206-5:	0	1	1	1	2	2	3		

6. CONTENT:

Suggested Assignments: It is expected that the student should prepare write up of at least 5 topics as a home work and submit report to the teacher before the grant of term.

7. THEORY :**SECTION-I**

Sr. No .	Topics / Sub-topics	Lectures (Hours)
1	UNIT 1. THE CONSTITUTION 1.1 Introduction. 1.2 The History of making of the Indian Constitution. 1.3 Basic structure and its interpretation. 1.4 Fundamental Rights and Duties and their interpretation	4
2	UNIT 2 .UNION GOVERNMENT 2.1 Structure of the Indian Union. 2.2 President –Role and power. 2.3 Prime minister and council of ministers. 2.4 Lok sabha and Rajya Sabha. 2.5 Union Territories and their limitations.	6
3	UNIT 3. STATE GOVERNMENT 3.1 Governer –Role and power. 3.2 Chief Minster and council of ministers. 3.3 State secretariat. 3.4 Administrative Regions of Maharashtra.	6

SECTION -II

4	UNIT.4 LOCAL ADMINISTRATION 4.1 District Administration. 4.2 Municipal Corporation. 4.3 Zilla Panchayat 4.4 Taluka (Tahasil) Administration .	4
5	UNIT 5. ELECTION COMMISSION 5.1 Role and functioning. 5.2 Chief Election Commissioner –Appointment. 5.3 State Election Commission. 5.4 Elections and duties of government /Non government servants – introduction	6
6	UNIT 6. JUDICIARY PROVISIONS 6.1 Introduction 6.2 Different courts. 6.3 Government legal advisor-provisions. 6.4 Limitations of courts and co-ordination with Home department.	6

- vi) **ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS :-** It is expected that the student should prepare write up of at least 5 topics as a home work and submit report to the teacher before the grant of term.
1. Indian constitution formation .
 2. Indian constitution important provisions.
 3. Formation of Indian government process.
 4. Power of president and prime minister/important facilities to them.
 5. District administration along with administration at municipal corporation, tahasil and jilha panchayat.
 6. Election commission and their responsibilities.
 7. Judiciary system in india-District courts and their limitations.

Continuous Assessment of Practical Assignments: No practical's but student should write at least 5 assignments on above topics..

8. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions.

Teaching and Learning Resources:

1. Chalk board 2. Video clips 3.PPT 4. Suggested websites.

9. REFERENCE MATERIAL :

Suggested Learning Resources

Sr.no	Title of Book	Author	Publication
1	Ethics and Politics of Indian constitution	Rajiv Bhargava	Oxford University -New Delhi-2008
2	The Constitution Of India	B.L.Fadia	Sahitya Bhawan- 2017 edition
3	Introduction to constitution of Indian	D.D.Basu	Lexis Nexis- 2018 Edition
4	Maharashtra Shasan diary		

Suggested softwares /Learning websites:-

1. <https://www.constitution.org/cons/india/const.html>
2. <https://www.legislative.gov.in/constitution-of-india>
3. <http://www.sci.gov.in/constitution>
4. <http://www.toppr.com/guide/civics/the-indian-constitution/the-constitution of india>

Grade to the students should be allotted as follows:-

1. If the student scores marks more than 90 percent - Grade A +
2. If the student scores marks more than 85 percent - Grade A
3. If the student scores marks more than 80 percent - Grade B +

4. If the student scores marks more than 75 percent - Grade B
5. If the student scores marks more than 70 percent - Grade C +
6. If the student scores marks more than 60 percent - Grade C

LEVEL-III BASIC TECHNOLOGY COURSES

COURSE ID :17

Course Name : APPLIED MATHEMATICS
Course Code : ITG301
Course Abbreviation : GAPA

1. TEACHING AND EVALUATION SCHEME :

Pre-requisite Course(s) : CCG105 & CCG118

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	03	04
Tutorial	01	

Evaluation Scheme :

Component Details and Duration	Progressive Assessment		Term End		Total
	Theory	Tutorials	Theory	Practical	
	Average of two tests of 20 marks each	As mentioned in the syllabus	Term End Theory Exam (03 hours)	NIL	
Marks	20	--	80		100

2. RATIONALE:

Mathematics is an important pre-requisite for the development and understanding of engineering and technological concepts. For an engineer and technologist, knowledge of Mathematics is an effective tool to pursue and to master the applications in the engineering and technological fields. Applied mathematics is designed for its applications in engineering and technology. It includes integration, differential equation. The connection between applied mathematics and its applications in real life can be understood and appreciated. Integral calculus helps in finding the area. Differential equation is used in finding curve, rectilinear motion. Statistics and probability will help a student to analyze data of large volume in their higher studies. The fundamentals of these topics are directly useful in understanding engineering applications in various fields.

3. COMPETENCY:

The course should be taught and implemented with the aim to develop the course outcomes (CO's) for the student to acquire the competency needed to apply the mathematical techniques for engineering subjects.

- Cognitive:** understanding and applying principles of mathematics to engineering problems
- Psychomotor:** To prepare charts displaying the area of irregular shapes using the concept of integration, prepare charts to displaying grouped and ungrouped data

3. **Attitude:** discipline, consistency, hard work , to concentrate ,accuracy, punctuality, aesthetics

4. COURSE OUTCOMES(CO's)

ITG301-1 To solve examples on integration using various techniques

ITG301-2 To solve examples on measures of dispersion

ITG301-3 To solve Differential equation of first order and first degree by various methods

ITG301-4 To solve problems on Probability using addition theorem and Probability distributions

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and disciplin e specific knowled ge	PO 2 Problem Analysis	PO 3 Design / Develop ment of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Managem ent	PO 7 Life-long Learning	PSO1 Design and developmen t	PSO2 Database and Network management
Competency: The course should be taught and implemented with the aim to develop the course outcomes (CO's) for the student to acquire the competency needed to apply the mathematical techniques for engineering subjects.	3	1	2	2	2	2	3	2	1
ITG301-1:	3	1	1	2	3	2	3	1	--
ITG301-2:	3	1	1	2	3	2	2	1	==
ITG301-3:	3	2	3	2	2	2	3	2	2
ITG301-4:	3	3	3	2	2	2	2	2	2

6. CONTENT:

A) SUGGESTED TUTORIALS

A.1 Tutorials and related skills to be developed : (Tutorials marked as * are compulsory)

Tutorial Work:

Tutorials and related skills to be developed :

Sr. No .	Title of Experiment	Skills to be developed	Course outcome
*1	Indefinite Integrals	1. To evaluate Integration using standard formulae 2. To evaluate Integration using Substitution Method	ITG301-1
*2	Indefinite Integrals	To evaluate Integration of Various forms.	ITG301-1
*3	Indefinite Integrals	To evaluate Integration using by Parts rule and Partial fraction method	ITG301-1
*4	Definite Integrals	To evaluate Define Integration for various forms and using properties.	ITG301-1
*5	Measures of dispersion	To solve examples on Range, Mean deviation and Standard deviation	ITG301-2
*6	Differential equations	1. To determine Order and Degree of D.E.. 2. Examples on V.S. form , Homogeneous form	ITG301-3
*7	Differential equations	Examples on Linear of D.E and Exact D.E.	ITG301-3
*8	Probability	To solve examples on probability	ITG301-4
*9	Probability distribution	To solve examples on Bonomial and Poisson distribution	ITG301-4
*10	Probability distribution	To solve examples on Normal distribution	ITG301-4

7. CONTENT:**SECTION I**

Sr. No .	Topics / Sub-topics	Lectures (Hours)	Theory Evaluatio n (Marks)
<i>Course Outcome ITG301-1: To solve examples on integration using various techniques</i>			
1	INDEFINITE INTEGRALS 1.1 Definition, Standard formulae 1.2 Rules of Integration(without proof), Examples 1.3 Integration by substitution 1.4 Integration by parts Integration by partial fractions	12	20
<i>Course Outcome ITG301-1: To solve examples on integration using various techniques</i>			
2	DEFINITE INTEGRALS 2.1 Definition, Examples 2.2 Properties of Definite Integration (without proof), Examples based on properties	06	10
<i>Course Outcome ITG301-2: To solve examples on measures of dispersion</i>			
3	MEASURES OF DISPERSION 3.1 Range 3.2 Mean deviation about mean 3.3 Standard deviation(except Assumed mean method and Step deviation method)	06	10
	Sub-Total	24	40

SECTION II

Sr. No .	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG301-3: Solve Differential equation of first order and first degree by various methods</i>			
4.	DIFFERENTIAL EQUATIONS 4.1 Definition of differential equation 4.2 Order & degree of Differential equations 4.3 Solutions of Differential equations of first order & first degree of following types 4.3.1 Variables separable 4.3.2 Homogenous Equation 4.3.3 Exact equations 4.3.4 Linear Equations	12	20
<i>Course Outcome ITG301-4: To solve problems on Probability using addition theorem and Probability distributions</i>			
5.	PROBABILITY 5.1 Mathematical definition of Probability of any event 5.2 Addition theorem of Probability 5.3 Examples	04	06
<i>Course Outcome ITG301-4: To solve problems on Probability using addition theorem and Probability distributions</i>			
6	PROBABILITY DISTRIBUTION 6.1 Binomial distribution 6.2 Poisson's distribution 6.3 Normal distribution	08	14
	Total	Sub	24
	Total		48
			80

8. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION:

Topic No.	Name of topic	Distribution of marks (level wise)			Course Outcome	Total Marks
		Remem	Comprehens	Applica		
1	Indefinite Integrals	4	6	6	ITG301.1	16
2	Definite Integrals	2	2	6	ITG301.1	10
3	Measures of dispersion	--	--	06	ITG301.2	06
4	Differential equations	4	4	8	ITG301.3	16
5	Probability	6	6	8	ITG301.4	20
6	Probability Distribution	2	4	6	ITG301.4	12
	Total	18	22	40		80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

9. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials
4. Online E Course Videos

10. REFERENCE MATERIAL:**b) Books / Codes**

S. No.	Title of Book	Author	Publication
1.	G.V. Kumbhojkar	Engineering Mathematics III	Phadake Prakashan, Kolhapur
2.	Patel Rawal	Applied Mathematics	Nirali Prakashan, Pune
3.	Sameer Shah	Applied Mathematics	Tech-Max Publication, Pune
4.	P.N.Wartikar	Applied mathematics	Pune vidyarthi Griha Prakashan , Pune
5.	H.K.Dass	Higher engineering mathematics	S .Chand publication
6.	B.S.Grewal	Higher engineering Mathematics	Khanna publication, New Delhi
7.	P.M.Patil & others	Applied mathematics	Vision Publication,Pune

c) Websites

- i) www.khanacademy.org
- ii) www.easycalculation.com
- iii) www.math-magic.com

COURSE ID : 18

Course Name : DIGITAL ELECTRONICS AND MICROPROCESSOR
Course Code : ITG302
Course Abbreviation: GDTE

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Basic Electronics (ITG104)

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	4	6
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (Internal)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-IV	
Marks	20	--	80	50I	150

2. RATIONALE:

It is essential to know fundamentals of digital electronics to understand the concept of microprocessor and its applications. Microprocessors benefits to meet challenges of growing applications of advanced microprocessor based technologies hence students are expected to be conversant with components of microprocessors and microprocessor based programming. This course is designed to help the students to design digital circuits and to understand the architecture of 8086 microprocessor. The course also enables students to develop assembly language programs using instruction set of 8086 microprocessor.

3. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences.

Cognitive: Understanding and applying logic to design digital circuits and microprocessor based applications.

Psychomotor: i) Designing combinational circuits using K-map techniques

ii) Developing microprocessor programs to fulfill application oriented need.

Affective: Attitude of i) precision ii) accuracy iii) punctuality

4. COURSE OUTCOMES:

ITG302-1: Test the logic gates, logic circuits and perform different binary arithmetic and number system conversion operations

ITG302-2: Construct combinational logic circuit.

ITG302-3: Construct sequential logic circuit.

ITG302-4: Use registers and instructions of 8086.

ITG302-5: Develop assembly language programs using 8086.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CPO-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"--" : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Build digital systems including microprocessor based systems	1	2	2	3		2	3	1	
ITG302-1:	1	--	1	3	--	--	--	1	--
ITG302-2:	2	2	2	3	2	2	3	1	--
ITG302-3:	2	2	2	3	2	2	3	1	--
ITG302-4:	1	--	1	--	--	--	--	1	--
ITG302-5:	1	2	2	3	3	2	3	3	--

6.CONTENT:**A) SUGGESTED PRACTICALS**

A.1 Laboratory experiments and related skills to be developed :(Any six experiments from 1 to 7 and any six experiments from 7 to 14 should be performed)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
1	Test different Logic Gates and verify the truth table.	Testing of logic gates	ITG302-1
2	Verify De Morgan's Theorem	Realize circuit for De Morgan's theorem	ITG302-1
3	Realize all gates using universal gates NAND and NOR	Realize any Boolean expression using only NAND and using only NOR	ITG302-1
4	Construct Half adder and Full adder and verify it's truth table.	1. Realize circuit of Half adder & full adder using gates 2. Design the logic circuit for given application	ITG302-2
5	Construct Half subtractor and Full subtractor and verify it's truth table.	1. Realize circuit of Half subtractor & full subtractor using gates 2. Design the logic circuit for given application	ITG302-2
6	Construct JK, D and T flip flop and verify the truth table.	Realize flip flops using gate	ITG302-3
7	Construct 3 bit Asynchronous UP counter and write the sequence.	Design Asynchronous counter	ITG302-3
8	Develop an ALP to i) add two 16 bit numbers ii) subtract two 16 bit numbers	Develop and execute ALP for arithmetic operations	ITG302-4 ITG302-5
9	Develop an ALP to add series of 16 bit numbers	Develop and execute ALP for given application	ITG302-5

10	Write and execute an ALP to find sum of series of 8 bit and 16 bit numbers.	Develop and execute ALP for arithmetic operations	ITG302-4 ITG302-5
11	Develop an ALP to multiply two 16 bit numbers. (Signed and unsigned.)	Develop and execute ALP for given application	ITG302-5
12	Develop an ALP to divide two 16 bit numbers. (Signed and unsigned.)	Develop and execute ALP for given application	ITG302-5
13	Develop an ALP to find the smallest number from an array of n numbers.	Develop and execute ALP for given application	ITG302-5
14	Develop an ALP to find the largest number from an array of n numbers.	Develop and execute ALP for given application	ITG302-5

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The micro projects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

1. Burglar alarm using logic gates
2. Freezer warning buzzer
3. A push button lock
4. A safety thermostat
5. An automatic watering system

For microprocessor: students should simulate program using assembly language

1. Checker's Board using 8x8 matrix
2. Chess Board using 8x8 matrix
3. 16 bit Calculator
4. Traffic light controller
5. Home Automation

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)for assembly lang programming/ 8086 kit module
2	Any digital trainer kit/bread board, digital ICs, Power Supply, Wires

8. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITG302-1: Test the logic gates, logic circuits and Perform different binary arithmetic and number system conversion operations			
1	<p>NUMBER SYSTEMS, CODES AND LOGIC GATES.</p> <p>1.1 Terms Bit, Nibble, Byte, Word, Double Word 1.2 Introduction to Number systems- Binary number System, Decimal Number System, Octal, hexadecimal number system. 1.3 Conversion of one number system to another number system (integer and fractions) 1.4 Binary arithmetic addition, subtraction (1's and 2's complement) 1.5 BCD addition, BCD subtraction(9's and 10's complement) 1.6 Study of different codes(ASCII, Gray, Excess -3 code) 1.7 Characteristics of digital ICs (propagation delay, noise margin, power dissipation, Fan in, Fan out) 1.8 Basic gates (AND, OR, NOT), Derived gates (NAND, NOR, EX-OR, EX-NOR), Concept of universal gate, Realization of all gates using universal gates. 1.9 Laws of Boolean algebra, De Morgan's Theorem, Simplification of Boolean equations using Boolean algebra and its realization using gates.</p>	10	14
Course Outcome ITG302-2: Construct combinational logic circuit.			
2	<p>COMBINATIONAL LOGIC CIRCUITS</p> <p>2.1 Standard/canonical forms for Boolean functions, Min terms and Max terms. 2.2 Simplification of logical circuit by way of Sum Of Product (SOP) and Product Of Sum (POS) methods. 2.3 Expression's simplification using Boolean algebra techniques (K map for 2,3,4 variables) 2.4 Construction of Half and Full Adder, Half and Full Subtractor using K-map. 2.5 Design Binary to Gray code converter and Gray to binary code converter 2.6 Necessity, principle and types of multiplexers 2.7 Necessity, principle and types of demultiplexers 2.8 Decoders: 2 line to 4 line, 3 line to 8 line, 4 line to 16 line</p>	12	14

<i>Course Outcome ITG302-3: Construct sequential logic circuits.</i>			
3	SEQUENTIAL LOGIC CIRCUITS 3.1 Comparison of combinational and sequential circuit. Block diagram of sequential logic circuit. 3.2 Flip-flops: Triggering methods used, Edge and Level triggering. 3.3 Working of different types of flip-flops with diagram and truth table (SR, JK, D and T type flip flop) 3.4 Asynchronous UP and DOWN counter design (3 bit) using T Flip flop 3.5 Four bit shift register using D Flip Flop. 3.6 SISO, SIPO, PISO, PIPO shift register.	10	12
	Sub-total	32	40

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG302-4: Use registers and instructions of 8086.</i>			
4	INTRODUCTION TO 8086 MICROPROCESSOR. 4.1 History of microprocessor and types. 4.2 Salient features of 8086, pin diagram and architecture of 8086, flag register and segment register of 8086. 4.3 Concept of memory segmentation and pipelining 4.4 Physical address generation 4.5 Concept of minimum and maximum mode of operation. 4.6 Timing diagram in minimum and maximum mode. 4.6 Overview of Pentium family processors. 4.7 Characteristics of RISC processor. 4.8 Comparison of CISC and RISC in terms of addressing modes, length, instruction set.	14	18
<i>Course Outcome ITG302-5: Develop assembly language programs using 8086.</i>			
5	ASSEMBLY LANGUAGE PROGRAMMING OF 8086 5.1 Concept of assembly language program. 5.2 Instruction set-Data transfer, Arithmetic and logical, Branch and loop, Shift, rotate and string instructions (Only format and examples) 5.3 Addressing modes of 8086 and relevant examples	18	22

	5.4 Assembly Language programs for (8 bit & 16 bit) Addition, subtraction, Multiplication, Division. 5.5 Assembly Language programs on Decision making and Looping.		
	Sub total	32	40
	Total	64	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Number Systems, Codes and Logic Gates.	04	02	08	14
I / 2	Combinational logic circuits	04	04	06	14
I / 3	Sequential logic circuits	02	02	08	12
II/ 4	Introduction to 8086 microprocessor	06	08	04	18
II / 5	Assembly Language Programming of 8086	02	04	16	22
	Total	18	20	42	80

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given below.

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/ Logic/ Program/ Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma IV.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma IV.

11. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions
2. Regular Home Assignments.

3.Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
- 2.Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	R P Jain	Modern Digital Electronics	Tata McGraw Hill Education, New Delhi,2016ISBN(13):978-0-07-066911-6
2.	Leach Donald P, Malvino Albert Paul, Saha Gautam	Digital Principles and Applications	Tata McGraw Hill Education, New Delhi,2016ISBN:978-93-392-0341-2
3.	Bhurchandi K M, Roy A K	Advanced microprocessors and peripherals 3/E	Tata McGraw Hill Education, New Delhi,2016ISBN:9781259006135
4.	Savaliya M T	8086 Programming and advanced processor architecture	Wiley India. New Delhi,2013,ISBN:978-81-265-3091-5

c) Websites

- i) <http://www.learnabouth-electronics.org/digital/dig42.php>
- ii) <http://www.logiccircuit.org/download.html>
- iii) www.intel.com
- iv) <http://www.firmcodes.com/diffrence-risc-cisc/architecture>
- v) www.cburch.com/logisim

COURSE ID: 19

Course Name : DATA COMMUNICATION
Course Code : ITG303
Course Abbreviation : GDTC

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	3	4
Practical	1(T)	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Tutorial	Theory	Oral Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	25E	125

2. RATIONALE:

Communication plays a vital role in various fields like business, academics, defense, budget research, engineering, medicine. In the present Industrial & commercial environment, the technician is expected to use digital communication skillfully.

The primary purpose of this course is to give an elementary but sound fundamental understanding of how data communication work, its basic components, how they work and basic knowledge of applications of Internet.

3. COMPETENCY

Explain analog and digital communication techniques.

Cognitive:

- i) Show how data communication works
- ii) Describe data communication basic components, how they work.

Psychomotor:

- i) Investigate hardware & software components of a communication system
- ii) drawing data communication models iii) Digital& Analog communication

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG303-1: Explain the concepts of data communication and networking

ITG303-2: Describe analog and digital signal.

ITG303-3: Describe digital to analog and analog to analog conversion

ITG303-4: Explain Transmission modes and different transmission medias

ITG303-5: Identify and correct digital transmission errors

ITG303-6: Illustrate Protocols for Noiseless and Noisy Channels

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-": no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Explain analog and digital communication techniques	1	--	--	--	-	1	1	--	2
ITG303-1	1	--	--	--	-	1	1	--	2
ITG303-2:	1	--	--	--	-	1	1	--	1
ITG303-3:	1	--	--	--	-	1	1	--	1
ITG303-4:	1	--	--	--	-	1	1	--	1
ITG303-5:	1	3	2	3	2	2	2	--	2
ITG303-6:	1	--	--	--	-	1	1	--	2

6.CONTENT:**B) SUGGESTED PRACTICAL'S/ EXERCISE**

A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1	Data and Communication Model.	<ul style="list-style-type: none"> • Understanding Data • Data Representation • Data Flow 	ITG303-1
*2	Analog Data & Signals	<ul style="list-style-type: none"> • Understanding Characteristics of Signal • Period, Frequency, Phase, Wavelength • Calculation of Bandwidth..Examples 	ITG303-2
*3	Digital Data & Signals	<ul style="list-style-type: none"> • Understanding Characteristics of Signal • Bit Rate, Bit Length, Baseband and broadband Transmission • Calculation Examples 	ITG303-2
*4	Transmission Impairments	<ul style="list-style-type: none"> • Understanding Factors which affects Communication • Attenuation, Unit of attenuation, Distortion, Noise. • Methods to detect these Factors 	ITG303-2
*5	Digital Transmission	<ul style="list-style-type: none"> • Understanding Coding Scheme and Transmission Mode for digital transmission • Line Coding • Block Coding • Transmission Modes 	ITG303-4
*6	Analog Transmission	<ul style="list-style-type: none"> • Understanding aspects of Digital to Analog Conversion • Examples 	ITG303-4
*7	Serial Transmission	<ul style="list-style-type: none"> • Demonstration of serial transmission using COM port 	ITG303-4
*8	Modems	<ul style="list-style-type: none"> • Understanding Role of Modem • Functions of Modem • Operation of Modems 	ITG303-4

		<ul style="list-style-type: none"> • Types of Modem and Examples 	
*9	Error Detection and Correction	<ul style="list-style-type: none"> • Error Detection V/S Correction • Hamming Distance • Linear Codes, Cyclic Code • Examples 	ITG303-5
*10	Flow Control and Error Control	<ul style="list-style-type: none"> • Understanding Flow and Error Control • Protocols for Flow and Error Control 	ITG303-6
*11	Microproject	<ul style="list-style-type: none"> • Case Study of Example Network(Like Telephone Networks , switching Network, Wireless Network) 	ITG30 3-1 ITG30 3-2 ITG30 3-3

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a)**Survey on guided transmission media:** Prepare a report on recent and widely used guided media in industries depending on cost ,speed, efficiency, reliability
- b)**Survey on unguided transmission media:** Prepare a report on recent and widely used guided media in industries depending on cost ,speed, efficiency, reliability
- c)**Survey of different wireless networking devices:** Prepare a report on different wireless networking devices.

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr.No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Network Connecting device/transmission media
3	Network cable tester,crimping tool,RJ-45 connectors,Ethernet Cable

8. CONTENT:**SECTION I**

Sr. No .	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG303-1: Explain the concepts of data communication and networking</i>			
1	INTRODUCTION TO DATA COMMUNICATION <ul style="list-style-type: none"> 1.1 Characteristics of Data communication 1.2 Communication System Components 1.3 Data Representation 1.4 Data Flow 1.5 Network Communication Model <ul style="list-style-type: none"> 1.5.1 OSI Model 	06	12
<i>Course Outcome ITG303-2: Describe analog and digital signal.</i>			
2	DATA & SIGNALS <ul style="list-style-type: none"> 2.1 Analog & Digital <ul style="list-style-type: none"> 2.1.1 Analog and Digital Data 2.1.2 Analog and Digital Signals 2.1.3 Periodic and Non Periodic Signals 2.2 Periodic Analog Signals <ul style="list-style-type: none"> 2.2.1 Sine wave 2.2.2 Phase 2.2.3 Wavelength 2.2.4 Time and Frequency Domain 2.2.5 Bandwidth 2.3 Digital signals <ul style="list-style-type: none"> 2.3.1 Bit rate 2.3.2 Bit Lengths 2.3.3 Transmission of digital Signals 2.4 Transmission Impairments <ul style="list-style-type: none"> 2.4.1 Attenuation 2.4.2 Distortion 2.4.3 Noise 	08	14
<i>Course Outcome ITG303-3: Describe digital to analog and analog to analog conversion</i>			
3	ANALOG TRANSMISSION <ul style="list-style-type: none"> 3.1 Digital to analog Conversion <ul style="list-style-type: none"> 3.1.1 Aspects of digital to analog conversion 3.1.2 Amplitude Shift Keying 3.1.3 Frequency Shift Keying 3.1.4 Phase Shift Keying 	08	14

Sr. No .	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	3.2 Analog to Analog Conversion 3.2.1 Amplitude Modulation 3.2.2 Frequency Modulation 3.2.3 Phase Modulation 3.3 Frequency Division Multiplexing 3.4 Wavelength Division Multiplexing 3.5 Synchronous Time Division Multiplexing		
	Sub-total	22	40

SECTION-II

Course Outcome ITG303-4: Explain Transmission modes and different transmission medias

4	DIGITAL TRANSMISSION AND TRANSMISSION MEDIA 4.1 Introduction to Line coding schemes 4.2 Analog to Digital Conversion 4.2.1 Pulse Code Modulation(Introduction) 4.2.2 Delta Modulation(Introduction) 4.3Transmission Modes 4.3.1 Parallel Transmission 4.3.2-Serial transmission 4.4 Communication media 4.4.1 Guided Transmission media-Twisted pair cable, Coaxial cable, Fiber-optic cable -Unguided Transmission media-Radio Waves, Microwaves, Infrared, Satellite	08	12
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Course Outcome ITG303-5: Identify and correct digital transmission errors

5	ERROR DETECTION AND CORRECTION 5.1 INTRODUCTION 5.1.1 Types of error 5.1.2 Redundancy 5.1.3 detection Versus Correction 5.2 Block coding 5.2.1 Error detection 5.2.2 Error Correction 5.2.3 Hamming distance 5.2.4 Minimum Hamming Distance 5.3 Linear Block Code 5.3.1 Minimum Distance for Linear Block Code 5.3.2 Simple parity check codes	10	14
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Sr. No .	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	5.3.3 Hamming codes 5.4 Cyclic Codes 5.4.1 Cyclic Redundancy check 5.4.2 Advantages of cyclic codes 5.5 Checksum- Idea, One's complement		
Course Outcome ITG303-6: Illustrate Protocols for Noiseless and Noisy Channels			
6	DATA LINK CONTROL 6.1 Framing 6.2 Flow and Error Control 6.3 Protocols For Noiseless channel 6.3.1 Simplest Protocol 6.3.2 Stop-and-Wait Protocol 6.4 Protocols for Noisy channel 6.4.1 Stop-and-Wait Automatic Repeat Request 6.4.2 Go-Back-N Automatic Repeat Request 6.4.3 Selective Repeat Automatic Repeat Request 6.4.5 Piggybacking	08	14
	Sub total	26	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction to Data Communication	04	04	04	12
I / 2	Data and Signals	04	04	06	14
I / 3	Analog Transmission	04	04	06	14
II/ 4	Digital Transmission and Transmission media	04	04	04	12
II / 5	Error Detection and Correction	04	04	06	14
II/6	Data Link Control	04	04	06	14
	Total	24	24	32	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma III*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end oral exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	05
2.	Results/Observations/Output	05
3.	Logical thinking and approach	05
4.	Oral	10
	TOTAL.	25

*Assessment at semester end practical exam as per Pro-forma III.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	Silberschatz, Korth, Sudarshan	Database System Concepts (4 th edition)	Tata McGraw-Hill
2.	Ivan Bayross	SQL, PL/SQL	BPP Publication
3.	Bipin Desai	An Introduction To Database System	BPP Publication
4.	G.K.Gupta	Database Management Systems	Tata McGraw-Hill

b) Websites

- i) www.javatpoint.com
- ii) www.geeksforgeeks.org
- iii) www.tutorialspoint.com
- iv) www.techopedia.com

COURSE ID: 20**Course Name : OOP USING C++****Course Code : ITG304****Course Abbreviation : GCPP****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2. RATIONALE:

Object oriented programming has become the preferred approach for most software projects. Object oriented programming concepts are useful for constructing complex physical systems. Instead of viewing the program as a series of steps to be carried out, it views as a group of objects that have certain properties and can take appropriate actions. Among the Object oriented programming languages available, C++ is most widely used language. Different programs based on Inheritance, polymorphism, encapsulation, overriding requires knowledge of C++. This subject acts as a base for languages JAVA, VC++ & UML.

3. COMPETENCY

Apply Basic OOP concepts to solve given problems.

Cognitive: The students will be able to understand concept of object oriented programming in various applications.

Psychomotor: i) Use C++editor on Windows and/or Linux platform

ii) Compile and debug C++ program

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG304-1: Capture the concepts of object oriented programming and related functions.

ITG304-2: Develop C++ programs using classes and objects.

ITG304-3: Implement constructor and destructor in C++ program.

ITG304-4: Implement Inheritance in C++ program

ITG304-5: Express concept of pointers with its types & Polymorphism

ITG304-6: Develop C++ programs to perform file operations and handling exceptions

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: <i>Apply Basic OOP concepts to solve given problems</i>	2	2	2	1	1	2	2	2	-
ITG304-1	1	1	2	1	1	1	1	2	-
ITG304-2	2	2	2	1	1	2	1	3	-
ITG304-3	2	1	1	1	-	1	1	1	-
ITG304-4	2	2	2	1	1	2	2	2	-
ITG304-5	2	2	2	1	1	2	2	2	-
ITG304-6	2	2	2	1	1	2	2	2	-

6. CONTENT:**A) SUGGESTED PRACTICAL'S/ EXERCISE**

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	CO
1	Comparative study of POP & OOP	1. Definition of POP 2. Definition of OOP 3. Characteristics of POP & OOP 4. Basic concepts of OOP	ITG304-1
*2	Write a Program to Input And Output data	1. Understanding Input & Output Stream 2. Syntax for cin and cout 3. Simple C++ Program	ITG304-1
*3	Write a Program to create an object of a class	1. Definition of class and Object 2. Study of access specifiers 3. Syntax for class declaration 4. Use of Dot operator 5. Syntax of object creation 6. Program using class & Objects	ITG304-2
4	Write a Program to create and manipulate array of object	1. Understanding Array of objects 2. Syntax for declaration of array of objects 3. Implementation of this concept.	ITG304-2
*5	Write a Program to access Static member variables	1. Understanding static member variable 2. Syntax to declare static member variable 3. Program using static member variable	ITG304-2
6	Write a Program using object as function argument	1. Understanding Object as Argument to function 2. Syntax for function Declaration having object as argument. 3. Understanding Call by Value & Pass by Reference 4. Implementation of object as function argument.	ITG304-1,2
*7	Write a Program to define a class with constructor and destructor.	1. Definition of Constructor 2. Characteristics of constructor 3. Definition of Destructor 4. Characteristics of Destructor 5. Syntax for Declaration of Constructor & destructor function 6. Program based on constructor and destructor.	ITG304-3

8	Write a Program using constructor with default argument	1. Understanding constructor with default arguments 2. Syntax for default arguments 3. Program using constructor with default argument	ITG304-3
*9	Write a Program to implement single and hierarchical Inheritance.	1. Definition of inheritance 2. Understanding Base and Derived classes. 3. Definition of single inheritance 4. Definition of hierarchical inheritance 5. Three visibility modes in inheritance 6. Syntax to derive a class from base class. 7. Programs based on single and hierarchical inheritance	ITG304-4
*10	Write a Program to implement Multiple Inheritance with virtual base class.	1. Definition of Multiple Inheritance and Virtual base class. 2. Syntax to declare a base class as virtual. 3. Programs based on Multiple Inheritance with virtual base class.	ITG304-4
*11	Write a Program using Pointer	1. Understanding pointers in C 2. Declaration and definition of pointers in C 3. Implementation of pointers in C	ITG304-5
12	Write a Program using Pointer to string	1. Declaration and definition of pointers in C++ 2. Understanding pointers to string concept 3. Syntax to Declare pointers to string with example 4. Implementation of pointers to string	ITG304-5
13	Write a Program using Pointer to object	1. Understanding Pointer to object 2. Syntax to declare a pointer to object 3. Implementation of pointers to object	ITG304-5
*14	Write a Program using 'this' Pointer	1. Use and Definition of this pointer 2. Program using 'this' pointers	ITG304-5
*15	Write a Program to overload unary and binary operator	1. Understanding operator overloading 2. Rules for overloading unary operators 3. Rules for overloading binary operators 4. Operators cannot be overloaded 5. Syntax for declaration of operator overloading function 6. Programs for overloading various operators.	ITG304-5
*16	Write a Program to implement run time polymorphism	1. Understanding Late Binding & Dynamic binding 2. Definition of virtual Function. 3. Rules for declaring virtual Function 4. Syntax to declare virtual Function 5. Implementation of virtual Function	ITG304-5
17	Write a program to	1. Study of I/O Streams	ITG304-6

	perform various operations on file	2. use and Syntax of open () & close () method 3. Study of various modes for opening a file. 4. Program for reading writing from/to file.	
*18	Write a Program for Exception Handling	1. Study of handling various types of Exceptions.	ITG304-6

A.2 Micro-project

Each student should have allotted one micro project in the beginning of the semester. The micro projects are group based (group of 2 students). Each micro project should encompass two or more COs.

Each student has to maintain dated work diary consisting of individual contribution in the micro project work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

- a) Implementing DOS commands using command line arguments e.g. copy, type, copy con
- b) Develop library management application
- c) Develop games using classes
- d) Develop Hospital management application
- e) Any other micro projects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad Specification
1	Computer System(Any computer system with basic configuration)
2	'C++' Compiler(Turbo C++compiler/GCC compiler or any other C++ compiler)

8. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG304- 1 Capture the concepts of object oriented programming and related functions.</i>			
1	PRINCIPLE OF OBJECT ORIENTED PROGRAMMING <ul style="list-style-type: none"> 1.1 What is OOP? 1.2 Applications of OOP 1.3 Beginning with C++ <ul style="list-style-type: none"> 1.3.1 A simple C++ program 1.3.2 Structure of C++ program 1.3.3 Creating source file 1.3.4 Compiling & linking 1.4 Tokens, Expressions and control structures <ul style="list-style-type: none"> 1.4.1 Tokens, keywords, identifiers, Basic data types, Derived data types, Symbolic Constants, Type Compatibility, Declaration of variables, Operators in C++, Scope Resolution operator, Memory management operators manipulators and type cast operator, operator precedence 1.4.2 Control structures. 	06	08
2	FUNCTIONS IN C++ <ul style="list-style-type: none"> 2.1 Introduction 2.2 The main function 2.3 Function prototype 2.4 Default arguments, constant arguments 2.5 Call by value 2.6 Call by Reference 2.7 Return by Reference 2.8 Inline function 2.9 Function overloading 	06	08
<i>Course Outcome ITG304-2: Develop C++ programs using classes and objects.</i>			
3	CLASSES & OBJECTS <ul style="list-style-type: none"> 3.1 Introduction 3.2 Specifying a class, defining member function, a C++ program with a class, Making a outside function inline, Nesting of member function, Private member functions, Arrays within class. 3.3 Memory allocation for Objects ,Static data member, static member function, Arrays of Objects, Objects as a function 	08	14

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	argument, Friendly functions, Returning object		
Course Outcome ITG304-3 Implement constructor and destructor in C++ program.			
4	CONSTRUCTORS & DESTRUCTORS 4.1 Introduction 4.2 Constructors , Parameterized constructors, Multiple constructors in a class, Constructors with Default arguments 4.3 Dynamic initialization of objects. 4.4 Copy Constructor 4.5 Destructors	04	10
	Sub-total	24	40

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITG304-4 Implement Inheritance in C++ program			
5.	INHERITANCE : EXTENDING CLASSES 6.1 Introduction 6.2 Concept of Inheritance, Defining derived classes, Types of inheritance(single, multilevel, multiple, Hierarchical, hybrid), making a private member inheritance 6.3 Virtual base classes, abstract classes.	06	12
Course Outcome ITG304-5 Express concept of pointers with its types & Polymorphism.			
6	POINTERS, VIRTUAL FUNCTION & POLYMORPHISM 6.1 Manipulation of Strings Using Operators 6.2 Pointers, Pointers to Objects, this pointer, Pointer to Derived classes 6.3 Introduction of Polymorphism, Types of Polymorphism 6.4 Compile Time Polymorphism: Function Overloading, Operator Overloading, Overloading Unary Operator and Binary Operator, Rules For Overloading Operators Overloading 6.5 Run Time Polymorphism: Virtual functions, rules for virtual functions, pure virtual functions.	08	14
Course Outcome ITG304-6 Develop C++ programs to perform file operations and handling exceptions			

7	WORKING WITH FILES AND EXCEPTION HANDLING 7.1 Managing console I/O Operations++ streams, C++ stream classes, Unformatted I/O operations, Formatted I/O operations managing output with manipulators. 7.2 Working with files , Introduction, Classes for file stream operations, Opening & closing a file, Detecting End-of-file 7.3 File modes, File pointers and their manipulations, Sequential Input and Output operations 7.4 Updating a file: Random access, Error handling during file operations, Command line arguments. 7.5 Exception Handling: Introduction, Basics of Exception Handling, Exception handling mechanism 7.6 Throwing mechanism, catching mechanism	10	14
	Sub total	24	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledg e	Comprehe nsion	Applicatio n	
I / 1	Principal of Object Oriented Programming	04	02	02	08
I / 2	Functions in C++	04	02	02	08
I / 3	Classes and Objects	04	06	04	14
I / 4	Constructors & Destructors	02	04	04	10
II/5	Inheritance : Extending classes	04	04	04	12
II/6	Pointers, virtual function & polymorphism	04	06	04	14
II/7	Working with files and Exception Handling	04	06	04	14
	Total	26	30	24	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X* .

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b) **Assessment Criteria for Term-end Practical Examination:**

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma III.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides (PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

b) Books / Codes

Sr. No.	Title	Author	Publication
1.	Object Oriented Programming with C++	BALAGURUSAMY,E	Tata McGraw Hill, New Delhi 2015, ISBN: 9781259029936
2.	Object Oriented Programming in Turbo C++	Robert Lafore	Sams Publication, New Delhi 2015, ISBN: 9780672323089
3	The C++ Programming Language	Stroustrup.B	Pearson Education, New Delhi 2015, ISBN: 9780201889543

4	Let us C ++	Yashwant Kanetkar.	BPB PUBLICATIONS
5	Programming with C++	John R Hubbard	Tata McGraw-Hill Education

b) Websites

- b. www.sourcecodesworld.com
- c. www.softteam.com
- d. www.cplus.about.com/od/beginnertutorialall
- e. <http://www.nptel.ac.in>
- f. https://www.tutorialpoint.com/cplusplus/cpp_object_oriented.htm

COURSE ID: 21

Course Name	: DATABASE MANAGEMENT SYSTEM
Course Code	: ITG305
Course Abbreviation	: GDBM

1. TEACHING AND EVALUATION SCHEME

Pre-requisite Course(s) : NIL

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2. RATIONALE:

The essential requirement of any organization maintaining database system is the knowledge and hands-on experience of powerful database management system. Also the need of today's software development is competence in a GUI based front end tool, which can connect to relational database engine. The database management system is a collection of programs that enables to store, modify and extract information from a database. This course gives the students the ability to understand the design of DBMS and use any RDBMS package as a backend for developing database applications.

3. COMPETENCY

Design and implement normalized database structure and solve SQL, PL/SQL queries.

Cognitive: The students will be able to:

1. Identify the concept of Relational Database system
2. Define program data independence, database schema and database instances and analyze different data models.
3. Execute different SQL queries and PL / SQL programs.

Psychomotor: i) Installation of database software ii) Execute SQL queries iii) Draw E-R diagram

Affective: Attitude of i) precision ii) accuracy iii) punctuality

4. COURSE OUTCOMES:

ITG305-1: State the importance and advantages of DBMS and describe the structure of DBMS.

ITG305-2: Explain the concept of relational algebra and implement set operations.

