POORNIMA

INSTITUTE OF ENGINEERING & TECHNOLOGY

2018-19

COs, POs ASSESSMENT & ATTAINMENT PROCESS MANUAL

APPLIED SCIENCES

COMPUTER ENGINEERING

CIVIL ENGINEERING

ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTRICAL ENGINEERING

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CHAPTER I

Vision and Mission of the Institution

VISION:

To create knowledge-based society with scientific temper through cutting-edge technologies, innovative research and to become valuable resource for enriching mankind.

MISSION:

- To provide an environment that will allow students and faculty members to be skilled in creation and implementation of new ideas.
- To provide platform to improve questioning, observing, testing, analyzing and communication skills.
- To provide qualitative education and generate new knowledge with integration of emerging technologies and research.
- To practice and promote high standard of potential ethics, transparency and accountability

CHAPTER II.A

Vision and Mission of the Applied Sciences Department

VISION:

To facilitate skills-based learning of Sciences and Engineering through cutting-edge technologies, innovative research to cater needs of the society through integrating human values.

MISSION:

- To provide an environment that facilitates skilled manpower in creation and implementation of new ideas in sciences.
- To provide a platform to improve questioning, observing, testing, analyzing and communication skills.
- To provide qualitative education and generate new knowledge in the sciences and technology domain.
- To provide all measures to maintain professional ethics in life long working

CHAPTER II.B

Vision and Mission of the Computer Engineering Department

VISION:

To create an environment in which new ideas, research and technology develop and the technocrats and innovators of tomorrow become competent to face the global challenges.

MISSION:

- To develop competent professional with innovative mindset, problem solving, design and implementation skills through excellent under graduate education.
- To provide platform to students so that they can expertise themselves as a computer professional, entrepreneurs or as a manager while fulfilling their ethical and social responsibility in a globally competitive environment.
- To contribute significantly to the research and discovery of new arenas of methods and knowledge in the field of computer engineering.

CHAPTER II.C

Vision and Mission of the Civil Engineering Department

VISION:

To serve the Nation by providing high quality engineering education that enables students to get a profession that can improve the civil infrastructure and social welfare.

MISSION:

- To create enabling environment for excellent teaching, learning and research in the diverse field for sustainable development.
- To draw the best expertise in science and technology so as to provide students with the skills to visualize, synthesize and execute projects in these fields.
- To absorb a vitality of entrepreneurship and innovation in its students.

CHAPTER II.D

Vision and Mission of Electronics and Communication Engineering Department

VISION:

To be a global leader in Electronics and Communication Engineering, pioneering advancements and innovation in the field.

MISSION:

- Excellence in Education: Provide an outstanding learning experience, equipping students with comprehensive knowledge and practical skills in Electronics and Communication Engineering.
- Cutting-edge Research: Conduct innovative research to push the boundaries of knowledge, addressing current and future challenges in communication technology and electronics.
- Collaborative Environment: Foster a culture of interdisciplinary collaboration within and outside the department, facilitating exchange of ideas and fostering creativity.
- Leadership Development: Prepare graduates to be industry-ready leaders, instilling in them values of integrity, professionalism, and a commitment to ethical practices in addressing global engineering challenges.

CHAPTER II.E

Vision and Mission of Electrical Engineering Department

VISION:

To be a leader in the teaching and training of electrical engineering by producing graduates into highly skilled technocrats, who can thrive in their chosen field and engage in creative research and entrepreneurship while making a strong commitment for the betterment of the society.

MISSION:

- To offer cutting-edge tools that supports the attainment of excellence in research and development as well as teaching and learning.
- To give students unique learning experiences and a supportive atmosphere so they can improve their technical, extracurricular, co-curricular, entrepreneurial, soft skill and personality attributes.
- To improve training programs, research facilities and consulting services in order to fill the gap between business and academics.
- To provide students with need-based skill development programs in the ongoing education for the long-term advancement and progress of the society.