ITG305-3: Create and manipulate database using SQL commands

ITG305-4: Explain the need of normalization and state various forms of normalization.

ITG305-5: Write PL/SQL code using Control Structure, Functions and Triggers

ITG305-6: Apply security and safety on database

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES

(CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and CoS	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Design and implement normalized database structure and solve SQL,PL/SQL queries	1	3	2	3	2	3	3	-	3
ITG305-1	1	-	-	1	1	2	3	-	3
ITG305-2:	1	2	2	3	2	3	2	-	3

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
ITG305-3:	1	3	2	3	2	3	2	-	3
ITG305-4:	1	1	2	2	2	2	2	-	3
ITG305-5:	1	3	2	3	2	3	2	-	3
ITG305-6:	1	2	-	-	2	2	2	-	3

6.CONTENT:

SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
1*	Install and configure database product(such as Oracle, MySQL or any other relational database product)	1) Installation of database product	ITG305-1
2*	Study of database design	1) Study of database schema 2) Designing ER diagram for any database	ITG305-1
3*	Study of Relational Algebra operations	1) Study of fundamental operations of relational algebra 2) Queries based on relational algebra	ITG305-2
4*	Creating database	1) Creating database 2) Creating table 3) Inserting, updating and deleting records 4) Displaying records 5) Applying integrity constraints	ITG305-3
5*	Modifying table structure	1) Using Alter table command 2) Using Rename command	ITG305-3
6*	Operators	1) Executing SQL queries using Arithmetic, Logical, Mathematical operators 2) Grouping data from tables	ITG305-3
7*	Functions	1) Executing SQL queries using String functions 2) Executing SQL queries using Date	ITG305-3

		functions 3) Executing SQL queries using Group functions 4) Executing SQL queries using Mathematical functions	
8*	Subqueries, Joins	1) Executing subqueries 2) Joining tables	ITG305-3
9*	Views, Indexes, Sequences and Synonyms	1) Creating view, sequence and synonyms. Creating and Index 2) Inserting, Updating, Deleting records using view 3) Deleting view 4) Creating Sequences, Altering Sequences, Dropping Sequences 5) Creating Indexes and Synonyms.	ITG305-3
10*	PL/SQL Control and Iterative Structures	1) Understanding PL/SQL block structure 2) Using conditional controls in PL/SQL 3) Using iterative controls in PL/SQL	ITG305-4
11*	Cursors	1) Understanding types of cursor and cursor attributes 2) Using explicit cursor	ITG305-4
12	Stored Procedures and functions and Triggers	1) Understanding creating and deleting stored procedures and functions 2) Example programs 3) Understanding the concept of trigger and its types 4) Creating a trigger 5) Applying trigger 6) Deleting trigger	ITG305-4
13*	Transaction and Normalization	1) Understanding concept of transaction 2) Commit and Rollback statement 3) Understanding the concept of normalization 4) Understanding 1NF, 2NF, 3NF and BCNF	ITG305-6

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a) Hospital Management System: Patient Database/Doctor Database/Billing(any one database)
- b) College Admission: Student personal Information System / Merit List database(any one database)
- c) Medical Purchase: Database of medicine inventory records
- d) Library management: Book issue/book stock database
- e) Any other microprojects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Any RDBMS software (MySQL/SQL Server or any other)

8. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG305-1: State the importance and advantages of DBMS and describe the structure of DBMS.</i>			
1	INTRODUCTION TO DBMS <ul style="list-style-type: none"> 1.1 Purpose of Database System 1.2 DBMS vs. File system 1.3 Instances and Schemas 1.4 Data Models: <ul style="list-style-type: none"> 1.4.1 Entity Relationship Model 1.4.2 Relational Model 1.5 Database Schema 1.6 Data Definition Language, Data Manipulation Language 1.7 Database Administrator and Database Users 1.8 Entity sets, Relationship set, Attributes, types of attributes, domain, Mapping Cardinalities 	08	14
<i>Course Outcome ITG305-2: Explain the concept of relational algebra and implement set operations.</i>			
2	RELATIONAL MODEL <ul style="list-style-type: none"> 2.1 Structure of Relational Database 2.2 Database Schema 2.3 Query languages 2.4 Relational Algebra 	06	12

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	2.4.1 Fundamental Operations 2.4.2 Codd's rules of RDBMS		
Course Outcome ITG305-3: Create and manipulate database using SQL commands			
3	SQL 3.1 Introduction to SQL queries 3.2 Creating, Inserting, Updating, Deleting tables 3.3 Integrity constraints – primary key, foreign key, NULL constraints 3.4 Arithmetic, Logical, Relational operators 3.5 Aggregate functions, Mathematical functions, Date functions, String functions 3.6 Joins, Types of joins, Sub queries 3.7 View – need, creating, updating and deleting database view 3.8 concept of index 3.9 Creating Sequences, Altering Sequences, Dropping Sequences 4.0 Synonyms: Creating Synonyms, Dropping Synonyms	10	14
	Sub-total	24	40

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITG305-4: Explain the need of normalization and state various forms of normalization.			
4	NORMALIZATION 4.1 Purpose of normalization 4.2 Functional dependencies and decomposition 4.3 Normalization using 1NF, 2NF, 3NF, BCNF 4.4 Denormalization- process, benefits and drawbacks	06	12
Course Outcome ITG305-5: Write PL/SQL code using Control Structure, Functions and Triggers			
5	PL / SQL 5.1 PL / SQL block structure 5.2 Variables 5.3 PL/SQL control structures 5.4 Cursors – Types, Attributes 5.5 Triggers – Use of database trigger 5.6 Stored procedures and functions – Advantages, Syntax for creating	08	14

	5.7 Exception handling in PL/SQL		
Course Outcome ITG305-6: Apply security and safety on database			
6	DATABASE SECURITY AND TRANSACTION PROCESSING 6.1 Database security: Introduction to database security, Data security requirements, Types of database Users, Creating, Altering and deleting users. 6.2 Protecting the data within database- Database Privileges: Systems Privileges and object privileges, Granting and revoking privileges, Grant and Revoke command 6.3 Transaction and concurrency Control-Concept, Properties and States of Transaction, Concurrency issues, need for transactions, Necessary properties of transactions (ACID properties), Transaction states, Lock-Based Concurrency Control 6.4 Database Backup -Types of Failures, Causes of failures, Database Backup	10	14
	Sub total	24	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction To DBMS	04	04	06	14
I / 2	Relational Model	02	04	06	12
I / 3	SQL	04	04	06	14
II/ 4	Normalization	02	04	06	12
II / 5	PL/SQL	04	04	06	14
II/6	Database security and transaction processing	04	04	06	14
	Total	20	24	36	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma III.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	Silberschatz, Korth, Sudarshan	Database System Concepts (4 th edition)	Tata McGraw-Hill
2.	Ivan Bayross	SQL, PL/SQL	BPP Publication
3.	Bipin Desai	An Introduction To Database System	BPP Publication
4.	G.K.Gupta	Database Management Systems	Tata McGraw-Hill

b) Websites

- i) www.javatpoint.com
- ii) www.geeksforgeeks.org
- iii) www.tutorialspoints.com
- iv) www.techopedia.com

COURSE ID: 22

Course Name : COMPUTER NETWORK
Course Code : ITG306
Course Abbreviation : GCON

1.TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2.RATIONALE:

In today's age of Information Technology almost every application sends information from one place to another place. Computer network organizes this information in such a way that it can be sent anywhere over wide geographical area and output remote information at a push of button. This indicates the type of networks used. Here we study basic concept of networking, its applications, topologies, network devices, protocol used, OSI reference model, TCP/IP model, IP addressing and various types of the communication protocols.

3.COMPETENCY

Analyse basic principles and purpose of network components.

Cognitive: The students will be able to:

- I. Understand basic concepts of network components
- II. Identify Network medium

Psychomotor:

- I) Setup IP address to PC
- II) Identify topologies and cables used in local network
- III) Categorize network devices.

Affective: Attitude of i) precision ii) accuracy iii) punctuality

4.COURSE OUTCOMES:

- ITG306-1:** Classify types of networks and topologies.
- ITG306-2:** Identify network devices and describe their functions.
- ITG306-3:** Distinguish between Media access methods used in network
- ITG306-4:** Summarize IEEE Standards
- ITG306-5:** Explain working of TCP/IP protocol
- ITG306-6:** Describe Remote Logging, Electronic Mail and File Transfer Protocol

5.COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solution	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Analyse basic principles and purpose of network components.	2	2	2	2	1	1	2	2	1
ITG306-1	1	-	1	1	2	-	2	-	3
ITG306-2	1	1	2	1	1	-	3	-	3
ITG306-3	2	-	-	1	1	-	2	-	2
ITG306-4	1	2	2	1	-	-	3	-	2
ITG306-5	2	-	-	2	2	-	3	-	3
ITG306-6	1	1	1	-	1	-	3	-	3

6. CONTENT

SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1.	Compare different network types and topologies	1. Identify network types 2. Identify network topology 3. Compare network type and topology based on implementation	ITG306-1
*2.	Draw Layout of lab network	1. Observe any network laboratory 2. Identify topology 3. Draw network structure	ITG306-1
*3.	Compare Network devices	1. Survey different networking devices available in Market. 2. Install Network Interface card and find its MAC address	ITG306-2
*4.	Create Network for Files sharing	1. Create Network of 2 computer using any Guided Media	ITG306-4
*5.	Perform Device sharing in Network	1. Share Printer and File in Same Workgroup network	ITG306-4
6.	Create a network using cable and RJ45 connectors	1. Prepare and test Straight and cross UTP cable	ITG306-3
*7.	Configure the IP address setting	1. Identify ways to configure IP address 2. Configure IP address using static and dynamic method	ITG306-5
*8.	Testing Internet connection	1. Using Network setting and sharing Menu for wired and Wireless Network Connection	ITG306-5
9	Perform TCP/IP Socket Programming	1. Writing TCP Client-server program using any programming language 2. Writing UDP Client-server program using any programming language	ITG306-5
*10	Remote Logging, Electronic Mail FTP protocol.	1. Using Telnet Commands 2. Using ftp commands	ITG306-6

11	Report of Industrial Visit	1. Visit any Existing network Infrastructure and prepare Report on visited network specification.	ITG306-1,2,3,4,5,6
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A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

- a) Prepare Survey report on Latest Network Devices available in Market
- b) Prepare Report on Different existing networks in use
- c) Drawing a Lab Layout of any small firm.
- d) Any other micro projects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System (Any computer system with basic configuration)
2	Network Infrastructure with medium and connecting devices
3	Internet Connection

8. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG306-1: Classify types of networks and topologies.</i>			
1	Introduction to Computer Networking 1.1 Network Services 1.2 Application of Computer Networks 1.3 Advantages and disadvantages of Computer Network 1.4 Active and Passive Network 1.5 Network Architecture- 1.5.1 Client Server Network 1.5.2 Peer-to Peer Network 1.5.3 Centralized and distributed Computing 1.6 The Internet	04	06
2	Line configuration 2.1 Point to point, Multi point; 2.2 Topology - Mesh, Star, Tree, Bus, Ring, Hybrid; 2.3 Network Criteria-Categories of network, Classification of network, LAN, MAN, WAN. 2.4 Transmission media Guided and Unguided	07	12
<i>Course Outcome ITG306-2: Identify network devices and describe their functions</i>			
3	Network Reference Model and Network Devices 3.1 OSI reference model 3.2 TCP/IP reference model 3.3 Comparison of OSI ,TCP/IP model 3.4 Addressing- Physical Addresses, Logical Addresses Port Addresses, Specific Addresses 3.4 Network devices (Introduction & Functionalities) 3.4.1 Repeaters 3.4.2 Hubs- Types 3.4.3 Bridges-Types 3.4.4 Switches (Multiport bridges)	07	12
<i>Course Outcome ITG306-3:Distinguish between Media access Mechanisms used in networks</i>			
4	Multiple Access 4.1 Random access aloha 4.2 Carrier sense multiple access (CSMA) 4.3 Carrier sense multiple access with collision detection (CSMA/CD) 4.4 Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)	06	10

Section II

<i>Course Outcome ITG306-4: Summarize IEEE Standards for wired and wireless LAN</i>			
5	IEEE Standards 5.1 IEEE Standards 5.2 Standard Ethernet 5.2.1 MAC Sub layer 5.2.2 Categories of Standard Ethernet, 10base5, 10base2, 10base-T; 1Base5, 100Base-T 5.4 Bridge Ethernet, Switched Ethernet, fast Ethernet 5.5 Gigabit Ethernet, Ten-Gigabit Ethernet 5.6 IEEE802.11-Architecture, Frame format 5.7 Bluetooth- -Architecture	08	14
<i>Course Outcome ITG306-5: Explain working of TCP/IP protocol</i>			
6	TCP/IP Fundamentals 6.1 TCP/IP Protocol suite 6.2 IPv4 Addresses 6.2.1 Address Space 6.2.2 Notations 6.2.3 Classful Addressing 6.2.4 Classless Addressing (CIDR) 6.2.5 Network Address Translation (NAT) 6.3 Transport Layer – UDP – TCP (Introduction and Functionality only) 6.4 Socket Programming 6.4.1Socket and Socket based communication. 6.4.2TCP/IP Socket Programming 6.4.3UDP Socket Programming	08	14
<i>Course Outcome ITG306-6: Describe Remote Logging, Electronic Mail and File Transfer Protocol</i>			
7	Remote Logging, Electronic Mail and File Transfer 7.1 Remote Logging 7.1.1 TELNET 7.2 Electronic Mail 7.2.1 Architecture 7.2.2 User Agent 7.2.3 MIME 7.2.4 SMTP 7.2.5 POP and IMAP 7.2.6 Web-Based Mail 7.3 File Transfer 7.3.1 FTP 7.3.2 Anonymous FTP	08	12

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Topic Name	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Networking Basic	02	04	04	10
I / 2	Line Configuration	02	04	02	08
I / 3	Network Reference Model and Network Device	04	06	02	12
I / 4	Medium access	04	04	02	10
II / 5	IEEE Standard	06	04	02	12
II / 6	TCP/IP Fundamentals	04	06	04	14
II / 7	Remote Logging, Electronic Mail and File Transfer	04	06	04	14
	Total	26	34	20	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

c) **Assessment Criteria for Term-end Practical Examination:**

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-formaIII.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides (PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) **Books / Codes**

Text Books:

1. Data Communication and Networking- Behrouz, Forouzan TMH 1999
2. Computer Networks -Tanenbaum Fourth edition

b) **Websites**

- <http://www.w3schools.com/>
- https://www.tutorialspoint.com/data_communication_computer_network/
- <https://searchnetworking.techtarget.com/>
- <https://nptel.ac.in/courses/106/105/106105183/>
- https://onlinecourses.swayam2.ac.in/cec19_cs07/preview

COURSE ID: 23**Course Name : OPERATING SYSTEM****Course Code : ITG307****Course Abbreviation : GOPS****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (Internal)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-IV	
Marks	20	--	80	50I	150

2. RATIONALE:

Operating system is the interface between the user and the computer system. Its function is to coordinate processes and to manage I/O devices and memory. This is a core technology subject and the knowledge of which is absolutely essential for Computer Engineers. It familiarizes the students with the functions and services provided by the operating system. This subject gives an overview of UNIX and Windows operating system as a case study.

3. COMPETENCY

Analyze basic principles and purpose of operating system and its components.

Cognitive: The students will be able to:

I.Understand basic concepts of Operating system.

Psychomotor:

- I) Installing Operating System
- II) Using Troubleshooting commands on OS

Affective: Attitude of i) precision ii) accuracy iii) punctuality

4. COURSE OUTCOMES:

ITG307-1: Explain different types of Operating System

ITG307-2: Recognize the services provided by Operating System and Operating System structure.

ITG307-3: Describe the concept of Process Management.

ITG307-4: Apply various CPU Scheduling Algorithms on given processes

ITG307-5: Describe Memory Management, File Management, I/O management.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-": no correlation]

Competency and COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Analyze basic principles and purpose of operating system and its components.	2	2	2	2	1	1	2	-	1
ITG307-1	1	-	-	1	1	-	2	-	1
ITG307-2	2	2	-	1	1	-	2	-	1
ITG307-3	1	1	1	2	-	-	2	-	-
ITG307-4	2	2	2	1	2	-	2	-	1
ITG307-5	1	-	-	1	-	-	2	-	1

6. CONTENT

SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1.	Booting Process	1. Checking booting process 2. Setting BIOS configuration	ITG307-1
*2.	Installation	1. Installation of Any Operating System 2. Installation of drivers 3. Configuration of Computer system	ITG307-2
*3.	System Information	1. Checking system information 2. Checking whether particular device is working properly or not 3. Installing drivers of various devices	ITG307-5
*4.	Disk Partitioning	1. Partitioning the hard disk 2. Understanding the FAT	ITG307-5
*5.	Disk Maintenance	1. Study and use of utilities like ScanDisk, Disk Cleanup, Disk Defragmenter, disk scheduling	ITG307-5
*6.	Scheduling Algorithms	Implementation of FIFO and Priority Scheduling algorithms using C or C++	ITG307-4
*7.	Implementation of basic commands	Implementation of pwd, ls, su, who, date Commands	ITG307-1
*8.	Implementation of directory related commands in Linux	Implementation of mkdir, touch ,cd\,cd.., rmdir Commands	ITG307-5

*9	Implementation of Process management commands in Linux	Implementation of Fg , Top , PS , Kill , NICE , DF Commands	ITG307-3
*10	Implementation of file related commands in Linux	Implementation of cp, mv, head, grep,	ITG307-5
*11	Implementation of commands used to find files in Linux	find and locate file Commands	ITG307-5
12	Implementation of basic utilities in Linux	Implementation of cat, rm, less, more, hostname Commands	ITG307-2

A.2 Micro-project

Each student should be allotted one microproject at the beginning of the semester. The micro projects are group based (group of 2 students). Each micro project should encompass two or more COs.

Each student has to maintain a dated work diary consisting of individual contributions in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

Case Study -

- 1) Current trends in Operating System
- 2) Open source Operating system

Comparative study of 5 different Operating System based on

- Manufacturer,
- Development and Distribution,
- Computer architecture supported,
- file system supported,
- Security threats

Kernel type

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Any Operating System

8. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG307-1 Explain the different types of Operating System.</i>			
1	INTRODUCTION TO OPERATING SYSTEM <ul style="list-style-type: none"> 1.1 What is an O.S?, Evolution, Generation 1.2 Mainframe Systems – Batch, Multi programmed, Multitasking, Time sharing, Desktop. 1.3 Parallel systems 1.4 Real time system. 1.5 Distributed system 1.6 Clustered System 	06	10
<i>Course Outcome ITG307-2 Recognize the services provided by Operating System and Operating System structure.</i>			
2	OPERATING SYSTEM STRUCTURE <ul style="list-style-type: none"> 2.1 System Components 2.1.1 Process Management 2.1.2 Main Memory Management 2.1.3 File Management 2.1.4 I/O Management 2.1.5 Secondary storage management 2.1.6 Networking 2.1.7 Protection system 2.1.8 Command Interpreter System 2.2 Operating System Services 2.3 System Calls–Process controls, File management, Device Management, Information Maintenance, communication. 2.4 System Programs 2.5 System structure 2.5.1 Simple structure 2.5.2 Layered approach 2.5.3 Monolithic 2.5.4 Microkernel 2.6 Booting 	10	16
<i>Course Outcome ITG307-3 Describe the concept of Process Management.</i>			
3	PROCESS MANAGEMENT <ul style="list-style-type: none"> 3.1 Process Concept – Process, Process State, Process Control Block, Thread 	08	14

	<p>3.2 Process Scheduling – Scheduling queues, schedulers, context switch</p> <p>3.3 Operations on Process: creation, termination.</p> <p>3.4 Inter process communication.</p> <p>3.5 Thread – overview, benefits, user and kernel threads</p> <p>3.6 Multithreading Models - Many to one, one to one, many to many.</p>		
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SECTION II*Course Outcome ITG307-4: Apply various CPU Scheduling Algorithms on given processes*

4	SCHEDULING 4.1 Scheduling – Objectives, concept, criteria, CPU and I/O burst cycle. 4.2 Types of Scheduling-Pre-emptive, Non pre-emptive. 4.3 Scheduling Algorithms. first come first served (FCFS), Shortest job first (SJF), Round Robin (RR), Priority. 4.4 Other Scheduling, Multilevel, Multiprocessor, real time. 4.5 Dead Locks 4.5.1 System Model 4.5.2 Necessary conditions for deadlock 4.5.3 Resource Allocation Graph 4.6 Method for Handling Deadlocks 4.7 Deadlock Prevention & Detection. 4.8 Recovery from Dead Locks	08	16
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Course Outcome ITG307-5 Describe Memory Management, File Management, I/O management.

5	MEMORY MANAGEMENT 5.1 Address Binding 5.2 Logical V/S Physical Address Space 5.3 Dynamic Loading 5.4 Swapping 5.5 Contiguous Memory Allocation. 5.6 Paging 5.6.1 Basic Method 5.7 Segmentation. 5.7.1Basic Method 5.7.2 Hardware	08	14
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6	FILE and IO MANAGEMENT 6.1 File system & file concept 6.1.1 File Attributes 6.1.2 File Operations 6.1.3 File Types 6.2 Access methods-sequential access and direct access 6.3 Directory structure 6.3.1 Single Level Directory 6.3.2 Two Level Directory 6.3.3 Tree Structured Directory 6.4 Protection 6.5 File system structure--organization 6.6 Contiguous allocation method of disk space 6.7 I/O MANAGEMENT 6.7.1 I/O Hardware 6.7.2 Polling 6.7.3 Interrupt 6.7.4 DMA 6.8 Application I/O interface	08	10
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9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total Marks
		Remember	Understand	Applica-tion		
1	Introduction To Operating System	06	02	02	ITG307-1	10
2	Operating System Structure	08	04	04	ITG307-2	16
3	Process Management	04	06	04	ITG307-3	14
4	Scheduling	04	04	08	ITG307-4	16
5	Memory Management	06	04	04	ITG307-5	14
6	File Management	04	04	02	ITG307-5	10
TOTAL		32	24	24		80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given
Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-formaIII.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides (PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) Books / Codes

1.	AviSilberschatz	Applied Operating system concept
2.	Sumitabha Das	UNIX System V.4 Concepts and Applications
3.	Achyut S. Godbole	Opearating Systems

b) Websites

- i) <http://www.w3schools.com/>
- ii) <https://www.tutorialspoint.com/>
- iii) <https://opensource.com/article/18/9/>
- iv) https://onlinecourses.nptel.ac.in/noc20_cs04/preview
- v) <https://www.classcentral.com/course/swayam-operating-system-17712>

COURSE ID: 24

Course Name : SOFTWARE ENGINEERING
Course Code : ITG308
Course Abbreviation : GSOE

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS2020

Scheme component	Hours / week	Credits
Theory	3	4
Tutorial	1(T)	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Tutorial	Theory	Oral Examination (Internal)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each Tutorial(CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-IV	
Marks	20	--	80	25I	125

2. RATIONALE:

Software has become the key element in the evolution of Computer-based systems and products. Over the past 50 years, software has evolved from a specialized problem solving and information analysis tool to an industry in itself. Software is composed of programs, data and documents. Each of these items comprises a configuration that is created as part of the software engineering process. The intent of this course is to provide a framework for building software with high quality.

3. COMPETENCY

Apply the principles of software engineering to design and develop software.

Cognitive: The students will be able to:

- i) Examine the role of Software Engineer.

- ii) Identify all the phases of software development life cycle.
- iii) Describe the various processes along with project planning in software engineering.

Psychomotor: i) Design software models ii) Design software requirement specification
iii) Draw function oriented and object oriented diagrams

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG308-1: Select suitable software process model for the Software development.

ITG308-2: Prepare software requirements specification.

ITG308-3: Estimate size and cost of given software project.

ITG308-4: Classify software design types.

ITG308-5: Apply principles of Software Quality assurance and Maintenance.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[**Note: Correlation levels:** 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-”: no correlation]

Competency and Co-s	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Apply the principles of software engineering to design and develop software.	2	1	2	1	1	2	2	1	-
ITG308-1	2	-	1	2	1	1	1	1	-
ITG308-2	2	2	-	1	1	1	-	1	-
ITG308-3	3	-	1	2	2	2	1	--	-
ITG308-4	1	-	3	3	1	-	2	3	-
ITG308-5	1	-	1	-	1	-	1	1	-

6. CONTENT:

SUGGESTED TUTORIAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed:
(Tutorials' marked as * are compulsory)

Sr. No	Title of Experiment	Skills to be developed	Course outcome
01	Application and use of studied process models such as Agile, CBD,ASD	Describe different Life cycle Models	ITG308 - 1
*02	Write Problem statement to define the project title with bounded Scope of Project.	Define Problem statement for chosen system.	ITG308 - 1
*03	Select relevant process model to define activities and related tasks set for assigned project	Identify suitable Process model for chosen system.	ITG308 - 1
04	Gather application specific requirements for selected project	Prepare Requirement Analysis for suggested system	ITG308 - 2
*05	Prepare broad SRS(software requirement specification) for selected project	Prepare SRS for suggested system	ITG308 - 2
06	Develop Software Requirement Specification using Use-Case Scenario	Prepare requirements with Use-case scenario	ITG308 - 2
*07	Evaluate Size of the project using Function-Point metric	Estimating size using FP metric for chosen system.	ITG308 - 3
*08	Estimate Cost using COCOMO/COCOMO II model	Estimating cost using COCOMO model for chosen system	ITG308 - 3
*09	Identify risk involved in the project and prepare RMMM plan(RMMM -Risk management, Mitigation and Monitoring)	Prepare RMMM Plan with identifying Risks	ITG308 - 3
*10	Develop data design using DFD's and ER Diagram.	Perform the function oriented diagram : DFD,ER Diagram	ITG308 - 2, 4
*11	Draw the Activity Diagram to represent a flow from one activity to another activity for software development.	Perform the Object oriented diagram : Activity Diagram	ITG308 - 2, 4
12	Draw Sequence diagram, Collaboration diagram, State Transition Diagram for assigned project (e.g. Library Management)	Perform the Object oriented diagram : Sequence Diagram, State Transition Diagram ,Collaboration Diagram	ITG308 -4
*13	Write Test cases to validate requirements of assigned project from SRS document	Test software by developing various test cases for software project	ITG308 - 5
*14	Prepare SQA Plan for assigned Project	Study Software Quality Assurance System	ITG308 - 5

A.2 Micro-project

Each student should allotted one micro project in the beginning of the semester. The micro projects are group based (group of 2 students). Each micro project should encompass two or more COs.

Each student has to maintain dated work diary consisting of individual contribution in the micro project work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

- a) Study and analyze given software and write the characteristics and functions of the same.
- b) Choose any problem statement and use data models to represent solution.
- c) Case study of application specific software product for requirement engineering.
- d) Any other micro projects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Any UML Tool

8. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG308-1: Select Suitable software process model for the Software development.</i>			
1	SOFTWARE ENGINEERING CONCEPTS <ul style="list-style-type: none"> 1.1 Evolving Role of Software 1.2 Software Definition, Software Characteristics, Software Components, Software applications, 1.3 Role of Management in Software Development 1.4 The Process: Software Engineering: A Layered Technology -Process, Methods, and Tools. 1.5 Software process model: Prototyping model, RAD Model, Evolutionary Software Process Models, Incremental model, Spiral model, Concurrent development model, Component-based development model, Formal methods model. 1.6 Fourth generation techniques. Component based Development(CBD), Aspect-Oriented Software Development, Agile Process Model: Extreme Programming, Adaptive Software Development(ASD) 1.7 Selection criteria for software process model. 	08	14
<i>Course Outcome ITG308-2: Prepare the software requirement specification</i>			
2	SOFTWARE REQUIREMENT ANALYSIS <ul style="list-style-type: none"> 2.1 Requirements Engineering, Crucial Process Steps 2.2 Types of Requirements (known, unknown, undreamt) <ul style="list-style-type: none"> 2.2.1 Functional and Nonfunctional requirement 2.2.2 User and System requirement 2.3 Requirement Elicitation <ul style="list-style-type: none"> 2.3.1 Interviews 2.3.2 Brainstorming sessions 2.3.3 Facilitated Application specification Technique(FAST) 2.3.4 Quality Function Deployment 2.3.5 The Use Case Approach 2.4 Requirement Analysis <ul style="list-style-type: none"> 2.4.1 Data Flow Diagram - Leveling (level 0, 1) 2.4.2 Data Dictionaries 2.4.3 Entity- Relation Diagrams 2.4.4 Software Prototyping 2.5 Requirement Documentation <ul style="list-style-type: none"> 2.5.1 Characteristics of good SRS 2.5.2 Format of SRS with example 	08	12

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	2.6 Requirement Validation 2.6.1 Requirement Review		
<i>Course Outcome ITG308-3: Estimate size and cost of given software project.</i>			
3	SOFTWARE PROJECT PLANNING 3.1 Planning and its importance. 3.2 Activities during project planning 3.3 The Management Spectrum: 4 P's and Significance. 3.4 Size estimation 3.4.1 Lines of code(LOC) 3.4.2 Function Point 3.4.3 Cost estimation 3.5 The Constructive Cost Model(COCOMO) 3.5.1 Basic Model 3.5.2 Intermediate Model 3.5.3 Detailed COCOMO Model 3.6 COCOMO II 3.6.1 Application Composition Estimation Model 3.6.2 The Early Design Model 3.6.3 Post Architecture Model 3.7 Risk Analysis and Management 3.7.1 Risk Identification 3.7.2 Risk Assessment 3.7.3 Risk Containment 3.7.4 RMMM strategy	08	14
	Sub-total	24	40

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG308-4 Classify software design types.</i>			
4.	SOFTWARE DESIGN 4.1 What is Design 4.1.1 Conceptual and Technical design 4.1.2 Objectives of designs 4.1.3 Why Design is important 4.2 Modularity 4.2.1 Module Coupling 4.2.2 Module Cohesion	08	14

	4.2.3 Relationship between Cohesion and Coupling 4.3 Strategy of Design 4.3.1 Bottom up Design 4.3.2 Top Down Design 4.3.3 Hybrid Design 4.4 Function Oriented Design 4.4.1 Design Notations 4.4.2 Functional Procedure Layers 4.5 Object Oriented Design 4.5.1 Basic Concepts 4.5.2 Steps to Analyze and Design Object Oriented System 4.5.3 Case Study of Library Management System		
<i>Course Outcome ITG308-5: Apply Software Quality assurance and Maintenance principles to software project development.</i>			
5	SOFTWARE QUALITY ASSURANCE AND TESTING 5.1 Software Quality and Software Quality Assurance 5.1.1 Software Quality Concepts 5.1.2 Software Quality Factors 5.1.3 Software Quality Activities 5.1.4 Software Review 5.2 The ISO approach to quality assurance system 5.2.1 The ISO 9001 standard 5.2.2 Six Sigma for Software Engineering 5.2.3 CMMI: Levels, Process Areas 5.3 Testing Process 5.4 Definition 5.5 Testing Purpose 5.6 Some Terminologies (Introduction) 5.6.1 Error, mistake, bug, fault, failure 5.6.2 Test ,Test case and Test Suite 5.6.3 Alpha , Beta & Acceptance testing 5.7 Basic Concept of White Box ,Black Box Testing	08	12
6	SOFTWARE MAINTENANCE 6.1 What is software maintenance 6.1.1 Categories of Maintenance 6.2 Problems during Maintenance 6.3 Potential Solution to Maintenance Problems 6.3.1 The maintenance Process 6.3.2 Program Understanding 6.3.3 Generating Particular maintenance Proposal 6.3.4 Ripple Effects 6.3.5 Modified Program Testing 6.3.6 Maintainability 6.4 Reverse Engineering 6.4.1 Scope and Tasks	08	14

	6.4.2 Levels of Reverse Engineering 6.4.3 Reverse Engineering Tools 6.5 Software Re-engineering 6.5.1 Source Code Translation 6.5.2 Program Restructuring		
		Sub total	24
		Total	48

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Software Engineering Concepts	5	5	4	14
I / 2	Software Requirement Analysis	5	5	2	12
I / 3	Software Project Planning	4	4	6	14
II / 4	Software Design	4	4	6	14
II/5	Software Quality Assurance and Testing	3	5	4	12
II/6	Software Maintenance	3	5	6	14
	Total	24	28	28	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION

b) Assessment Criteria for Tutorial/ Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Term work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma IV

c) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end Term work:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

* Assessment at semester end as per Pro-forma IV

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides (PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

1. Books/Codes

Sr. No.	Author	Title	Publisher
1.	K.K. Agrawal &Yogesh Singh	Software engineering	Copyright © New Age International Publishers, 2007
2.	Rogar Pressman	Software Engineering A Practitioner's Approach	McGraw Hill Education; New Delhi 7th edition ISBN 978-0-07-337597-7
3	Jalote Pankaj	An Integrated Approach to Software Engineering	Narosa Publication New Delhi ISBN 978-1-4757-3857-5

b) Websites

1. <http://www.rspa.com/spi/>
2. www.tutorialpoint.com/softwareengineering/
3. www.versionone.com/agile-101/
4. www.sei.cmu.edu
5. www.nptel.ac.in/courses/

Course ID : 26

Course Name : PROGRAMMING USING .NET
Course Code : ITG309
Course Abbreviation : GPRD

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme : MPECS 2020

Scheme component	Hours / week	Credits
Theory	2	6
Practical	4	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External) & Micro-project	
Details of Evaluation	--	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	--	As per Proforma-III	
Marks	--	--	--	100E	100

2. RATIONALE:

.NET Framework (pronounced dot net) is a software framework developed by Microsoft that runs primarily on Microsoft Windows. It includes a large library and provides language interoperability (each language can use code written in other languages) across several programming languages. This course requires knowledge of web page designing. It involves the technologies used today to develop interactive and sophisticated web sites using ASP.NET. Web Technology is based on dot net technology, a frame work, which supports many languages so that application designed in one language (like C++, COBOL, JAVA, etc) can be connected/interfaced with this frame work hence it is more flexible and advanced.

3. COMPETENCY

Design Windows Applications and Web Applications using C# and ASP.NET technology

- Cognitive:**
- i) Use software to write and execute .net programs
 - ii) Design Windows Applications and Web Applications
 - iii) Developing database related applications using ASP.NET and ADO.NET

Psychomotor: i) Use software to write and execute .net programs ii) Developing simple applications

4. COURSE OUTCOMES:

ITG309-1: Describe .net framework environment to develop programs.

ITG309-2: Develop C# programs for implementing functions and Object Oriented programming concept.

ITG309-3: Design simple ASP.NET web forms using controls.

ITG309-4: Develop programs in ASP.NET using Cookies, Session, Application and Server Objects.

ITG309-5: Connect and manipulate database using ADO.NET for ASP.NET Web applications

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ Develop ment of solutions	PO 4 Engineer ing Tools, Experim entation and Testing	PO 5 Engineeri ng Practices for society, sustainabi lity and Environm ent	PO 6 Project Manage ment	PO 7 Life- long Learnin g	PSO1 Design and develop ment	PSO2 Database and Network manageme nt
Competency: Design Windows Applications and Web Applications using C# and ASP.NET technology	1	1	3	2	1	1	1	2	2
ITG309-1:	1	--	2	2	1	--	--	1	--
ITG309-2:	1	1	3	3	1	--	--	2	--
ITG309-3:	1	1	2	3	1	1	--	2	1
ITG309-4:	1	1	2	2	1	1	--	3	2
ITG309-5:	1	1	3	2	1	1	1	3	3

6. CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1.	Introduction to .NET Environment	1. Installation of Visual Studio	ITG309-1
*2.	Console Application in .NET	1. Creating simple program using C# in console application 2. Debugging in No break (Normal) Mode , Debugging in Break Mode	ITG309-1
*3.	Data Types and variables and Constants in C#	1. Development of C# program using various data types, multiple variables and constants	ITG309-1
*4.	Control Structure in C#-Decision Making Statement	1. Development of C# program using Decision Making Statements	ITG309-2
*5.	Control Structure in C#-Iterative Statement	1. Development of C# program using Iterative(Loop) statements	ITG309-2
*6.	Numeric and String functions, User Defined Functions	1. Development of C# program using numeric functions in .net - Log, Sin, Cos etc. 2. Development of C# program using String functions in .net - Mid, InStr, Replace etc 3. Develop C# programs using user defined functions, function Overloading	ITG309-2
*7.	Windows Form Application in .NET and event handling	1. Working with Form control properties 2. Working With Label , text box and Command button control Properties	ITG309-2
*8.	Windows Form Application in .NET and event handling	1. Working with Option button and check box properties 2. Working with Combo box and Linux	ITG309-2

*9.	Working with OOPS concept in C#	<ol style="list-style-type: none"> 1. Implementation Constructors and Destructors 2. Implementation of Inheritance 3. Implementation of Polymorphism 	ITG309-2
10.	Using Delegates, abstract classes and Interfaces in C#.	<ol style="list-style-type: none"> 1. Implementation of Delegates 2. Implementation of abstract classes 3. Implementation of Interfaces 	ITG309-2
*11.	Using Web Form Controls Textbox, Label, Command Button in ASP.NET	<ol style="list-style-type: none"> 1. Textbox – use of properties, methods and events 2. Label - use of properties, methods 3. Command button - use of properties, methods and events 	ITG309-3
*12.	Using Option button, Checkbox , Listbox and Combobox In ASP.Net	<ol style="list-style-type: none"> 1. Difference in use of Option button, Checkbox 2. Option button - use of properties, methods and events 3. Checkbox - use of properties, methods and events 4. Listbox - use of properties, methods and events 5. Combobox - use of properties, methods and events 	ITG309-3
*13.	Implementation of Controls in ASP.net	<ol style="list-style-type: none"> 1. Design registration form of college using text box, text area, radio list, check list,button etc. using Autopostback property. 2. Simple application for following function: (1) Login (2) Surfing (3) Logout 	ITG309-3
*14.	Reading & Writing cookies	<ol style="list-style-type: none"> 1. Implementation of Reading cookies And write cookies 	ITG309-4
*15.	Accessing session variables	<ol style="list-style-type: none"> 1. Develop session programs with Session object, SessionID, Session.Timeout and Session.Abandon 2. To make use of Session Variables 	ITG309-4
16.	Creating Global.asa file, Master Page in ASP.NET	<ol style="list-style-type: none"> 1. Implement OnStart and OnEnd events of Session and Application obj. 2. Create Global.asa file 3. Creating Master Page in ASP.NET 	ITG309-4

*17.	Database Connection	1. To establish connection to database 2. To close a connection to database	ITG309-5
*18.	Desktop Database Manipulation in ADO.NET using Window forms	1. To manipulate the data in database	ITG309-5
*19.	Web Application Database Web Forms Manipulation in ADO.NET using Web forms	1. To manipulate the data in database	ITG309-5
*20.	Online Web Application	Online application (student, employee, product, shopping mall) (a) Using dataset, data reader. (b) Same application using data table and data row. (use data grid to display data) (c) Bind the data to data grid using properties / templates. (d) Display details (student, employee, product, etc.) using data list. (4 cols per line)	ITG309-5

A.2 Micro-project

Each student should be allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students). Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:(Following ideas can be implemented as window application or Web based application)

- a) **Students Record System** – Prepare a menu driven application to maintain Academic management in Store
- b) **Store Management Application** – Prepare a menu driven application for inventory management in Store.
- c) **Hotel Management Application** – Prepare Hotel room booking system having variety of rooms. Hotel billing system for various services used by guest.
- d) **Traffic Signals Control Design** – Design an application for traffic signal control using timer control.
- e) **Ecommerce Website** - Create a Website that displays buyers information for e-commerce website such as amazon, flipcart, containing name, contact details, phone no, address, email id, purchased items, wishlist items, purchased product ID, payment mode. Apply different validation rules for user inputs
- f) Any other microprojects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Visual Studio Latest Version software

8. CONTENT: ITG309

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)
<i>Course Outcome ITG309-1: Describe .net framework environment to develop programs.</i>		
1	INTRODUCING TO .NET <ul style="list-style-type: none"> 1.1 Introducing .NET :- Cross Platform, Open Source, Programming Language, IDE, SDK and runtimes, Execution Models(CLR , JIT complier and IL, AOT Compiler, Automatic memory management) CIL 1.2 Introducing .NET Framework, Evolution of .NET Framework, Benefits of .NET Framework, Architecture of .NET Framework 1.3 Comparison of VB.NET & C#.NET 1.4 Introduction to C# :- features of C#, C# Preprocessor Directives, Creating a simple C# console application 1.5 Identifiers and Keywords, Data Types , variables and constants, 1.6 Expression and Operators 	6
<i>Course Outcome ITG309-2: Develop C# programs for implementing functions and Object oriented programming concept.</i>		
2	FUNCTIONS, DEBUGGING AND ERROR HANDLING <ul style="list-style-type: none"> 2.1 Defining and Using Functions ,Variable Scope 2.2 The Main() Function 2.3 Struct Functions 2.4 Overloading Functions 2.5 Creating Windows Form application in .NET with Toolbox (Use of Textbox, label, command button, Option button Checkbox, List box , combo box, password) 2.6 Events:-Event Sources, Event Handlers, Events and Delegates, Multiple Event Handlers 	5
3	IMPLEMENTATION OBJECT ORIENTED PROGRAMMING <ul style="list-style-type: none"> 3.1 Classes and Objects: - Creating Class, creating an array of objects, Using this keyword, Nesting classes, Partial Class Definition, Methods as Class Members, passing an Object as an Argument to a Method, Returning a Value from a Method, Access Modifiers 3.2 Constructors and Destructors 3.3 Static Classes and Static Class Members 3.4 Encapsulation, Using Delegates 3.5 Inheritance and Polymorphism 3.6 Abstraction and Interfaces 	5
	Sub-total	16

SECTION II

Sr. No .	Topics/ Subtopics	Lectures (Hours)
<i>Course Outcome ITG309-3: Design simple ASP.NET web forms using controls</i>		
4.	INTRODUCTION TO ASP.NET <ul style="list-style-type: none"> 4.1 Difference between ASP and ASP.NET 4.2 Introduction to web application, its uses, Introduction to IIS, IIS Express 4.3 ASP.NET IDE, Life cycle of an ASP.NET web Page 4.4 ASP.NET Web forms, Introduction to MVC framework, Using Web forms controls – Textbox, listbox, command button, combo box, Option Button, Checklist Box 	4
<i>Course Outcome ITG309-4: Develop programs in ASP.NET using Cookies, Session, Application and Server Objects.</i>		
5.	USING COOKIES, SESSION AND SERVER OBJECT <ul style="list-style-type: none"> 5.1 Cookies Definition, Advantages and Disadvantages of Cookies 5.2 Creating a Cookies, Removing Cookies 5.3 Session Objects - Using session variables 5.4 Application Objects - Using application variables 5.5 Initializing Application and Session variables 5.6 Creating a global.asa file 5.7 Server object- Methods- CreateObject, Execute, HTMLEncode, MapPath, Transfer 5.8 Adding web.config file. Creating Simple Master Pages 	5
<i>Course Outcome ITG309-5: Connect and manipulate database using ADO.NET.</i>		
6	INTEGRATING WITH DATABASE, ADO.NET <ul style="list-style-type: none"> 6.1 Microsoft's universal data access strategy – OLEDB, ODBC, RDO, ADO, ADO.net 6.2 The Connection object , Making a Sql connection object .Using Sql Connection , Closing a connection 6.3 ADO.Net in ASP.Net <ul style="list-style-type: none"> 6.3.1 Connection and Command Object. 6.3.2 Dataset and data reader. 6.3.3 Data table and Data row. 6.3.4 Web.config introduction. 6.3.5 Binding data with data grid. 6.4 Accessing and manipulating data using command Object. <ul style="list-style-type: none"> 6.4.1 The Recordset and Field object 6.4.2 Executing a query 	7

	6.4.3 Opening a recordset 6.4.4 Navigating in a recordset 6.5 Creating Database application with Window from and Web application 6.6 Web Services :- The Life Cycle of Web Service , The Structure of Web Service , Creating a Web Service	
	Sub-total	16
	Total	32

9. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b) **Assessment Criteria for Term-end Practical Examination:**

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
TOTAL.		50

*Assessment at semester end practical exam as per Pro-forma III.

10. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
- 2.Slides(PPT)
3. Self-learning Online Tutorials
4. Online E Course Videos

11. REFERENCE MATERIAL:**1. Books/ Codes**

S. No.	Title of Book	Author	Publication
1.	.NET Programming 6-in-1, Black Book	Kogent Learning Solutions Inc.	DreamTech Press
2.	C# 8.0 and .NET Core 3.0 Modern Cross-Platform Development	Mark J. Price	Kindle Edition
3.	The Complete Reference ASP.NET	Anthony Jones	Paperback
4.	ASP.net	Dave Mercer	TATA Mc Grow Hill

b) Websites

- i) <https://docs.microsoft.com/en-us/dotnet/csharp>
- ii) <http://www.tutorialspoint.com/csharp/>
- iii) <http://www.completecsharptutorial.com/>
- iv) <http://csharp.net-tutorials.com/>

COURSE ID: 26

Course Name : DATA STRUCTURE
Course Code : ITG310
Course Abbreviation : GDST

1. TEACHING AND EVALUATION SCHEME :

Pre-requisite Course(s) : ITG101
Teaching Scheme: MPECS 2020

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	03	05
Practical	02	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External & Micro-project)	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2. RATIONALE:

For efficient implementation of algorithms, proper organization and structuring data is essential. The primary objective of this course is to provide the student with an advanced treatment of computer programming with an emphasis on design and implementation of abstract data structures.

The coding language is C/C++.

3. COMPETENCY:

Implement relevant algorithms using Data Structures.

Cognitive: The students will be able to:

1. Know and identify different type of data Structure.
2. Implement relevant algorithms using Data Structures.

Psychomotor: i) Use Turbo C editor ii) Use compilation & debugging commands of Turbo C.

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES:

ITG310-1 Perform basic operation on array.

ITG310- 2 Apply different searching and Sorting techniques to data.

ITG310-3 Implement basic operations on stack using array representation

ITG310-4 Implement basic operations on Queue using array representation.

ITG310-5 Implement basic operations on Linked List.

ITG310-6 Implement program to create and traverse tree to solve problems

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/ development of solutions	PO 4 Engineering Tools, experimentation and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Implement relevant algorithms using Data Structures.	1	2	2	1	1	1	2	1	-
ITG310-1	2	2	2	1	1	-	2	1	-
ITG310-2	1	2	2	1	1	1	2	1	-
ITG310-3	1	2	2	1	1	-	2	1	-
ITG310-4	1	2	2	1	1	-	2	1	-
ITG310-5	1	2	2	1	1	1	2	1	-
ITG310-6	1	2	2	1	1	-	2	1	-

6. SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr No.	Title of Practical Exercise	Skills / Competencies to be developed	Course Outcome
1*	Implement a 'C' Program for Array operation	1. Definition and types of Array 2. Operation performed on Array 3. Implementation of program to Creation , Insertion, Deletion and Display Array element	ITG310-1
2*	Implement a 'C' Program to sort array using Bubble Sort method	1. Concept of Bubble Sort 2. Example/Logic of Bubble Sort 3. Implementation of Bubble Sort	ITG310-2
3*	Implement a 'C' Program to sort array using Selection Sort method	1. Concept of Selection Sort 2. Example/Logic of Selection Sort 3. Implementation of Selection Sort	ITG310-2
4	Implement a 'C' Program to sort array using Insertion Sort method	1. Concept of Insertion Sort 2. Example/Logic of Insertion Sort 3. Implementation of Insertion Sort	ITG310-2
5*	Implement a 'C' Program to search particular data element from the given array using Linear Search.	1. Concept of Linear Search. 2. Example/Logic of Linear Search. 3. Implementation of Linear Search.	ITG310-2
6*	Implement a 'C' Program to search particular data element from the given array using Binary Search.	1. Concept of Binary Search. 2. Example/Logic of Binary Search. 3. Implementation of Binary Search.	ITG310-2
7 *	Implement a 'C' Program to perform PUSH and POP operation(with all operation condition) on stack using array.	1. Concept of stack 2. Memory representation of stack 3. Operation performed on stack with all condition 4. Implementation of Stack using array	ITG310-3
8	Implement a 'C' Program to perform Recursion using stack	1. Concept of Recursion 2. Implementation of factorial of number using stack. 3. Implementation of Fibonacci sequence using stack.	ITG310-3
9*	Implement a 'C' Program to perform INSERT and DELETE operations on Linear Queue using array	1. Concept of Linear Queue 2. Memory representation of Linear Queue 3. Operation performed on Linear Queue with all condition 4. Implementation of Linear Queue to perform	ITG310-4

		INSERT and DISPLAY operation and DISPLAY queue.	
10	Implement a 'C' Program to perform INSERT and DELETE operations on Circular Queue using array	1. Concept of Circular Queue 2. Memory representation of Circular Queue 3. Operation performed on Circular Queue with all condition 4. Implementation of Circular Queue to perform INSERT , DELETE operation and DISPLAY queue.	ITG310-4
11*	Implement a 'C' Program to perform Insert, Delete, Traverse and Search operations on Singly Linked List	1. Concept of Singly Linked List 2. Memory representation of Singly Linked List 3. Operation performed on Singly Linked List with all condition 4. Implementation of Singly Linked List to perform Insert, Delete, Traverse , Search operations and display List.	ITG310-4
12	Implement a 'C' Program to perform Insert, Delete, Traverse and Search operations on Circular Singly Linked List	1. Concept of Circular Singly Linked List 2. Memory representation of Circular Singly Linked List 3. Operation performed on Circular Singly Linked List with all condition 4. Implementation of Circular Singly Linked List to perform Insert, Delete, Traverse , Search operations and display List.	ITG310-5
13*	Write C program to Implement BST (Binary Search Tree) and traverse the tree (Inorder , Preorder, Postorder).	1. Concept of Circular Binary Search Tree 2. Operation performed on Binary Search Tree . 3. Implementation of Binary Search Tree operation and display tree.	ITG310-6

NOTE : Mix of minimum 12 or more practical need to be performed , out of which , the practical marked as ** are compulsory.

A.2 Micro-project

Each student should allotted one micro project in the beginning of the semester. The micro projects are group based (group of 2 students) .Each micro project should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the micro project work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

1. Implementation of simple program using stack to Arrange number of CDs in CD box.
2. Implementation of simple program using queue for railway reservation system.
3. Implementation of simple program using queue for Admission line.
4. Develop a program in C' that creates Queue of given persons. Shift the original position of person to a new position based on its changed priority or remove a person front the Queue using Linked List implementation.
5. Develop a program in C that creates tree to store given data set using linked list representation. Locate and display a specific data from the data set.
6. Develop a C program for performing following banking Operations: Deposit, Withdraw and Balance enquiry. Select appropriate data structure for the same.
7. Any other micro projects suggested by subject faculty on similar line.

7. MAJOR EQUIPMENT / INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will be used in uniformity in conduct of experiments , as well as aid to procure equipment by authorities concerned.

Sr. No.	Equipment Name with broad specification	Practical
1	Computer System (Any computer system which is available in laboratory)	For All Practical
2	'C' compiler / GCC compiler	

8. CONTENT :**SECTION I**

Sr. No.	Topics / Sub-topics	Lecture s (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG310-1 Perform basic operation on array.</i>			
1	INTRODUCTION TO DATA STRUCTURE <ul style="list-style-type: none"> 1.1 Concept and need of DS , Abstract data type 1.2 Types of Data Structure : <ul style="list-style-type: none"> 1.2.1 Linear Data Structure 1.2.2 Non-Linear Data Structure 1.3 Operations on data structures <ul style="list-style-type: none"> 1.3.1 insertion 1.3.2 Deletion 1.3.3 searching 1.3.4 traversing 1.3.5 sorting 	06	10

	1.4 Algorithm Complexity : 1.4.1 Time Complexity 1.4.2 Space Complexity		
<i>Course Outcome ITG310- 2 Apply different searching and Sorting techniques to data.</i>			
2	SORTING & SEARCHING 2.1 Sorting - Introduction 2.2 Sorting Techniques - Sorting of Data set using following sorting techniques : 2.2.1 Bubble Sort 2.2.2 Selection Sort 2.2.3 Insertion Sort 2.2.4 Quick Sort 2.2.5 Merge Sort 2.2.6 Radix Sort 2.3 Searching - Introduction 2.3.1 Linear Search 2.3.2 Binary Search	08	16
<i>Course Outcome ITG310-3 Implement basic operations on stack using array representation</i>			
3	Stack 3.1 Introduction to Stack : Definition , Example of Stack , Stack as an Abstract Data Type 3.2 Representation of Stack in memory using Arrays 3.2.1 Primitive operations of stack : PUSH , POP 3.2.2 Stack Operations Conditions – Stack Full / Stack Overflow, Stack Empty / StackUnderflow. 3.2.3 Applications of Stack • Reversing a list • Polish notations 3.3 Conversion of infix to postfix expression , Evaluation of postfix expression, Converting an infix into prefix expression, Evaluation of prefix expression . 3.4 Recursion : Factorial & Fibonacci sequence using recursion.	10	14
	Total	24	40
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG310-4 Implement basic operations on Queue using array representation.</i>			
4	QUEUES <ul style="list-style-type: none"> 4.1 Introduction to Queue : Definition , Example of Queue, Queue as an Abstract Data Type 4.2 Representation of Queue in memory using Arrays 4.3 Types of Queue : Linear Queue, CircularQueue, Concept of Priority Queue , Concept of Double Ended Queue 4.4 Queue Operations – INSERT, DELETE <ul style="list-style-type: none"> 4.4.1 Queue Operations Conditions – Queue Full ,Queue Empty 4.5 Applications of Queue 	06	12
<i>Course Outcome ITG310-5 Implement basic operations on Linked List.</i>			
5	LINKED LIST <ul style="list-style-type: none"> 5.1 Introduction to Linked list : Definition , Example of Linked List , Terminologies : Node, Address, Pointer, Information/Data, Next, Null Pointer, Empty list. 5.2 Types of lists - Linear list , Circular list , Doubly linked list 5.3 Operations on Singly linked list - Searching, Insertion of new node and Deletion of node in list 5.4 Implementation of stack, queue using linked list 	08	12
<i>Course Outcome ITG310-6 Implement program to create and traverse tree to solve problems.</i>			
6	TREES AND GRAPH <ul style="list-style-type: none"> 6.1 Introduction to Tree Terminology- tree, leaf node, degree of node, degree of tree, level of node, Depth / Height of tree, Path , In-degree & Out-degree , Ancestor & descendant nodes 6.2 Types of Trees: General tree, Binary tree,Binary search tree (BST). <ul style="list-style-type: none"> - Binary tree Traversal methods : In order traversal, Preorder traversal, Post order traversal 6.3 Expression Tree 6.4 Introduction to Graph Terminology - graph, node (vertices), arcs (edge), directed graph, undirected graph, in-degree, out-degree, adjacent, successor, Predecessor, weight, weighted graph, path, length, cycle , Connected graph, multigraph , complete graph, strongly Connected 	10	16

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	graph 6.5 Sequential Representation of Graph 6.6 Adjacency List, Adjacency Matrix of directed / undirected graph.		
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

9. Specification table for setting question paper for semester end theory examination :

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Total Marks
		Remember	Understand	Application	
1	Introduction to data structure	04	04	02	10
2	Sorting and Searching	04	04	08	16
3	Stacks	02	04	08	14
4	Queues	02	06	04	12
5	Linked List	02	02	08	12
6	Trees and Graph	02	04	10	16
TOTAL		16	24	40	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION

f) Assessment Criteria for Term work :

i) Continuous Assessment of Practical Assignments :

Every practical assignment shall be assessed for 25 marks as per following criteria :

Domain	Particulars	Marks out of 50
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/ Logic/ Program/ Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given. Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

g) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
TOTAL.		50

*Assessment at semester end practical exam as per Pro-formaIII.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods :

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

12.REFERENCE MATERIAL :**a) Books / Journals / IS Codes**

Sr. No.	Author	Title	Publisher
1	Balgurusamy	Data structures using C	McGraw Hill Education, New Delhi 2013, ISBN : 978-1259029547
2	ISRD Group	Data structures using C	McGraw Hill Education, New Delhi 2013, ISBN : 978-12590006401
3	Lipschutz	Data structures with C (SCHAUM's OUTLINES Series)	McGraw Hill Education, New Delhi 2013, ISBN : 978-0070701984
4	Samarjeetkaur,Sandhir Sharma, P.P. Singh	Data structure – complete Course Book	Deep & Deep Publications Private Ltd.

B) SUGGESTED LEARNING WEBSITES

- i. <http://npte1.ac.in/courses/106102064/1>
- ii. wwwoopwebcom/algorithms
- iii. wwwstudytonightcom/data-structures/
- iv. wwwcsDtexasedu/users
- v. liscswssuedu
- vi. <http://wwwacademictutorialscom/data-structures>
- vii. <http://wwwsitebaycom/data-structure/c-data-structure>

* * *

COURSE ID : 27

Course Name : JAVA PROGRAMMING

Course Code : ITG311

Course Abbreviation : GJAP

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme : MPEC2020

Scheme component	Hours / week	Credits
Theory	3	7
Practical	4	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2. RATIONALE:

Java language enhances and refines the object oriented paradigm. Java supports development of dynamic, secure and portable web based applications. This subject knowledge is essential for development of customized and web based applications. Java being platform independent language is widely used in various business applications

3. COMPETENCY

Apply principles of Java for development of windows and web based applications.

Cognitive : i) Understand concepts of OOP

- ii) Apply concept of Exception handling, multithreading, package and interface
- iii) Implement GUI based applications and event handling

Psychomotor : i) Installation of JDK

- ii) Compiling and debugging Java programs
- iii) Designing GUI based and web based applications

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES :

ITG311-1 Recall concepts of object oriented features and control structures in java.

ITG311-2 Construct Classes & Objects using concepts of inheritance ,method overloading, method overriding, array, vector.

ITG311-3 Develop the programs using Interface & Packages.

ITG311- 4 Demonstrate multithreaded program with exception handling.

ITG311-5 Design web page using Applets & Graphics function in java

IT G311-6 Develop programs for handling I/O and file streams

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"--" : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Apply principles of Java for development of windows and web based applications.	1	1	3	3	1	3	1	3	--
ITG311-1	1	--	--	--	--	1	1	1	--
ITG311-2	1	2	3	3	2	2	1	3	--
ITG311-3	1	2	3	3	2	2	1	3	--
ITG311-4	1	2	3	3	2	2	1	3	--
ITG311-5	1	2	3	3	2	2	1	3	--
ITG311-6	1	2	3	3	2	2	1	3	--

6. CONTENT:

A.SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
1*	Introduction to Java Environment	1) Study of java environment 2) Study of JVM, JDK tools 3) Writing and running a java program	ITG311-1
2*	Control Structures	1) If...else statement, else if ladder 2) For loop 3) Do While loop 4) While loop 5) Continue and break statements	ITG311-1
3*	Class	1) Concept of class and objects 2) Defining a class, adding methods and variables 3) Accessing class members	ITG311-2
4*	Static fields, methods and method overloading	1) Use of static members 2) Use of Method Overloading	ITG311-2
5*	Inheritance	1) Study and use of various forms of Inheritance- Single, Multilevel, Hierarchical 2) Method Overriding	ITG311-2
6*	Method overloading	1)Program for Method overloading in Java	ITG311-2
7*	Method overriding	1)Program for method overriding in Java	ITG311-2
8*	Array	1) Defining, Initializing array (1D, 2D) 2) Accessing array elements (1D, 2D)	ITG311-2
9*	String	1)Write a Java program to reverse a string 2)Check if a string is palindrome 3)Programs including String methods	ITG311-2
10*	Vector	1)Develop a program for implementation of vectors in Java	ITG311-2
11*	Creating a Package	1) Creating a package 2) Adding class to a Package 3) Accessing a Package class	ITG311-3

12*	Adding class to an existing package	1) Adding class to existing Package 2) Hiding a class in a package 3) Using system packages	ITG311-3
13*	Interface	4) Defining an interface 5) Use of interface 6) Multiple Inheritance using interface	ITG311-3
14*	Multithreading	1) Understanding the concept of thread and its states 2) Starting and running thread 3) Stopping and blocking thread 4) Implementing Runnable interface	ITG311-4
15*	Exception Handling	1) Use of try...catch block 2) Use of Multiple catch statements 3) Using Finally statement 4) Throwing an exception	ITG311-4
16*	Applet and 2D Graphics	1) creating and executing an applet 2) Drawing shapes on an applet 3) Displaying Text on an applet 4) Passing parameters to an applet 5) Creating a Frame 6) Drawing 2D shapes - line, circle, ellipse, rectangle, arc, polygon 7) Filling shapes with various colors	ITG311-5
17*	File handling in Java	1)Develop a program for implementation of I/O stream classes 2)Develop a program for implementation of file stream classes	ITG311-6

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micropojects is as follows:

- a)Mini Banking system for handling deposits and withdrawal
- b)Medical store stock management system
- c)Library book issue management system
- d)Bus Reservation System

- e) Attendance management System
 f) Develop a small animation using applet, graphics and multithreading

All practicals are compulsory here.

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr.N o	Equipment Name with broad specifications
1	Computer with JDK 1.8 or above
2	Any IDE for Java Programming such as Eclipse , JCreator or any other product

8. CONTENT:

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
SECTION-I			
<i>Course Outcome ITG311-1: Recall concepts of object oriented features and control structures in java.</i>			
1	INTRODUCTION TO JAVA <ul style="list-style-type: none"> 1.1 Java features 1.1.2 Compiled & Interpreted 1.1.3 Simple 1.1.4 Object oriented 1.1.5 Distributed 1.1.6 Robust & secure 1.1.7 Architecture Neutral 1.1.8 Platform independent & portable 1.1.9 Multithreaded & interactive 1.1.10 High performance 1.1.11 Dynamic 1.2 How Java differ from C & C++ 1.3 Java environment 1.4 Data types of Java <ul style="list-style-type: none"> 1.4.1 Constants & Symbolic Constants, variables 1.4.2 dynamic initialization, data types, array & string, scope of variable, typecasting, standard default values 1.5 Operators in Java <ul style="list-style-type: none"> 1.5.1 Arithmetic Operators 1.5.2 Relational Operators 	08	10

	<p>1.5.3 Logical Operators,</p> <p>1.5.4 Increment & Decrement</p> <p>1.5.5 Conditional Operators</p> <p>1.5.6 Bit wise Operators</p> <p>1.5.7 Instance of Operators</p> <p>1.5.8 Dot Operators</p> <p>1.5.9 Operator precedence & associativity</p> <p>1.5.10 Evaluation of Expressions, Type conversions in expressions</p> <p>1.5.11 Mathematical Functions - min(), max(), sqrt(), pow(), exp(), round(), abs().</p> <p>1.6 decision making, branching & looping</p> <ul style="list-style-type: none"> 1.6.1 The if...else statement 1.6.2 Switch 1.6.3 While, Do....while 1.6.4 For loop 1.6.5 Jumps in loops and labeled loops 1.6.6 Breaking control flow 		
Course Outcome ITG311-2: Construct Classes & Objects using concepts of inheritance ,method overloading, method overriding, array, vector.			
2	<p>CLASSES , OBJECTS and METHODS</p> <p>2.1 Fundamentals of Object Oriented Programming -- Object and Classes, Data abstraction and encapsulation, Inheritance, Polymorphism, Dynamic Binding</p> <p>2.2 class –</p> <ul style="list-style-type: none"> 2.2.1 Add variable 2.2.2 Adding methods 2.2.3 Creating object 2.2.4 Accessing class members <p>2.3 Visibility Control Public, Private, Protected, default, friendly private Protected access</p> <p>2.3 Static fields & methods</p> <p>2.4 Constructor , Constructor overloading</p> <p>2.5 Inheritance in Java</p> <p>2.6 Method overloading & overriding</p> <p>2.7 final variable & methods and final classes</p> <p>2.8 abstract method & classes</p> <p>2.9 finalize method, Use of this keyword</p> <p>2.10 Arrays and Strings</p> <ul style="list-style-type: none"> 2.10.1 Types of arrays, creating an array 2.10.2 strings, string classes and string buffer 	08	15

	2.10.3vectors,wrapper classes,enumerated types		
Course Outcome ITG311-3: Develop the programs using Interface & Packages.			
3	PACKAGE,INTERFACES AND INNERCLASSES <p>3.1 Define package, type of package, Naming and creating packages, accessing package, import statement, static import, adding class and interface to a package 3.2 Define interface, implementing interface, accessing interface, variables and methods, extending interfaces, interface references, nested interfaces 3.3 Using inner class to access object state 3.4 Local and static inner classes</p>	08	15
	Sub-total	24	40

SECTION-II

Course Outcome ITG311-4: Demonstrate multithreaded program with exception handling.

4	EXCEPTION HANDLING AND MULTITHREADING <p>4.1 Errors and Exceptions: Types of errors, exceptions, try and catch statement, nested try statement, throws and finally statement, built-in-exceptions, chained exceptions, creating own exceptions(throw clause),subclasses 4.2 Concept of thread, thread properties/states, running and starting threads, stopping and blocking threads, mplementing runnable interface</p>	08	15
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Course Outcome ITG311-5: Design web page using Applets & Graphics function in java

5	JAVA APPLETS AND GRAPHICS PROGRAMMING <p>5.1 Applet, Applet lifecycle, Local and remote applets, How applet differs from an application, Applet tag, Adding Applet to HTML file, creating and executing Applet, Passing parameters to applet, embedding <applet>tags in java code 5.2 Graphics Programming: Graphics classes, lines, rectangles, ellipse, circle, arcs, polygons, color and fonts, setColor(), getColor(), setForeground(), setBackground(), font class, variable defined by font class: name, pointSize, size, style, font methods- getFamily(),getFont(),getFontname(),getSize(),getStyle(),getAllFonts() , get Available font family name() of the graphics environment class.</p>	08	15
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Course Outcome ITG311-6: Develop programs for handling I/O and file streams

6	MANAGING INPUT/OUTPUT/FILES IN JAVA 6.1 Introduction and concept of stream 6.2 Stream Classes 6.3 Byte Stream Classes: Input Stream classes, Output Stream Classes, Character Stream Classes 6.4 Using streams 6.5 Using File Class 6.1.1 I/O Exceptions 6.1.2 Creation of files 6.1.3 Reading/writing characters, reading/writing byte 6.1.4 Handling primitive data types	08	10
	Sub total	24	40
	Total	48	80

9. Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction to java	04	04	02	10
I / 2	CLASSES , OBJECTS and METHODS	04	04	07	15
I / 3	Package, interfaces and inner classes	04	04	07	15
II/ 4	Exception handling and multithreading	04	04	07	15
II/ 5	Java applets and graphics programming	04	04	07	15
II / 6	Managing input/output/files in java	02	02	06	10
	Total	22	22	36	80

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given
Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-formaIII.

11. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Books / Codes**

S. No.	Title of Book	Author	Publication
1.	The Complete Reference Java2-Eleventh Edition	Herbert Schildt	McGrawHill
2.	Programming with Java	E Balgurusamy	TMH
3.	Core Java Volume I-Fundamentals	Cay S. Horstmann, Gary Cornell	Pearson India Education Services Pvt. Ltd.
4.	Thinking in Java	Bruce Eckel	Prentice Hall

b) Websites

1. www.javatpoint.com
2. www.w3schools.com
3. www.tutorialspoint.com
4. www.geeksforgeeks.org

COURSE ID: 28 (A)

Course Name : MULTIMEDIA & ANIMATION TECHNIQUES
Course Code : ITG312
Course Abbreviation : GMMT

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	2	4
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (Internal& Micro-project)	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-IV	
Marks	--	--	--	75I	75

2. RATIONALE:

One picture speaks thousand words. Animation has given a boost to various areas like film production, Advertisement, e-learning & animated web-site etc. This course will enable the students to implement their creative imagination to produce animated text & images, audio and video. It is a practical oriented course which deals with various fonts, audio & video formats, bitmap images, animation.

3. COMPETENCY :

Design and develop animation, images, audio and video using multimedia tools.

Cognitive : i) Select the basic components of Multimedia

ii) Synthesize animated text, images, audio and video

Psychomotor : i) Draw 2D animations ii) Design images, audio and video of various formats

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES :

- ITG312-1** Prepare images using different color models.
- ITG312-2** Edit images using Graphical processing tools.
- ITG312-3** Build website with multimedia contents.
- ITG312-4** Develop 2D animation object.
- ITG312-5** Develop 3D animation object.
- ITG312-6** Apply Multimedia tools and laws for designing web page

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-" : no correlation]

Competency and COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledg e	PO 2 Proble m Analysi s	PO 3 Design/ Developme nt of solutions	PO 4 Engineeri ng Tools, Experimen tation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Managem ent	PO 7 Life- long Learnin g	PSO1 Design and development	PSO2 Database and Network management
COMPETENCY :Design and develop animation, images, audio and video using multimedia tools.	2	2	2	2	1	1	2	2	-
ITG312-1	2	2	1	2	1	-	1	1	-
ITG312-2	1	2	1	1	1	-	1	1	-
ITG312-3	1	3	1	1	2	2	1	1	-
ITG312-4	1	2	1	2	2	-	2	2	-
ITG312-5	1	2	1	2	2	--	2	2	-
ITG312-6	1	2	1	2	3	-	2	2	-

6.CONTENT:**C) SUGGESTED PRACTICAL'S/ EXERCISE**

A.1Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. no	Laboratory experience	Skills developed	CO
1*	Introduction to Multimedia	<ul style="list-style-type: none"> 1. Create different types of still images using graphical processing tool. 2. Develop images using RGB/ CMY/ HSB color models. 3. Convert given image into different image formats. 	ITG312-1
2*	Introduction to movie maker software	<ul style="list-style-type: none"> 1. Develop simple movie clip using movie maker 	ITG312-1
3	Image Editing	<ul style="list-style-type: none"> 1. Draw seed & create small plant with use of at least 4 frames. 	ITG312-2
4	Introduction to graphical processing tool.	<ul style="list-style-type: none"> 1. Develop GIF image using graphical processing tool. 2. Design Banner using graphical processing tool. 	ITG312-2
5	Use Concept of 2D animation for wallpaper creation	<ul style="list-style-type: none"> 1. Apply different word art on text and Create Wallpaper using various tools of 2D image processing software. 	ITG312-2
6	Use Concept of 2D animation for applying various effects	<ul style="list-style-type: none"> 1. Apply various effects (Drop Shadow, vignette, mirror, reflection) on text using any 2D image processing software. 	ITG312-2
7	Use Concept of 2D animation for image editing.	<ul style="list-style-type: none"> 1. Merge multiple photographs using any 2D image processing software. 2. Apply Rotate and change rotation center operation to an image using any 2D image processing software. 	ITG312-2
8	Use Concept of 2D animation for image editing using various effect.	<ul style="list-style-type: none"> 1. Modify existing image by adding Rainy Season effect using 2D image processing software. 	ITG312-2
9*	Insert image or picture into webpage.	<ul style="list-style-type: none"> 1. Insert image or picture into webpage using any professional HTML editor. 	ITG312-3
10*	Create 2D Animation.	<ul style="list-style-type: none"> 1. Create 2D Animation for Bouncing and Rolling ball down 	ITG312-4
11*	Design simple 3D animation.	<ul style="list-style-type: none"> 1. Design simple 3D animation using basic shapes. 	ITG312-5
11	sample model development	<ul style="list-style-type: none"> 1. Object creation, types & development methods, sample model development 	ITG312-5

12*	Lighting effect to 3D object.	1. Apply Lighting effect to 3D object.	ITG312-6
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NOTE : Mix of minimum 12 or more practical need to be performed , out of which , the practical marked as ** are compulsory.

A.2 Micro-project

Each student should allotted one micro project in the beginning of the semester. The micro projects are group based (group of 2 students) .Each micro project should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the micro project work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

1. E-cards Funny cartoon shorts in 2D animation.
2. Build Interactive animated web page
3. Design Personnel Portfolio using 2D Animation
4. Modeling a cartoon character in 3D graphic processing tool
5. Any other micro-projects suggested by course faculty on similar line.

Design any one micro project and write multimedia law for selected micro project.

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of experiments, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment Name with Broad Specifications	Expt. S. No.
1	Hardware: Personal computer Pentium IV, 2 GHz minimum (i3-i5 preferable), RAM minimum 2 GB onwards.	For all Experiments
2	Operating system: Windows 7/10/LINUX	
3	Graphics and animation development tools preferably Open source based Software: Gif animation tool, Pencil, Synfig Studios, Stykz, Blender, Sci lab or any other Multimedia graphics processing tool	

8. CONTENT:**SECTION - I**

Sr. No.	Topics / Sub-topics	Lecture s (Hours)
<i>Course Outcome ITG312-1 Prepare images using different color models</i>		
1	INTRODUCTION TO MULTIMEDIA <ul style="list-style-type: none"> 1.1Concept of Multimedia : Types, Use of Multimedia. 1.2Vector and Raster Graphics in multimedia, Regular text vs. anti-aliased text , Standard selection vs. floating, selection, Tolerance and Opacity 1.3Color Models – RGB, CMY, HSB, Hue, saturation, and brightness 1.4Basics of Graphics – Basic Shapes: Line, Circle, Rectangle. 1.5Hardware Requirements (CRT, LCD) and Software Requirements (Color Model in different Software), Characteristics of Multimedia. 1.6Creating Multimedia based application, Multimedia Authoring. 1.7Virtual Reality : Fundamentals, its applications 	05
<i>Course Outcome ITG312-2 Edit images using Graphical processing tools.</i>		
2	IMAGE EDITING , COMPRESSION AND SOUND <ul style="list-style-type: none"> 2.1 Image File Formats: Raster Format, Bitmap (BMP) Format, Graphics Interchange Format (GIF), Joint Photographic Experts Group (JPEG), Tagged Image File Format (TIFF), Portable Network Graphics (PNG) and their differences. 2.2 Basic operations on image: Crop, Resize, Complement 2.3 Image Compressions techniques: Lossy and Lossless. 2.4 Effects and its types: Fonts and its types, Text effect (Ketchup, rope, Fire, fruit) Image Effect broken mirror effect, Flaming ball effects, water drop effect in image. 2.5 Multimedia system sounds , Digital audio , Audio file format . 2.6 Adding sound to multimedia file. 	05
<i>Course Outcome ITG312-3 Build website with multimedia contents.</i>		

3	WEBPAGE DEVELOPMENT USING MULTIMEDIA 3.1 Create Simple Two-Column Web Page with Header and Footer. 3.2 Design Home Page. 3.3 Hypertext and Hypermedia. 3.4 Upload or Publish Your First Web Page. 3.5 Different Audio file formats: Uncompressed audio format, Lossless compressed audio format, Lossy compressed audio format. mp3, wav, mpeg-4, wma, pcm. MIDI Versus Digital Audio. 3.6 Video file Formats: MPEG: MPEG1, MPEG2, MPEG4, AVI	06
	Total	16

SECTION II

Sr. No.	Topics / Sub-topics	Lecture s (Hours)
<i>Course Outcome ITG312-4 : Develop 2D animation object.</i>		
4	INTRODUCTION TO 2D ANIMATION 4.1 Create and modify 2D elements. 2D versus 3D 4.2 Line tool, Fill/Attributes, Different shapes, text tools and pen tool 4.3 2D animation: Animation: Animation basics, Timeline, Frames and Key Frames, Creating a basic text animation, Creating and manipulating animations, Creating a basic frame-by-frame animation, Using Onion Skin to modify an animation, Using shape twining and hinting, Using motion twining with a guide, Mask Animations	06
<i>Course Outcome ITG312-5 : Develop 3D animation object.</i>		
5	INTRODUCTION TO 3D ANIMATION 5.1 3D Animation: Manipulate Objects in 3D 5.2 Edit mode/Mesh Modeling. 5.3 Object / Edit Mode Modeling: Empty Object, Background Image, Parenting Objects, Joining Objects, Separating Objects. 5.4 Lighting: Point Lamp, Sun Lamp 5.5 Animation in 3D: Basic Key frame Animation, Graph Editor, Cyclic Animation, Path Animation	06
<i>Course Outcome ITG312-6 Apply Multimedia concept and the law for designing web page</i>		
6	MULTIMEDIA AND THE LAW 6.1 Intellectual property rights 6.1.1 Copyright 6.1.2 Patents	04

Sr. No.	Topics / Sub-topics	Lecture s (Hours)
	6.2 Errors and inaccuracies 6.3 Electronic trading	
		Total 16

9. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/Logic/ Program/ Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) PROGRESSIVE SKILLS TEST :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach, procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

d) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
TOTAL.		50

*Assessment at semester end practical exam as per Pro-formaIII.

10. INSTRUCTIONAL STRATEGIES:**Instructional strategies:**

1. Lectures and discussions.
2. Laboratory experiences and laboratory interactive sessions.
3. Time bound assignments.

Teaching and Learning resources, including references:

1. Chalk-board.
2. Transparencies
3. Presentation Slides

4. Demonstrative video files

Assessment at semester end practical exam as per Pro-forma II.

11. REFERENCE MATERIAL:

a) Books / Code

Sr.No	AUTHOR	TITLE	PUBLICATION
1	Parekh, Ranjan	Principles of Multimedia 2e	Tata McGraw Hill New Delhi. 2016, ISBN-13:978-1-25-900650-0
2	Andleigh, Prabhat K Thakrar , Kiran	Multimedia Systems and Design	Prentice Hall of India (PHI) 2003 ISBN: 81-203-2177-4
3	Li , Ze - Nian	Fundamentals of Multimedia	Prentice Hall of India (PHI) ISBN-13: 978-8120328174
4	Vaughan Tay	Multimedia: Making It Work,9e	Tata McGraw Hill New Delhi. May 2014, ISBN: 9780071832885
5	Parekh, Ranjan	Principles of Multimedia 2e	Tata McGraw Hill New Delhi. 2016, ISBN-13:978-1-25-900650-0

b) Websites

- i. <https://www.youtube.com/watch?v=7FSxJJ5-SZ8>
- ii. <https://www.youtube.com/watch?v=faWNkTPKKjg>
- iii. <http://gryllus.net/Blender/Lessons/Lesson02.html>
- iv. <https://www.thesitewizard.com/gettingstarted/dreamweaver1.shtml>
- v. <https://www.youtube.com/watch?v=OGa61mDT4a4>
- vi. <https://www.youtube.com/watch?v=zYA4gYho5vo>
- vii. <https://www.youtube.com/watch?v=9KOVgLsvHYM>

COURSE ID: 28(B)**Course Name : CLIENT SIDE SCRIPTING USING JAVA SCRIPT****Course Code : ITG313****Course Abbreviation : GCJS****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	2	4
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (Internal)& Micro-project	
Details of Evaluation	--	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	--	As per Proforma-IV	
Marks	--	--	--	75I	75

2. RATIONALE:

JavaScript is the globally used client-side languages for the web. The JavaScript language is so popular that hundreds of developers have made customized libraries that make development easier for other programmers and web designers. This course enables student to understand JavaScript concept and perform interactive dynamic scripting for real time web based projects.

3. COMPETENCY**Develop interactive dynamic webpages using JavaScript.****Cognitive:** i) Design and write code simple web pages.

ii) Design webforms with different form events, validation features.

Psychomotor : i) Surfing different types of web sites. ii) Implementation of different types of websites. iii) Recognize different types of validations features in websites.

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG313-1: Create interactive webpages using JavaScript control flow structure, arrays, functions and strings

ITG313-2: Develop webpage to handle form events using JavaScript.

ITG313-3: Create webpage using cookies and validating form with regular expression.

ITG313-4: Develop webpage with Object and DOM.

ITG313-5: Use of node.js, JSON and angular.js framework.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solution	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Develop interactive dynamic webpages using JavaScript	1	2	2	3	1	--	1	3	--
ITG313-1:	-	1	2	3	1	--	1	2	--
ITG313-2: .	1	2	3	3	1	1	1	2	--
ITG313-3:	1	2	2	2	1	--	--	2	--
ITG313-4:	1	2	2	2	1	1	--	2	--
ITG313-5: .	1	1	2	1	2	--	1	1	--

6. CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Laboratory Work:

Laboratory experiments and related skills to be developed :

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1	Write a javascript with HTML program using variables and datatypes.	1. Identify the different data types 2. Uses of variables	ITG313-1
*2	Create Webpage with javascript to insert into HTML and using external javascript file.	1. Understand use of javascript with HTML	ITG313-1
*3	Write javascript to demonstrate use of operators.	1. Use of arithmetic operator 2. Use of logical operators 3. Use of assignment operators 4. Use of Conditional Operators	ITG313-1
*4	Implement JavaScript program using if condition statement and looping .	1. Use of condition statement and looping	ITG313-1
*5	Implement JavaScript to use array and associative array.	1. Apply the use of array and associative array	ITG313-1
*6	Write JavaScript program to implement string methods and functions	1. Use of string methods 2. Recognize using functions	ITG313-1
*7	Design a webpage in JavaScript to implement form fields.(Assume any website)	1. Apply all form fields. 2. Use of all form fields.	ITG313-2
*8	Create a webpage to implement registration form for ecommerce website. Apply all form events.	1. Perform form events on webpage 2. Understand working of form events	ITG313-2
*9	Create a webpage to implement all cookies function.	1. Use of all cookies function	ITG313-3
10	Create a webpage to implement session.	2. Session Creation 3. Use of Session object 4. Working of Sessions	ITG313-3
11	Develop a webpage for validation of form field using regular expressions.	1. Able to validate webpage form fields with different criteria using regular expression.	ITG313-3

*12	Implement JavaScript program using concept of object and DOM object.	1. Use of object 2. Use of document object model	ITG313-4
*13	Write program using node.js, JSON and angular.js framework	1. Recognize use of node.js 2. Understand JSON 3. Understand use of angular.js	ITG313-5

A.2 Micro-project

Each student should be allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students). Each microproject should encompass two or more COs.