CHAPTER II.F

The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department: -

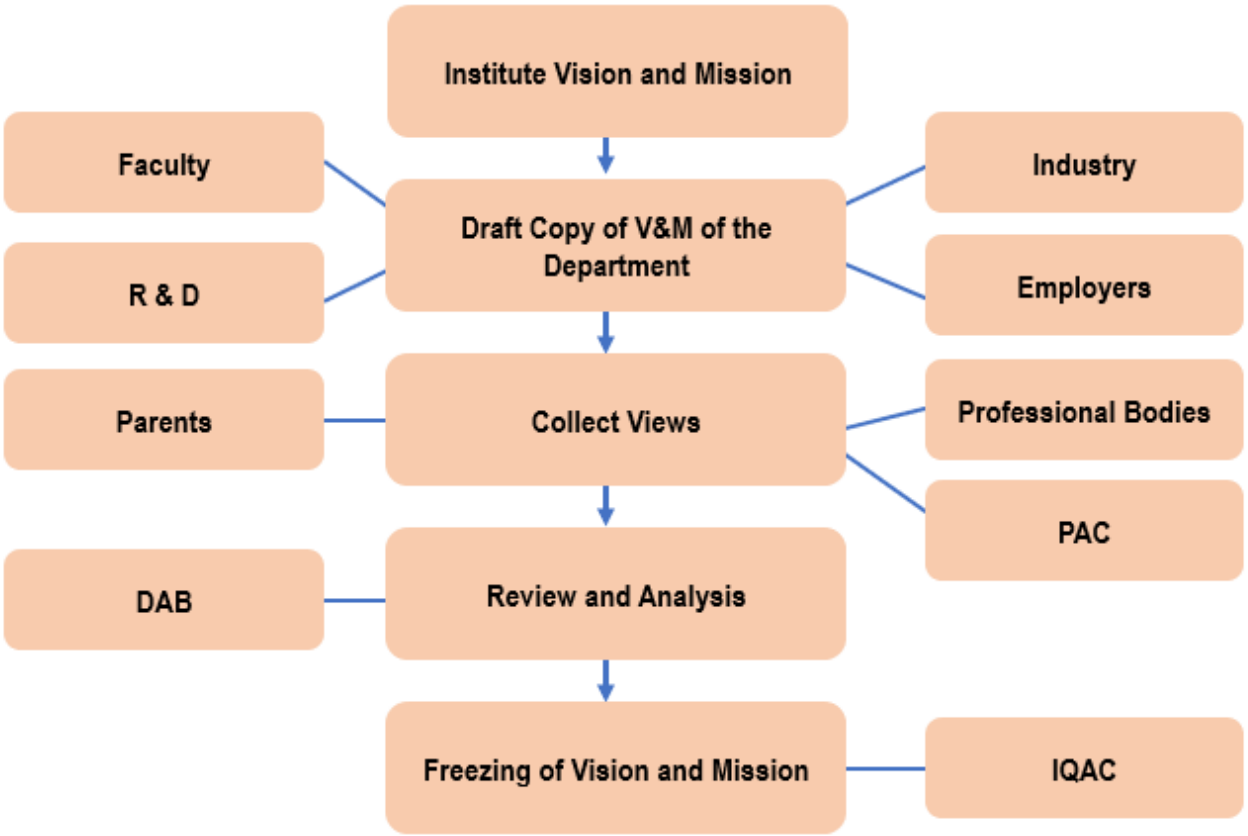
Step 1: The Vision & Mission of the Institute is taken as the basis.

Step 2: The Department conducts brain-storming sessions with the faculty on the skill-set required by the local and global employers, Industry Advances in Technology and R & D, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Parents, Professional Bodies, Program Assessment Committee (PAC) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The received views from Parents, Professional Bodies, Program Assessment Committee (PAC) are analyzed and reviewed by Department Advisory Board (DAB) to check the consistency with the vision and mission of the institute.

Step 5: After are reviewing, IQAC finalized and freeze the Vision and mission of the department.



CHAPTER III

CO-PO-PSO Definitions and Procedure

Course outcomes (COs):

Course outcomes (COs) are direct statements that describe the essential and enduring disciplinary knowledge, abilities that students should possess and the depth of learning that is expected upon completion of a course. They are clearly specified and communicated. The Course Outcomes are prepared by the course coordinator in consultation with concerned faculty members teaching the same course.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):
Program Specific Outcomes are statements that describe what the graduates of a specific engineering program should be able to do.