Each student has to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a) Create a WebPage that displays buyers information for e-commerce website such as Amazon, Flipkart, containing name, contact details, phone no, address, email id, purchased items, wishlist items, purchased product ID, payment mode. Apply different validation rules for user inputs. Use javascript and regular expression to perform error handling. Apply cookies and even handling concept.
- b) Create a webpage for your Institute. Create login system for faculty and student. Apply validation rules, regular expression, cookies concept.
- c) Create a webpage for Student Course Registration System for your Institute. Apply validation rules, regular expression, cookies concept.
- d) Any other micro projects suggested by subject faculty on similar line.

7. MAJOR EQUIPMENTS/ INSTRUMENTS/SOFTWARE REQUIRED

Sr. No.	INSTRUMENTS/SOFTWARE
1.	Browser
2.	NOTEPAD/Free Webpage Designing Tool

8. CONTENT: ITG313

Section I

Sr. No.	Topics / Sub-topics	Lectures (Hours)
<i>Course Outcome ITG313-1: Create interactive webpages using JavaScript control flow structure, arrays, functions and strings.</i>		
1	INTRODUCTION To Java Script <ul style="list-style-type: none"> 1.1 Web Scripting Fundamentals, Server- Versus Client-Side Programming 1.2 History, Features, JavaScript statements, A Simple Example, Code Editing Tools, The HTML Document, Keywords, Literals, JavaScript Values, Comments 1.3 Variables and data types 1.4 Expressions and Operators, Arithmetic Operators Comparison Operators, Logical (or Relational) Operators, Assignment Operators, Conditional (or ternary) Operators 1.5 If else statement, if else if statement, nested if statement, switch case 1.6 Loop statement - for loop, for ---in loop, while loop, do – while loop, continue statement 1.7 Inserting the JavaScript into an HTML document, using external java script files with examples 	5
2	ARRAY , FUNCTIONS AND STRING <ul style="list-style-type: none"> 2.1 Declare array, Initializing an Array, defining a array element, access the array element, Using array with Loop, Understanding the properties and methods of the Array Object, Using Associative array 2.2 Function – declaring function, defining function, Adding parameters to function, scope of variable and arguments 2.3 Calling a function with and without an argument, calling function from HTML, function calling another function, returning a value from function 2.4 String – String and string methods 	5
<i>Course Outcome ITG313-2: Develop webpage to handle form events using JavaScript.</i>		
3	FORM & EVENT HANDLING <ul style="list-style-type: none"> 3.1 Building blocks of the form :- forms basics, Accessing forms, Form Fields- textbox, password field, radio buttons, checkboxes, pull-down menus, scrolled lists, buttons, hidden fields, common Input Element Properties, Form Validation 	6

	3.2 Introduction to Event Handler, 3.3 Form Events – Abort Event, Blur Event, Change Event, Click Event, Focus Event, Keydown, Keypress, Keyup Event, Load Event, Mousedown, Mousemove, Mouseup, Mouseover, Mouseout, Reset , Submit, Unload Event 3.4 Creating Script using Event Handler	
	Sub-Total	16

SECTION II

Sr. No .	Topics / Subtopics	Lectures (Hours)
<i>Course Outcome ITG313-3: Create webpage using cookies and validating form with regular expression.</i>		
4.	COOKIES, SESSION & REGULAR EXPRESSION 4.1 Cookies – Definition, the document. Cookie property, Cookie ingredients, writing a cookie, reading a cookie, deleting a cookie, writing multiple values in a single cookie 4.2 Session: Introduction to Session & its working. 4.3 Regular Expression – Need of regular expression, Concept of regular expression, finding non matching characters, entering a range of characters, matching digits and non-digits, matching punctuation and symbols, matching words, Using String replace () with a Regular Expression	7
<i>Course Outcome ITG313-4: Develop webpage with Object and DOM.</i>		
5.	OBJECT & DOCUMENT OBJECT MODEL 5.1 Defining Objects, creating Object, Accessing Object Properties, Accessing Object Methods 5.2 Browser Properties -opening a window, giving a new window focus, JavaScript location and history 5.3 Defining the Document object, Using the properties of Document Object, Using the methods of document object	6
<i>Course Outcome ITG313-5: Use of node.js, JSON and angular.js framework.</i>		
6	JAVASCRIPT FRAMEWORK & CROSS-PLATFORM RUNTIME ENVIRONMENT 6.1 Introduction to Node .js, a simple example application 6.2 Introduction to Angular.js, a simple example application 6.3 Difference between Node.js and Angular.js 6.4 Introduction to JSON, example	3
	Sub Total	16
	Total	32

9. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach, procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma IV.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma IV.

10. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials
4. Online E Course Videos

11. REFERENCE MATERIAL:

a) Books

S. No.	Title of Book	Author	Publication
1.	A JavaScript Beginner Guide	John Pollock	McGraw Hill Companies
2.	JavaScript The complete Reference	Thomas Powell, Fritz Schneider	Publisher(s):McGraw-Hill ISBN: 9780071741217
3.	JavaScript Absolute Beginner Guide	Kriupa Chinnathambi	Pearson Education
4.	JavaScript in 24 hours(SAMS teach yourself)	Phil Ballard, Michael Moncour	Pearson Education , Inc

b) Websites

- i. <https://www.w3schools.com/js/>
- ii. <https://www.javascripttutorial.net/>
- iii. <https://www.tutorialspoint.com/javascript/index.htm>
- iv. <https://javascript.info/>

COURSE ID:28(C)

Course Name : INTERNET OF THINGS
Course Code : ITG314
Course Abbreviation : GIOT

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	2	4
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End Examination		Total
	Theory	Practical	Theory Examination	Practical Examination (External)& Micro-project	
Details of Evaluation	--	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	--	As per Proforma-IV	
Marks	--	--	--	75I	75

2. RATIONALE:

The Internet is evolving to connect people to physical things and also physical things to other physical things all in real time. It's becoming the Internet of Things (IoT). The course enables student to understand the basics of Internet of things and protocols. It introduces some of the application areas where Internet of Things can be applied. Students will learn about the middleware for Internet of Things.

3. COMPETENCY

Implement Internet of Things by interfacing Arduino with different sensors and IOT devices

Cognitive: i) Develop Arduino programming with Arduino
ii) Apply working of sensors with Arduino devices

Psychomotor : i) Use to handle IOT devices. ii) Diagnose and troubleshoot sensors , Arduino devices

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG314-1: Recognize characteristics, designs of IOT.

ITG314-2: Differentiate between different types of sensors, IOT devices.

ITG314-3: Implement interfacing of Arduino with sensors using Arduino programming

ITG314-4: Explain working of different real time applications of IOT.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-": no correlation]

Competency and COs	Programme Outcomes POs and PSOs									
	PO 1 Basic and disciplin e specific knowled ge	PO 2 Problem Analysis	PO 3 Design/ Develop ment of solution s	PO 4 Engineering Tools, Experiment ation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Managem ent	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management	
Competency: Implement Internet Of Things by interfacing Arduino with different sensors and IOT devices	2	2	2	2	1	--	1	2	3	
ITG314-1:	1	1	--	1	--	--	--	1	1	
ITG314-2:	1	1	2	2	1	--	1	1	1	
ITG314-3:	1	2	3	2	1	--	1	3	2	
ITG314-4:	1	3	2	2	1	--	1	2	2	

6. CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Laboratory Work:

Laboratory experiments and related skills to be developed :

Sr. No	Title of Experiment	Skills to be developed	Course outcome
*1	Explain and identify features, need of IoT and design of IoT.	1. Understand need of IoT 2. Physical Design of IoT 3. Logical Design of IoT	ITG314-1
*2	Identify different sensors and its	1. Recognize types of sensors	ITG314-1

	working.	2. Use of sensors	
*3	Identify and compare different IoT devices, wireless devices.	1. Compare between different IOT Devices	ITG314-1
*4	Installation of Arduino	1. Install Arduino software IDE	ITG314-1
*5	Arduino program using control statements & operators	1. Implementation of control statements 2. Develop Arduino program using operators	ITG314-1
*6	Implement Arduino program using functions	1. Develop programs using functions.	ITG314-1
*7	Implement Arduino programming interfacing with Humidity Sensor, Temperature Sensor.	1. Working of Arduino with interfacing different sensors	ITG314-2
*8	Implement Arduino programming interfacing with Water Sensor, PIR Sensor	1. Working of Arduino with interfacing different sensors	ITG314-2
*9	Implement Arduino programming interfacing with Ultrasonic Sensor	1. Working of Arduino with interfacing with ultrasonic sensors	ITG314-3
*10	Implement Arduino programming of Blinking LED and Fading LED	1. Develop programs using interfacing with LED.	ITG314-3
11.	Implement Arduino programming for Seven Segment Display	1. Develop programs to display seven segment display.	ITG314-4
12.	Implement Arduino programming for Display counter using Arduino	1. Develop programs using display counter	ITG314-5

A.2 Micro-project

Each student should be allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) . Each microproject should encompass two or more COs.

Each student has to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micropojects is as follows:

- a) IoT based Humidity and Temperature Monitoring
- b) IoT based Weather Monitoring System
- c) IoT based Home Automation System
- d) IoT based Air Pollution Monitoring System
- e) Any other micropojects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS/ INSTRUMENTS/SOFTWARE REQUIRED

Sr. No.	INSTRUMENTS/SOFTWARE
1.	Arduino Device, LED
2.	Different Sensor - Humidity Sensor, Temperature Sensor, Water Sensor, PIR Sensor, Ultrasonic Sensor
3.	Arduino Software IDE

8. CONTENT: ITG314

Section I

Sr. No.	Topics / Sub-topics	Lectures (Hours)
<i>Course Outcome ITG314-1: Recognize characteristics, designs of IOT</i>		
1	INTRODUCTION To IoT <ul style="list-style-type: none"> 1.1 Definition & Characteristics of IoT 1.2 Physical Design of IoT <ul style="list-style-type: none"> • Things in IoT • IoT protocols 1.3 Logical Design of IoT <ul style="list-style-type: none"> • IoT functional block • IoT Communication Model • IoT Communication API 1.4 IoT enabling Technologies, IoT levels and deployments, IoT issues, challenges, application 	8
<i>Course Outcome ITG314-2: Differentiate between different types of sensors, IOT devices.</i>		
2	IOT Devices <ul style="list-style-type: none"> 2.1 IoT Sensors and Actuators, IoT sensors types, IoT Actuator types, Basic working Technique of Sensor 2.2 IoT devices and its features :- Arduino, Uno, Raspberry pi, Node Microcontroller Unit, ESP32 2.3 IoT Wireless devices and uses in IoT:- LPWAN(Low Power Wide Area Networks), Cellular(3G/G4/5G), Bluetooth, Zigbee, Wi-fi, RFID 	8
	Sub-Total	16

SECTION II

Sr. No .	Topics/ Subtopics	Lectures (Hours)
<i>Course Outcome ITG314-3: Implement interfacing of Arduino with sensors using Arduino programming</i>		
3	ARDUINO WITH ARDUINO PROGRAMMING 3.1 Arduino Board Description, Installation of Arduino IDE Software 3.2 Introduction to Arduino programming, Program Structure, Data types, Variables & Constant, Operators 3.3 Control Statements, Loops, Functions, String, String Object, Time, Arrays 3.4 Arduino Function Libraries :- I/O functions, Character Functions, Math library, Trigonometric Functions	6
<i>Course Outcome ITG314-4: Explain working of different real time applications of IOT.</i>		
4.	ARDUINO IMPLEMENTATION WITH SENSORS, IOT CLOUD 4.1 Programming with Arduino Sensors :- Humidity Sensor, Temperature Sensor, Water Sensor, PIR Sensor, Ultrasonic Sensor 4.2 Arduino programming of Blinking LED and Fading LED 4.3 Arduino – Seven Segment Display 4.4 Arduino – Display counter using Arduino 4.5 Introduction to Arduino IoT Cloud	6
5.	CASE STUDIES 5.1 Agriculture, Healthcare, Activity monitoring 5.2 Home Automation	4
	Sub-Total	16
	Total	32

9. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION**b) Assessment Criteria for Practical Assignments :****i) Continuous Assessment of Practical Assignments:**

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma IV.

c) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10

3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma IV.

10. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials
4. Online E Course Videos

11. REFERENCE MATERIAL:

e) Books / Codes

S. No.	Title of Book	Author	Publication
1.	Internet Of Things - A Hands On Approach	<u>Arsheep Bahga, Vijay Madisetti</u>	Orient Blackswan Private Limited - New Delhi
2.	Arduino Programming in 24 Hours, Sams Teach Yourself	<u>Blum Richard</u>	Kindle Edition
3.	Rethinking the Internet of Things: A Scalable Approach to Connecting Everything	Francis daCosta	Apress Publications
4.	Getting Started with the Internet of Things: Connecting Sensors and Microcontrollers to the Cloud	Cuno Pfister	Kindle Publication

b) Websites

- i) <https://nptel.ac.in/courses/106/105/106105166/>
- ii) <https://spoken-tutorial.org/>
- iii) <https://www.coursera.org/specializations/iot>
- iv) https://www.tutorialspoint.com/internet_of_things/index.htm

**LEVEL-IV
APPLIED TECHNOLOGY COURSES**

COURSE ID:29**Course Name : NETWORK ADMINISTRATION****Course Code : ITG401****Course Abbreviation : GNAD****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : ITG306****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2. RATIONALE:

In today's age of Information Technology almost every application sends information from one place to another place. This subject is network application-based subject. It gives the practical knowledge of designing computer network. This subject covers the installation and configuration of any network operating system. With the proper configuration of operating system on the server, the students will be able to manage and administer the network resources. This subject also covers network maintenance, troubleshooting tools and network security.

3. COMPETENCY

Configure and maintain the organization's computer network

Cognitive: i) Understanding and recalling network administration to design network for home or office

ii) Describe active directory architecture, domain name system, use of firewall and IP security

Psychomotor: i) Administer the network operating system ii) Troubleshoot OS and TCP/IP utilities

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG401-1 Design network plan for home or small office.

ITG401-2 Describe IPv6 addressing and host configuration with DNS.

ITG401-3 Illustrate Active directory architecture

ITG401-4 Troubleshoot network maintenance and virus problem

ITG401-5 Discuss protocols and firewalls for network security

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
“-” : no correlation]

Competency and COs	Programme Outcomes POs and PSOs								
	PO 1 Basic & dis- cipline specif- ic know- ledge	PO 2 Proble m Analys is	PO 3 Design / Analys is	PO 4 Develo pment of sol- utions	PO 5 Engineeri ng Tools, Experimen tation and Testing	PO 6 Engineering Practices for society, sustainabilit y and Envi- ronment	PO 7 Project Manage ment	PSO1 Life- long Learnin g	PSO2 Design and developm ent
Competency: Configure and maintain the organization's computer network	2	2	2	2	1	1	2	2	1
ITG401-1	2	-	3	1	2	-	2	-	3
ITG401-2	2	1	2	1	1	-	3	-	3
ITG401-3	2	-	-	1	2	-	2	-	2
ITG401-4	1	2	4	1	2	-	3	-	2
ITG401-5	2	-	-	2	2	-	3	-	3

6. CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1.	Design Network Plan for given Scenario	1. Identifying client requirement 2. Planning cost and material for network 3. Detailing network Plan	ITG401-1
*2.	Installation of Server Operating System	1. Installing any available server Operating System 2. Installation of Drivers and Settings	ITG401-1
*3.	Installing and configuring a network capable print device.	1. Installing a printer 2. Print spooler service 3. Viewing printer preferences	ITG401-1
*4.	Installing DHCP	1. Installing and configuring DHCP server (using any capable component)	ITG401-2
*5.	Installing DNS	1. Installing and configuring DNS server (using any capable component)	ITG401-3
6	Installing Active directory	2. Installing and configuring DNS server (using any capable component)(E. G. Samba)	
7.	User account management	1. Creating an Account 2. Disabling, renaming and enabling an Account 3. Moving an Account 4. Changing an Accounts password 5. Deleting an Account	ITG401-3
*8.	Network troubleshooting	1. OS utilities – Execution of commands with all options.	ITG401-4
*9.	Network troubleshooting	1. TCP/IP utilities – Execution of commands with all options.	ITG401-4
*10	Configuring Firewall on PC	1. Configuring and setting firewall on Personal computer	ITG401-5
11	Network Backup	1. Performing Backup and restore in Linux using tar command	ITG401-4
*12	Installation of Network Protocol analyzer	1. Installation of Network Protocol analyzer (Freeware e.g,	ITG401-1,2,3,4,5

		wireshark, Nagios etc)	
13	Industrial Visit	1. Visit any industry which has Network established. 2. Prepare report based on visit.	ITG401-1,2,3,4,5

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students). Each microproject should encompass two or more COs.

Each student has to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

- a) Prepare Survey report on Latest Network Devices available in Market
- b) Prepare Report on Different network infrastructure by visiting industry.
- c) Prepare Network plan for Given Layout of any small firm.
- d) Any other micro projects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System (Any computer system with basic configuration), Printer
2	Server Operating system (Any Available)
3	Network Infrastructure with medium and connecting devices
4	Internet Connection
5	Any Antivirus Software

8. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG401-1 Design network plan for home or small office.</i>			
1	IMPLEMENTATION OF NETWORK <ul style="list-style-type: none"> 1.1 Network Design Overview 1.1.1 Reasoning the need 1.1.2 Seeking approval 1.2 Designing a home or small office network 1.2.1 Selecting computers 1.2.2 Selecting a networking protocol <ul style="list-style-type: none"> - Choosing a network medium - Choosing a network speed 1.2.3 Expanding the network 1.3 Remote Network Access <ul style="list-style-type: none"> 1.3.1 Public Switched Telephone Network (PSTN) 1.3.2 Integrated Services Digital Network (ISDN) 1.3.3 Digital Subscriber Line (DSL) 	05	12
<i>Course Outcome ITG401-2 Describe IPv6 addressing and host configuration with DNS</i>			
2	NETWORK CONNECTION AND HOST CONFIGURATION <ul style="list-style-type: none"> 2.1 IPv6 Addressing-notation, address space, three types of address 2.2 IPv6 Packet format <ul style="list-style-type: none"> Base Header, Flow Label, Comparison between IPv4 and IPv6 Headers Dynamic Host Configuration Protocol (DHCP) <ul style="list-style-type: none"> - RARP, BOOTP (introduction) - IP address allocation-static dynamic, Automatic - TCP/IP Client configuration - DHCP packet structure - DHCP Message Type option 	10	14
<i>Course Outcome ITG401-2 Describe IPv6 addressing and host configuration with DNS</i>			

3	THE DOMAIN NAME SYSTEM 3.1 Need For DNS 3.2 Name Space 3.2.1 Flat Name Space 3.2.2 Hierarchical Name Space 3.2.3 Domain Name space 3.3 DNS in Internet 3.3.1 Generic top level domains 3.3.2 Country-code domains 3.3.2 Inverse Domain 3.3.3 Registrar 3.4 DNS Resolution 3.4.1 Resolvers 3.4.2 DNS Message Header 3.4.3 Types of Records -Question Record - Resource Record 3.4.4 Root Name Server	09	14
	SubTotal	24	40

Section II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG401-3:Explain Active directory architecture</i>			
4	ACTIVE DIRECTORY ARCHITECTURE 4.1 Object types 4.2 Object Naming 4.2.1 Canonical Names 4.2.2 LDAP notation 4.2.3 Globally unique identifiers 4.2.4 User principle names 4.3 Domain, Trees and Forests 4.4 DNS and Active directory 4.5 Global Catalog Server	06	12
<i>Course Outcome ITG401-4:Troubleshoot network maintenance and virus problem</i>			
5	NETWORK MAINTENANCE AND TROUBLESHOOTING 5.1 Backups 5.1.1 Backup Hardware 5.1.2 Backup Software Functions 5.2 Network Antivirus Policies 5.2.1 Types of Viruses	10	14

	<p>5.2.2 Preventing virus infections</p> <p>5.3 Patches and Updates</p> <p> 5.3.1 Major updates</p> <p> 5.3.2 Patches</p> <p> 5.3.3 Driver Updates</p> <p> 5.3.4 Software upgrades</p> <p>5.4 Operating System Utilities for Network Troubleshoot</p> <p> 5.4.1 NET - NET CONFIG, NET DIAG, NET START and NET STOP, NET SESSION, Net Watcher</p> <p>5.5 TCP/IP Utilities for Network troubleshooting</p> <p> 5.5.1 Ping</p> <p> 5.5.2 Traceroute</p> <p> 5.5.3 Route</p> <p> 5.5.4 Netstat</p> <p> 5.5.5 Nslookup</p> <p> 5.5.6 Ipconfig</p>		
<i>Course Outcome ITG401-5 Explain protocols and firewalls for network security</i>			
6	NETWORK SECURITY <p>6.1 Firewalls</p> <p> 6.1.1 Types of firewalls</p> <p> 6.1.2 Firewall configuration</p> <p> 6.1.3 Limitations of firewalls</p> <p>6.2 IP Security</p> <p> 6.2.1 Introduction</p> <p> 6.2.2 IPSec Overview</p> <p> - Introduction, IPSec protocols, IKE protocol, Security Association</p> <p> 6.2.3 Authentication Header (AH)</p> <p> - AH format, Dealing with replay attacks, Modes of operation</p> <p> 6.2.4 Encapsulating Security Payload (ESP)</p> <p> - ESP format, Modes of operation</p> <p> 6.2.5 IPSec Key Management</p> <p> - Introduction, Oakley key determination protocol, ISAKMP (Packet Format Only)</p> <p>6.3 Virtual Private Networks (VPN)</p> <p> 6.3.1 Introduction</p> <p> 6.3.2 VPN Architecture</p>	08	14
	SubTotal	24	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Topic Name	Distribution of marks (level wise)			Total marks
		Knowledg e	Comprehensio n	Application	
I / 1	Implementation of Network	2	4	6	12
I / 2	Network Connection and Host Configuration	4	4	6	14
I / 3	Domain name System	4	6	4	14
I / 4	Active directory Architecture	4	4	4	12
II / 5	Network Maintenance & troubleshooting	4	4	6	14
II / 6	Network Security	4	6	4	14
	Total	22	28	30	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given
 Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach, procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
TOTAL.		50

*Assessment at semester end practical exam as per Pro-formaIII.

10. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board 2. Slides (PPT) 3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Reference Books**

S. No.	Title of Book	Author	Publication
1.	Data Communication and Networking	Behrouz, Forouzan	TMH 1999
2.	Computer Networks	Tanenbaum	Pearson Education India
3.	Networking All in One Desk Reference For Dummies	Doug Lowe	John Wiley & Sons

b) Websites

- i) <http://www.w3schools.com/>
- ii) <https://www.dnsstuff.com/free-network-monitoring-software>
- iii) <https://searchnetworking.techtarget.com/>
- iv) <https://nptel.ac.in/courses/106/105/106105183/>
- v) https://onlinecourses.swayam2.ac.in/cec19_cs07/preview
- vi) <https://www.thegeekstuff.com/2014/01/install-dns-server/>

COURSE ID: 30

Course Name : SOFTWARE TESTING
Course Code : ITG402
Course Abbreviation : GSOT

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : ITG308

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	03	05
Practical	02	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (Internal)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-IV	
Marks	20	--	80	50I	150

2. RATIONALE:

The complexity and size of today's software makes writing secure, bug-free code is extremely difficult, in such a situation testing of software before release is very essential. Software testing can be considered as "Quality Gate" which will pass/release only quality software. Students will learn how to find bugs/errors in any computer program, how to plan an effective test approach, how to clearly report findings and to tell when software is ready to release. Also it introduces various levels and types of testing so that students will be able to practically apply appropriate testing method on

application. It also covers manual testing as well as expanding manual test efforts with various automation tools.

3. COMPETENCY:

Understand the various automated testing tools to improve testing efficiency.

Cognitive: The students will be able to:

- i) Understand how software testing fits into the software development process.
- ii) Learn various types and levels of Software Testing.
- iii) Develop the skills to find bugs in any type of software.
- iv) Learn how to effectively plan tests, communicate the bugs you find.
- v) Use your new testing skill to test not just the software but also the product specification, the raw code even the user's manual.

Psychomotor: i) Adapt knowledge of software testing life cycle; test planning, test case writing and testing execution. ii) Describe defect management.

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality.

4. COURSE OUTCOMES:

ITG402-1: Capture Basics of Software Testing.

ITG402-2: Compare types of testing.

ITG402-3: Design test cases using levels of testing and special tests.

ITG402-4: List various steps in Test management.

ITG402-5: Use testing tools and measurements for defect management.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Understand the various automated testing tools to improve testing efficiency.	2	1	2	1	1	2	3	2	-
ITG402-1:	2	1	-	-	-	1	1	-	-
ITG402-2:	2	1	-	-	-	1	1	-	-
ITG402-3:	2	2	2	1	1	2	3	2	-
ITG402-4:	2	1	1	-	1	1	2	-	-
ITG402-5:	2	2	3	2	2	2	3	2	-

6. CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Sr. No.	Title of Practical Exercise	Skills / Competencies to be developed	Course Outcome
*1	Introduction to Software Testing Concepts	Introduction to Software Testing Concepts.	ITG402-1
*2	Case Study	To study any one sample system specification and design the test cases for it. (E.g. Student information system, Library management system, Hospital	ITG402-2

		management system etc.)	
*3	Design of Test cases.	To write test cases on simple calculator application.(BB Testing)	ITG402-2
*4	Design of Test cases	Design Test cases for railway reservation form.	ITG402-3
*5	Design of Form	To design test cases for any login form(E.g.: Gmail or Yahoo login form)	ITG402-3
*6	Design of Test cases for system	To design test cases for mobile phone system(E.g.: check battery is inserted in mobile properly, check SIM is inserted properly, check incoming and outgoing call)	ITG402-3
*7	Design of Test cases for Application	To design test cases for notepad/WordPad/MS-Word application.	ITG402-4
*8	Design of Test cases for Application	To design test cases for ATM machine	ITG402-4
*9	Automate Microsoft Word Application	Using any freeware automation testing tool, atomize and run test cases for MS-Word application	ITG402-5
*10	Prepare Defect Report	Prepare Defect report after executing test cases for any login form	ITG402-5
*11	Implementation Web Testing	Testing web application for performance using any automated tool(e.g. Selenium)	ITG402-5
*12	Use of test management tool	Automate any application for test management tool (e.g. Test Director)	ITG402-5

A.2 Micro-project

Each student should allotted one micro project in the beginning of the semester. The micro projects are group based (group of 2 students) .Each micro project should encompass two or more Co.

Each student has to maintain dated work diary consisting of individual contribution in the micro project work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

- a) Library Management: book issue/book stock system
- b) Any other micro projects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Selenium(Web Testing Tool Freeware)
3	Mantis Bug Tracker
4	IBM Relational Function Tester (Test Management Tool)
5	Spreadsheet Package
6	Bugzilla (Defect Tracking Tool)

8. CONTENT :

A) THEORY :

SECTION I

Sr. No.	Topics / Sub-topics	Lecture (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG402-1 Capture Basics of Software Testing</i>			
1	BASICS OF SOFTWARE TESTING <ul style="list-style-type: none"> 1.1 Software Quality, Definition of Software Testing, Role of Testing 1.2 Failure, Error, Fault, Defect, Bug Terminology 1.3 Objectives of Testing 1.4 Test Case 1.5 When To Start and Stop Testing of Software (Entry and Exit Criteria) 1.6 Skills for Software Tester 1.7 Verification and Validation (V Model), Quality Assurance, Quality Control. 1.8 Methods of Testing: Static and Dynamic Testing 	06	10
<i>Course Outcome ITG402-2 Compare types of testing</i>			
2.	TYPES OF TESTING <ul style="list-style-type: none"> 2.1 White Box Testing <ul style="list-style-type: none"> 2.1.1 Static Testing- Inspections, Structured Walkthroughs, Technical Review 2.1.2 Structural Testing- Code Functional Testing, Code Coverage Testing, Code Complexity Testing 2.2 Black-Box Testing <ul style="list-style-type: none"> 2.2.1 Techniques for Black Box Testing 	08	14

	Requirement Based Testing, Positive and Negative Testing , Boundary Value Analysis, DecisionTables 2.2.2 Equivalence Partitioning, User Documentation Testing, Graph Based Testing. 2.3 Sample Examples on White and Black Box Testing.		
Course Outcome ITG402-3 Design test cases using levels of testing and special tests			
3	Levels Of Testing And Special Tests 3.1 Unit Testing 3.1.1 Driver, Stub 3.2 Integration Testing 3.2.1 Decomposition Based Testing 3.2.2 Top-Down Integration, Bottom-Up Integration, Bi-directional Integration, Incremental Integration, NonIncremental Integration 3.3 System Testing 3.3.1 Recovery Testing, Security Testing, 3.3.2 Performance Testing, Load Testing, Stress Testing, Usability Testing, Compatibility Testing 3.4 Acceptance Testing 3.4.1 Acceptance criteria 3.4.2 Alpha Testing and Beta Testing 3.5 Special Tests 3.5.1 Smoke Testing and Sanity Testing, Regression Testing, Usability Testing, GUI Testing 3.5.2 Object Oriented Application Testing: Client-Server Testing, Web based Testing	10	16
	Sub-total	24	40

SECTION II

Sr. No.	Topics / Sub-topics	Lecture (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG402-4 List various steps in Test management</i>			
4	<p>Test Management</p> <p>4.1 Test Planning</p> <ul style="list-style-type: none"> 4.1.1 Preparing a Test Plan, Scope Management, Deciding Test Approach, Setting Up Criteria for Testing 4.1.2 Identifying Responsibilities, Staffing, Training Needs, Resource Requirements, Test Deliverables, Testing Tasks <p>4.2 Test Management</p> <ul style="list-style-type: none"> 4.2.1 Choice of Standards, Test Infrastructure Management, Test People Management 4.2.2 Integrating with Product Release <p>4.3 Test Process</p> <ul style="list-style-type: none"> 4.3.1 Base Lining a Test Plan, Test Case Specification 4.3.2 Update of Traceability Matrix, Executing Test Cases, Collecting and Analyzing Metrics 4.3.3 Preparing Test Summary Report <p>4.4 Test Reporting</p> <ul style="list-style-type: none"> 4.4.1 Recommending Product Release 	10	16
<i>Course Outcome ITF402-5 Use testing tools and measurements for defect management</i>			
5	<p>Defect Management</p> <p>5.1 Introduction, Defect Classification, Defect Management Process</p> <p>5.2 Defect Life Cycle, Defect Template</p> <p>5.3 Estimate Expected Impact of a Defect, Techniques for Finding Defects, Reporting a Defect.</p>	06	12
6	<p>Testing Tools And Measurements</p> <p>6.1 Limitations of Manual Testing and Need for Automated Testing Tools</p> <p>6.2 Features of Test Tool: Guideline for Static and Dynamic Testing Tool</p> <p>6.3 Advantages and Disadvantages of Using Tools</p> <p>6.4 Selecting a Testing Tool</p>	08	12

	6.5 When to Use Automated Test Tools, Testing Using Automated Tools 6.6 Metrics and Measurement.: Types of Metrics, Project Metrics, Progress and Productivity Metrics		
	Sub total	24	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledg e	Comprehe nsion	Applicatio n	
I / 1	Basics of Software Testing	05	02	03	10
I / 2	Types Of Testing	05	04	05	14
I / 3	Levels of Testing And Special Tests	06	05	05	16
II/ 4	Test Management	06	05	05	16
II/5	Defect Management	04	04	04	12
II/6	Testing Tools And Measurements	04	04	04	12
	Total	30	24	26	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05

Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
	TOTAL	25

ii) Progressive Skills Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given. Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma IV.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma IV

11. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides (PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Books / Codes**

Sr. No .	Title	Author	Publication
1.	Software Testing: Principles and Practices	Srinivasan Desikan Gopalaswamy Ramesh	PEARSON Publisher: Pearson India2005,ISBN:9788177581218
2.	Software Testing: Principles, Techniques and Tools	M G Limaye	Tata McGraw Hill Education, New Delhi, 2007 ISBN 13:9780070139909
3	Software Testing: Principles and Practices	Naresh Chauhan	Oxford University Press Noida
4	Software Testing	Ron Patton	Cambridge University Press, Bengaluru. ISBN :978-1-107-65278-1

b) Websites

- i) <http://www.selenium.com>
- ii) http://en.wikipedia.org/wiki/Test_automation
- iii) http://en.wikipedia.org/wiki/Software_testing#Testing_tools
- iv) <http://www.softwaretestingsoftware.com>
- v) www.toolsqa.com
- vi) http://www.tutorialspoint.com/software_testing/

* * *

COURSE ID : 31

Course Name : INFORMATION SECURITY
Course Code : ITG403
Course Abbreviation : GIFS

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Nil
Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	03	05
Practical	02	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (Internal& Micro-project)	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (03 hours)	As per Proforma-II	
Marks	20	--	80	25I	125

2. RATIONALE :

Information security is becoming one of the most important areas of computing today. It is essential to understand various threats to secure computing and the basic security design principles and techniques developed to address these threats. The student will be able to recognize potential threats to confidentiality, integrity and availability. This course will introduce basic cryptography, web security, basic authentication mechanism, email security. It will develop knowledge for security of information and information systems within organizations.

3. COMPETENCY :

Maintain security of information systems using cryptography, authentication mechanisms and email security

Cognitive :

- i) Identify threats to confidentiality, integrity and availability of information systems
- ii) Demonstrate encryption techniques
- iii) Explain symmetric and asymmetric key algorithms
- iv) Understand Internet security and message authentication

Psychomotor : i) Solve examples on cipher techniques

- ii) Write programs to implement encryption techniques
- iii) Perform a case study on security attack on information system

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES :

The students will be able to :

ITG403-1: Classify security attacks of information systems

ITG403-2: Apply user identification and authentication methods.

ITG403-3: Apply cryptographic algorithms to maintain Information Security.

ITG403-4: Apply algorithm to share asymmetric key.

ITG403-5: Apply measures to prevent attacks on network using different protocol and firewall.

ITG403-6 Illustrate intrusion detection and password management techniques

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-" : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Understand the various automated testing tools to improve testing efficiency.	2	1	2	1	1	2	3	2	-
ITG403-1	-	-	-	-	2	-	2	2	-
ITG403-2:	1	1	1	1	2	1	2	-	-
ITG403-3:	2	3	2	1	2	1	2	-	-

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
ITG403-4:	2	3	2	1	2	1	2	2	-
ITG403-5:	2	3	2	1	2	2	2	2	-
ITG403-6:	1	3	2	1	2	1	2	2	-

6. CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Sr No.	Title of Practical Exercise	Skills / Competencies to be developed	Course Outcome
*01	Search of information security threats	1. Search of security attacks 2. Find the example of security attacks	ITG403 - 1
*02	Install and configure Antivirus	1. Install and configure Antivirus software on system (any). 2. Set up operating system updated.	ITG403 - 1
*03	Perform Backup and Restore of the system.	1. Perform Backup and Restore of the system.	ITG403 - 1
*04	Use access permissions	1. Apply security to file folder or application using access permissions and verify.	ITG403 - 2
*05	Set password to OS and Application.	1. Set up passwords to operating system 2. Set up passwords to applications.	ITG403 - 2
*06	Write a program to implement Caesar Cipher	1. Concept of Caesar Cipher 2. Example/Logic of Caesar Cipher 3. Implementation of Caesar Cipher	ITG403 - 3
07	Write a program to implement Vernam Cipher	1. Concept of Vernam Cipher 2. Example/Logic of Vernam Cipher 3. Implementation of Vernam Cipher	ITG403 - 3
*08	Write a program to implement Rail fence technique	1. Concept of Rail fence technique 2. Example/Logic of Rail fence technique 3. Implementation of Rail fence technique	ITG403 - 3

09	Write a program to implement Simple Columnar Transposition technique	1. Concept of Simple Columnar Transposition technique 2. Example/Logic of Simple Columnar Transposition technique. 3. Implementation of Simple Columnar Transposition technique.	ITG403 - 3
*10	Create and verify digital signature	1. Create and verify digital signature using tool (e.g. Cryptool)	ITG403 - 4
11	Install , configure ,se firewall	1. Install on any operating system 2. configure firewall settings on any operating system	ITG403 -5
*12	Trace the origin of email	1. Trace the origin of email using any tool (e.g., emailTrackerPro)	ITG403 - 5
*13	Implementation of a program to check strength of password	1. Implementation of a program to check strength of a text password	ITG403 - 6

A.2 Micro-project

Each student should allotted one micro project in the beginning of the semester. The micro projects are group based (group of 2 students) .Each micro project should encompass two or more Co.

Each student has to maintain dated work diary consisting of individual contribution in the micro project work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

1. Case Studies in Secure Computing: Achievements and Trends.
2. Implement Client/Server communication using cryptography tools in your laboratory.
3. Create digital certificate for your departmental/ personal communication.
4. Implement communication system using steganography. Encrypt image and message using any cryptography technique.
5. Implement communication system using steganography using audio files. Encrypt audio file and message using any cryptography technique.
6. Implement Three Level Password Authentication System.
7. Any other micro-projects suggested by subject faculty on similar line.

7. MAJOR EQUIPMENT / INSTRUMENTS REQUIRED

Sr. No.	Equipment Name with broad specification	Practical
1	Computer System (Any computer system which is available in laboratory)	For All
2	Antivirus Software(any)	Practical

3	Any compiler	6,7,8,9,13
4	Encryption Decryption tool (preferably open source based)	10,
5	Web tracing tool (preferably open source based)	11
6	E-mail tracing tool (preferably open source based)	12

8.CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG403-1: Classify security attacks of information systems</i>			
1	INTRODUCTION TO INFORMATION SECURITY <ul style="list-style-type: none"> 1.1 Foundations of Computer Security: Definition and Need of computer security, Security Basics: Confidentiality, Integrity, Availability, Accountability, Non- Repudiation and Reliability. 1.2 Risk and Threat Analysis: Assets, Vulnerability, Threats, Risks, Counter measures. 1.3 Threat to Security: Viruses, Phases of Viruses, Worms, Intruders, Insiders. 1.4 Type of Attacks: Active and Passive attacks , Denial of Service ,DDOS, Backdoors and Trapdoors , Sniffing, phishing, Spoofing, Man in the Middle, Replay, TCP/IP Hacking, Encryption attacks. 1.5 Information, Need and Importance of Information, information classification, criteria for information classification, Security, need of security. 1.6 A model for network security 	08	14
<i>Course Outcome ITG403-2: Apply user identification and authentication methods.</i>			
2	USER AUTHENTICATION AND ACCESS CONTROL <ul style="list-style-type: none"> 2.1 Identification and Authentication: User name and Password, Guessing password, Password attacks- Piggybacking, Shoulder surfing, Dumpster diving. 2.2 Biometrics: Finger Prints, Handprints, Retina, patterns, Voice patterns, Signature and Writing patterns, Keystrokes. 2.3 Access controls: Definition, Authentication Mechanism, principle-Authentication, Authorization, Audit, Policies: DAC, MAC, RBAC. 	06	12
<i>Course Outcome ITG403-3: Apply cryptographic algorithms to maintain Information Security.</i>			

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
3	Symmetric Cryptography <ul style="list-style-type: none"> 3.1 Introduction: Plain Text, Cipher Text, Cryptography, Cryptanalysis, Cryptology, Encryption, Decryption. 3.2 Symmetric cipher model 3.3 Substitution techniques <ul style="list-style-type: none"> 3.3.1 Caesar cipher 3.3.2 Playfair cipher 3.3.3 Hill cipher 3.4 Transposition techniques <ul style="list-style-type: none"> 3.4.1 Rail fence technique 3.4.2 Simple columnar technique 3.4.3 Vernam cipher 3.5 Steganography: Procedure 3.6 DES (Data encryption Standard) algorithm. 	10	14
	Sub Total	24	40
Section II			
<i>Course Outcome ITG403-4: Apply algorithm to share asymmetric key.</i>			
4	Asymmetric cryptography <ul style="list-style-type: none"> 4.1 Introduction to Asymmetric encryption, 4.2 Public key cryptosystem 4.3 RSA algorithm - encryption and decryption techniques 4.4 Key Management <ul style="list-style-type: none"> 4.4.1 Distribution of public keys 4.4.2 Diffie-Hellman key exchange algorithm 4.5 Man-in-middle attack 4.6 Digital Signature 	06	12
<i>Course Outcome ITG403-5: Apply measures to prevent attacks on network using different protocol and firewall.</i>			
5	Internet Security <ul style="list-style-type: none"> 5.1 Secure Socket Layer <ul style="list-style-type: none"> 5.1.1 Handshake protocol 5.1.2 Record protocol 5.1.3 Alert protocol 	10	14

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	5.2 Secure HTTP 5.3 E-mail security 5.3.1 Pretty Good Privacy 5.3.2 S/MIME 5.4 Firewall: Need of Firewall. 5.5 Firewall Policies, Configuration, limitations, DMZ.		
Course Outcome ITG403-6:Illustrate intrusion detection and password management techniques.			
6	Information Security and Cyber laws 6.1 Intruders 6.1.1 Intrusion techniques 6.1.2 Intrusion detection techniques 6.2 Password management 6.2.1 Password protection 6.2.2 Password selection strategies 6.3 Malicious software: Types of malicious software 6.4 Distributed Denial of Service Attacks	08	14
	Sub Total	24	40
	Total	48	80
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

9. Specification table for setting question paper for semester end theory examination:

Section / Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Total marks
		Remember	Understand	Application	
I / 1	Introduction to Information Security	4	6	4	14
I / 2	User Authentication and Access Control	4	4	4	12
I / 3	Symmetric Cryptography	2	4	8	14
II / 4	Asymmetric cryptography	2	4	6	12
II / 5	Internet Security	2	6	6	14
II / 6	Information Security and Cyber laws	2	4	8	14
Total		16	28	36	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR TERM WORK AND PRACTICAL EXAMINATION

a. Assessment Criteria for Term work :

i) Continuous Assessment of Practical Assignments :

Every practical assignment shall be assessed for 25 marks as per following criteria :

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given
Final marks of term work shall be awarded as per *Assessment Pro-forma X* .