Dissemination of Vision, Mission, Quality policy, COs, POs & PSOs

S.No	Stakeholders	Activities/Meetings	Mode of communication	Period of Interaction
1	Students	Semester Re-opening Day	College website, notice boards, Department Notice boards, Library, Department Magazines, Student induction program, Student awareness workshops, Question Papers, Student profile & Progress Report	Semester wise
		Department Events		Periodically
		Students Counselling Meeting		Quarterly
2	Students	Induction Day	College website, Weekly schedules, Meeting Hall, Notice boards, Student induction program	Yearly once
		Fresher's Day		
3	Parents	Induction day	Tutors and HOD	Yearly Once
4	Industry Experts	R&D Meeting	College website, Presentation by Institute Head	As Required
		MoU Meeting		As Required
5	Academic Experts	Seminar	College website, feedback forms, Conference coordinators, Department event Organizers	Frequently
		Workshop		Semester wise
		Conference		Yearly once
		Guest Lectures		Periodically
6	Faculty Members	Management meeting With Experts	College website, Notice boards, Faculty meetings	Semester wise
		Department meetings	Notice boards, Official E-mail ID	Semester wise

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Program Outcomes

Engineering Graduates will be able to:

- **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

- **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

- **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

- **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

- **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

- **Environment and Sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- **Project Management and Finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

- **Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

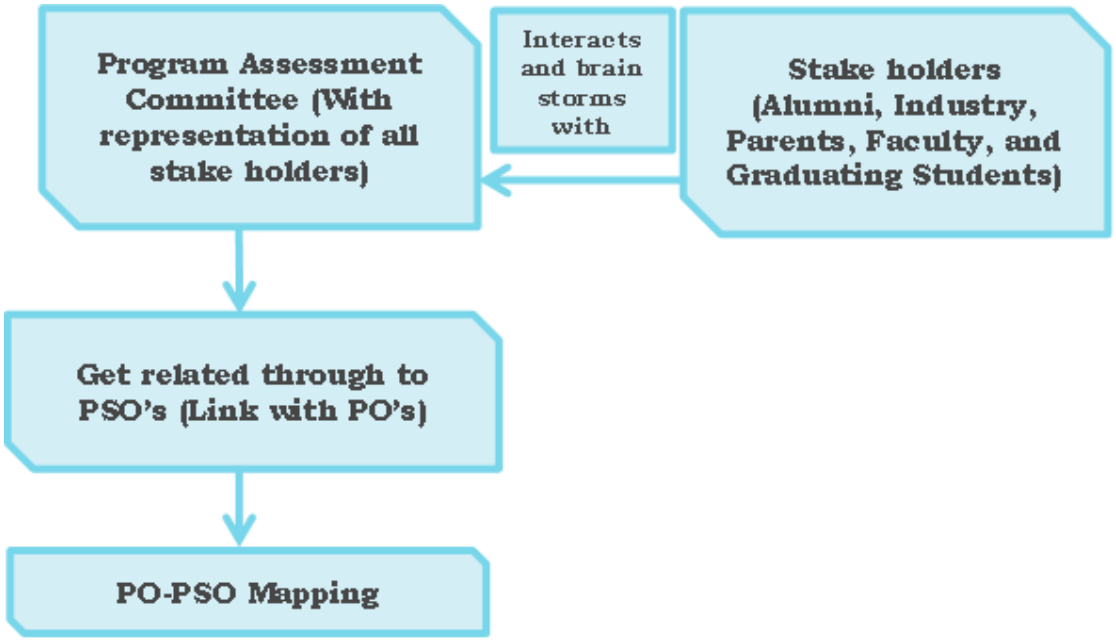
S.No	Graduate Attributes	Program Outcomes
1	**Engineering Knowledge:** Graduate should be able to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	a) Graduate will demonstrate knowledge in fundamentals of mathematics, science and engineering.
2	**Problem Analysis:** Graduate should be able to Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	b) Graduate will demonstrate an ability to identify, formulate and solve problems in key areas of Electrical and Electronics Engineering - design and application of equipment, devices and systems.
3	**Design / Development of Solutions:** Graduate should be able to Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations	c) Graduate will demonstrate an ability to design and conduct experiment, analyze and interpret data in Electrical and Electronics Engineering.
4	**Conduct investigations of complex problems:** Graduate should be able to Use research- based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid Conclusions	d) Graduate will demonstrate ability in conducting investigate ones to solve problems using research-based knowledge and methods to provide logical conclusions
5	**Modern tool usage:** Graduate should be able to Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	e) Graduate will demonstrate skills to use modern engineering and IT tools, software's and equipment to analyze the problems in Electrical and Electronics Engineering
6	**The engineer and society:** Graduate should be able to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	f) Graduate will show the understanding of impact of engineering solutions on the society to assess health, safety, legal, and social issues in engineering
7	**Environment & sustainability:** Graduate should be able to Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	g) Graduate will demonstrate the impact of professional engineering solutions in environmental context and to be able to respond effectively to the needs of sustainable development
8	**Ethics:** Graduate should be able to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	h) Graduate will demonstrate knowledge of Professional and ethical responsibilities

9	**Individual and team work:** Graduate should be able to Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	i) Graduate will demonstrate an ability to work effectively as an individual and as a team member/ leader in multi- Disciplinary areas.
10	**Communication:** Graduate should be able to communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instruction	j) Graduate will be able to critique writing samples (abstract, executive summary, project report) and oral presentations.
11	**Project management and finance:** Graduate should be able to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage project and in multidisciplinary environments	k) Graduate will demonstrate knowledge of management principles and apply these to manage projects in multidisciplinary environments.
12	**Life-long learning:** Graduate should be able to recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change	l) Graduate will recognize the need of self-education and ability to engage in life - long learning.

PROGRAM SPECIFIC OUTCOMES

Process for Defining PSOs

The program Assessment committee along with the stake holders define the program specific outcomes after having a brain storming session with the stake holders.



CHAPTER IV
CO-PO-PSO Mapping Procedure

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

- "1" – Slight (Low) Correlation
- "2" – Moderate (Medium) Correlation
- "3" – Substantial (High) Correlation
- "-" indicates there is no correlation.

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO). Course Outcomes are the statements that declare what students should be able to do at the end of a course. POs are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal engineering program should have. Graduates Attributes (GAs) are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. GAs form a set of individually assessable outcomes of the programme. The Program outcomes reflect the ability of graduates to demonstrate knowledge in fundamentals of Basic Sciences, Humanities and Social Sciences, Engineering Sciences and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of graduation. The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society. These outcomes also enable the graduate to pursue higher studies and engage in R&D for a successful professional career. The proper definition and the attainment of POs contribute to the attainment of Program Specific Outcome which will help the graduate to perform his/ her duties, professional responsibilities, design, development, production and testing of novel products, ability to deal with finances and project management during his/her early professional career of 3 to 4 years.

Process involved in CO-PO Mapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate COs for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behavior that students will acquire through the course.

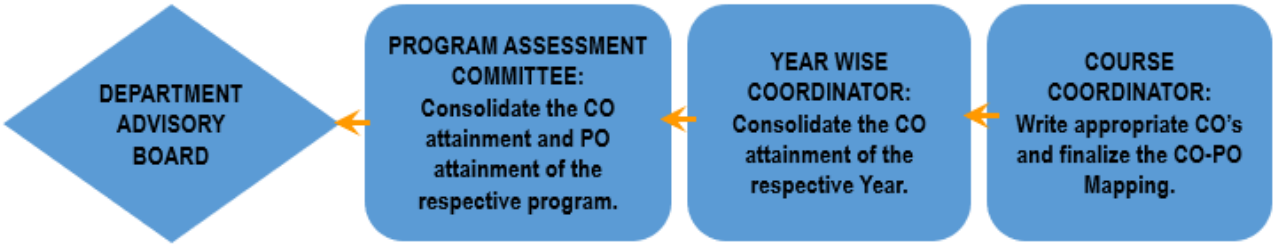


Figure: Hierarchy of faculty involvement

After writing the CO statements, CO will be mapped with PO of the department. If the department is having more than one section in a year or the same course is available for more than one program of the same institute in a semester, the subject expert will be nominated as course coordinator of the corresponding course. The role of the course coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual student's extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the eighth semester. The Program Assessment Committee (PAC) has to evaluate the attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Department Advisory Board (DAB).