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma II.

Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma II

11. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides (PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Reference Books**

Sr. No.	Author	Title	Publisher
1.	Atul Kahate	Cryptography and network security	McGraw Hill
2.	William Stallings	Cryptography and network security Principles and practices	Pearson
3.	Computer Security	Dieter Gollmann	Wiley Publication, New Delhi, ISBN :978-0-470-74115-3
4.	Cyber Laws And IT Protection	Harish Chander	PHI Publication, New Delhi, 2012 ISBN:978-81-203-4570-6

b)Websites

- i) <http://nptel.ac.in/courses/106105162/>
- ii) https://www.tutorialspoint.com/computer_security/computer_security_quick_guide.htm
- iii) <http://learnthat.com/introduction-to-network-security/>
- iv) <https://freevideolectures.com/course/3027/cryptography-and-network-security>
- v) <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/>
- vi) <http://stylesuxx.github.io/steganography/>
- vii) <https://smartninja-pgp.appspot.com/>
- viii) <http://www.cyberlawsindia.net/cyber-india.html>
- ix) <https://www.upcounsel.com/cyber-law>
- x) <http://cyberlaws.net/cyber-law/>

COURSE ID :32

Course Name : PYTHON PROGRAMMING
Course Code : ITG404
Course Abbreviation : GPYH

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme : MPECS 2020

Scheme component	Hours / week	Credits
Theory	3	7
Practical	4	

Evaluation Scheme :

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (Internal)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-IV	
Marks	20	--	80	75E	175

2. RATIONALE :

Working with programmable languages like C, C++, VC++ and Visual Basics, programmer finds a tedious job for writing a large number of instructions for designing and creating a tool, whereas Python has its own predefined tools and it is very easy to understand. A programmer works faster with Python to create complicated applications. Therefore, computer professionals must learn python programming. Python is powerful programming language. It has efficient high level data structures and a simple but effective approach to object oriented programming. It is an ideal language for scripting and rapid application development in many areas on most platforms.

3. COMPETENCY

Develop programming Knowledge with python to solve real engineering problem.

Cognitive : Implementing Procedural and object oriented programming with python

Psychomotor : i) Operating Computer software tools of python efficiently.

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES:

ITG404-1 Recognize different building blocks, data types in Python

ITG404-2 Implement python programs using operators, control flow statement and function.

ITG404-3 Apply object-oriented programming concept in python.

ITG404-4 Implement python programs using different file handling functions.

ITG404-5 Validate patterns using regular expression and perform machine learning functions.

ITG404-6 Develop python programs using GUI toolkit and interfacing with database.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CPO-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and Cos	PO								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/ development of solutions	PO 4 Engineering Tools, experimentation and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Develop programming Knowledge with python to solve real engineering problem.	2	2	3	3	1	2	2	3	2
ITG404-1	1	1	--	2	--	--	--	1	---
ITG404-2	1	1	2	3	1	1	1	2	---
ITG404-3	1	1	2	2	1	1	1	2	-
ITG404-4	2	1	2	2	1	--	1	2	2
ITG404-5	2	2	2	2	1	--	1	2	
ITG404-6	2	2	3	3	1	1	1	3	3

6.CONTENT:**A) SUGGESTED PRACTICAL'S/ EXERCISE
Laboratory Work****A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)**

Sr. No.	Title of Experiment	Skills to be developed	Course Outcome
*1	Install and Configure Python IDE	1. Installation of Python IDE 2. Identify different tools in Python IDE.	ITG404 - 1
*2	Programs data types on numbers, string and arrays	1. Develop python programs using numbers, string and arrays.	ITG404 - 1
*3	Programs on different types of structures (Set and list,) in python.	1. Perform following operations on Set and List <ul style="list-style-type: none">• Create• Access• Update 1. Delete	ITG404 - 1
*4	Programs on different types of structures(tuples, data dictionaries)	2. Perform following operations on tuple and data dictionaries <ul style="list-style-type: none">• Create• Access• Update• Delete	ITG404 - 1
*5	Program using conditional and looping statement with operators	1. Use of if statement 2. Use of if.....else statement 3. Use of operators	ITG404 - 1
*6	Program using looping statement.	1. Use of while, for statement 2. Use of loop statement Continue, Pass, break, else statement	ITG404 - 1
*7	Program using functions	1. Function arguments parameter passing 2. Use of local variable 3. Accessing global variable	ITG404 - 2
*8	Use of Constructors	Implementation of constructors	ITG404 - 2

*9	Implementation of inheritance	<p>Perform programs on following inheritance.</p> <ol style="list-style-type: none"> 1. Simple Inheritance 2. Multiple Inheritance 	ITG404 – 2
*10	Method overloading	Develop programs for method overloading and overriding.	ITG404 – 2
*11	Method overriding	Develop programs for method overriding	ITG404 – 2
*12	Programs on Exception Handling	1.Program based on exception concepts	ITG404 – 2
*13	Implementation of file handling operations	<p>Perform following file handling function with python.</p> <ul style="list-style-type: none"> • Opening a File • Closing a File • Knowing Whether a File Exists or Not • Working with Binary Files 	ITG404 – 3
*14	file handling operations	<p>Write python programs for following file functions.</p> <ul style="list-style-type: none"> • Appending Text to a File • read functions -read(), readline() and readlines() • write functions - write() and writelines() 	ITG404 – 3
*15	Using Pattern searching in regular Expression.	<p>Write Python program to perform regular expression functions using regex.</p> <ul style="list-style-type: none"> • findall • search • split • sub 	ITG404 – 5
16	Validation in Regular Expression	Write Python program to validate Password, email, url validation	ITG404 – 5
*17	Machine learning functions	Calculate Mean, Median , Mode functions using python	ITG404 – 5
18	Implement Machine learning operations	<p>Perform python programs on following functions</p> <ul style="list-style-type: none"> • Standard Deviation, Percentile • Data Distribution & Histogram • Normal Data Distribution 	ITG404 – 5

*19	Interacting with GUI	Develop program to learn GUI programming using Tkinter.	ITG404 – 6
*20	Interacting with Database	Write python script to connect with MySQL. Perform database functions as follows <ul style="list-style-type: none"> • Insert records • Update records • Display records • Delete records 	ITG404 – 6
21	Using GUI design and Database	Develop python program to interact with GUI Tkinter and Database.	ITG404 – 6

A.2 Micro-project

Each student should be allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain a dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- Create a simple calculator using classes and objects.
- Create an English Dictionary which will able to perform following functions.
 - Add a word and its meaning
 - Print list of words and its meaning
 - Update a word and its meaning
 - Delete a word and its meaning
- Student database management system – Develop system to store student roll number, name, age, address, email-id, contact no. Apply add, display, update delete functions. Use regular expressions to validate data while adding into the database.
- Any other micro projects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Python Interpreter/ IDE

8. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG404 - 1 Recognize different building blocks, data types in Python</i>			
1	INTRODUCTION TO PYTHON PROGRAMMING <ul style="list-style-type: none"> 1.1 Introduction to Python, Features of Python 1.2 Python Environment Setup – Installation and working of IDE 1.3 Python building blocks – Identifiers, Keywords, Indention, Variable, Comments 1.4 Components of Python program data types(At least 4 methods of each) <ul style="list-style-type: none"> • Numbers • Strings • Arrays • Sets • Lists – Changeable Sequences of Data, • Tuples – Unchanging Sequences of Data, • Dictionaries – Groupings of Data Indexed by Name, • Object storage • Type conversion • Assignment statements • Print statements 1.5 Introduction to in built libraries. 1.6 Running simple python script to display a message 	8	14
<i>Course Outcome ITG404 - 2 Implement python programs using operators, control flow statement and function</i>			

2	OPERATORS, CONTROL FLOW STATEMENTS AND FUNCTIONS 2.1 Basic Operators – Arithmetic, Comparison/Relational, Assignment, Logical, Bitwise, Membership, Identity operators, Python operator Precedence, 2.2 Control flow statement: - <ul style="list-style-type: none">• Conditional Statement• Looping Statement• Loop using Continue, Pass, break, else statement 2.3 functions: - Function definition, function calling, function argument and parameter passing, return statement, Scope of the variable, local variable and global variable.	8	12
<i>Course Outcome ITG404 -3 Apply object oriented programming concept in python</i>			
3	OBJECT ORIENTED PROGRAMMING IN PYTHON 3.1 Creating a Class <ul style="list-style-type: none">3.1.1 Self Variables3.1.2 Types of Methods 3.2 Constructors 3.3 Inheritance 3.4 Polymorphism <ul style="list-style-type: none">3.6.1 Operator Overloading3.6.2 Method Overloading & Overriding 3.5 Exception Handling <ul style="list-style-type: none">3.7.1 Errors in a Python Program3.7.2 Exceptions3.7.3 Types of Exceptions3.7.4 The Except Block	8	14
	Sub-total	24	40

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG404 -4 Implement python programs using different file handling functions.</i>			
4.	FILE HANDLING 4.1 Types of Files in Python 4.2 Opening a File 4.3 Closing a File 4.4 Knowing Whether a File Exists or Not 4.5 Working with Binary Files 4.6 Appending Text to a File 4.7 Understanding read functions, read(), readline() and	8	14

	readlines() 4.8 Understanding write functions, write() and writelines()		
Course Outcome ITG404 -5 Validate patterns using regular expression and perform machine learning functions.			
5	Regular Expression & Machine Learning Functions 5.1 Pattern searching using regex in python (findall, search, split, sub) 5.2 Password, email, url validation using regular expression 5.3 Machine learning – Data set, Data Types 5.4 Mean, Median , Mode 5.5 Standard Deviation, Percentile, Data Distribution & Histogram, Normal Data Distribution	8	12
Course Outcome ITG404 -6 Develop python programs using GUI toolkit and interfacing with database.			
6	GUI Programming and Databases 6.1 GUI Programming: 6.1.1Writing a GUI with Python 6.1.2 GUI Programming Toolkits 6.1.3 Creating GUI Widgets with Tkinter 6.1.5 Creating Layouts, Radio Buttons and Checkboxes, Dialog Boxes. 6.5 Database Access: 6.5.1 Python's Database Connectivity 6.5.2 Types of Databases Used with Python 6.5.3 Mysql database Connectivity with Python 6.5.4 Performing Insert , Deleting & Update operations on database	8	14
	Sub-total	24	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section /Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Total marks
		Remember	Understand	Application	
I / 1	INTRODUCTION To Python Programming	4	4	6	14
I / 2	Operators, Control Flow Statements and Functions	4	4	4	12
I / 3	Object Oriented Programming in Python	4	4	6	14
I / 4	File Handling	4	4	6	14
II / 5	Regular Expression & Machine Learning Functions	2	4	6	12
II/6	GUI Programming and Databases	4	4	6	14
TOTAL		22	24	34	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05

Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
	TOTAL	25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma IV.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma IV.

11. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Reference Books**

Sr. No .	Author	Title	Publisher
1.	Rao, K. Nageshwara, Shaikh Akbar	Python Programming	SciTech Publication
2.	Martin C Brown	Python: The Complete Reference	McGraw Hill Publication
3.	Mark Lutz, David Ascher	Learning Python	O'Reilly Publication
4.	Beazley, David	Python Essential Reference	Addison-Wesley Professional

b) Websites

- i) <https://docs.python.org/3/tutorial/>
- ii) <https://www.w3schools.com/python/>
- iii) <https://www.spokentutorial.org>
- iv) <https://www.tutorialspoint.com/python/index.htm>

COURSE ID : 33**Course Name : ADVANCED JAVA PROGRAMMING****Course Code : ITG405****Course Abbreviation : GAJP****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : Java Programming (GJAP) ITG311****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	1	5
Practical	4	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External)& Micro-project	
Details of Evaluation	---	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	---	As per Proforma-III	
Marks	--	--	--	100E	100

2. RATIONALE:

In the today's world of Internet, online transaction processing and managing the dataflow over network becomes an important issue. Based on the object oriented concepts and Core Java concepts, this subject will enable students to get hands on experience over the issues of managing data on web, developing powerful GUI based friendly user interface using AWT and Swings, developing powerful database applications, server side programming.

3. COMPETENCY

Apply principles of Advanced Java Programming to solve engineering problems as follows:

Cognitive: The students will be able to:

- i) Apply AWT and Swing concepts for developing programs.
- ii) Analyze connectivity with database using java.
- iii) Apply servlet, spring framework to develop programs.

Psychomotor: i) Installation of JDK. ii) Create java connectivity with different databases
 iii) Create sockets for client server applications. iv) Develop servlet programs
 v) Develop Spring programs

Affective: Attitude of i) precision ii) accuracy iii) punctuality

4. COURSE OUTCOMES:

ITG405-1: Develop programs using GUI framework (AWT, Swing)

ITG405-2: Handle events of AWT and Swing components..

ITG405-3: Develop programs with database connectivity.

ITG405-4: Develop network programs using sockets.

ITG405-5: Develop Servlet programs and Spring programs.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Disciplin e specific knowled ge	PO 2 Proble m	PO 3 Desig n / Analy sis	PO 4 Devel opme nt of soluti ons	PO 5 Engin eering Tools, Experi mentation and Testin g	PO 6 Engine ering Practice s for society, sustain ability and Environ ment	PO 7 Projec t	Life-long Lear ning	PSO1 Desig n and develo pment
Competency: Apply principles of Advanced Java Programming to solve engineering problems as follows:	1	3	3	3	1	3	3	3	3

ITG405-1	1	2	3	3	-	2	2	3	-
ITG405-2:	1	3	3	3	-	2	2	3	3
ITG405-3:	3	3	3	3	-	2	2	3	3
ITG405-4:	1	1	2	2	1	2	2	3	3
ITG405-5:	1	3	2	3	1	3	2	3	3

6. CONTENT:

A]SUGGESTED PRACTICALS/ EXERCISE

Laboratory Work:

A.1 Laboratory Experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1	IDE for Java	Install any one IDE (NetBeans ,Eclipse, JCreator etc) for JDK1.7 or higher	ITG405-1
*2	java.awt Package - Controls	Use of java.awt package for GUI Using various layouts Use of Button, Label, Checkbox, TextField, TextArea, Checkboxgroup	ITG405-1
*3	Layout manager	Study layout manager Use of flowlayout, borderlayout, gridlayout, gridbaglayout, panellayout Design simple calculator using layouts	ITG405-1
*4	java.awt Package -Menu	Use of java.awt package for GUI Using various layouts Adding menu bar to a frame	ITG405-1
*5	GUI using javax.swing	Displaying frame, panel Displaying components – Scrollpane, JComboBox in JApplet Use of proper layout	ITG405-1
*6	Adding toolbar	Displaying Toolbar on frame	ITG405-1
*7	Jtable	Create Table Use of Jtable	ITG405-1
*8	Jtree	Create Tree Use of Jtree	ITG405-1
*9	Event Handling – Window Event	WindowEvent – using WindowListener Interface Using Adapter classes	ITG405-2
*10	Event Handling- Keyboard Event	KeyEvent - using KeyListener Using Adapter classes	ITG405-2
*11	Event Handling - MouseEvent	MouseEvent – using MouseListener Interface MouseEvent – using MouseMotionListener Interface	ITG305-2

		Using Adapter classes	
*12	Connecting to database	Implement an application or applet to connect to database using JDBC	ITG305-3
*13	Sending queries to database	Implement an application or applet to insert, update, delete and display records	ITG305-3
14	Connecting to cloud database	Program based on cloud database connection	ITG305-3
*15	TCP/IP based communication	TCP/IP based communication between client and server. Sending data between client and server	ITF405-4
*16	UDP based communication	UDP based communication between client and server. Sending data between client and server	ITF405-4
*17	Http Servlet class	Servlet lifecycle Use of request and response object Use of get and post methods	ITF405-5
18	Http Servlet class	Implement session tracking using cookies.	ITF405-5
*19	Spring Framework	Installation of Spring – Environment(Spring Tool Suite, Maven or Gradle)	ITF405-5
*20	Spring Framework	Spring core IOC and Dependency Injection Hello World program using Spring	ITF405-5

A.2 Micro-project

Each student should allot one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work. Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a) Hospital Management System: Patient Database/Doctor Database/Billing(any one database)
- b) College Admission: Student personal Information System / Merit List database(any one database)
- c) Medical Purchase: Database of medicine inventory records
- d) Library management: Book issue/book stock database
- e) Any other microprojects suggested by subject faculty on similar line

7.MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer with JDK1.7 or above, any IDE for Java Programming such as Eclipse, JCreator, NetBeans
2	Databases like MySql, Oracle, MS-Access
3	Apache Tomcat Web Server 7 or higher version
4	Spring Tool Suite, Maven or Gradle

8. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)
<i>Course Outcome ITG405-1: Develop programs using GUI framework(AWT , Swing)</i>		
1	Abstract Window Toolkit(AWT) 1.1 Component, Container, window, frame, panel Creating windowed programs and applets 1.2 AWT controls : use of AWT controls: label, buttons, checkbox, checkbox group, Text field, Input validation and password fields, Text area, scrollbars, building menus 1.3 Layout manager: flowlayout, Border layout, GridLayout, GridBagLayout, panel layout	03
<i>Course Outcome ITG405-1: Develop programs using GUI framework(AWT , Swing)</i>		
2	GUI USING SWING 2.1 Swing features, Difference between AWT and Swing, JFrame, JApplet, JPanel classes 2.2 Adding button, textbox, label, radio button, combo box, listbox, tabbed panes, scroll panes on Window 2.3 Displaying menu and toolbar, JTables and Jtree classes MVC architecture	02
<i>Course Outcome ITG405-2: Handle events of AWT and Swing components.</i>		

3	EVENT HANDLING 3.1 Basics of event handling 3.2 Selecting event listeners 3.3 Window events, Action events, Mouse events 3.4 Adapter classes 3.5 awt event hierarchy 3.6 semantic and low level events in awt 3.7 low level event types <ul style="list-style-type: none">• focus event• keyboard event• consuming event• mouse events	03
	Sub-total	08
SECTION-II		
<i>Course Outcome: ITG405-3: Develop programs with database connectivity.</i>		
4	JAVA DATABASE CONNECTIVITY 4.1 Java as a Database front end 4.2 Database client/server methodology <ul style="list-style-type: none">Two-Tier Database DesignThree-Tier Database Design. 4.3 The JDBC API- The API Components, Security Considerations, JDBC Drivers, JDBC-ODBC Bridge 4.4 Database Connectivity using JDBC API, inserting, updating and deleting records, sending queries through JDBC bridge & handling result 4.5 Connectivity with Cloud Database.	03
<i>Course Outcome: ITG405-4: Develop network programs using sockets.</i>		
5	NETWORKING AND SOCKET PROGRAMMING 5.1 Basics Socket overview, client/server, reserved sockets, proxy servers, internet addressing. 5.2 The networking classes & interfaces 5.3 Inet address, Factory methods, instance method 5.4 Creating servers/clients sockets- Sending Data from client to server <ul style="list-style-type: none">or vice-versa, 5.5 Creating proxy server, Datagram server & client.	02
<i>ITG405-5: Develop servlet programs and Spring programs.</i>		

6	SERVLETS 6.1.1 The Life Cycle Of a Servlet, Simple Servlet, The Servlet API The Javax Servlet Package 6.1.2 Reading Servlet Parameters, Reading Initialization Parameters Javax. Servlet. http package, 6.1.3 Handling HTTP Requests and responses 6.1.4 Using Cookies, Session Tracking Spring Framework 6.2.1 Introduction to Spring Framework 6.2.2 Features of Spring 6.2.3 Spring modules, Spring Bean Factory 6.2.4 Spring Application Context, Spring DI 6.2.5 Spring Integration; Spring messaging, Spring JMS 6.2.6 Spring MVC 6.2.7 Spring DAO	03
	Sub total	08
	Total	16

9. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

i) Assessment Criteria for Practical Assignments :

Every practical assignment shall be assessed for 25 marks as per given criteria.

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given
 Final marks of term work shall be awarded as per *Assessment Pro-forma III*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Proforma III.

Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

b) Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-formaIII.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
- 2.Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Reference Books**

Sr. No .	Author	Title	Publisher
1.	Sun MicroSystems	Core Java 2 - Volume II	Pearson
2.	Herbert Schildt	Complete reference Java 2	McGraw Hill, New Delhi
3.	Steven Holzner	Java 2 Black Book	Tata McGraw-Hill
4	Craig Walls	"Spring in Action", Manning"	Dreamtech Press, 4th edition

b) Websites

- i) www.javatpoint.com
- ii) www.geeksforgeeks.org
- iii) [www.tutorialpoints.com](http://www.tutorialspoints.com)
- iv) www.techopedia.com

COURSE ID : 34

Course Name : MOBILE APPLICATION DEVELOPMENT
Course Code : ITG406
Course Abbreviation : GMAP

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : ITG311

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External) & Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2. RATIONALE:

The aim of the subject is to teach the development of android mobile applications. The subject helps the students to design and create the innovative mobile apps using android development tools. The subject is practical oriented and covers the basic terminology and functionality required for developing mobile applications. This course examines the principles of mobile application design and development. Students will learn application development on the Android platform. Topics will include user interface design, user interface building, data handling, network techniques , home screen widgets, use of sensors, and specifics such as GPS and

motion sensing. Students are expected to work on a project that produces a professional-quality mobile application. Projects will be deployed in real-world applications.

3. COMPETENCY

Design android mobile application.

Cognitive: i)Understand Android Architecture and tools used for developing android applications.

ii) Design Android Mobile Applications.

Psychomotor: i) Create Android Mobile Applications using Android Development Tools.

Affective: Attitude of i) precision ii) accuracy iii) punctuality iv)aesthetic presentation

4. COURSE OUTCOMES:

ITG406-1: Interpret features of Android Operating system

ITG406-2: Configure Android Environment and development tools

ITG406-3: Develop rich user interfaces by using layouts and controls

ITG406-4: Use User interface components for Android Application Development

ITG406-5:Create Android Application using database

ITG406-6: Publish Android application

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"--" : no correlation]

Competency and CoS	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Design Android Mobile Application	1	--	--	3	3	3	2	3	--
ITG406-1	1	--	--	--	--	--	1	--	--
ITG406-2:	1	--	--	2	--	2	2	1	--
ITG406-3:	1	--	--	3	2	3	2	3	--
ITG406-4:	1	--	--	3	2	3	2	3	--
ITG406-5:	1	--	2	3	2	3	2	3	2
ITG406-6:	1	--	2	3	3	3	3	3	--

6.CONTENT:**D) SUGGESTED PRACTICAL'S/ EXERCISE**

A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. No .	Title of Experiment	Skills to be developed	Course outcome
*1	Introduction to Android Programming	1. Install and Setup Android studio. 2.Create Basic Hello World Android Application	ITG406-1, ITG406-2
*2	Use of different layouts	1.Develop a program to implement Linear layout,absolute layout 2.Develop a program to implement frame layout,table layout,absolute layout	ITG406-3
*3	Using different UI controls	1.Write a Program Using UI Control (Text View ,Edit Text , Auto Complete Text View) 2.Write a Program Using UI Control (Button,Image Button,Toggle Button)	ITG406-4
*4	Toast Alerts	Develop a program to implement custom toast alert	ITG406-4
5	Datepicker	Develop a program to pick up a date from datepicker.	ITG406-4
*6	.Playing Audio and Video	Write A Program to play Audio and Video	ITG406-5
*7	Use of Intents	1.Create android application that will show the working of implicit Intent. 2.Create android application that will show the working of explicit intent.	ITG406-5
*8	Content provider	1.Study of ways to create Android application using database. 2.Implement android application that create database, insert values to the database, access values from database and delete the values from database	ITG406-5
*9	Async Task	Perform Async task using SQLite	ITG406-5
*10	Sensors	Develop a program to implement Sensors	ITG406-5

*11	Using Camera	Develop a program to program to build camera	ITG406-5
*12	Sending Email and SMS Telephony	1.Develop a program for sending email 2.Develop a program to :a)Send SMS b)Receive SMS	ITG406-6
*13	Using Maps	Deploy map based application	ITG406-6

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a)Develop Android Application on Traffic surveying
- b)Develop Android Application on online shopping
- c)Develop Android Application on making calculator
- d)Develop Android Application for game

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system which is available in laboratory with minimum 8GB RAM)
2	Any compatible open source tools(e.g. Android Studio/Eclipse IDE,Any compatible web server, Any compatible database tool e.g.SQLite)

8. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG406-1: Interpret features of Android Operating System</i>			
1	INTRODUCTION TO ANDROID OPERATING SYSTEM <ul style="list-style-type: none"> 1.1. What is Android ?, What is open handset alliance? Android Ecosystem. 1.2. Why Android? Features Of Android 1.3. Android Architecture 	06	12
<i>Course Outcome ITG406-2: Configure Android Environment and development tools</i>			
2	CONFIGURATION OF ANDROID ENVIRONMENT <ul style="list-style-type: none"> 2.1 Operating System, Java JDK, Android SDK 2.2 Android Development Tools(ADT) 2.3 Android Virtual Devices(AVDs) 2.4 Emulators 2.5 Dalvik Virtual Machine, Difference between JVM and DVM 2.6 Steps to install and configure Eclipse and SDK 	08	14
<i>Course Outcome ITG406-3: Develop rich user interfaces by using layouts and controls</i>			
3	CREATE THE FIRST ANDROID APPLICATION AND STUDY OF LAYOUTS <ul style="list-style-type: none"> 3.1 Control Flow, Directory Structure 3.2 Understanding components of a screen, Fundamental UI Design 3.3 Linear Layout 3.4 Absolute Layout 3.5 Frame Layout 3.6 Table Layout 	10	14
	Sub-total	24	40

SECTION-II*Course Outcome ITG406-4: Use User interface components for Android Application Development*

4	DESIGNING YOUR USER INTERFACE WITH VIEW <ul style="list-style-type: none"> 4.1 TextView 4.2 Button, ImageButton 4.3 EditText 4.4 Checkbox 4.5 ToggleButton 4.6 RadioButton And RadioGroup 4.7 ProgressBar 	08	12
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Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	4.8 ListView 4.9 GridView 4.10 Image View 4.11 Scroll View 4.12 Custom Toast Alert 4.13 Time And Date Picker		
<i>Course Outcome ITG406-5: Create Android Application using database</i>			
5	ACTIVITY AND MULTIMEDIA WITH DATABASES 5.1 Introduction 5.2 Intent, Intent_Filter 5.3 Activity Life Cycle 5.4 Broadcast Lifecycle 5.5 Service: Features Of service, Android platform service, Defining new service, Service Lifecycle, Permission ,example of service 5.6 Android System Architecture ,Multimedia framework, Play Audio and Video, Use of camera, Text to speech, Sensors, Async tasks 5.7 SQLite Database, Why SQLite ?Creation and connection of the database ,Extracting value from cursors, Transactions	08	14
<i>Course Outcome ITG406-6: Publish Android application</i>			
6	TELEPHONY,MESSAGING,SECURITY AND APPLICATION DEPLOYMENT 6.1 SMS Telephony 6.2 Location Based Services: Creating the project, Getting the maps API key, Displaying the map, Displaying the zoom control ,Navigating to a specific location, Adding markers ,Getting location, Geocoding and reverse Geocoding, Getting Location data, Monitoring Location. 6.3 Android Security Model, Declaring and using permissions, Using customer permission. 6.4 Application Deployment: Creating small application, Signing of application, Deploying app on Google play store, Become a publisher, Developer console.	08	14
	Sub total	24	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction to Android Programming	02	04	06	12
I / 2	Android Framework Overview	04	04	06	14
I / 3	Activities, Intents and Intent Filters	04	04	06	14
II / 4	Android User Interface	02	04	06	12
II / 5	Designing User Interface using views	04	04	06	14
II / 6	Understanding Content Provider	04	04	06	14
	Total	20	24	36	80

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma III.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

-
1. Chalk board 2.Slides(PPT) 3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) Reference Books

Sr. No.	Author	Title	Publisher
1.	ANDROID	Prasanna Kumar Dixit,	Vikas Publications
2.	Pro Android 5	David Maclean,Satya Komatineni,Grant Allen	Apress Publications
3.	Android Programming for beginners	Hortan,John	Packet Publication

b) Websites

- i)<https://www.tutorialspoint.com/android>
- ii)<http://developer.android.com/guide/index.html>.
- iii)<http://developer.android.com/reference/packages.html>
- iv)<http://developer.android.com/guide/components/fundamentals.html>
- v)<http://developer.android.com/guide/topics/ui/index.html>
- vi)<http://developer.android.com/guide/topics/ui/declaring-layout.html>
- vii)<http://code.google.com/android/add-ons/google-apis/maps-overview.html>

COURSE ID: 35(A)**Course Name: ETHICAL HACKING AND DIGITAL FORENSICS****Course Code : ITG407****Course Abbreviation : GEHF****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	03	05
Practical	02	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (Internal& Micro-project)	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-IV	
Marks	20	--	80	50I	150

2. RATIONALE:

Advancements and applications of Information Technology are ever changing. Digital Forensic and Ethical Hacking aims is legally breaking into computers and devices to test an organization's defenses. Students will learn to keep the important data of a business organization or a security agency safe from the malicious hackers.

3. COMPETENCY:

Use various tools to identify vulnerabilities of system and protect system against attack.

Cognitive: The students will be able to:

- i. Find out Ethical issues in digital forensic.
- ii. Learn various types of evidences and Challenges in evidence handling.

- iii. Develop the skills to hack own system.
- iv. Secure system , web server and database

Psychomotor: i) Adapt knowledge of hacking; ii)finding Vulnerabilities iii) protecting system against attack.

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality.

4. COURSE OUTCOMES:

ITG407-1: Compare models of digital forensic Investigation.

ITG407-2: Describe the Evidence Handling procedure.

ITG407-3: Describe Ethical hacking Process.

ITG407-4: Detect Hacker Mindset and Network Vulnerabilities.

ITG407-5: Identify Web, Database and operating system Vulnerabilities.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note: Correlation levels:1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Use various tools to identify vulnerabilities of system and protect system against attack.	2	1	2	1	1	2	3	2	-
ITG407-1	2	-	-	-	-	-	1	-	-
ITG407-2:	1	2	-	-	-	-	1	-	-
ITG407-3:	1	2	-	-	-	-	2	-	-
ITG407-4:	1	3	1	1	3	-	3	-	2
ITG407-5:	1	2	1	1	3	-	3	-	2

6. CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Sr. No.	Title of Practical Exercise	Skills / Competencies to be developed	Course Outcome
*1	Demonstrate how digital forensics can be used in investigation	1. Explain digital forensics 2. Use of digital forensics in investigation.	ITG407-1
2	Demonstrate how to analyze fake photo/image in digital forensics.	1. Use any tool and find fake image. 2. Write the steps to analyze fake image.	ITG407-1
*3	Explain Digital Evidences and Challenges in evidence handling (Explain it with any one real life example).	1. Explain Digital Evidences 2. Write Challenges in evidence handling.	ITG407-2
*4	Hack your own computer system.	1. Hack your own computer system.	ITG407-3
*5	How to crack Hacker mindset.	1. Write the procedure to crack Hacker mindset.	ITG407-4
*6	How to capture data from network.	1. Use tool to capture network data 2. Write procedure to capture network data.	ITG407-4
*7	Identify password of user on any operating system.	1. Using tool to password of user on any operating system. 2. Write procedure to password of user on any operating system.	ITG407-4
*8	Find out the vulnerabilities in your mobile/computer/any operating system/digital device.	1. Find out the vulnerabilities in any device.	ITG407-5
*9	Record the activities of unauthorized user on any operating system.	1. Use any tool. 2. Record activities of unauthorized user.	ITG407-5
*10	Demonstrate how to protect E-Mail against email attack	1. Find out email attack 2. Use tool to how to protect E-Mail against email attack	ITG407-5
11	Write procedure for how will you secure your database.	1. Find Database attack 2. Write procedure for how will	ITG407-5

		you secure your database.	
12	Find how to protect web server against web server attacks	1. Find web server attacks 2. protect web server against web server attacks	ITG407-5

A.2 Micro-project

Each student should allot one micro project in the beginning of the semester. The micro projects are group based (group of 2 students). Each micro project should encompass two or more Co.

Each student has to maintain dated work diary consisting of individual contribution in the micro project work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micro projects is as follows:

- A) Study any case of forgery / falsification crime case solved using digital forensics:
 - i. Identify the model used for Digital Investigation.
 - ii. Was investigation done ethically or unethically.
 - iii. Where was digital evidence found for crime establishment?
 - iv. State the punishment method.
- B) Study Credit card fraud as an identity threat. Identify:
 - i. Use of digital media in carrying out fraud.
 - ii. Vulnerability Exploited.
 - iii. Effect of fraud.
 - iv. Protection/Precaution to be taken against such frauds.
- C) Study any Trojan attack. Identify the Trojan attack:
 - i. State the way trojan got installed on particular Machine.
 - ii. State the effects of the Trojan.
 - iii. Elaborate/Mention/State protection/Blocking mechanism for this specific Trojan, example specification of any anti-threats platform which filters the Trojan.

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System (Any computer system with basic configuration)
2	Any open source tool kit
3	Digital Media

8. CONTENT :**A) THEORY :****SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG407-1 Compare models of digital forensic Investigation</i>			
1	Basics of Digital Forensics <ul style="list-style-type: none"> 1.1 Digital forensics <ul style="list-style-type: none"> 1.1.1 Introduction to digital forensic 1.1.2 History of forensic 1.1.3 Rules of digital forensic 1.1.4 Definition of digital forensic 1.1.5 Digital forensics investigation and its goal 1.2 Models of Digital Forensic Investigation <ul style="list-style-type: none"> 1.2.1 Digital Forensic Research Workshop Group (DFRW S) Investigative Model 1.2.2 Abstract Digital Forensics Model (ADFM) 1.2.3 Integrated Digital Investigation Process (IDIP) 1.2.4 End to End digital investigation process (EEDIP) 1.2.5 An extended model for cybercrime investigation 1.2.6 UML modelling of digital forensic process model (UMDFPM) 1.3 Ethical issues in digital forensic <ul style="list-style-type: none"> 1.3.1 General ethical norms for investigators 1.3.2 Unethical norms for investigation 	08	12
<i>Course Outcome ITG407-2 :Describe the Evidence Handling procedure.</i>			
2	Digital Evidences <ul style="list-style-type: none"> 2.1 Digital Evidences <ul style="list-style-type: none"> 2.1.1 Definition of Digital Evidence 2.1.2 Best Evidence Rule 2.1.3 Original Evidence 2.2 Rules of Digital Evidence 2.3 Characteristics of Digital Evidence <ul style="list-style-type: none"> 2.3.1 Locard's Exchange Principle 2.3.2 Digital Stream of bits 2.4 Types of evidence <ul style="list-style-type: none"> 2.4.1 Illustrative, Electronics, Documented, Explainable, Substantial, Testimonial 2.5 Challenges in evidence handling 	08	14

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	2.5.1 Authentication of evidence 2.5.2 Chain of custody 2.5.3 Evidence validation 2.6 Volatile evidence		
Course Outcome ITG407-3 Describe Ethical hacking Process.			
3	Basics Ethical Hacking 3.1 Ethical Hacking <ul style="list-style-type: none"> 3.1.1 How Hackers Beget Ethical Hackers 3.1.2 Defining hacker, Malicious users 3.2 Concept - need to hack your own systems 3.3 Concept – Understanding the dangers your systems face <ul style="list-style-type: none"> 3.3.1 Nontechnical attacks 3.3.2 Network-infrastructure attacks 3.3.3 Operating-system attacks 3.3.4 Application and other specialized attacks 3.4 Obeying the Ethical hacking Principles <ul style="list-style-type: none"> 3.4.1 Working ethically 3.4.2 Respecting privacy 3.4.3 Not crashing your systems 3.5 The Ethical hacking Process <ul style="list-style-type: none"> 3.5.1 Formulating your plan 3.5.2 Selecting tools 3.5.3 Executing the plan 3.5.4 Evaluating results 3.5.5 Moving on 	08	14
	Total	24	40

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
SECTION II			
<i>Course Outcome ITG407-4 Detect Hacker Mindset and Network Vulnerabilities.</i>			
<p>4 NETWORK HACKING AND NETWORK INFRASTRUCTURE</p> <p>4.1 Cracking the Hacker Mindset</p> <ul style="list-style-type: none"> 4.1.1 What You're Up Against? 4.1.2 Who breaks in to computer systems? 4.1.3 Why they do it? 4.1.4 Planning and Performing Attacks 4.1.5 Maintaining Anonymity <p>4.2 Network Hacking and Network Infrastructure:</p> <ul style="list-style-type: none"> 4.2.1 Network Infrastructure Vulnerabilities 4.2.2 Scanning-Ports 4.2.3 Ping sweep 4.2.4 Scanning SNMP 4.2.5 Grabbing Banners 4.2.6 Analyzing Network Data and Network Analyzer 4.2.7 MAC - daddy attack <p>4.3 Wireless LANs :</p> <ul style="list-style-type: none"> 4.3.1 Implications of Wireless Network Vulnerabilities 4.3.2 Wireless Network Attacks 4.3.3 Google Hacking <p>4.4 Proxy & Packet Filtering,</p> <p>4.5 Incident handling and response.</p>	08	14	
<i>Course Outcome ITG407-5 Identify Web, Database and operating system Vulnerabilities.</i>			
5	<p>TYPES OF HACKING</p> <p>5.1 Application Hacking</p> <p>5.2 Messaging Systems</p> <ul style="list-style-type: none"> 5.2.1 Vulnerabilities 5.2.2 Foot Printing 5.2.3 E-Mail Attacks- E-Mail Bombs, 5.2.4 Banners 5.2.5 Best practices for minimizing e-mail security risks <p>5.3 Operating System Hacking</p> <ul style="list-style-type: none"> 5.3.1 Introduction of Windows and Linux Vulnerabilities 5.3.2 Windows Hacking 	10	16

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
6	WEB AND DATABASE VULNERABILITIES <ul style="list-style-type: none"> 6.1 Web Applications : <ul style="list-style-type: none"> 6.1.1 Web Vulnerabilities 6.1.2 Directories Traversal and Counter measures, 6.2 Database System <ul style="list-style-type: none"> 6.2.1 Database Vulnerabilities 6.2.2 Best practices for minimizing database security risks. 	06	10
	SubTotal	24	40
	Total	48	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Basics of Digital Forensics	04	04	04	12
I / 2	Digital Evidences	04	06	04	14
I / 3	Basics Ethical Hacking	04	04	06	14
II/ 4	Network Hacking and Network Infrastructure	04	04	06	14
II/5	Types of Hacking	04	04	08	16
II/6	Web and Database Vulnerabilities	02	04	04	10
	Total	22	26	32	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :**i) Continuous Assessment of Practical Assignments:**

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test:

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given
Final marks of term work shall be awarded as per *Assessment Pro-forma X* .

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach, procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma IV.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma IV

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides (PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) Reference Books

Sr. No.	Title	Author	Publication
1.	The Basics of Digital Forensic	John Samsons	Elsevier ISBN: 978-1-59749 -661-2
2.	Digital Forensic (2017 Edition)	Dr. Nilakashi Jain Dr. Dhananjat R. Kalbande	Wiley Publishing Inc. ISBN: 978-8-265-6574-0
3	Hacking for Dummies (5th Edition)	Kevin Beaver CISSP	Wiley Publishing Inc. ISBN: 978-81-265-6554-2

b) Websites

- i) <https://resources.infosecinstitute.com/digital-forensics-models/#gref>.
- ii) <https://www.researchgate.net/publication/300474145> Digital Forensics/download
- iii) <https://docs.microsoft.com/en-us/sysinternals/downloads/psloggedon>
- iv) www.openwall.com/passwords/windows-pwdump
- v) https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_process.htm
- vi) <https://slideplayer.com/slide/7480056/>

COURSE ID: 35(B)

Course Name : WEB DEVELOPMENT USING PHP

Course Code : ITG408

Course Abbreviation : GWET

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (Internal)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-IV	
Marks	20	--	80	50I	150

2. RATIONALE:

The PHP Hypertext Preprocessor (PHP) is a server side scripting language that allows web developers to create dynamic websites that interact with databases. PHP is basically used for developing web-based software applications. This course is designed to build skills of developing websites with PHP. Students will be able to develop interactive web applications using PHP and MySQL databases.

3. COMPETENCY

Dynamic web development using PHP & MySql.

Cognitive: The students will be able to:

- i) Understand PHP scripting, accessing file systems using PHP.
- ii) Demonstrate PHP programming with examples

Psychomotor: i) Install & troubleshoot PHP, MySql & Apache.

- ii) Write PHP scripts using control structures for various basic applications.

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG408-1: Installation and basic syntax of PHP.

ITG408-2: Implement arrays, function & string functions using PHP.

ITG408-3: Design form by Embedding PHP with HTML

ITG408-4: Perform PHP programs using cookies, sessions.

ITG408-5: Write PHP scripts to add, insert, and update records in MySQL database connectivity.

ITG408-6: Develop file system programs in PHP.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
" - " : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Develop ment of solutions	PO 4 Engineer ing Tools, Experim entation and Testing	PO 5 Engineeri ng Practices for society, sustainabi lity and Environm ent	PO 6 Project Manage ment	PO 7 Life- long Learnin g	PSO1 Design and develop ment	PSO2 Database and Network manageme nt
Competency: Dynamic web development using PHP & MySql	1	2	3	3	1	2	1	3	1
ITG408-1	1	1	2	2	1	-	1	2	-
ITG408-2	1	2	3	2	1	1	1	2	-
ITG408-3	1	2	3	3	1	1	1	3	-
ITG408-4	1	2	3	3	1	-	1	3	-
ITG408-5	1	2	2	2	1	1	1	3	3
ITG408-6	1	2	2	2	1	1	1	2	2

6.CONTENT:**A)SUGGESTED PRACTICAL'S/ EXERCISE****A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)**

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1	Installation & Configuration Of PHP	Install PHP,Apache & MySQL as bundle using Xampp or Wamp software tool or any another techniques and latest tool	ITG408-1
*2	Use of Operators	Write a PHP script to demonstrate arithmetic operators, comparison operator, and logical operator	ITG408-1
*3	Use of Variables and Conditions	Write PHP Script to find maximum number out of three given numbers	ITG408-2
4	Use of looping	Write PHP Script to print Fibonacci series	ITG408-3
*5	Implementation of arrays	Write PHP Script for addition , substration of two 2x2 matrices.	ITG408-3
*6	Implementation of Functions	Write PHP script to demonstrate Variable function Write PHP script to demonstrate Anonymous function	ITG408-3
*7	Perform on String functions	Write PHP script to demonstrate string function.	ITG408-3
*8	Implementation using forms	Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.[Use \$_GET Method]	ITG408-3
*9	Using HTML forms interacting with PHP script	Create Website Registration Form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page. [Use \$_POST Method]	ITG408-3
*10	Use of Cookies	Write a PHP script to demonstrate passing variables with cookies.	ITG408-4
*11	Implementation of Sessions	Write two different PHP script to demonstrate passing variables with	ITG408-4

		sessions	
*12	Interacting with MySQL Database	<p>Write a PHP script to connect MySQL server from your website and perform functions on the database.</p> <ol style="list-style-type: none"> 1. Insert record 2. Display records 3. Update records 4. Delete records 	ITG408-5
*13	Using File Handling in PHP script	Write PHP script to demonstrate File functions	ITG408-6

A.2 Micro-project

Each student should be allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain a dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a) **Students Record System** – Prepare a menu driven WebSite to maintain Academic management in Store
- b) **College Website with Course Exam Registration System** - Develop college website with accepting student registration for courses and for exams using PHP and MySql database.
- c) **Hotel Management Website** – Prepare Hotel room booking system having a variety of rooms. Hotel billing system for various services used by guest.
- c) **Ecommerce Website** - Create a Website that displays buyers information for e-commerce websites such as amazon, flipkart, containing name, contact details, phone no, address, email id, purchased items, wishlist items, purchased product ID, payment mode. Apply different validation rules for user inputs
- e) Any other micro projects suggested by subject faculty on similar line

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	XAMPP or WAMP server

8. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG408-1: Installation and basic syntax of PHP.</i>			
1	Introduction To PHP <ul style="list-style-type: none"> 1.1 History of PHP, Features of PHP, PHP Syntax 1.2 Introduction to Apache Web Server, Introduction to MySQL, 1.3 Relationship between Apache, MySQL and PHP, Installation Of PHP(WAMP or XAMPP server or any latest server) 1.4 Variables, Global Variable, Data Types, Operators, Expression and Constants 1.5 Decision Making Control Statement- if, if-else, nested if, switch, break and continue statement 1.6 Loop control structures- while, do-while, for and foreach 	8	12
<i>Course Outcome ITG408-2: Implement arrays, function & string functions using PHP.</i>			
2	Arrays, Functions & String <ul style="list-style-type: none"> 2.1 Creating and Manipulating Array, Types of Arrays – Indexed, Associative and Multidimensional arrays 2.2 Extracting data from arrays, implode, explode and array flip 2.3 Traversing Arrays 2.4 Function and its types – User defined function, Variable function and Anonymous function 2.5 Operations on String and String functions : word_count(), strlen(), strrev(), strops(), str_replace(), ucwords(), strtoupper(), strtolower(), strcmp() 	08	14
<i>Course Outcome ITG408-3: Design form by Embedding PHP with HTML</i>			

3	Creating and Validating forms 3.1 Form Controls: text box, text area, radio button, checkbox list, button 3.2 Browser Role -GET and POST methods, Submitting form values, using <code>\$_Get</code> and <code>\$_Post</code> 3.3 Accessing form inputs with <code>Get/Post</code> functions 3.4 Combining HTML and PHP codes together on single page, Redirecting the user 3.5 From validation in PHP(<code>preg_match()</code> function, Empty String, Validate -string, numbers, email, URL, input length)	8	14
	Sub-total	24	40

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	<i>ITG408-4: Perform PHP programs using cookies, sessions.</i>		
4	Cookies and Session 4.1 Cookies – Use of cookies, Attributes of cookies, create cookies, modify cookies value and delete cookies 4.2 Session – Use of Session, Start Session, get session variables, destroy session 4.3 Sending E-mail	06	10
	<i>ITG408-5: Write PHP scripts to add, insert, and update records in MySQL database connectivity.</i>		
5	Connecting to MYSQL DATABASE 5.1 Introduction to MySQL – MYSQL Concept, MySQL Structure, Syntax 5.2 Connecting to a MySQL database: 5.3 Creating and Deleting MySQL database using PHP 5.4 Updating, Inserting, Deleting records in the MySQL database using PHP 5.5 Hosting Website	10	16
	<i>ITG408-6: Develop file system programs in PHP.</i>		
6	File Handling 6.1 File paths and permissions 6.2 Displaying directory contents 6.3 Working with <code>fopen()</code> & <code>fclose()</code> - creating a new file - appending data to a file	8	14

	6.4 File system housekeeping - copying file - renaming file - deleting file		
	Sub-total	24	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section/ Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehe- nsion	Application	
I / 1	Introduction To PHP	04	04	04	12
I / 2	Arrays, Functions & String	04	04	06	14
I / 3	Creating and Validating forms	04	04	06	14
II / 4	Cookies and Session	02	04	04	10
II / 5	Connecting to MYSQL DATABASE	04	04	08	16
II / 6	File Handling	04	04	06	14
	Total	22	24	34	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma IV.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma IV.

11. INSTRUCTIONAL STRATEGIES:**Instructional Methods:**

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Reference Books**

Sr. No	Author	Title	Publisher
1.	W. Jason Gilmore	Beginning PHP and MySQL, 4th Edition	Apress
2.	Steven Holzner	PHP: The Complete Reference	McGraw-Hill
3.	Robin Nixon	Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition	O'reilly Media
4.	Julie C. Meloni	Teach yourself PHP, MySQL and Apache All in One , 5th Edition	Pearson Education,

b) Websites

- i) <https://www.php.net/>
- ii)<https://www.w3schools.com/php/DEFAULT.asp>
- iii) <https://www.tutorialspoint.com/php/index.htm>
- iv)<https://spoken-tutorial.org>

COURSE ID: 35 (C)**Course Name : OBJECT ORIENTED MODELING AND DESIGN****Course Code : ITG409****Course Abbreviation : GOOM****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : Nil****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (Internal)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (03 hours)	As per Proforma-IV	
Marks	20	--	80	50I	150

3.RATIONALE:

Object oriented modeling and design presents an Object Oriented approach to software development. It is based on modeling objects from the real world and then using the model to build language-independent design. This subject shows how to use Object Oriented concepts throughout the entire software life cycle, from analysis through design implementation by using different models. The graphical notation i.e. described in subjects helps the software developer to visualize a problem before going for implementation. This subject will be useful for the student to understand the concepts of Object Oriented

Programming System and to model these concepts using Unified Modeling Language (UML) for any application, before actually going for coding part.

3.COMPETENCY

Apply principles of object oriented modeling to represent different software designs.

Cognitive: i) Identify the software design may be represented as a set of interacting objects that

manage their own state and operations

ii) Describe the activities in the object-oriented design process

Psychomotor: i) Investigate the objects by creating object model diagram.

ii) Design the Use-case diagram, Sequence diagrams and structural modeling diagrams.

Affective: i) Attitude of ii) Precision iii) Accuracy iv) Punctuality

4.COURSE OUTCOMES:

ITG409-1: State object-oriented concepts and themes.

ITG409-2: Capture the high level requirement into modeling concepts.

ITG409-3: Visualize the architectural view of software for better understanding to the customers.

ITG409-4: Draw advanced class diagrams and component diagrams.

5.COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-": no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Apply principles of object oriented modeling to represent different software designs.	1	3	3	3	-	2	3	3	3
ITG409-1	2	2	1	1	-	2	3	2	2
ITG409-2:	2	3	3	1	-	2	2	3	3
ITG409-3:	1	3	3	1	-	3	2	2	3
ITG409-4:	1	3	2	2	-	2	2	2	3

6.CONTENT:**A) SUGGESTED PRACTICAL'S/ EXERCISE**

A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. No .	Title of Experiment	Skills to be developed	Course outcome
*1	Object Diagram	Draw Object diagram.(Any one) ATM, Library Management System, Railway Reservation System	ITG409-1
*2	Class Diagram	Draw Class diagram.(Any one) ATM, Library Management System, Railway Reservation System	ITG409-2
*3	Use Case Diagram	Draw Use Case diagram. .(Any one) ATM, Library Management System, Railway Reservation System	ITG409-3
*4	State Diagram	Draw State diagram. (Any one) ATM, Library Management System, Railway Reservation System	ITG409-3
*5	Activity Diagram	Draw Activity diagram. (Any one) ATM, Library Management System, Railway Reservation System	ITG409-3
*6	Collaboration Diagram	Draw Collaboration diagram. (Any one) ATM, Library Management System, Railway Reservation System	ITG409-3
*7	Sequence Diagram	Draw Sequence diagram.(Any one) ATM, Library Management System, Railway Reservation System	ITG409-3
*8	Advance Class Diagram	Draw Advance Class diagram. (Any one) ATM, Library Management System, Railway Reservation System	ITG409-4
*9	Component Diagram	Draw Component diagram. (Any one) ATM, Library Management System, Railway Reservation System	ITG409-4
*10	Deployment Diagram	Draw Deployment diagram. (Any one)	ITG409-4

		ATM, Library Management System, Railway Reservation System	
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A.2 Micro-project

Each student should allot one microproject in the beginning of the semester. The micro projects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

Draw UML diagrams for any one.

- a) Hotel Management
- b) Hospital Management
- c) College Management
- d) Alumni Student Database Management
- e) Any other micro projects suggested by subject faculty on similar line

7.MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	UML Diagram Tool (StarUML, SmartDraw etc.)

7. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Marks
<i>Course Outcome ITG409-1: State object-oriented concepts and themes.</i>			
1	INTRODUCTION <p>1.1 Object Oriented development & themes 1.2 Evidence for usefulness, modeling as a Design Technique. 1.3 Objects and Classes (Object Diagrams, Attributes, Operations and Methods), Links, Associations</p>	04	08
<i>Course Outcome ITG409-2: Capture the high level requirement into modeling concepts.</i>			
2	OBJECT MODELING <p>2.1 Advanced Concepts (General Concepts, Multiplicity, Link Attributes, Association as a Class, Roll names, Ordering, Qualification, Aggregation). 2.2 Generalizations and Inheritance, Grouping Constructs. 2.3 Aggregation versus Association And Generalization, Recursive Aggregates and Propagation of Operations. 2.4 Abstract Classes, Multiple Inheritance, Metadata, Candidate Keys, Constraints</p>	12	20
<i>Course Outcome ITG409-2: Capture the high level requirement into modeling concepts.</i>			
3	DYNAMIC & FUNCTIONAL MODELING <p>3.1 Events, states, operations, concurrency, nested state diagrams, advanced dynamic 3.2 Modeling concepts, relation of object and dynamic models 3.3 DFD, relation of functional to object and dynamic Models</p>	08	12
	Sub-total	24	40

SECTION-II

Course Outcome ITG409-3: Visualize the architectural view of software for better understanding to the customers.

4	OVERVIEW OF UML 4.1 Efforts of standardization / Integration, OMG approval for UML, Scope of UML, Conceptual model of UML, Architectural -Meta model, Unified Software Development Lifecycle. 4.2 Introduction to UML Diagrams	06	10
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Course Outcome ITG409-3: Visualize the architectural view of software for better understanding to the customers.

5	UML – BEHAVIORAL MODELING 5.1 Use case diagram: Terms and Concepts, Modeling Techniques. 5.2 Interaction diagram (Sequence and collaboration diagram): Terms and Concepts, Modeling techniques. 5.3 State chart diagram: Terms and Concepts, Modeling techniques. 5.4 Activity diagram: Terms and Concepts, Modeling techniques.	12	18
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Course Outcome ITG409-4: Draw advanced class diagrams and component diagrams.

6	UML - STRUCTURAL MODELING 6.1 Advanced Class Diagrams: - Advanced Classes and Relationships, Interfaces, Types and Roles, Packages, Instances. Object Diagrams. 6.2 Component Diagrams: Terms and Concepts, Common modeling techniques. Deployment Diagrams: Terms and Concepts, Common modeling techniques.	06	12
	Sub total	24	40
	Total	48	80

**9.SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER
END THEORY EXAMINATION**

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction	04	02	02	08
I / 2	Concept of OOP and Object Modeling	04	08	08	20
I / 3	Dynamic and Functional Modeling	02	04	06	12
II / 4	Overview of UML	02	04	04	10
II / 5	UML- Behavioral model	04	06	08	18
II / 6	UML Structural Model	02	04	06	12
	Total	18	28	34	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only

10.ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per given criteria.

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/ Logic/ Program/ Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma IV*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Proforma IV.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
TOTAL.		50

**Assessment at semester end practical exam as per Pro-formaIV.*

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) Reference Books

Sr. No .	Author	Title	Publisher
1.	Rumbaugh, Blaha	Object Oriented Modeling and Designing (Refer for 1,2,3,4 Chapter)	Pearson Prentice Hall
2.	Booch, Jacobson, Rumbaugh	The UML UserGuide(Addison Wesley)	Pearson Education India
3.	Mark Paiestly	Practical OOD with UML- .(Refer for 5, 6 and 7 Chapter)	Tata McGraw Hill
4.	Kahate (TMH)	Object oriented Analysis & design	Tata McGraw-Hill

b) Websites

- i) <http://uml.tutorials.trireme.com/>
- ii) http://pigseye.kennesaw.edu/~dbraun/csis4650/A&D/UML_tutorial/
- iii) <http://www.smartdraw.com/tutorials/software-uml/uml.htm>
- iv) <http://www-db.stanford.edu/~burback/watersluice/node55.html>

LEVEL-V

MANAGEMENT AND DIVERSIFIED

COURSES

COURSE ID :36

Course Name : ENTREPRENEURSHIP AND START-UPS
Course Code : CCG501
Course Abbreviation : GESU

1.TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Nil

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	02	04
Practical	02	

Evaluation Scheme :

Mode of Evaluation	Progressive Assessment		Term End Examination			Total
	Theory	Practical	Theory Examination	Term Work	Practical Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	--	--	*As per Proforma-IV	
Marks	--	--	--	--	50I	50

* Assessment as per pro-forma-III

E- External Examination

2. RATIONALE:

Globalization, liberalization and Privatization along with revolution in information technology have opened up new opportunities transforming lives of masses. In this context, there is an immense opportunity of establishing manufacturing, service, trading, marketing and consultancy enterprises by diploma engineer, Our fast growing economy provides ample scope for diploma engineers to succeed as an entrepreneur. Entrepreneurship requires distinct skill sets which are

attempted to be developed through this course. To begin with, this course aims to develop the competency and the related outcomes in order to start small enterprises.

3. COMPETENCY :

The aim of this course is help the students to attain the industry identified competency through various teaching & learning experiences:

Cognitive : i) Understanding and applying principles and labor laws ii) Observing iii) Classifying iv) Interpreting

Psychomotor: Man power handling.

Affective: i) Follow the safe practices, ii) Practice good housekeeping iii) Maintain tool and equipment

4. COURSE OUTCOMES:

CCG501-1: Identify your entrepreneurial attributes

CCG501-2: Identify the business opportunities that suits you

CCG501-3: Use the support systems to zero down to your business idea.

CCG501-4: Develop comprehensive business plans.

CCG501-5: Prepare plans to manage the enterprise effectively.

5.COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),

"-" : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline Specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solution	PO 4 Engineering Tools, Experimentation and Testing	PO 5 The engineering Practices for society,	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design & Development	PSO2 Database & Networking
Competency: To attain the industry identified competency through various teaching and learning experiences	2	1	2	3	2	3	3	2	2
CCG501-1	1	1	--	--	--	--	1	--	--
CCG501-2	1	1	--	--	--	--	2	--	--

CCG501-3		1	1	--	--	--	--	2	--	--
CCG501-4		1	1	--	--	--	--	2	--	--
CCG501-		1	1	--	--	--	--	2	--	--

6.CONTENT :**A) SUGGESTED PRACTICAL'S/ EXERCISE****A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)**

The practical's in this sections are the sub components of the COs to be developed and assessed in the students for the attainment of the competency.

Sr. No.	Practical Outcomes (PrOs)	Unit Nos.	Approx Hrs. Required
*1	Submit a profile summary (about 500 words) of a successful entrepreneur indicating milestone achievement.	I	02
2	Undertaking SWOC analysis to arrive at your business idea of a product / service.	I	02
3	General business ideas (product / service) for intrapreneurial and entrepreneurial opportunities through brainstorming.	II	02
4	Undertake self-assessment test to discover your entrepreneurial opportunities.	II	02
5	Identify business opportunities/ <u>self-employments</u> areas suitable for you.	II	02
6	Survey industries of your stream; grade them according to the level of scale of production, investment, turnover, pollution to prepare a report on it.	II	02
*7	Visit a bank/Financial institution to enquire about various funding schemes for small scale enterprise.	III	02
*8	Collect loan application forms of national banks/other financial institutions.	III	02
*9	Compile the information from financial agencies that will help you set up your business enterprise.	III	02

*10	Compile the information from government agencies that will help you set up your business enterprise.	III	02
*11	Prepare Technological feasibility report of a chosen product/service.	III	02
*12	Prepare a set of short term, medium and long term goals for starting a chosen small scale enterprise.	III	02
*13	Prepare marketing strategy for your chosen product/service.	IV	02
14	Compile the information about insurance schemes covering different risk factors.	IV	02
15	Find the breakeven point for the business idea chosen by you.	V	02
*16	Prepare a business plan for your chosen small scale enterprise.	V	02
17.	Organize funfair for your class and write report of profit/loss.	V	02
18.	Visit report of any industry: Brief history, types and details of services/support assistance being given, any other information which is useful to self-employer/entrepreneur.	V	02

Note: A judicious mix of minimum 12 or more practical need to be performed, out of which, the

Practical's marked as '*' are compulsory, so that the student reaches the 'Precision Level of

Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.

The above practical Outcomes also comprise the following social skills/attitudes which are Affective Domain Outcomes that are best developed through the laboratory/field based experiences:

- a. Follow safe practices
- b. Good housekeeping practices
- c. Practice energy conservation
- d. Demonstrate working as a leader/a team member
- e. Maintain tools and equipment's
- f. Follow ethical practices

The Affective Domain Outcomes are not specific to any one Practical Outcomes, but are embedded in many Practical Outcomes. Hence, the acquisition of the Affective Domain Outcomes takes place gradually in the students when he/she undertake a series of practical experiences over a period of time.

A.2 Micro-project

Other than the classroom and laboratory learning, following are the suggested student related Co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare report of about 5 pages for each activity, also collect/record physical evident for their (student's) portfolio which will be useful for their placement interviews:

- a. Download product development and innovative films from internet.
- b. Prepare collage for "Traits of Successful entrepreneurs"
- c. Identify your hobbies and interests and convert them into business idea.
- d. Convert your project work into business.
- e. Decide any product and analyze its good and bad features.
- f. Choose any product and study its supply chain.
- g. Visit industry exhibitions, trade fairs and observe nitty-gritty of business.
- h. Perform a survey and identify local resources available for setting up of an enterprise.
- i. Conduct a market survey for a project. Collect data on machinery specifications, price, output/hr, power consumption, manpower requirement, wages, raw material requirement, specification, competitor's product price, features, dealer commissions, and marketing mix.
- j. Prepare a business plan and organize a business plan competition.

7.MAJOR EQUIPMENTS/INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will user in uniformity in conduct of experiments, as well as aid to procedure equipment by authorities concerned.

Sr. No.	Equipment Name with Broad Specifications	PrO. No.
1	Seminar Hall equipped with conference table, chairs and multimedia facilities.	All
2	Modern Desktop Computer with internet connection.	All

8.CONTENT:

Sr. No.	Topics / Sub-topics	Lectures (Hours)
1	ENTREPRENEURSHIP DEVELOPMENT- CONCEPT AND SCOPE 1.1 Concepts and Overview of Entrepreneurship. Evolution and Growth of Entrepreneurship in India. Role of Entrepreneurship in Economic Development. Entrepreneurship as a career. 1.2 Traits of successful intrapreneur / entrepreneur: Consistency, creativity, initiative, independent decision making, assertiveness, persuasion, persistence, information seeking, 1.3 Entrepreneurship: Scope in local and global market. 1.4 Intrapreneur and entrepreneur. 1.5 Types of enterprises and their features: Manufacturing, Service and trading. 1.6 Steps in Setting up of a business	06
2	ENTREPRENEURIAL OPPORTUNITIES AND SELECTION PROCESS: 2.1 Product / Service selection: Process, core competence, product / service life cycle, new product / service development process, mortality curve, Creativity and innovation in product / Service modification / development. 2.2 Process selection: Technology life cycle, forms and cost of transformation, Factors affecting process selection, Location for an industry, Material handling. 2.3 Market study procedures: Questionnaire design, sampling, Market survey, Data analysis 2.4 Getting information from concerned stake holders such as Maharashtra Centre for Entrepreneurship Development (MCED), National Institute for Micro, Small and Medium Enterprises (NI-MSME, Prime Minister Employment Generation Program (PMEGP), Directorate of Industries (DI), Khadi Village Industries Commission (KVIC).	08
3	SUPPORT SYSTEMS 3.1 Categorization of MSME, Ancillary Industries. . 3.2 Support system-Government Agencies: MCED, NI- MSME, PMEGP, DI, KVIC. 3.3 Support agencies for entrepreneurship guidance, training, registration, technical consolidation, technology transfer and quality control, marketing and finance 3.4 Breakeven point, return of investment and return on sales.	06

Sr. No.	Topics / Sub-topics	Lectures (Hours)
4	BUSINESS PLAN PREPARATION 4.1 Sources of Product for Business: Feasibility study. 4.2 Ownership, Capital, Budgeting, Matching Entrepreneur with the project, Feasibility report preparation and evaluation criteria. 4.3 Business plan preparation.	06
5	MANAGING ENTERPRISE 5.1 Unique Selling proposition (U.S.P.): Identification, Developing a marketing plan. 5.2 Preparing Strategies of handling Business: Policy making, negotiation and bargaining techniques. 5.3 Risk management: planning for calculated risk taking, initiation with low cost projects, integrated futuristic planning, angel investors, venture capitalist. 5.4 Incubation centers: Role and procedure.	06

9. Performance Indicator: -

Sr. No.	Performance Indicators	Weightage in %
1	Leadership Skills	20
2	Team Work	20
3	Lateral / Creative Thinking	10
4	Observation and Recording	10
5	Self-learning	20
6	Answer the simple questions	10
7	Submission of report on time	10
Total		100

10. REFERENCE MATERIAL

a) Reference Books

Sr. No.	Title of Books	Author	Publication
1	The entrepreneurial Instinct: How Everyone Has the Innate Ability to Start a Successful Small Business.	Mehta, Monica	McGraw-Hill Education, New Delhi, 2012, ISBN 978-0-07-179742-9
2	Entrepreneurship	Hisrich R. D.	McGraw-Hill Education, New Delhi, 2013, ISBN-13: 978-1259001635

3	Part I Readings in Entrepreneurship Education	Sareen S.B.	Entrepreneurship Development Institute of India (EDI), GOI, Ahmedabad, 2016; ISBN: 978-0078029169
4	Reading Materials of Entrepreneurship Awareness Camp	Gujral, Raman	Entrepreneurship Development Institute of India (EDI), GOI, Ahmedabad
5	Product Design and manufacturing	Chitale A.K.	PHI Learning, New Delhi, 2014; ISBN: 9788120348738
6	Entrepreneurship Development Small Business Entrepreneurship	Charantimath, Poornima	Pearson Education India, New Delhi; ISBN: 9788131762264
7	Entrepreneurship Development: Special Edition for MSBTE	CPSC, Manila	Tata McGraw Hill, New Delhi
8	Entrepreneurship Development Small Business Management	Khanka S. S.	S. Chand and sons, New Delhi, ISBN: 978-93-5161-094-6
9	Entrepreneurship Development	S. Anil Kumar	New Age International, New Delhi, ISBN: 9788122414349

ii) SUGESTED SOFTWARE/LEARNING RESOURCES

Sr. N o	SOFTWARE/LEARNING RESOURCES	LINKS
1	MCED Book Links	http://www.mced.nic.in/UdyojakSpecial.aspx?linktype=Udyojak
2	MCED Product and Plan Details	http://www.mced.nic.in/allproduct.aspx
3	The national Institute for Entrepreneurship and Small Business Development Publications	http://www.mced.nic.in/Publications.html
4	Courses: The National Institute of Small Business Development Publication	http://niesbud.nic.in/docs/1standardized.pdf
5	Entrepreneur.com	http://www.entrepreneur.com/lists
6	GOVERNMENT SPONSORED SCHEMES	http://www.nabard.org/content1.aspx?id=23andcatid=23andmid=530
7	NABARD- Information Centre	http://www.nabard.org/Tenders.aspx?cid=501andid=24

8	NABARD – What we do	http://www.nabard.org/content1.aspx?id=8&catid=8&mid=488
9	Market Review	http://www.businesstoday.in/markets
10	Start Up India	http://www.startupindia.gov.in/pdffile.php?title=Sartup%20India%20Action%20Plan&type=Action&q=Action%20Plan.pdf&content_type=Action&submenu_point=action
11	About – Entrepreneurship Development Institute of India (EDII)	http://www.ediindia.org/institute.html
12	EDII -Centres	http://www.ediindia.org/centres.html
13	EDII – Publications	http://www.ediindia.org/publication.html
14	Business Plan: A Step-By-Step Guide	http://www.entrepreneur.com/article/247574
15	The National Science and Technology Entrepreneurship Development Board (NSTEDB)	http://www.nstedb.com/index.html
16	NSTEDB – Training	http://www.nstedb.com/training/training.html
17	Tata Exposures	http://www.tatasocial-in.com/project-exposure
18	Ministry of Micro, Small and Medium Enterprises	http://www.dcmsme.gov.in/schemes/TEQUPDetail.html
19	List of Business Ideas for Small Scale Industry	http://small.sidbi.in%20/thinking-starting-business/big-list-business-ideas-small-business
20	Thinking of Entrepreneurship	http://smallb.sidbi.in/entrepreneurship-stage/thinking-entrepreneurship
21	List of Service for Small Scale Industry	http://www.archive.india.gov.in/business/Industry_services/illustrative.php
22	NSIC Schemes and Services	http://www.nsic.co.in/SCHSERV.ASP

* * *

COURSE ID: 37

Course Name : INTERNSHIP-I (4 Weeks- After Fourth Semester During Summer Vacation)

Course Code : CCG502

Course Abbreviation : GINO

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Nil

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	--	03
Practical	--	

Evaluation Scheme :

Component	Progressive Assessment		Semester end		Total
	Theory	Practical	Theory	Practical*	
Duration	Average of two tests of 20 marks each	One Skill Test (2 hours) *	One paper (3 hours)	One practical (2 hours)	
Marks	---	--	---	50 E	50

* Assessment as per scheme given in Table-3 and Table -4, E- External Examination

2. RATIONALE

This Industrial training (internship) is compulsorily introduced for all the diploma programmes to expose the students for a longer period to the industrial environment and develop the relevant good habits of industry culture among the students before they enter the industry. By exposing and interacting with the real life industrial setting, the students will appreciate and get accustomed to the actual working of an industry along with the best practices adopted by them. The industrial culture skills fall under soft skills, life skills and hands-on which will be inculcated among the students. Such a short exposure will be an effective association with the industry, for the students and will be instrumental in orienting them to be industry ready, to a much greater extent than the present ones, after completion of the respective diploma programme.

3. COMPETENCY

The course is intended to develop the following competencies:

- **Soft Skills such as: Communication, Presentation etc.**
- **Life skills such as: Time management, Safety, Innovation, Entrepreneurship, Team building etc.**
- **Hands-on skills such as: Design, Implementation, Different operations, Quality Assurance etc.**

4. COURSE OUTCOMES

The industrial training (internship) related competencies as mentioned above to supplement those attained through several courses up to fourth semester of the relevant programme can be achieved by the following course outcomes:

CCG502-1: Communicate effectively (verbal and equally written) the works carried out.

CCG502-2: Prepare and present the report of the works carried out.

CCG502-3: Exercise time management and safety in the work environment.

CCG502-4: Work effectively as a team member.

CCG502-5: Demonstrate various quality assurance skills.

Note: Both ESE and PA part of assessment will be carried out by institute faculty and industry training supervisor as explained in the relevant proforma of assessment.

5. GENERAL GUIDELINES FOR INDUSTRIAL TRAINING

- a) **Training during the programme:** Between 4th and 5th semester (During Summer Vacation).
- b) **Duration of the training:** four/three weeks
- c) **Training Area:** Students should be trained in large and medium scale Industry / Organization. However, despite the best efforts by the institute, if large and medium scale Industry / Organization are not available to all students then, students can also be placed in small scale Industry / Organization.
- d) These Industries / Organizations can be Government /Public limited/ or Private family enterprises.

For *IT* industries it can be any software developers, cyber security companies, web page developers, networking companies, data base management companies, telecommunication companies or IT division of any other industries/finance/retail companies or organizations where software are used and maintained for various applications.

6. ROLE OF PARENT DEPARTMENT OF THE INSTITUTES

Sr. No	Activity	Schedule
1	Collecting information about Industry / Organization available for training along with capacity (Format - 1)	Before completion of 3 rd semester
2	Student and mentor allocation as per the slots available for in-plant training (Desirable mentor- student ratio is 1:15)	Before commencement of 4 th semester
3	Communication with Industry / Organization available for training along with capacity and its confirmation	Before first Unit Test of the 4 th semester
4	Obtaining consent letter from parents / guardian (Format - 2)	Before second Unit Test of the 4 th semester
5	Student enrollment for In-plant training (Format-3)	Before commencement of 4 th semester examination
6	Issue letter to the Industry / Organization for the training along with details of students and mentors. (Format - 4)	During 4 th semester examination
7	Mentors to carry out progressive assessment of the students during the in-plant training (Format -5)	Each week of training
8	End of training assessment by mentor along with Industry / Organization expert as external examiner(Format - 6)	Before 5 th semester ESE

Suggestions:

- a) Departments can take help of alumni or present students (if they or their parents or relatives have some contact in different industries) for securing placement.
- b) The students would normally be placed as per their choices, in case of more demand for a particular Industry / Organization students would be allocated place based on their relative merit. However, if some students have arranged training placement in some companies with the help of their parents/relatives etc. then they will be given preference for placement in those companies.
- c) Principal/HOD/Faculty should address students about industrial safety norms, rules and discipline to be maintained in the Industry / Organization during the training before relieving students for training.

- d) The faculty member during the visit to Industry / Organization will check the progress of the student in the training, his/ her attendance, discipline and project report preparation.

7. EXPECTATIONS FROM INDUSTRY

Helping the institute in developing the following competencies among students

- **Soft Skills such as: Communication, Presentation etc.**
- **Life skills such as: Time management, Safety, Innovation, Entrepreneurship, Team building etc.**
- **Hands-on skills such as: Design, Implementation, Different operations, Quality Assurance etc.**

8. ROLES AND RESPONSIBILITIES OF THE STUDENTS

Following should be informed to students in the letter deputing them for the training, an undertaking for this should also be taken from them

- a) Students would interact with the mentor to suggest choices for suitable Industry / Organization. If students have any contact in Industry / Organization (through their parents, relatives or friends) then same may be utilized for securing placement for themselves and their peers.
- b) Students have to fill the forms duly signed by authorities along with training letter and submit it to training officer in the industry on the first day of training. Student should also carry with him/her the Identity card issued by institute during training period.
- c) He/she will have to get all the necessary information from the training officer regarding schedule of the training, rules and regulations of the Industry / Organization and safety procedures to be followed. Student is expected to observe these rules, regulations, procedures.
- d) Students should know that if they break any rule of industry or do not follow the discipline then industry can terminate the training and sent back the students.
- e) It is the responsibility of the student to collect information from Industry / Organization about manufacturing processes / testing and quality assurance methods/specifications of machines and raw materials/maintenance procedures/ production planning/organizational structure etc.
- f) During the training period students have to keep record of all the useful information in Log book and maintain the weekly diary as provided and get it signed from mentor as well as Industry / Organization training in-charge.
- g) In case they face any major problem in industry such as an accident or any disciplinary issue then they should immediately report the same to the institute.
- h) Prepare final report about the training for submitting to the department at the time of presentation and viva-voce and get it signed from mentor as well as Industry / Organization training in-charge.

9. FORMAT FOR TRAINING REPORT

Following is the suggestive format for the training report, actual format may differ slightly depending upon the nature of Industry / Organization. The training report may contain the following

- Title page
- Certificate
- Abstract
- Acknowledgement
- Content Page

Chapter 1. Organizational structure of Industry / Organization and General Lay Out

Chapter 2. Introduction of Industry / Organization (Type of products and services, history, turn over and number of employees etc.)

Chapter 3. Types of major equipment/instruments/ machines used in industry with their specification, approximate cost and specific use and their routine maintenance.

Chapter 4. Manufacturing Processes along with production planning and control methods.

Chapter 5. Testing of raw materials, components and finished products along with quality assurance procedures.

Chapter 6. Major material handling product (lifts, cranes, slings, pulleys, jacks, conveyor belts etc.) and material handling procedures.

Chapter 7. Safety procedures followed and safety gear used (includes Preventive maintenance schedule and breakdown maintenance procedures).

Chapter 8. Particulars of Practical Experiences in Industry / Organization if any in Production/ Assembly/ Testing/Maintenance.

Chapter 9. Short report/description of the project (if any done during the training)

Chapter 10. Special/challenging experiences encountered during training if any (may include students liking & disliking of work places)

References/Bibliography

10. SUGGESTED LEARNING STRATEGIES

Students should visit the website of the industry where they are undergoing training to collect information about products, processes, capacity, number of employees, turnover etc. They should also refer the handbooks of the major machines and operation, testing, quality control and testing manuals used in the industry. Students may also visit websites related to other industries wherein similar products are being manufactured as their learning resource.

11. TENTATIVE WEEK-WISE SCHEDULE OF INDUSTRIAL TRAINING

The industrial training is a common course to all programmes; therefore the industry / Organization selection will depend upon the nature of programme and its related industry. The training activity may vary according to nature and size of Industry / Organization. The following table details suggestive schedule for industrial training for all programmes.

Table - 2 Detail week schedule and Marks distribution

S. No.	Week No.	Details of activities to be completed during Industrial training	Marks distribution/ week for PA
1	Week No. 1	Induction to industry and its departments	05
		Study of layout and specifications of major machines, equipment and raw materials / components / software used.	05
2	Week No. 2	Study of setup ,processes/ milestone project.	05
		Study of QA/QC procedures.	10
		Study safety and maintenance procedure in an industry/organization	
3	Week No. 3	Build a project as per requirements from Industry	10
4	Week No. 4	Report Submission and Completion certificate	05
PA marks to be given by industry supervisor		25	
PA marks to be given by polytechnic faculty based on performance		10	
Total PA marks for training			75

Table - 3 ASSESSMENT SCHEME FOR INDUSTRIAL TRAINING

Training duration	PROGRESSIVE ASSESSMENT <i>(Weekly report of all 4 week and attendance)</i>		END SEMESTER ASSESSMENT <i>(Seminar and Oral)</i>		Total marks	
	Max. marks	Min. marks	Max. marks	Min. marks	Max. marks	Min. marks
Six weeks	#75	-----	75**	30	150	60

**assessed by external examiner based on report (25 Marks), presentation (25 Marks) and Viva-Voce (25 Marks)

Table - 4 Distribution of End-Semester-Examination (ESE) marks of Industrial Training

Marks for Industrial Training Report	Marks for Seminar/ Presentation	Marks for Oral/Viva-voce	Total ESE marks
25	25	25	75

FORMAT-1 : INFORMATION ABOUT INDUSTRY/ORGANISATION FOR TRAINING

- 1) Name of the industry/organisation:
- 2) Address/communication details(incl email):
- 3) Contact person details:
 - a) Name:
 - b) Designation:
 - c) Email
 - d) Contact number/s:
- 4) Type:

Govt / PSU / Pvt /

Large scale / Medium scale / Small scale

- 5) Products/services offered by industry:
- 6) a) Whether willing to offer Industrial training facility during May/ June for Diploma in Engineering students: Yes / No.
- b) If yes, whether you offer 6 weeks training : YES/NO
- c) Internship capacity possible:

Programme	Civil Engg	Mechanical Engg	Electrical Engg	Total
Male					
Female					
Total					

- 7) Whether accommodation available for interns Yes / No.

If yes capacity:_____

- 8) Whether internship is charged or free:

If charged please specify amount per candidate: _____

Signature of responsible person:

FORMAT-2 : OBTAINING CONSENT LETTER FROM PARENTS/GUARDIANS

(UNDERTAKING FROM PARENTS)

To,

The Principal,

Subject: Consent for Industrial Training.

Sir/Madam,

I am fully aware that -

- i) My ward studying in _____ semester at your _____ institute has to undergo six weeks of Industrial training for partial fulfillment towards completion of Diploma in _____ Engineering.
- ii) For this fulfillment he/she has been deputed at _____ industry, located at _____ for internship of _____ weeks for the period from _____ to _____.

With respect to above I give my full consent for my ward to travel to and from the mentioned industry. Further I undertake that -

- a) My ward will undergo the training at his/her own cost and risk during training and/or stay.
- b) My ward will be entirely under the discipline of the organization where he/she will be placed and will abide by the rules and regulations in face of the said organization.
- c) My ward is NOT entitled to any leave during training period.
- d) My ward will submit regularly a prescribed weekly diary ,duly filled and countersigned by the training supervisor of the organization to the mentor faculty of the polytechnic.

I have explained the contents of the letter to my ward who has also promised to adhere strictly to the requirements. I assure that my ward will be properly instructed to take his own care to avoid any accidents/injuries in the industry. In case of any accident neither industry nor the institute will be held responsible.

Signature :

Name : _____

Address : _____

Phone Number:_____

**FORMAT-3 : STUDENT ENROLLMENT FOR IN-PLANT TRAINING (TO BE
DESIGN BY PROGRAMME DEPARTMENT)**

Sr. No.	Roll No	Name of Student	Email ID	Contact No	Class of Student	Company name/ Organization Name	Address of Company

**FORMAT-4: ISSUE LETTER TO THE INDUSTRY/ORGANISATION FOR THE
TRAINING ALONG WITH DETAILS OF STUDENTS AND MENTORS**

To,

The HR Manager,

Subject: Placement for Industrial training of ___ weeks in your organization....

Reference: Your consent letter no:

Sir,

With reference to the above we are honored to place the following students from this institute for Industrial training in your esteemed organization as per the arrangement arrived at.

Diploma programme in _____ Engg.

Sr. no.	Enrolment no.	Name:	Mentor

Diploma programme in _____ Engg.

Sr. no.	Enrolment no.	Name:	Mentor

Kindly do the needful and oblige.

Thanking you in anticipation

Yours sincerely,

(Principal)

Name of the Institute:

with Seal

FORMAT-5
PA of Internship-I

Academic year : 20 -20

Name of the industry:

Sr. No.	Enrolment Number	Name of student	Marks					PA Marks by Industry Supervisor	PA based on Report by mentor faculty	Total
			Week 1(Out of 10)	Week 2(Out of 15)	Week 3(out of 10)	Week 4(Out of 5)	Total (A)(out of 40)			

Marks for PA are to be awarded for each week considering the level of completeness of activity observed, from the daily diary maintained and feedback from industry supervisor.