Identification of curricular gap

At the time of CO-PO mapping, the course in-charge has to identify the curricular gap in the course, based on the recent technological trends as well as feedback received from the stakeholders. After that, the course in-charge has to discuss with DAB about the steps to be taken to bridge the curricular gap. Content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, in plant training, online quiz, etc.

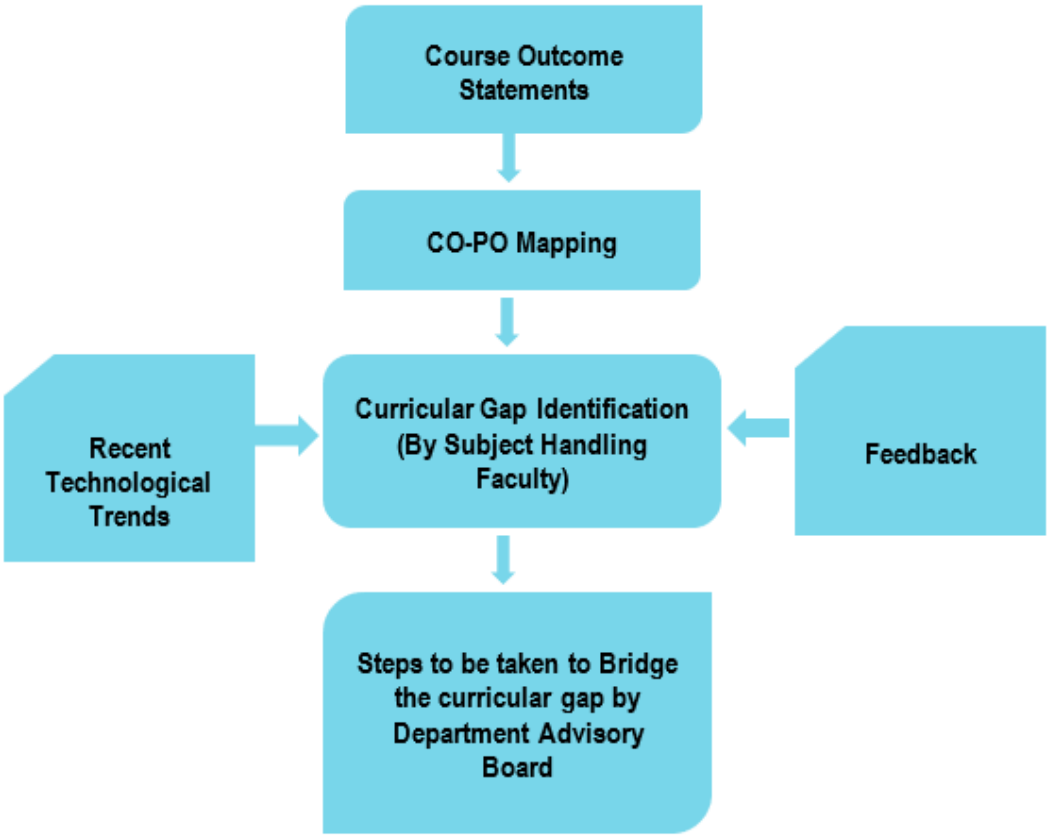


Figure: Identification of curricular gap

Course Outcomes to PO and PSO Mapping

Mapping strength of a course to PO/ PSO can be obtained by taking the average of the CO-PO/ PSO mapping matrices of that course. Program level CO-PO matrix for all the courses including first year courses will be done by the program coordinator.