Name of mentor:

Signature of mentor

FORMAT-6:

**END OF TRAINING ASSESSMENT BY MENTOR ALONG WITH
INDUSTRY/ORGANIZATION EXPERT AS EXTERNAL EXAMINER**
(TO BE DESIGN BY PROGRAMME DEPARTMENT)

Sr. No.	Roll No	Name of Student	Class of Student	Company name/ Organization Name	Name of Guide (Internal) (25)	Industry / Organization Expert (External) (25)	Marks Obtained (50)

COURSE ID:38

Course Name : INTERNSHIP-II (3 WEEKS- AFTER FIFTH SEMESTER DURING WINTER VACATION)

Course Code : CCG503

Course Abbreviation : GINT

1.TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Nil

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	--	02
Practical	--	

Evaluation Scheme :

Component	Progressive Assessment		Semester end		Total
	Theory	Practical	Theory	Practical*	
Duration	Average of two tests of 20 marks each	One Skill Test (2 hours) *	One paper (3 hours)	One practical (2 hours)	
Marks	---	--	---	50 E	50

* Assessment as per scheme given in Table-3 and Table -4, E- External Examination

2.RATIONALE

This Industrial training (internship) is compulsorily introduced for all the diploma programme to expose the students for a longer period to the industrial environment and develop the relevant good habits of industry culture among the students before they enter the industry. By exposing and interacting with the real life industrial setting, the students will appreciate and get accustomed to the actual working of an industry along with the best practices adopted by them. The industrial culture skills fall under soft skills, life skills and hands-on which will be inculcated among the students. Such a short exposure will be an effective association with the industry, for the students and will be instrumental in orienting them to be industry ready, to a much greater extent than the present ones, after completion of the respective diploma programme.

3.COMPETENCY

The course is intended to develop the following competencies:

- **Soft Skills such as: Communication, Presentation etc.**
- **Life skills such as: Time management, Safety, Innovation, Entrepreneurship, Team building etc.**
- **Hands-on skills such as: Design, Implementation, Different operations, Quality Assurance etc.**

4.COURSE OUTCOMES

The industrial training (internship) related competencies as mentioned above to supplement those attained through several courses up to fourth semester of the relevant programme can be achieved by the following course outcomes:

CCG503-1: Communicate effectively (verbal and equally written) the works carried out.

CCG503-2: Prepare and present the report of the works carried out.

CCG503-3:Exercise time management and safety in the work environment.

CCG503-4: Work effectively as a team member.

CCG503-5: Demonstrate various quality assurance skills.

Note: Both ESE and PA part of assessment will be carried out by institute faculty and industry training supervisor as explained in the relevant proforma of assessment.

5.GENERAL GUIDELINES FOR INDUSTRIAL TRAINING

i)**Training during the programme:** After 5th semester (During Winter Vacation).

ii)**Duration of the training:** Three weeks

iii)**Training Area:** Students should be trained in large and medium scale Industry / Organization. However, despite the best efforts by the institute, if large and medium scale Industry / Organization are not available to all students then, students can also be placed in small scale Industry / Organization.

iv)These Industries / Organizations can be Government /Public limited/ or Private family enterprises.

For *IT* industries it can be any software developers, cyber security companies, web page developers, networking companies, data base management companies, telecommunication companies or IT division of any other industries/finance/retail companies or organizations where software are used and maintained for various applications.

6.ROLE OF PARENT DEPARTMENT OF THE INSTITUTES

Sr. No	Activity	Schedule
1	Collecting information about Industry / Organization available for training along with capacity (Format - 1)	Before completion of 4 th semester
2	Student and mentor allocation as per the slots available for in-plant training (Desirable mentor- student ratio is 1:15)	Before commencement of 5 th semester
3	Communication with Industry / Organization available for training along with capacity and its confirmation	Before first Unit Test of the 5 th semester
4	Obtaining consent letter from parents / guardian (Format - 2)	Before second Unit Test of the 5 th semester
5	Student enrollment for In-plant training (Format- 3)	Before commencement of 5 th semester examination
6	Issue letter to the Industry / Organization for the training along with details of students and mentors. (Format - 4)	During 5 th semester examination
7	Mentors to carry out progressive assessment of the students during the in-plant training (Format - 5)	Each week of training
8	End of training assessment by mentor along with Industry / Organization expert as external examiner(Format - 6)	After 5 th semester ESE

Suggestions:

- a) Departments can take help of alumni or present students (if they or their parents or relatives have some contact in different industries) for securing placement.
- b) The students would normally be placed as per their choices, in case of more demand for a particular Industry / Organization students would be allocated place based on their relative merit. However, if some students have arranged training placement in

some companies with the help of their parents/relatives etc. then they will be given preference for placement in those companies.

- c) Principal/HOD/Faculty should address students about industrial safety norms, rules and discipline to be maintained in the Industry / Organization during the training before relieving students for training.
- d) The faculty member during the visit to Industry / Organization will check the progress of the student in the training, his/ her attendance, discipline and project report preparation.

7.EXPECTATIONS FROM INDUSTRY

Helping the institute in developing the following competencies among students

- **Soft Skills such as: Communication, Presentation etc.**
- **Life skills such as: Time management, Safety, Innovation, Entrepreneurship, Team building etc.**
- **Hands-on skills such as: Design, Implementation, Different operations, Quality Assurance etc.**

8.ROLES AND RESPONSIBILITIES OF THE STUDENTS

Following should be informed to students in the letter deputing them for the training, an undertaking for this should also be taken from them

- i) Students would interact with the mentor to suggest choices for suitable Industry / Organization. If students have any contact in Industry / Organization (through their parents, relatives or friends) then same may be utilized for securing placement for themselves and their peers.
- ii) Students have to fill the forms duly signed by authorities along with training letter and submit it to training officer in the industry on the first day of training. Student should also carry with him/her the Identity card issued by institute during training period.
- iii) He/she will have to get all the necessary information from the training officer regarding schedule of the training, rules and regulations of the Industry / Organization and safety procedures to be followed. Student is expected to observe these rules, regulations, procedures.
- iv) Students should know that if they break any rule of industry or do not follow the discipline then industry can terminate the training and sent back the students.

- v) It is the responsibility of the student to collect information from Industry / Organization about manufacturing processes / testing and quality assurance methods/specifications of machines and raw materials/maintenance procedures/ production planning/organizational structure etc.
- vi) During the training period students have to keep record of all the useful information
- vii) in Log book and maintain the weekly diary as provided and get it signed from mentor as well as Industry / Organization training in-charge.
- viii) In case they face any major problem in industry such as an accident or any disciplinary issue then they should immediately report the same to the institute.
- ix) Prepare final report about the training for submitting to the department at the time of presentation and viva-voce and get it signed from mentor as well as Industry / Organization training in-charge.

9.FORMAT FOR TRAINING REPORT

Following is the suggestive format for the training report, actual format may differ slightly depending upon the nature of Industry / Organization. The training report may contain the following

- Title page
- Certificate
- Abstract
- Acknowledgement
- Content Page

Chapter1.Organizational structure of Industry / Organization and General Lay Out

Chapter2. Introduction of Industry / Organization (Type of products and services, history, turn over and number of employees etc.)

Chapter3. Types of major equipment/instruments/ machines used in industry with their specification, approximate cost and specific use and their routine maintenance.

Chapter4. Manufacturing Processes along with production planning and control methods.

Chapter5.Testing of raw materials, components and finished products along with quality assurance procedures.

Chapter6. Major material handling product (lifts, cranes, slings, pulleys, jacks, conveyor belts etc.) and material handling procedures.

Chapter7.Safety procedures followed and safety gear used (includes Preventive maintenance schedule and breakdown maintenance procedures).

Chapter8. Particulars of Practical Experiences in Industry / Organization if any in Production/ Assembly/ Testing/Maintenance.

Chapter9. Short report/description of the project (if any done during the training)

Chapter10. Special/challenging experiences encountered during training if any (may include students liking & disliking of work places)

12. SUGGESTED LEARNING STRATEGIES

Students should visit the website of the industry where they are undergoing training to collect information about products, processes, capacity, number of employees, turnover etc. They should also refer the handbooks of the major machines and operation, testing, quality control and testing manuals used in the industry. Students may also visit websites related to other industries wherein similar products are being manufactured as their learning resource.

13. TENTATIVE WEEK-WISE SCHEDULE OF INDUSTRIAL TRAINING

The industrial training is a common course to all programmes; therefore the industry / Organization selection will depend upon the nature of programme and its related industry. The training activity may vary according to nature and size of Industry / Organization. The following table details suggestive schedule for industrial training for all programmes.

Table - 2 Detail week schedule and Marks distribution

S. No.	Week No.	Details of activities to be completed during Industrial training	Marks distribution/ week for PA
1	Week No. 1	Induction to industry and its departments	05
		Study of layout and specifications of major machines, equipment and raw materials / components / software used.	05
		Study of setup ,processes/ milestone project.	
		Study of QA/QC procedures.	05
		Study safety and maintenance procedure in an industry/organization	
2	Week No. 2	Finalize the project work in consultation with the industry personnel/department .	05
		Gather the resources/literature etc. necessary for the accomplishment of the project.	05
		Build the project as per requirements.	10
3	Week No. 3	Report submission and completion certificate	05
PA marks to be given by industry supervisor		25	
PA marks to be given by polytechnic faculty based on performance		10	
Total PA marks for training		75	

Table - 3 ASSESSMENT SCHEME FOR INDUSTRIAL TRAINING

Training duration	PROGRESSIVE ASSESSMENT <i>(Weekly report of all 4 week and attendance)</i>		END SEMESTER ASSESSMENT <i>(Seminar and Oral)</i>		Total marks	
	Max. marks	Min. marks	Max. marks	Min. marks	Max. marks	Min. marks
Six weeks	#75	-----	75**	30	150	60

**assessed by external examiner based on report (25 Marks), presentation (25 Marks) and Viva-Voce (25 Marks)

Table - 4 Distribution of End-Semester-Examination (ESE) marks of Industrial Training

Marks for Industrial Training Report	Marks for Seminar/Presentation	Marks for Oral/Viva-voce	Total ESE marks
25	25	25	75

FORMAT-1 :**INFORMATION ABOUT INDUSTRY/ORGANISATION FOR TRAINING**

- 1) Name of the industry/organisation:
- 2) Address/communication details(incl email):
- 3) Contact person details:
 - e) Name:
 - f) Designation:
 - g) Email
 - h) Contact number/s:
- 4) Type:

Govt / PSU / Pvt /

Large scale / Medium scale / Small scale
- 5) Products/services offered by industry:
- 6) a) Whether willing to offer Industrial training facility during May/ June for Diploma in Engineering students: Yes / No.
- b) If yes, whether you offer 6 weeks training : YES/NO
- c) Internship capacity possible:

Programme	Civil Engg	Mechanical Engg	Electrical Engg	Total
Male					
Female					
Total					

- 7) Whether accommodation available for interns Yes / No.
If yes capacity:_____
- 8) Whether internship is charged or free:
If charged please specify amount per candidate: _____

Signature of responsible person:

FORMAT-2 : OBTAINING CONSENT LETTER FROM PARENTS/GUARDIANS
(UNDERTAKING FROM PARENTS)

To,

The Principal,

Subject: Consent for Industrial Training.

Sir/Madam,

I am fully aware that -

iii) My ward studying in _____ semester at your _____ institute has to undergo six weeks of Industrial training for partial fulfillment towards completion of Diploma in _____ Engineering.

iv) For this fulfillment he/she has been deputed at _____ industry, located at _____ for internship of _____ weeks for the period from _____ to _____.

With respect to above I give my full consent for my ward to travel to and from the mentioned industry. Further I undertake that -

- e) My ward will undergo the training at his/her own cost and risk during training and/or stay.
- f) My ward will be entirely under the discipline of the organization where he/she will be placed and will abide by the rules and regulations in face of the said organization.
- g) My ward is NOT entitled to any leave during training period.
- h) My ward will submit regularly a prescribed weekly diary ,duly filled and countersigned by the training supervisor of the organization to the mentor faculty of the polytechnic.

I have explained the contents of the letter to my ward who has also promised to adhere strictly to the requirements. I assure that my ward will be properly instructed to take his own care to avoid any accidents/injuries in the industry. In case of any accident neither industry nor the institute will be held responsible.

Signature :

Name : _____

Address : _____

Phone Number:_____

FORMAT-3:**STUDENT ENROLLMENT FOR IN-PLANT TRAINING**
(TO BE DESIGN BY PROGRAMME DEPARTMENT)

Sr. No.	Roll No	Name of Student	Email ID	Contact No	Class of Student	Company name/ Organization Name	Address of Company

FORMAT-4: ISSUE LETTER TO THE INDUSTRY/ORGANIZATION FOR THE TRAINING ALONG WITH DETAILS OF STUDENTS AND MENTORS

To,

The HR Manager,

Subject: Placement for Industrial training of ___ weeks in your organization....

Reference: Your consent letter no:

Sir,

With reference to the above we are honored to place the following students from this institute for Industrial training in your esteemed organization as per the arrangement arrived at.

Diploma programme in _____ Engg.

Sr. no.	Enrolment no.	Name:	Mentor

Diploma programme in _____ Engg.

Sr. no.	Enrolment no.	Name:	Mentor

Kindly do the needful and oblige.

Thanking you in anticipation

Yours sincerely,

(Principal)

Name of the Institute:

with Seal

FORMAT-5**PA OF INTERNSHIP-I**

Academic year : 20 -20

Name of the industry:

Sr. No.	Enrolment Number	Name of student	Marks				PA Marks by Industry Supervisor	PA based on Report by mentor faculty	Total
			Week 1(Out of 15)	Week 2(Out of 20)	Week 3(out of 05)	Total (A)(out of 40)			

Marks for PA are to be awarded for each week considering the level of completeness of activity observed, from the daily diary maintained and feedback from industry supervisor.

Name of mentor:

Signature of mentor

FORMAT-6:

**END OF TRAINING ASSESSMENT BY MENTOR ALONG WITH
INDUSTRY/ORGANIZATION EXPERT AS EXTERNAL EXAMINER
(TO BE DESIGN BY PROGRAMME DEPARTMENT)**

Sr. No.	Roll No	Name of Student	Class of Student	Company name/ Organization Name	Name of Guide (Internal)	Industry / Organization Expert (External)	Marks Obtained (50)

Course ID:39**Course Name : PROJECT - I****Course Code : ITG501****Course Abbreviation : GPRO****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme : MPECS 2020**

Scheme component	Hours / week	Credits
Theory	00	02
Practical	02	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (Internal)	
Details of Evaluation	--	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	--	As per Proforma-IV	
Marks	--	--	--	50I	50

2. RATIONALE:

In the field of Information Technology various technologies (hardware and Software) needs to be integrated and proper paradigms needs to be implemented to develop any kind of computer applications. Hence it becomes essential to get hands on experience for developing industrial applications. This course is essential to understand the implementation of the system development process i.e. analysis, design, coding, debugging and testing.

The project work should be undertaken by group of 4-5 students who will jointly work and implement the project with the approval of guide. The student should decide the area of

proposal work as per requirement of Industry / community or environment and work together for hardware / software solution for that work.

The project work is divided into two phases. In the first phase the group is expected to submit a synopsis upon choosing a project work. The synopsis report should include following points:

- Title of project
- Introduction
- Study of existing system
- Need of proposed work / Choice of topic with reasoning
- Literature review / Related work
- Hardware and software requirements
- Outline of proposed work
- Block diagram
- Expected schedule

Student should work on detailed system design, data flow design, data structure layout, file designs and complete 30 to 40 percent of work out of complete project work as a part of term work submission in the form of joint report.

The term work assignment should be carried out under the guidance of appointed project guide by Head of Dept. A seminar should be delivered by student on latest trends in IT as part of term work. The oral examination will be conducted by internal examiner as appointed by the Institute.

3.COMPETENCY :

Implementation of the software system development process i.e. analysis, design and coding.

Cognitive : i) Decide the area of proposal work as per requirement of Industry / community or environment

ii) Understand phases of Software Development Life Cycle for the project work

iii) Apply concepts of database, programming and networking for hardware or software solution of project work

Psychomotor : i) Prepare a block diagram for the proposed work

ii) Draw a Data Flow Diagram for the proposed system

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4.COURSE OUTCOMES :

The students will be able to :

ITG501-1 Identify need of Industry / community or environment and the area of proposed work

ITG501-2 Prepare a synopsis report including requirements, design, proposed schedule and modules of the project work

ITG501-3 Present seminar on recent trends in IT and prepare report.

ITG501-4 Write a project report and demonstrate project work.

5.COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-": no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Develop ment of solutions	PO 4 Engineer ing Tools,	PO 5 Engineeri ng Practices	PO 6 Project Manage ment	PO 7 Life- long Learnin g	PSO1 Design and develop ment	PSO2 Database and Network manageme nt
Competency: Implementation of the software system development process i.e. analysis, design and coding.	2	3	2	3	2	3	2	3	1
ITG501-1:	2	3	-	-	2	2	2	-	-
ITG501-2:	2	2	3	2	1	3	2	3	1
ITG501-3:	2	2	3	-	1	-	-	-	-
ITG501-4:	3	2	3	3	1	2	1	3	2

6.Criteria for Continuous Assessment of Practical work and Progressive Skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Requirement Analysis	05
3	Design - Algorithm, DFD	05
4	Logical Thinking and Approach	05
5	Progressive Project Demonstration	05
TOTAL		25

7.Criteria for assessment at semester end oral exam:

Sr. no	Criteria	Marks allotted
1.	Seminar	25
2.	Requirement Analysis	5
3.	Design - Algorithm, DFD	5
4.	Logical Thinking and Approach	5
5.	Project Report	5
6.	Project Demonstration	5
	TOTAL.	50

Assessment at semester end oral exam as per Pro-forma IV

COURSE ID : 40**Course Name :PROJECT-II****Course Code : ITG502****Course Abbreviation : GPRT****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : ITG501****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	00	04
Practical	04	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External)	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma III	
Marks	--	--	NIL	100E	100

2. RATIONALE:

In the field of Information Technology various technologies (hardware and Software) needs to be integrated and proper paradigms needs to be implemented to develop any kind of computer applications . Hence it becomes essential to get hands on experience for developing industrial applications. This subject is essential to understand the implementation of the system development process i.e. analyse, design, coding , debugging and testing .

The project work should be undertaken by group of 4-5 students who will jointly work and implement the project with the approval of guide. The student should decide the area of proposal work as per requirement of Industry

/ community or environment and work together for hardware / software solution for that work.

The project work is divided into two phases. In the second phase student should work on detailed system design, data flow design, data structure layout, file designs and complete project work as a part of term work submission in the form of joint report.

The group is expected to submit a report of a project work at the end of semester.
The report should include following points:

- Title of project
- Introduction
- Study of existing system
- Need of proposed work / Choice of topic with reasoning
- Literature review / Related work
- Requirement Analysis / SRS
- Hardware and software requirements
- System design that includes details of modules of system along with Data Flow Diagrams, ER diagram and Block diagram etc.
- Implementation details with snapshots
- Applications
- Conclusion and Future work
- Bibliography

These points are guidelines to the students. Students shall prepare a report containing these and additional points if any depending on the project as guided by the appointed project guide. The oral examination will be conducted by internal and external examiner as appointed by the Institute.

3. COMPETENCY

Implementation of the software system development process i.e. analysis, design, coding, debugging and testing.

Cognitive : i) Understand phases of Software Development Life Cycle for the project work. Apply concepts of database, programming and networking for hardware or software solution of project work

Psychomotor : i) Prepare a block diagram, DFD, ER diagram for the proposed work
ii) Test and debug implemented software / hardware system

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES:

ITG502-1: Plan and coordinate project team work as per schedule in synopsis

ITG502-2: Implement acquired technical knowledge practically

ITG502-3: Design all modules of proposed project work to meet the user requirements

ITG502-4: Test and debug the project work

ITG502-5: Write a project report after completion of complete project work

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
 “-” : no correlation]

Competency and CoS	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Implementation of the software system development process i.e., analysis, design, coding, debugging and testing	3	3	3	3	3	3	3	3	3
ITG502-1:	2	1	1	--	1	3	3	--	--
ITG502-2:	3	3	3	3	3	3	3	3	2
ITG502-3:	3	3	3	3	3	3	3	3	2
ITG502-4:	3	3	1	3	2	3	3	--	--
ITG502-5:	3	--	--	3	2	3	3	--	--

6. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/ Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Requirement Analysis	10
2.	Design – Algorithm, DFD	10
3.	Logical Thinking and Approach	10
4.	Project Report	10
5.	Project Demonstration	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-forma.III

COURSE ID: 41

Course Name : MANAGEMENT INFORMATION SYSTEM
Course Code : ITG503
Course Abbreviation : GMIS

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	3	3
Practical	--	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	--	Term End Online Theory Exam	--	
Marks	20	--	80	--	100

2. RATIONALE:

Information Systems plays major role in IT, and management of Information System for become major issue. We introduced this subject to our curriculum so that our students will able to deal with management of information system.

Management Information System facilitates the decision makers to extend their planning horizons & introduce even greater levels of uncertainty in business plans & budgeted allocations. Management Information System facilitates higher degree of accountability in business process.

3. COMPETENCY

Understand importance of Management Information System in modern organization.

Cognitive: The students will be able to understand:

- i) Necessity of Management Information System
- ii) Different challenges of Information System
- iii) Decision Making and Implementing with MIS
- iv) State the use of data warehouse, data mining for decision support system.

Psychomotor: i) Adopt Knowledge of MIS Applications in organizations

ii) Describe Customer Relationship Management & types of E-Business

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality

4. COURSE OUTCOMES:

ITG503-1: Illustrate the concepts of Management of Information System with Strategic Design.

ITG503-2: Capture Decision making concepts with its information.

ITG503-3: Apply Various Decision Support Systems

ITG503-4: Relate Various Technologies and E-Business Models of Information System.

ITG503-5: List various applications of MIS

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX :

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Understand importance of Management Information System in modern organization	2	1	1	-	-	1	1	1	-
ITG503-1	2	1	-	-	-	1	1	-	-
ITG503-2:	1	-	-	-	-	1	1	-	-
ITG503-3:	2	-	1	-	-	-	-	-	-
ITG503-4:	1	-	-	-	-	-	-	-	-
ITG503-5:	2	-	1	-	-	-	1	1	-

6. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG503- 1 Illustrate the concepts of Management of Information System with Strategic Design.</i>			
1	INTRODUCTION TO MANAGEMENT <ul style="list-style-type: none"> 1.1 MIS : Concept 1.2 MIS: Definition 1.2 Role of MIS 1.3 Impact of management information system 1.4 MIS the User 1.5 MIS : A Support to the Management 1.6 Management Effectiveness and MIS 1.7 Organization as a System 1.8 MIS : Organization Effectiveness 1.9 MIS for a Digital Firm 	06	12
2	STRATEGIC DESIGN OF MIS <ul style="list-style-type: none"> 2.1 Essentiality of Strategic Planning 2.2 Strategic Management of Business 2.3 Why Strategy Design of MIS? 	08	12

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	2.4 Balance Score card, Score Card and Dash Board 2.5 Strategic Design Of MIS 2.6 Development Process Steps for Strategic Design (SD) of MIS 2.7 Illustrating SD of MIS for Big Bazaar		
Course Outcome ITG503-2: Capture Decision making concepts with its information.			
3	DECISION MAKING & INFORMATION 3.1 Decision making concepts 3.2 Decision making process 3.3 Decision Analysis by Analytical Modeling 3.4 Behavioral Concepts in Decision Making 3.5 Organizational Decision making 3.6 MIS & Decision making 3.7 Information concept 3.8 Information: A Quality Product 3.9 Classification of the Information 3.10 Methods of Data and Information Collection	10	16
	Sub-total	24	40

SECTION II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITG503-3 Apply Various Decision Support Systems			
4	DECISION SUPPORT SYSTEM 4.1 Decision Support System (DSS): Concept and Philosophy 4.2 DSS Models: Behavioural, Management Science and Operations Research Models 4.3 Group Decision Support System (GDSS) 4.4 Artificial Intelligence (AI) System 4.5 Knowledge Based Expert System (KBES) 4.6 DSS Application in E-enterprise 4.7 MIS and Benefits of DSS	08	12
Course Outcome ITG503-4 Relate Various Technologies and E-Business Models of Information System.			
5	TECNOLOGY OF INFORMATION SYSTEM AND E-BUSINESS 5.1 Introduction 5.2 Data Processing 5.3 Transaction Processing 5.4 Application Processing	10	16

	5.5 Information System Processing 5.6 TQM of Information System 5.7 Introduction to E-business 5.8 Models of E-business 5.9 Internet and World Wide Web (WWW) 5.10 Security of E-business		
Course Outcome ITG503-5 List various applications of MIS			
6	APPLICATIONS OF MIS 6.1 Applications in manufacturing sector: Personal Management, Financial Management, Production Management, Materials Management, and Marketing Management 6.2 Applications in Service sector : Airlines, Hotels, Hospitals, Banking, Insurance, Utilities, and Finance.	06	12
	Sub total	24	40
	Total	48	80

7. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction to Management	04	04	04	12
I / 2	Strategic Design of MIS	04	04	04	12
I / 3	Decision Making & Information	06	06	04	16
II/4	Decision Support System	04	04	04	12
II/5	Technology of Information System and E-Business	06	06	04	16
II/6	Applications of MIS	04	04	04	12
	Total	28	28	24	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

8. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.

Teaching and Learning resources:

1. Chalk board 2.Slides (PPT) 3. Self-learning Online Tutorials

9. REFERENCE MATERIAL:

a) Reference Books

Sr. No.	Title	Author	Publication
1.	Management Information System	Waman S. Jawadekar	Tata McGraw Hill, Chennai 2013, ISBN: 9781259026690
2.	Management Information System	O'Brien	Tata McGraw Hill, New Delhi
3	Management Information System	Kenneth laudon	Pearson Prentice Hall 2012 ISBN:9780132668552

b) Websites

- i) www.en.wikipedia.org
- ii) www.dwinfocenter.org
- iii) www.ousourceking.com/bpol
- iv) <http://www.nptel.ac.in>

COURSE ID : 42

Course Name : TECHNICAL WRITING
Course Code : ITG504
Course Abbreviation : GTWR

1. TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme: MPECS 2020

Scheme component	Hours / week	Credits
Theory	--	02
Practical	02	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma IV	
Marks	--	--	--	50I	50

2. RATIONALE:

Technical writing provides core and advanced concepts of Latex. This subject is designed for beginners. The Latex is a high-quality typesetting system, used for the documentation of scientific and technical documents. It is widely used in **academia** for the communication and the publication of scientific papers popularly in fields such as economics, sociology, mathematics, chemistry, physics, engineering, etc. It also handles the formatting layout of different structures. The name is stylized as **LATEX**.

This subject includes the topics such as file types, latex editor, how to use latex, symbols, lists, fonts, table, format, etc.

3. COMPETENCY

Apply Latex programming concepts for developing project report.

Cognitive: The students will be able to:

1. Identify the importance of technical writing
2. Recognize different Latex commands
3. Identify Latex symbols, tables, fonts, colors, images, figures, etc

Psychomotor: i) Installation of Latex ii) Execute Latex commands iii) Develop reports using Latex symbols, tables, fonts, colors, images, figures, etc

Affective: Attitude of i) precision ii) accuracy iii) punctuality

4. COURSE OUTCOMES:

ITG504-1: Describe importance of technical writing

ITG504-2: Demonstrate installation of Latex

ITG504-3: Identify different file types in Latex

ITG504-4: Explain basic commands in Latex

ITG504-5: Illustrate Latex symbols, Lists, Fonts, Format, Table, Color, Images, Figures, Graphs

ITG504-6: Recognize different Math Symbols, Equations, Fractions, Integral, Derivatives

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
 “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Develop ment of solutions	PO 4 Engineer ing Tools, Experim entation and Testing	PO 5 Engineeri ng Practices for society, sustainabi lity and Environm ent	PO 6 Project Manage ment	PO 7 Life- long Learnin g	PSO1 Design and develop ment	PSO2 Database and Network manageme nt
Competency: Apply Latex programming concepts for developing project report	3	--	2	3	2	1	2	2	--
ITG504-1	2	--	--	--	--	1	2	--	--
ITG504-2:	1	2	--	3	1	2	1	--	--
ITG504-3:	2	--	--	3	1	2	1	2	--
ITG504-4:	2	3	3	3	3	3	2	3	--
ITG504-5:	2	3	3	3	3	3	2	3	--
ITG504-6:	2	3	3	3	3	3	2	3	--

6. CONTENT:

A) SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practical's marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1	Introduction to Technical Writing	1.Learn Meaning of Technical Writer 2.Analyze Role of Technical Writer 3. Evolution of Technical Communication 4.Characteristics of Technical Communication	ITG504-1

		5.Learn Essential Skills of Technical Communication; Indicators of 6)Excellence in Technical Communication; 6.Role of Technical Communication in Business and industry 7.Careers in Technical Communication.	
*2	Installation of Latex	1.Install Latex	ITG504-2
*3	Texmaker Overview	1.Learn about TexMaker	ITG504-2
*4	File types in Latex	1.Identify different file types in Latex	ITG504-3
*5	Difference between Latex and Word	1.Compare Latex and Word	ITG504-3
*6	Basic Commands in Latex	1.Exeute basic commands in Latex	ITG504-4
*7	Latex Symbols	1.Symbols List 2.Negation symbols 3.Arrow Symbols 4.General Punctuations	ITG504-5
*8	Latex Lists	1.Implement different types of latex lists 2.Learn and implement Ordered and Unordered Lists,Numbered Lists 3.Learn and use spacing arguments	ITG504-5
*9	Latex Fonts Size and Styles	1.Use Latex Paper Size and Font size 2.Use Latex Type Size 3.Use different categories of Latex Styles	ITG504-5
*10	Latex Formats	1.Use Formatting arguments 2.Use Structure formats	ITG504-5
*11	Latex Table	1.Use Latex tables	ITG504-5
12	Latex Colors	1.Develop code using Latex colors	ITG504-5
*13	Latex Images	1.Develop code using Latex Images	ITG504-5
14	Latex Figures	1. Develop code using Latex Floats 2. Develop code using Latex Caption Figures 3. Develop code using Latex Label and reference of a picture 4. Develop code using Latex Counters 5. Develop code using Latex Reflected Picture	ITG504-5
15	Latex Graphs	1.Basic graphs 2.Arrow edges,Bending edges 3.Labels on Edges	ITG504-5
*16	Latex smart diagrams	1.Flow diagram 2.Circular diagram	ITG504-5

		3.Bubble diagram 4.Descriptive diagram 5.Constellation diagram	
*17	Latex Math	1.Latex Math Symbols 2.Latex mathematical equations 3.Latex fractions 4.Latex matrix 5.Latex integral 6.Latex partial Derivative	ITG504-6
18	Online Latex editors	1.Latex Overleaf 2.Latex Papeeria	ITG504-6

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a)Develop a lab requirement document using Latex symbols, Lists
- b)Develop a canteen menu document using Latex Fonts
- c)Develop a Mathematical formula document using Latex Math equations
- d)Develop a document for College Management system using Latex Figures, Images, Smart diagrams

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	MikTex and Texmaker software

8. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma IV*

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05

4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
	TOTAL	25

Assessment at semester end practical exam as per Pro-forma III.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

**Assessment at semester end practical exam as per Pro-formaIII.*

9. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Regular Home Assignments.
2. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board 2.Slides(PPT) 3. Self-learning Online Tutorials

10. REFERENCE MATERIAL:**a) Books / Codes**

Sr. No.	Author	Title	Publisher
1.	Leslie Lamport	LaTeX: A document preparation system, User's guide and reference manual	Addison Wesley
2.	Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle, Chris Rowley	The Latex Companion	Addison-Wesley Professional
3.	Michel Goossens, Frank Mittelbach, Sebastian Rahtz, Denis Roegel, Herbert Voss	The LaTeX Graphics Companion, 2nd edition (TTCN series)	Addison-Wesley Professional
4.	Helmut Kopka, Patrick W. Daly	Guide to LaTeX (TTCN series)	Addison-Wesley Professional

b) Websites

- i) www.javatpoint.com
- ii) www.overleaf.com
- iii) www.latex-tutorial.com

COURSE ID: 43(A)

Course Name : CYBER LAW
Course Code : ITG505
Course Abbreviation : GCYL

1. TEACHING AND EVALUATION SCHEME :

Pre-requisite Course(s) : NIL

Teaching Scheme:MPECS-2020

Scheme component	Hours / week	Credits
Theory	03	03
Practical	--	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End Examination		Total
	Theory	Practical	Theory	Practical Examination (External)& Micro-project)	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	--	
Marks	20	--	80	--	100

2. RATIONALE:

Due to the heavy use of internet, Cybercrimes are increasing day by day. Hence Cyber Laws is one of the most important and relevant areas of information technology today. It is essential to understand the various threats to security and cyber laws associated with it.

3. COMPETENCY:

Identify information technology acts& intellectual property rights.

Cognitive: The students will be able to know :

- i. concept of different cyber laws.
- ii. State different issues in Cyber space

Psychomotor: i. Illustrate design of patents.

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) Effectiveness.

4. COURSE OUTCOMES:

The student will be able:

ITG505-1 State different laws& intellectual property issues.

ITG505-2 Compare different IT acts.

ITG505-3 Demonstrate patent acquisition.

ITG505-4 State domain name protection.

ITG505-5 Illustrate design of patents.

ITG505-6 Relate aspects of licensing.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note: Correlation levels: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and CoS	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Develop ment of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Identify information technology acts & intellectual property rights	2	1	1	-	-	1	1	1	-
ITG505-1	1	2	-	-	2	1	2	-	-
ITG505-2	1	-	-	-	2	-	2	-	-
ITG505-3	1	2	1	-	3	1	2	-	-
ITG505-4	-	1	-	-	3	1	2	1	-
ITG505-5	-	2	-	-	3	1	2	1	-
ITG505-6	-	1	-	-	3	1	2	1	

6.CONTENT :**B) THEORY :****SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG505-1 State different laws & intellectual property issues.</i>			
1	<p>CYBER LAWS</p> <p>1.1 Basic Concepts of Technology and Law</p> <ul style="list-style-type: none"> ii. Concept of Technology of Internet iii. Scope of Cyber Laws iv. Cyber Jurisprudence <p>1.2 Law of Digital Contracts</p> <ul style="list-style-type: none"> 1.2.1 The Essence of Digital Contracts 1.2.2 The System of Digital Signatures 1.2.3 The Role and Function of Certifying 1.2.4 The Science of Cryptography. <p>1.3 Intellectual Property Issues in Cyber Space:</p> <ul style="list-style-type: none"> 1.3.1 Domain Names and Related issues 1.3.2 Copyright in the Digital Media 1.3.3 Patents in the Cyber World. <p>1.4 Rights of Netizens and E-Governance:</p> <ul style="list-style-type: none"> 1.4.1 Privacy and Freedom Issues in the Cyber World 1.4.2 E-Governance 1.4.3 Cyber Crimes and Cyber Laws. 	08	12
<i>Course Outcome ITG505-2: Compare different IT acts.</i>			
2	<p>INFORMATION TECHNOLOGY ACT 2000</p> <p>2.1 Information Technology Act 2000</p> <ul style="list-style-type: none"> 2.1.1 Information Technology Act2000-1 (Sec 1to 13) 2.1.2 Information Technology Act-2000-2 (Sec 14 to 42and Certifying authority Rules), 2.1.3 Information Technology Act-2000-3 (Sec 43 to 45 and Sec 65 to 78) 2.1.4 Information Technology Act-2000-4(Sec 46 to Sec 64 and CRAT Rules) 2.1.5 Information Technology Act-2000-5 (Sec 79 to90) 2.1.6 Information Technology Act-2000-6 (Sec 91-94) Amendments in 2008. 	08	14

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	2.2 International Scenario in Cyber Laws : 2.2.1 Data Protection Laws in EU and USA 2.2.2 Child Abuse Protection Laws in EU and USA 2.2.3 Cyber Laws - the Malaysian Approach 2.3 Cyber Law Issues for Management 2.3.1 Cyber Law Issues in E-Business Management, 2.3.2 Major issues in Cyber Evidence Management, Cyber Law Compliancy Audit.		
<i>Course Outcome ITG505-3 Demonstrate patent acquisition.</i>			
3	BASIC PRINCIPLES AND ACQUISITION OF INTELLECTUAL PROPERTY RIGHTS 3.1 Focus on the: Philosophical Aspects of Intellectual Property Laws 3.2 Basic Principles of Patent Law 3.3 Patent Application procedure, Drafting of a Patent Specification, Understanding Copyright Law 3.4 Basic Principles of Trade Mark, Basic Principles of Design Rights, International Background.	08	14
	Total	24	40
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			
Section II			
<i>Course Outcome ITG505-4 State domain name protection.</i>			
4	Information Technology Related Intellectual Property Rights 4.1 Computer Software and Intellectual Property-Objective, Copyright Protection, Reproducing, Defenses, Patent Protection 4.2 Database and Data Protection-Objective, Need for Protection, UK Data Protection Act, 1998, US Safe Harbor Principle, Enforcement. 4.3 Protection of Semi-conductor Chips-Objectives Justification of protection, Criteria, Subject-matter of Protection, WIPO Treaty, TRIPs, SCPA. 4.4 Domain Name Protection-Objectives, domain name and Intellectual Property, Registration of domain names,	10	16

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	disputes under Intellectual Property Rights, Jurisdictional Issues, and International Perspective.		
<i>Course Outcome ITG505-5 Illustrate design of patents.</i>			
5	PATENTS (OWNERSHIP AND ENFORCEMENT OF INTELLECTUAL PROPERTY) <p>5.1 Patents-Objectives, Rights, Assignments, 5.2 Defences in case of Infringement Copyright-Objectives, Rights, Transfer of Copyright, work of employment Infringement, 5.3 Defences for infringement Trademarks-Objectives, Rights, Protection of good will, Infringement, Passing off, Defences. 5.4 Designs-Objectives, Rights, Assignments, Infringements, Defenses of Design Infringement</p>	08	16
<i>ITG505-6 Relate aspects of licensing.</i>			
6	Enforcement of Intellectual Property Rights <p>6.1 Civil Remedies, Criminal Remedies, Border Security measures. 6.2 Practical Aspects of Licensing – Benefits, Determinative factors, important clauses, licensing clauses.</p>	08	08
Total		24	40
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

7. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION :

Topic No.	Name of topic	Distribution of marks (Cognitive level-wise)			Total Marks
		Remember	Understand	Application	
1	Cyber Laws	04	04	04	12
2	Information Technology Act 2000	06	04	04	14
3	Basic Principles And Acquisition Of Intellectual Property Rights	04	06	04	14
4	Information Technology Related Intellectual Property Rights	06	04	06	16
5	Patents (Ownership And Enforcement Of Intellectual Property)	04	08	04	16
6	Enforcement of Intellectual Property Rights	02	02	04	08
TOTAL		26	28	26	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

8. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.

Teaching and Learning resources:

1. Chalk board 2.Slides (PPT) 3. Self-learning Online Tutorials

9. REFERENCE MATERIAL :

a) Reference Books

Sr. No.	Author	Title	Publisher
1.	Peter Weill , Jeanne Ross	IT Governance: How Top Performers Manage IT Decision Rights for Superior Results	Harvard business school press
2.	Jeanne W. Ross	Enterprise Architecture As Strategy: Creating a Foundation for Business Execution	Harvard business school press
3.	Peter Weill	IT Savvy: What Top Executives Must Know to Go from Pain to Gain	Harvard business school press
4.	Marx Warda	How To Register Your Own Copyright	Sphinx Publishing

b) Websites

- i) https://www.tutorialspoint.com/information_security_cyber_law/

* * *

COURSE ID :43(B)**Course Name : EMERGING TRENDS IN IT****Course Code : ITG506****Course Abbreviation : GEMT****1. TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme : MPECS 2020**

Scheme component	Hours / week	Credits
Theory	03	03
Practical	00	

Evaluation Scheme :

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical/Oral Examination	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	--	Term End Theory Exam (3 hours)	--	
Marks	20	--	80	--	100

2. RATIONALE :

Advancement and application of information technology are ever changing. Information technology has become an integral part of our daily life. Emerging trends aims at creating awareness about major trends that will define technological disruption in the upcoming years in the field of Information Technology. This course enable students to understand different latest areas in Information Technology.

3. COMPETENCY

Acquire knowledge of emerging trends in Information Technology.

Cognitive : i) Gain knowledge of AI, embedded system, blockchain technology working & VR/AR technology.

Psychomotor : i) Perform E commerce transactions with Debit card/Credit card and UPI system.

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES:

ITG506-1 Describe Artificial Intelligence, Machine learning and deep learning.

ITG506-2 Interpret Embedded System.

ITG506-3 Describe blockchain technology concept, working and uses.

ITG506-4. Compare different E-commerce Systems.

ITG506-5 State working of Virtual Reality & Augmented Reality.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-": no correlation]

Competency and CoS	PO								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/development of solutions	PO 4 Engineering Tools, experimentation on and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Acquire knowledge of emerging trends in Information Technology	2	1	-	1	1	-	1	1	-
ITG506-1	2	2	1	-	-	-	1	1	-
ITG506-2	1	2	1	-	-	-	-	-	-
ITG506- 3	1	3	1	-	-	-	-	-	-
ITG506-4.	1	2	1	-	-	-	-	1	-
ITG506-5	1	2	1	-	1	-	1	1	-

6. CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluatio n (Marks)
<i>Course Outcome ITG506-1: Describe Artificial Intelligence, Machine learning and deep learning</i>			
1	INTRODUCTION TO AI <ul style="list-style-type: none"> 1.1 Concept 1.2 Scope of AI 1.3 Components of AI 1.4 Types of AI 1.5 Applications of AI 1.6 Concept of machine learning 1.7 Concept of Deep learning 1.8 Case Study - OpenAI(Microsoft) 	8	14
<i>Course Outcome ITG506-2: Interpret Embedded System</i>			
2	EMBEDDED SYSTEM <ul style="list-style-type: none"> 2.1 Embedded System concept 2.2 Purpose of Embedded System 2.3 Architecture of Embedded System 2.4 Embedded Processors - PIC, ARM, AVR, ASIC 	7	12
<i>Course Outcome ITG506-3: Describe blockchain technology concept, working and uses.</i>			
3	INTRODUCTION TO BLOCKCHAIN TECHNOLOGY <ul style="list-style-type: none"> 3.1 History & Introduction to blockchain technology 3.2 private vs public blockchain 3.3 History of cryptocurrency, Introduction to Bitcoin, Mining Mechanism 3.4 Introduction to Hashing 3.5 Cryptography concept, Public Key cryptosystem 3.6 Uses of blockchain - E-commerce, Land Registration, Medical Information System 3.7 Future of Blockchain 	9	14
	Sub-total	24	40

SECTION II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG506-4: Compare different E-commerce Systems.</i>			
4	ECOMMERCE 4.1 E-Commerce and E-Business <ul style="list-style-type: none"> 4.1.1 Evolution of E-Commerce 4.1.2 Factors Fuelling E-Commerce 4.1.3 Comparison of E-Commerce with Traditional Commerce 4.2 Introduction to Internet Environment for E-Commerce 4.3 E Commerce Payment System :Credit Card, Debit Card, Smart Card, E-Money/UPI System, Electronic Fund Transfer 4.4 E commerce Security System	12	20
<i>Course Outcome ITG506-5: State working of Virtual Reality & Augmented Reality.</i>			
5	VIRTUAL REALITY & AUGMENTED REALITY 5.1 Virtual Reality Fundamentals: Defining Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual Reality Experience 5.2 Virtual Reality System, Interface to the Virtual World-Input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality 5.3 Introduction to Augmented Reality, features of augmented reality, Difference between AR and VR, Challenges with AR 5.4 AR system and functionality, visualization techniques for Augmented Reality 5.5 Introduction to Mixed Reality	12	20
	Sub-total	24	40
	Total	48	80

7. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total marks
		Remember	Understand	Application		
I / 1	Introduction to AI	4	4	4	ITG506-1	12
I / 2	Embedded System	4	4	6	ITG506-2	14
I / 3	Introduction to BlockChain Technology	4	4	6	ITG506-3	14
I / 4	E-Commerce	6	6	8	ITG506-4	20
II / 5	Virtual Reality & Augmented Reality	6	6	8	ITG506-5	20
TOTAL		24	24	32		80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

8. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

9. REFERENCE MATERIAL:**a) Reference Books**

Sr. No .	Author	Title	Publisher
1.	R. B. Mishra	Artificial Intelligence	PHI
2.	Sibhu K.V.	Introduction to Embedded System	Tata Mcgraw Hill
3.	Arvind Narayanan,Josh eph Bonneau	BitCoin & Cryptocurrency	Princeton University Press
4.	M. LaValle	Virtual Reality	Cambridge University Press, 2016
5.	V. Rajaraman	Essentials of E-Commerce Technology	Kindle Edition

b) Websites

- i) <https://nptel.ac.in/courses/106/102/106102220/>
- ii) https://www.tutorialspoint.com/embedded_systems/index.htm
- iii) <https://nptel.ac.in/courses/106/104/106104220/>
- iv) <https://arvr.google.com/vr/>
- v) <https://nptel.ac.in/content/storage2/courses/106108103/pdf/PPTs/mod13.pdf>

COURSE ID :43(C)**Course Name : MOBILE COMMUNICATION****Course Code : ITG507****Course Abbreviation : GMOC****1.TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	3	3
Practical	0	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	-	
Marks	20	--	80	-	100

2. RATIONALE:

Today's world is full of Mobile or wireless Communication, **Mobile Communication** is the use of technology that allows to communicate with others in different locations without the use of any physical connection. Now it became a vital part of our day-to-day life. It is very essential to our students to have conceptual knowledge of Mobile Communication. This subject gives the information about some concepts and applications of Mobile Communication.

3. COMPETENCY

Apply principles wireless communication system & mobile communication system.

Cognitive: i) Understanding and applying various algorithms on wireless system.

ii) Understand different architectures of wireless system used for communication.

iii) Apply various protocols in wireless communication system.

Psychomotor: i) Draw architecture of Global System for Mobile communication (GSM) & Bluetooth Technology.

ii) Create personal area network using Bluetooth technology.

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4. COURSE OUTCOMES:

ITG507-1 Illustrate concept of wireless devices and wireless transmission with its applications.

ITG507-2 Identify wireless transmission of data with medium access control.

ITG507-3 Explain telecommunication system with architecture.

ITG507-4 Illustrate wireless local area network & Bluetooth technology.

ITG507-5 Describe concept of network layer and transport layer with mobile devices.

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), “-” : no correlation]

Competency and COs	Programme Outcomes POs and PSOs								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solution	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Apply principles wireless communication system & mobile communication system.	2	2	2	2	-	-	2	-	1
ITG507-1	2	1	-	1	1	-	2	-	3
ITG507-2	2	1	2	1	1	-	3	-	3
ITG507-3	-	2	-	-	-	-	2	-	2
ITG507-4	2	2	-	1	2	-	3	-	2
ITG507-5	2	-	-	2	2	-	3	-	3

6. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG507-1 Illustrate concept of wireless devices and its transmission with its applications</i>			
1	INTRODUCTION <ul style="list-style-type: none"> 1.1 Need & Applications of Wireless 1.2 Wireless Data Technologies 1.3 Market for Mobile Communication 1.4 Mobile & Wireless Devices 	04	10

2	WIRELESS TRANSMISSION 2.1 Frequencies for Radio Transmission 2.2 Signals 2.3 Antennas 2.4 Signal Propagation- Path loss, Additional signal propagation effect, Multipath propagation 2.5 Multiplexing – SDM, FDM, TDM 2.6 Modulation- ASK, FSK, PSK, AFSK, APSK 2.7 Spread Spectrum- DHSS, FHSS 2.8 Cellular Systems	10	16
<i>Course Outcome ITG507-2 Identify wireless transmission of data and medium access control.</i>			
3	MEDIUM ACCESS CONTROL 3.1 Specialized MAC 3.1.1 Hidden and Exposed terminals 3.1.2 Near and Far Terminals 3.2 SDMA 3.3 FDMA 3.4 TDMA- Fixed TDM, Classical & Slotted Aloha, CSMA 3.5 CDMA 3.6 Comparison between SDMA/FDMA/TDMA/CDMA	10	14
	Subtotal	24	40

SECTION II

<i>Course Outcome ITG507-3 Explain telecommunication system with architecture.</i>			
4	TELECOMMUNICATION SYSTEMS 4.1GSM 4.1.1Mobile Services 4.1.2System Architecture 4.2 G Networks 4.2.1 System Architecture 4.2.2 Protocol Architecture 4.3Introduction to 4G and 5G Mobile networks 4.3.1 Comparison between 3G,4G and 5G	06	10
<i>Course Outcome ITG507-4 Illustrate wireless local area network & Bluetooth technology</i>			
5	WIRELESS LAN 5.1 Introduction 5.2 Infrared v/s Radio Transmission 5.3 Infrastructure & Ad-hoc Network 5.4 IEEE 802.11 -System & protocol architecture (Without detailed protocol description) 5.5 Bluetooth - User scenarios, architecture, scatternet & Piconet	08	14

<i>ITG507-5 Describe concept of network layer and transport layer with mobile devices.</i>				
6	6.1 MOBILE NETWORK AND TRANSPORT LAYER 6.1.1 Mobile IP 6.1.2 Entities & terminology 6.1.3 IP packet Delivery- Agent discovery, Registration 6.1.4 DHCP 6.2 MOBILE TRANSPORT LAYER 6.2.1 Traditional TCP 6.2.2 Indirect TCP 6.2.3 Snooping TCP 6.2.4 Mobile TCP 6.3 Support for Mobility 6.3.1 WAP - architecture 6.3.2 Wireless datagram protocol (concept) 6.3.3 File system	10	16	
	SubTotal	24	40	
	Total	48	80	

7. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Topic Name	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction	4	4	2	10
I / 2	Wireless transmission	4	6	6	16
I / 3	Medium access control	4	6	4	14
I / 4	Telecommunication systems	4	4	2	10
II / 5	Wireless LAN	4	4	6	14
II / 6	Mobile network and transport layer	4	6	6	16

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

8. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides (PPT)
3. Self-learning Online Tutorials

9. REFERENCE MATERIAL:

a) Reference Books

- i. Lacher Schiller - Mobile Communication
- ii. Peter Davis,Craig & McGulfin - Wireless LAN
- iii. Sandip Singh - The Wireless Application Protocol
- iv. Charles Archart & Grays -Professional WAP

b) Websites

- xiv) <http://www.w3schools.com/>
- xv) <https://www.accessengineeringlibrary.com/content/book/9780070527997/back-matter/appendix6>
- xvi) <https://www.t-mobile.com/5g>
- xvii)<https://www.tutorialspoint.com/5g/index.htm>

COURSE ID:44(A)**Course Name : CLOUD COMPUTING****Course Code : ITG508****Course Abbreviation : GCLC****1.TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Practical Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50	150

2. RATIONALE:

Cloud computing has evolved as a very important computing model, which enables information, software and other shared resources to be provisioned over the network as services in an on-demand manner. There are many aspects of cloud computing viz cloud types, storage in cloud ,security in cloud, cloud monitoring and management. Having specific skills in these areas is necessary for diploma pass-outs to create and maintain cloud based services. After learning this course student will be able to implement virtualization, create cloud based storage ,implement security and manage cloud services.

3. COMPETENCY

Maintain cloud based services

Cognitive:

- i) Understand Cloud applications, services
- ii) Discuss cloud vendors
- iii) Describe cloud infrastructure
- iv) Discuss cloud future, security issues

Psychomotor: i) Perform case study

Affective: Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) Effectiveness.

4. COURSE OUTCOMES:

ITG508-1: Explain Basics of cloud , services and applications of cloud computing.

ITG508-2: Implement Virtualization in Cloud Computing

ITG508-3: Maintain storage system in cloud

ITG508-4: Use Cloud Services

ITG508-5: Implement security in Cloud Computing

ITG508-6: Analyze future of cloud

5. COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
"-": no correlation]

Competency and CoS	Programme Outcomes POs and PSOs								
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Development of solutions	PO 4 Engineering Tools, Experimentation and Testing	PO 5 Engineering Practices for society, sustainability and Environment	PO 6 Project Management	PO 7 Life-long Learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Maintain Cloud Based Services	1	--	--	3	2	2	2	--	1
ITG508-1	1	--	--	--	--	1	1	--	1
ITG508-2:	1	--	--	3	2	2	2	--	1
ITG508-3:	1	--	--	2	1	2	1	--	1
ITG508-4:	1	--	--	3	2	2	1	--	1
ITG508-5:	1	1	1	3	3	2	2	--	1
ITG508-6:	1	--	--	1	2	1	2	--	1

6.CONTENT:

A.SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1	Use Google SaaS	<ul style="list-style-type: none"> • Use GMAIL • Use Google Docs to make spreadsheet and notes • Arrange conference on Google Meet 	ITG508-1
*2	Use Google Forms	<ul style="list-style-type: none"> • Create Google Forms for taking feedback 	ITG508-1
*3	Use of JustCloud	<ul style="list-style-type: none"> • Install or configure cloud using JustCloud 	ITG508-1
*4	Cloud9	<ul style="list-style-type: none"> • Use Cloud9 to demonstrate use of different languages 	ITG508-1
*5	Use of Vmware	<ul style="list-style-type: none"> • Create/Delete Virtual machines using Vmware 	ITG508-2
*6	OpenStack	<ul style="list-style-type: none"> • Implement Storage Service on cloud using OpenStack 	ITG508-3
*7	FileManagement	<ul style="list-style-type: none"> • Use OpenStack for file management 	ITG508-3
*8	Monitor Cloud	<ul style="list-style-type: none"> • Monitor cloud using Nagios tool 	ITG508-4
*9	Create and Host simple web application	<ul style="list-style-type: none"> • Create and Host simple web application on Microsoft Azure/GoogleCloud/Any cloud platform 	ITG508-4
*10	Provisioning and scaling of website	<ul style="list-style-type: none"> • Work in codeenvy to show provisioning and scaling of website 	ITG508-4
*11	Identity and Access Management	<ul style="list-style-type: none"> • Implement identity management and access management using OpenStack 	ITG508-5

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a) Prepare report on case study of Amazon Cloud Services
- b) Prepare report on case study of Google App Engine
- c) Create Infrastructure as service using OpenStack
- d) Develop Personal cloud using ownCloud and RaspberryPi

7. MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System Hardware-Minimum 8GB RAM,512GB HDD,Gigabit Ethernet Network Equipment Software Requirement-Apache Tomcat,Java,Python,Virtualization software Academic version of any public cloud service(Google/ AWS/ Azure)

8. CONTENT:

SECTION I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG508-1: Explain Basics of cloud , services and applications of cloud computing.</i>			
1	FUNDAMENTALS OF CLOUD COMPUTING 1.1 Cloud computing, Essential characteristics of cloud computing 1.2 Cloud Deployment Model: Public cloud, Private cloud, Community cloud, hybrid cloud 1.3 Cloud Service Models: IaaS, PaaS, SaaS 1.4 Cloud Economics and benefits 1.5 Architecture of Cloud computing 1.6 Cloud computing Infrastructure 1.7 Cloud based Integrated development Environment(IDE) to write run and debug code with browser	08	12
<i>Course Outcome ITG508-2: Implement Virtualization in cloud computing</i>			
2	VIRTUALIZATION 2.1 Virtualization in your organization-Characteristics, Why Virtualize? How to Virtualize? Concerns, Security 2.2 Server Solutions-Microsoft Hyper-V, VMware, VMware Infrastructure	08	14
<i>Course Outcome ITG508-3: Maintain storage system in cloud</i>			

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
3	STORAGE IN CLOUDS 3.1 Overview-Basics, Storage As Service, Providers, Security, Reliability, Advantages, Caution, Outages, Theft 3.2 Cloud Storage Providers-Amazon Simple Storage Service(S3), Nirvanix, MobileMe, Live Mesh 3.4 Cloud File Systems: Google File System(GFS) and Hadoop distributed file system(HDFS)	08	14
	Sub-total	24	40

SECTION-II

<i>Course Outcome ITG508-4: Use Cloud Services</i>			
4	CLOUD MONITORING AND MANAGEMENT 4.1 Service Provider and Users 4.2 An Architecture of federated cloud computing 4.3 Service Level Agreement(SLA) management: Types of SLA, Lifecycle of SLA 4.4 Service catalog, management and functional interfaces of services 4.5 Cloud portal and its functions 4.6 Cloud service lifecycle phases: Service planning, service creation, service operation, service termination 4.7 Cloud resource management: <ul style="list-style-type: none"> • Ab-initio Resource assignment • Periodic resource optimization 	08	12
<i>Course Outcome ITG508-5: Implement Security in cloud computing</i>			
5	SECURITY IN CLOUD COMPUTING 5.1 Cloud security fundamentals 5.2 Cloud Risk, Cloud Risk division <ul style="list-style-type: none"> 5.2.1 Polity and Organizational risks 5.2.2 Technical Risks 5.2.3 Legal Risks 5.3 Technologies for Data Security, Data Security Risk 5.4 Digital Identity and access management 5.5 Content level security 5.6 Security-As-A-Cloud Service	08	14

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Course Outcome ITG305-6: Analyze future of cloud			
6	MIGRATING TO THE CLOUD AND FUTURE 6.1 Cloud services for individuals- available services, skytap solution, 6.2 Cloud services aimed at the mid-market, enterprise- class cloud offering, MS exchange, VMotion, VMware vCenter Converter 6.3 Migration, which application do you need? Sending your existing data to cloud, use wave approach 6.4 Cloud Platforms-Amazon EC2 and S3,Microsoft Azure, Cloudstack, Intercloud, GoogleAppEngine etc.	08	14
	Sub total	24	40
	Total	48	80

9. SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END THEORY EXAMINATION

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Fundamentals of cloud computing	04	04	04	12
I / 2	Virtualization	04	04	06	14
I / 3	Storage in clouds	04	04	06	14
II/ 4	Cloud monitoring and management	04	04	04	12
II / 5	Security in cloud computing	04	04	06	14
II/6	Migrating to the cloud and future	04	04	06	14
	Total	24	24	32	80

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-formaIII.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board
2. Slides(PPT)
3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:

a) Reference Books

Sr. No.	Author	Title	Publisher
1.	Cloud Computing,Principals and paradigms	Buyya Rajkumar,J.Broberg,A.Goscinski	A John Wilwy & Sons,Inc.,Publication
2.	Cloud computing	Sharma Rishabh	Wiley Publications
3.	Mastering Cloud Computing	Buyya Rajkumar,Vecchiola Christian,Selvi S Thamarai	McGraw Hill Publication
4.	Cloud Computing: A Practical Approach	J.Vette, Toby J. Vette, Robert Elsenpeter	Tata, McGraw Hill
5.	Enterprise Cloud Computing	Gautam Shroff	Cambridge University Press
6.	Cloud Computing for Dummies	Judith Hurwitz, R.Bloor, Kanfman, F.Halper	Wiley India Edition
7.	Cloud Security & Privacy	Tim Malhar, S.Kumaraswamy, S.Latif	O'REILY

b) Websites

- i) <http://nptel.ac.in/courses/106105167/1>
- ii) <https://www.techopedia.com/definition/2/cloud-computing>
- iii) <https://onlinelibrary.wiley.com/doi/book/10.1002/9780470940105>

COURSE ID : 44(B)**Course Name : ADVANCE DATABASE MANAGEMENT SYSTEMS****Course Code : ITG509****Course Abbreviation : GADBM****1.TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : ITG305****Teaching Scheme: MPECS 2020**

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2.RATIONALE:

Advanced database management systems contain comprehensive contents on various concepts related to database systems, database design and management. Broadly it discusses about parallel and distributed database systems, database transactions, big data management and advances in database data. The student will get a detailed introduction about database administration and management, the role of machine learning in big data management. This course includes study of structured and unstructured database like MongoDB, SQL and XML for data management. The concept big data is used in today's information driven business world for managing

big data. After learning this subject student will be able to use ADBMS as a backend for developing database.

3.COMPETENCY

Apply Advanced Database Management Systems concepts using MongoDB and XML

Cognitive: The students will be able to:

- i)Identify parallel and distributed databases
- ii)Define Big Data
- iii)Execute different queries on advance database management systems

Psychomotor: i) Installation of database software ii) Execute SQL queries iii) Install data mining tool

Affective: Attitude of i) precision ii) accuracy iii) punctuality

4.COURSE OUTCOMES:

ITG509-1: Differentiate various database architectures

ITG509-2: Use Object Oriented and Advanced XML queries on Database.

ITG509-3: Manipulate data using Mongo DB commands

ITG509-4: Use Data Mining and Data Warehousing Concepts

ITG509-5: Develop Big data solutions using Hadoop

ITG509-6: Implement R Programming

5.COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
 “-” : no correlation]

Competency and Cos	Programme Outcomes POs and PSOs									
	PO 1 Basic and Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design / Develop ment of solutions	PO 4 Engineer ing Tools, Experim entation and Testing	PO 5 Engineeri ng Practices for society, sustainabi lity and Environm ent	PO 6 Project Manage ment	PO 7 Life- long Learnin g	PSO1 Design and develop ment	PSO2 Database and Network manageme nt	
Competency: Apply Advance Database Management Systems concepts using MongoDB and XML	3	2	2	3	2	3	2	--	3	
ITG509-1	3	--	--	--	1	2	1	--	3	
ITG509-2:	3	2	2	3	2	3	2	--	3	
ITG509-3:	3	2	2	3	2	3	2	--	3	
ITG509-4:	3	--	--	2	1	2	1	--	3	
ITG509-5:	3	--	--	2	1	2	1	--	3	
ITG509-6:	3	2	2	3	2	3	2	--	3	

6.CONTENT:**A.SUGGESTED PRACTICAL'S/ EXERCISE**

A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course outcome
*1	Install and configure database product(such as MySQL, Mongo DB or any other relational database product)	1)Installation of database product	ITG509-1
*2	Implementation of different locking protocols	Implementing Locking protocols	ITG509-2
*3	Creation of database using XML attributes and elements	Create database using XML attributes and Elements .	ITG509-2
*4	Queries based on FLOWER and XQuery	Implement queries based on FLOWER expressions and joins usingXQuery.	ITG509-2
*5	Nested Queries and sorting of results using Xquery	Implement queries based on Nested queries and sorting of results using XQuery.	ITG509-2
*6	Queries based on functions and types using Xquery	Implement queries based on functions and types using XQuery .	ITG509-2
*7	Queries using structured type in SQL	Execute queries using structured type in SQL	ITG509-2
*8	Queries using type inheritance and table inheritance in SQL	Execute queries using type inheritance and table inheritance in SQL	ITG509-2
*9	Queries using Array and Multiset types in SQL	Implement queries using Array and Multiset types in SQL	ITG509-2
*10	Queries using object identity and reference types in SQL	Execute queries using object identity and reference types in SQL	ITG509-2
*11	Design and Develop MongoDB Queries	Design and Develop MongoDB Queries using basic operations	ITG509-3
*12	Aggregation Queries using MongoDB	Implement aggregation Queries using MongoDB	ITG509-3
*13	Implement MongoDB Queries	Implement MongoDB Queries Usinf find() function	ITG509-3
14	Implement aggregation Queries	Implement aggregation Queries in MongoDB through MapReduce	ITG509-3
15	Installation and use of any data mining tool	Install and configure Any data mining tool (like WEKA) .	ITG509-4

16	Use of any installed data mining tool	Make use of installed data mining tool (like WEKA)	ITG509-4
17	Taking backup of MySQL Database	1. Take backup by copying table files 2. Take backup of delimited text files 3. Take backup using mysqldump 4. Save MySQL query results into a text or CSV file 5. Save query result into a .txt file	ITG509-4
*18	Install and Configure Hadoop and run Hadoop HDFS commands	1) Install and configure Hadoop 2) Run various Hadoop HDFS commands like version, mkdir, ls, put, copyFromLocal, get, copyToLocal, etc	ITG509-5
*19	Implement R Programming basic Practicals	1. Write a R program to take input from the user (name and age) and display the values. Also print the version of R installation 2. Write a R program to create a vector which contains 10 random integer values between -50 and +50. 3. Write a R program to get the first 10 Fibonacci numbers. 4. Write a R program to get all prime numbers up to a given number	ITG509-6

A.2 Micro-project

Each student should allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students). Each microproject should encompass two or more COs.

Each student have to maintain dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of microprojects is as follows:

- a. Develop and maintain XML database for Employee information System.
- b. Design and develop MongoDB database for library management system.
- c. Perform preprocessoring of data using any data mining tool (like WEKA).
- d. Perform database connectivity with any front end tool.

7.MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Any RDBMS software (MySQL/SQL Server/Oracle/MongoDB or any other)

8.CONTENT:

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Section I			
<i>Course Outcome ITG509-1: Differentiate various database architectures</i>			
1	<p>DATABASE ARCHITECHTURE</p> <p>1.1 Introduction to client-server Database Model: Two-Tier Client Server model, Three-Tier Client server model.</p> <p>1.2 Concurrency Control Techniques: Concurrency control protocols: Locked Based protocols, granting of locks, TwoPhase Locking protocol.</p> <p>1.3 Introduction to parallel databases: Parallel database system architecture, Types of parallelism, Parallel Database Implementation.</p> <p>1.4 Introduction to distributed databases: Distributed database system architecture, Benefits of distributed database system, Issues with distributed database systems.</p>	08	12
<i>Course Outcome ITG509-2:Use Object Oriented and Advance XML queries on database</i>			
2	<p>OBJECT BASED DATABASES</p> <p>2.1 Object Based Databases overview</p> <p>2.2. Complex data types</p> <p>2.3 Structured types and inheritanc in SQL</p> <p>2.4 Table inheritance</p> <p>2.5 Array and multiset types in SQL</p> <p>2.6 Object identity (OI) and reference typesin SQL</p> <p>2.7 XML: Introduction, structure of XML data, XML document schema ,Xpath, XQuery:FLOWER Expressions Joins,Nested Queries, Sorting functions, Functions and types</p>	14	14
<i>Course Outcome ITG509-3: Manipulate data using MongoDB commands</i>			

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
3	ADVANCE DATABASE TECHNIQUES <ul style="list-style-type: none"> 3.1 Structured versus Unstructured Data 3.2 NoSQL database concepts: Types of No SQL databases, No SQL data modeling, Benefits of No SQL, comparison between SQL and NoSQL database systems 3.3 NoSQL using MongoDB: Introduction to MongoDB Shell, Running the MongoDB Shell, MongoDB Client, Basic operations with MongoDB shell, Basic data types, Arrays, Embedded documents 3.4 Querying with MongoDB: find() function, specifying which keys to return, query criteria, OR queries, Types specific querying 3.5 Aggregation Introduction: Aggregation pipeline, Aggregation using Mapreduce, Single purpose aggregation 	12	14
	Sub-total	24	40
Section-II			
<i>Course Outcome ITG509-4: Use DataMining and DataWarehousing concepts</i>			
4	ADVANCES IN DATABASES <ul style="list-style-type: none"> 4.1 Introduction to Data Warehouse :Characteristics, Types of Data Warehouse Architecture, Data Marts, Data Warehousing Lifecycle, Data Warehouse Development 4.2 Introduction to Data Mining Techniques: Data mining technology and its relation to data warehousing, Association rules, classification and clustering, Applications of data mining. 4.3 Introduction to business Intelligence: Features, Frameworks, Types and Approaches for machine learning 4.4 Introduction to multimedia databases:Mobile Databases and digital databases 	08	14
<i>Course Outcome ITG509-5:Develop Big data solutions using Hadoop</i>			
5	BIG DATA MANAGEMENT <ul style="list-style-type: none"> 5.1 Big Data 5.2 Introduction to Hadoop:Building blocks and components,Hadoop Architechture, HBase, HIVE,Solid-State Drive 5.3 CloudEra, Oracle cloud 	06	12

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG509-6:Implement R Programming</i>			
6	INTRODUCTION TO R PROGRAMMING 6.1 Overview of R and RStudio 6.2 Installing R and RStudio on Windows 6.3 Introduction to Basics of R: Version of R and RStudio used Operating systems on which these run Quick introductionon to R and RStudio Resizing the font and window size *, +, -, ^, sqrt exp, log,etc 6.4 Introduction to DataFrames in R: Storing captaincy information in vectors Constructing a data frame using vectors Plotting one vector of a data frame vs. another one Adding a vector to a data frame ,etc 6.5 Introduction to RScript: What is an R script Features of an R script How to create and save an R script from the user interface (UI) of RStudio Shortcut keys to create an R script ,etc	10	14
	Sub total	24	40
	Total	48	80

**9.SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER
END THEORY EXAMINATION**

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledg e	Comprehe nsion	Applicatio n	
I / 1	Database architecture	04	04	04	12
I / 2	Object Based Databases	04	04	06	14
I / 3	Advance Database techniques	04	04	06	14
II/ 4	Advances in Databases	04	04	06	14
II / 5	Big Data Management	04	04	04	12
II/6	Introduction to R Programming	04	04	06	14
	Total	24	24	32	80

10. ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a) Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii) Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05

5	Oral Based on Lab work and completion of task	05
	TOTAL	25

Assessment at semester end practical exam as per Pro-forma III.

b) Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
	TOTAL.	50

*Assessment at semester end practical exam as per Pro-formaIII.

11. INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
3. Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board 2.Slides(PPT) 3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Reference Books**

Sr. No.	Author	Title	Publisher
1.	Database Management Application	Kogent Learning Solutions Inc.	Dreamtech Press 2014, ISBN-978-93-5119-476-7
2.	Database System Concepts	Kortli Flenery	Tata McGraw Hill Education, 6 th Edition ,ISBN -13:978-93-329-0135-4
3.	Complete Reference-MySQL	Vaswani Vikram	McGraw Hill Education, ISBN-13:9780070586840
4.	SQL,PL/SQL,The Programming Language of Oracle	Bayross Ivan	BPB Publications, 3 st Edition ISBN-13: 978-8176569644

b)Websites

- i) <https://www.tutorialspoint.com>
- ii) <https://www.w3schools.com>
- iii) <http://db.ucsd.edu/static/cse132b-sp01/oq1.htm>
- iv) <https://docs.mongodb.com /iiantia1/tutorial/install-mongodb-on-windows/>
- v) <http://www.cs.stir.ac.uk/courses/CSC9T6/practicals/1%20Data%20Mining/1%20-%20Weka%201.pdf>

COURSE ID : 44 (C)**Course Name : LINUX ADMINISTRATION****Course Code : ITG510****Course Abbreviation : GLIA****1.TEACHING AND EVALUATION SCHEME:****Pre-requisite Course(s) : NIL****Teaching Scheme : MPECS 2020**

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme :

Mode of Evaluation	Progressive Assessment		Term End		Total
	Theory	Practical	Theory	Oral Examination (External)& Micro-project	
Details of Evaluation	Average of two tests of 20 marks each to be converted out of 20 marks	(i) 25 marks for each practical (CA) (ii) One PST of 25 marks	Term End Theory Exam (3 hours)	As per Proforma-III	
Marks	20	--	80	50E	150

2.RATIONALE :

Operating system is most essential components of computer science. Multi-user operating system like Linux is most reliable & efficient system. Nowadays Linux is one of the most widely used Operating System. It provides many features as multitasking, security, multiuser, that's why it is mainly used in both servers and workstations. This course will

enable students to understand basics of linux OS, writing Shell script programs and configuring different servers.

3.COMPETENCY

Install Linux OS, perform linux commands, Shell programming and configuration of servers.

Cognitive : i) Develop ability to working with Linux utilities, understand system administration and servers.

ii) Demonstrate Shell programming with examples.

Psychomotor : i) Install & troubleshoot Linux OS.

ii) Write Shell programs using control structures for various basic applications.

iii) Configuration of servers.

Affective : Attitude of i) precision ii) accuracy iii) safety iv) punctuality v) aesthetic presentation

4.COURSE OUTCOMES:

ITG510-1 Installation of Linux OS & File formats

ITG510-2 Select basic Linux commands and utilities for different operations

ITG510-3 Develop shell programs using control structures

ITG510-4 Demonstrate System administration of Linux.

ITG510-5 Configure different servers for Linux.

5.COMPETENCY, COURSE OUTCOMES AND PROGRAMME OUTCOMES (CP-CO-PO) MATRIX

[Note : Correlation levels : 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High),
 “-” : no correlation]

Competency and CoS	PO								
	PO 1 Basic and discipline specific knowledge	PO 2 Problem analysis	PO 3 design/ development of solutions	PO 4 Engineering Tools, experimentation and testing	PO 5 Engineering practice for society, sustainability and environment	PO 6 Project management	PO 7 Life-long learning	PSO1 Design and development	PSO2 Database and Network management
Competency: Install Linux OS, perform Linux commands, Shell programming and configuration of servers	1	1	2	2	1	-	1	2	2
ITG510-1	1	-	-	3	1	-	-	-	-
ITG510-2	1	2	2	2	-	-	1	1	-
ITG510-3	1	2	1	2	-	-	1	1	-
ITG510-4.	2	1	2	2	1	-	1	1	1
ITG510-5	1	2	3	2	3	-	1	-	2

6.CONTENT:

A.SUGGESTED PRACTICAL'S/ EXERCISE

A.1 Laboratory experiments and related skills to be developed :(Practicals marked as * are compulsory)

Sr. No.	Title of Experiment	Skills to be developed	Course Outcome
*1	Linux Installation	Download Linux OS ISO file and install any distribution of Linux OS	ITG510 – 1
*2	Text Editor	Use Vi Editor and edit document with commands in different modes.	ITG510 – 1
*3	Pattern Search	Use grep command with options to search patterns from file.	ITG510 – 1
*4	Linux Basic Commands	Implement linux commands given in chapter 2.	ITG510 – 1
*5	Shell Script with control structures	Write shell scripts using control	ITG510 – 1

		structures. <ul style="list-style-type: none">• Ifelse structure• Case	
*6	Use of expr command	Write shell script using expr to perform arithmetic expression.	ITG510 – 1
*7	Shell Script loops	Write shell scripts using following loop structure. <ul style="list-style-type: none">• For• While	ITG510 – 2
*8	Managing users	Manage user permissions using chown command.	ITG510 – 2
*9	Managing Groups	Manage group permissions using chgrp command.	ITG510 – 2
10	DNS Server	Install & Configure DNS Server	ITG510 – 2
*11	FTP Server	Install & Configure FTP Server	ITG510 – 2
*12	Apache Server	Install & Configure Apache Web Server.	ITG510 – 2
13	DHCP Server	Install & Configure DHCP Server & DHCP Client.	ITG510 – 3

A.2 Micro-project

Each student should be allotted one microproject in the beginning of the semester. The microprojects are group based (group of 2 students) .Each microproject should encompass two or more COs.

Each student have to maintain a dated work diary consisting of individual contribution in the microproject work.

Micro-project term end assessment carries 20% of maximum marks allotted to term end practical exam.

A suggestive list of micropojects as case study is as follows:

- a) Case Study :- Install & Configure NFS Server.
- b) Case Study :- Install & Configure NIS Server.
- c) Case Study :- Install & Configure Samba Server.
- d) Any other micro projects suggested by subject faculty on similar line

7.MAJOR EQUIPMENTS OR INSTRUMENTS REQUIRED:

Sr. No	Equipment Name with broad specifications
1	Computer System(Any computer system with basic configuration)
2	Linux Server OS(Red Hat Enterprise Linux, Ubuntu, Cent OS, Debian OS)

8.CONTENT:**SECTION I**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluati on (Marks)
<i>Course Outcome ITG408-1: Installation of Linux OS & File formats</i>			
1	Introduction To Linux 1.1 Open source: Concept 1.2 Introduction to Linux <ul style="list-style-type: none"> • History • Linux principles • Comparative study with other OS's 1.3 Common Linux Features 1.4 Linux files System: Hierarchical File System, File System features 1.5 Linux Installation 1.6 Understanding Shell, Kernel-Role and services 1.7 Linux file formats(ext,ext2,ext3,ext4,swap) 1.8 Partitioning 1.9 Starting and shutting down in Linux, Boot loaders, init process.	8	12
<i>Course Outcome ITG408-2: Select basic Linux commands and utilities for different operations</i>			
2	ESSENTIAL COMMANDS IN LINUX 2.1 File and directories commands (cat, ls, cd, cp, rm, mkdir, rmdir, pwd, more, less) 2.2 Process related commands (ps, kill, wait, sleep) 2.3 File processing commands (wc, cut, paste, sort etc) 2.4 Creating file with vi editor, editing with vi editor 2.5 Date command 2.6 head :displays Beginning of File, tail : Displays End of File 2.7 grep : Finding a string in a File 2.8 find and locate :Finds Files 2.9 lpr, lprm, lpc: printing commands	08	14
<i>Course Outcome ITG408-3: Develop shell programs using control structures</i>			
3	SHELL PROGRAMMING 3.1 Introduction to Shell 3.2 Types of Shell 3.3 Comparisons between various shells	8	14

	<p>3.4 Shell programming in bash</p> <p>3.5 Understanding & setting shell variables Predefine variables PATH ,PSI ,BASH,BASH- VERSION, HOME, HOSTNAME, OSTYPE, PPID, UID</p> <p>3.6 Control Structures</p> <ul style="list-style-type: none"> 3.6.1 If....then 3.6.2 If....then....else 3.6.3 If ...then ...elif 3.6.4 For...in 3.6.5 While 3.6.6 Case <p>3.7 Builtin commands: type,read,exec,echo,sleep command</p> <p>3.8 Expressions</p> <ul style="list-style-type: none"> 3.8.1 Arithmetic evaluation 3.8.2 Logical evaluation 3.8.3 String pattern matching 3.8.4 Operators <p>3.9 Running a script from current directory</p>		
	Sub-total	24	40

Section II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
<i>Course Outcome ITG408-4: Demonstrate System administration of Linux.</i>			
4	System Administration <p>4.4 Role of Administrator, root- Administrator login,su-Superuser status, Administrative privileges - passwd command</p> <p>4.5 Managing user accounts: adding users, deleting users,User Configuration and Password file.</p> <p>4.6 Changing permissions and ownerships with chmod, chown command</p> <p>4.7 Creating and managing group :chgrp command -Modifying group attributes</p> <p>4.8 Getting system information with uname, host name</p> <p>4.9 Managing Disk Space: df,du, Disk Management - RAID</p> <p>4.10 Backups: Need of Backup, cpio & tar command</p>	10	18
<i>Course Outcome ITG408-5: Configure different servers for Linux.</i>			
5	Understanding & Configuring Servers <p>5.1 The init Daemon, Run Levels</p> <p>5.2 DNS:Installing DNS Server, Configuring DNS server, DNS records types,Setting up BIND database file, The DNS Toolbox, Configuring DNS clients.</p> <p>5.3 Apache Web Server:HTTP Protocol, Installing Apache HTTP Server, Starting up and shutting down apache, Testing Apache Installation, Configuring Apache</p> <p>5.4 FTP server: Basics of File Transfer Protocol, configuring ftp server, create ftp users, working with ftp server- transferring files.</p> <p>5.5 DHCP Server: DHCP Server Configuration, Configuring DHCP Client and Server, Dynamic Addresses and Fixed Addresses</p> <p>5.6 Introduction to NIS, NFS and Samba Server</p>	14	22
	Sub-total	24	40
	Total	48	80

**9.SPECIFICATION TABLE FOR SETTING QUESTION PAPER FOR SEMESTER END
THEORY EXAMINATION**

Section / Topic no.	Name of topic	Distribution of marks (Cognitive level-wise)			Course Outcome	Total marks
		Remember	Understand	Application		
I / 1	Introduction To Linux	4	4	4	ITG510-1	12
I / 2	Essential Commands in Linux	4	4	6	ITG510-2	14
I / 3	Shell Programming	4	4	6	ITG510-3	14
I / 4	System Administration	4	6	8	ITG510-4	18
II / 5	Understanding & Configuring Servers	6	8	8	ITG510-5	22
TOTAL		22	26	32	--	80

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

10.ASSESSMENT CRITERIA FOR PRACTICAL ASSIGNMENTS AND PRACTICAL EXAMINATION

a)Assessment Criteria for Practical Assignments :

i) Continuous Assessment of Practical Assignments:

Every practical assignment shall be assessed for 25 marks as per criteria given in *Laboratory Manual*

Domain	Particulars	Marks out of 25
Cognitive	Technical preparedness for practical	05
Psychomotor	Operating skills/Algorithm/ flowchart	05
	Observation/Logic/ Program/Result	05
Affective	Discipline and punctuality	05
	Procedure/ Decency/ Presentation	05
TOTAL		25

ii)Progressive Skills Test :

One mid-term *Progressive Skill Test* of 25 marks shall be conducted as per criteria given

Final marks of term work shall be awarded as per *Assessment Pro-forma X*.

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Logical thinking and approach ,procedure followed to achieve the result	05
3	Neat & complete Diagram and Output	05
4	Use of editors, frameworks	05
5	Oral Based on Lab work and completion of task	05
TOTAL		25

Assessment at semester end practical exam as per Pro-forma III.

b)Assessment Criteria for Term-end Practical Examination:

Every student has to perform one practical at semester end practical exam which shall be assessed as per following criteria.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Algorithm/ Flowchart and Program	20
2.	Results/Observations/Output	10
3.	Logical thinking and approach	10
4.	Oral	10
TOTAL.		50

*Assessment at semester end practical exam as per Pro-formaIII.

11.INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Discussions
2. Regular Home Assignments.
- 3.Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board 2.Slides(PPT) 3. Self-learning Online Tutorials

12. REFERENCE MATERIAL:**a) Reference Books**

Sr. No .	Author	Title	Publisher
1.	Blum,Richard,B resnahan	Linux Command Line and Shell Scripting	Wiley Publication
2.	Christopher Negus	Red Hat Linux 9 Bible	Wiley Publication
3.	Piterson Rechard	Red Hat: The Complete Reference	Mc Graw Hill Education
4.	Colling, Terri & Wall, Kurt	Red Hat Linux Networking & System Administration	Paperback

b) Websites

- i) <https://www.linux.org/>
- ii) <https://www.redhat.com/en/topics/open-source/what-is-open-source>
- iii) <https://www.tutorialspoint.com/Open-Source-Operating-Systems>
- iv) <https://opensource.com/resources/linux>