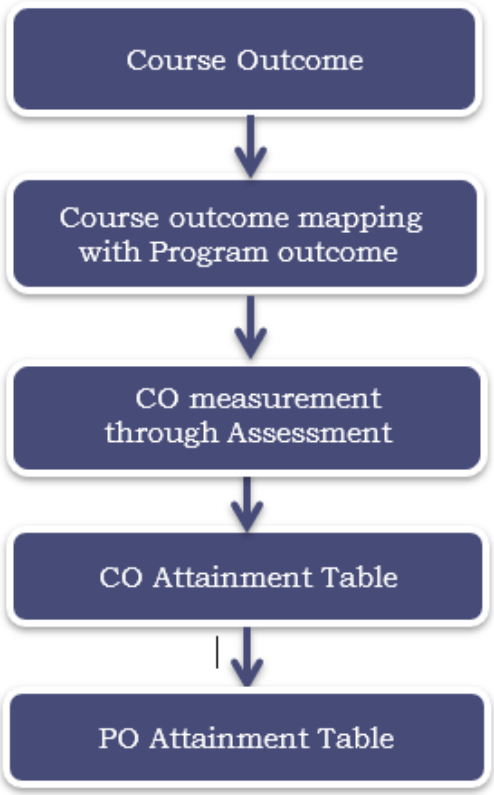


Figure: The process of CO-PO mapping validation

The process of CO-PO mapping validation is given is explained as below:

Step 1: Obtain course outcome.

Step 2: Mapping of Course Outcome with Program Outcome.

Step 3: CO measurement through assessment.

Step 4: Obtain CO attainment table through direct assessment methods.

Step 5: Obtain PO attainment table through direct and indirect assessment methods.

Course Outcomes (COs) relate the skills, knowledge, and behavior that students acquire in their matriculation through the course. These are specific to a course and hence differ from one to the other.

Each CO contributes to attainment of one or more PO(s); and that way to the overall attainment of the PO and associated PSO(s).

The modes of delivery enabling the attainments are:

For Theory Courses:

- Chalk-and-board
- PowerPoint presentations
- Animations

Individual / batch conduct of experiments in laboratories.

Process for CO – PO Mapping for Each Subject

The faculty teaching the subject is responsible for arriving / verifying the CO – PO mapping associated for that subject. This is based on understanding of the four/five COs of that subject and how they influence / impact any of the twelve POs. characterized in terms of a “High” / “Medium” / “Low” designation with scores of 3, 2 and 1 respectively. The above mapping is shared/ discussed/ finalized with the respective department Head and the DAB (Department Advisory Board).

The curriculum comprises of courses related to basic sciences, humanities and social discipline, engineering & technology, professional / open electives, projects and seminars. Each course contributes to learning outcomes reflecting the skills and competence that are required at the time of graduation.

The Program Outcomes (POs) reflect the ability of graduates to demonstrate knowledge in fundamentals of basic sciences, humanities and social discipline, engineering & technology and practically apply the knowledge for the benefit of society. The graduates must adhere to professional and ethical responsibilitiesin pursuit of their careers. These outcomes also enable the graduate to pursue higher studies and engage in R&D for a successful professional career.

The POs crystallize in the attainment of Program Specific Outcome (PSOs) which will help the graduate to perform his or her duties, professional responsibilities, design, development, production and testing of novel products, ability to deal with finances and project management. These capabilities are reflected in PSOs.

The POs are published and disseminated in the following ways:

- Displayed in the Department and in classroom.
- Explained to students and their parents as part of the induction Program.
- Explained to newly joined faculty and staff members during a staff orientation Program

CHAPTER V

Assessment Process

Program Assessment at the department level is broadly done under two heads:

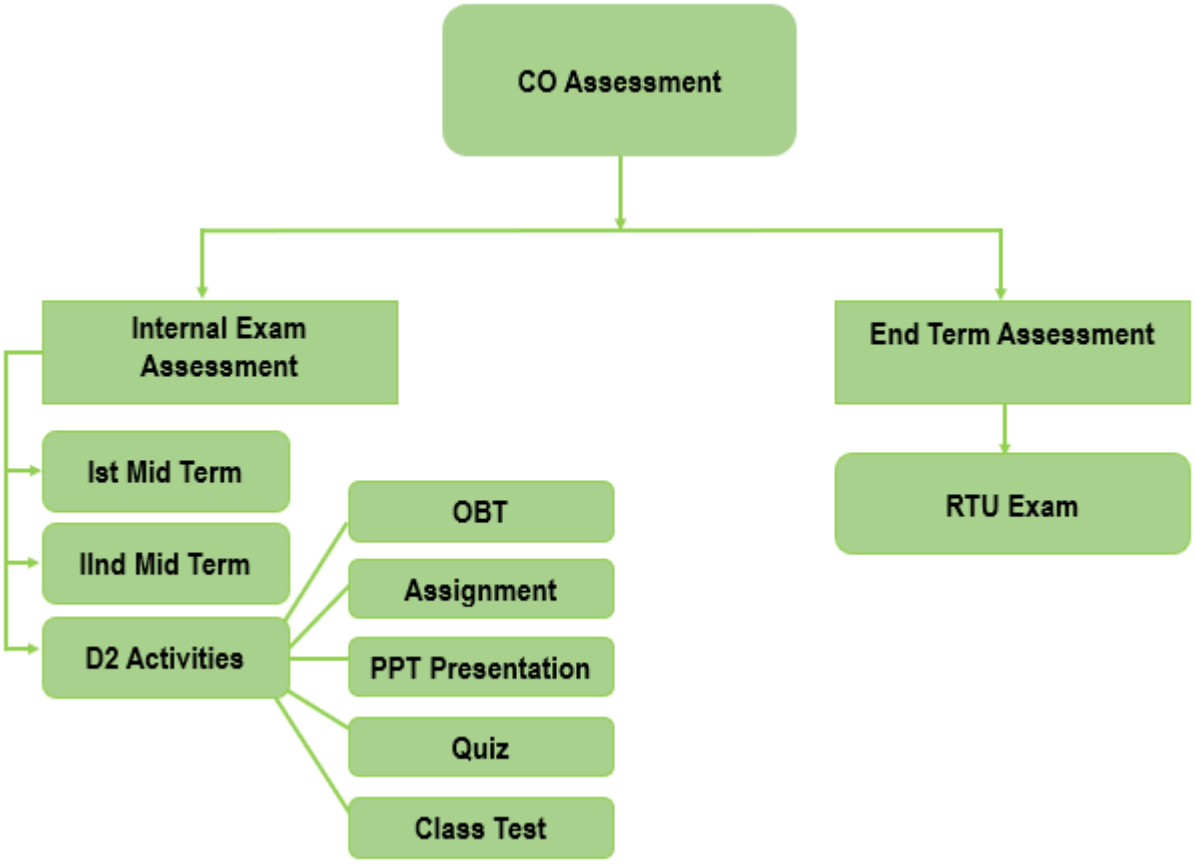
- Direct Assessment (DA), and
- Indirect Assessment (IA)

The tools used for Direct Assessment are as follows:

- Student performance in Mid-semester and End-semester Examinations.
- Student performance in Tutorials / Assignments.
- Student performance in Project Work, Viva-voce, Seminars.

The tools used for Indirect Assessment are as follows:

- Alumni: Survey Questionnaire
- Course Exit Survey
- Exit Feedback: Survey Questionnaire
- Parent: Survey Questionnaire
- Employer's Feedback Form
- Feedback Form on Facilities
- Analysis Of Students Feedback



Within DA, the Internal Assessment of the college is given 30 marks while the remaining 70 marks is for the external assessment. The overall attainment percentage values at the program level are arrived at as weighted average of 80% DA and 20% IA.

The student performance, as measured through the marks scored, is the foundation for direct assessment.

The steps in this direct assessment process are as follows:

- The marks obtained by the students in a class are entered in an MS Excel file. Every question is mapped to a CO which in turn is contributes to one or more POs.
- In the case of Internal Examinations, the first Internal determines the attainment of the first two CO while the second internal exam determines the attainment of the third and fourth.
- The final CO – PO attainment table is populated manually by the faculty taking the respective course, based on the four/five CO attainments obtained at the end of above step i.e., after the two Internal Assessments.
- This process is followed for all courses in any given semester.
- At the end of the four-year program / eight semesters, the subject- wise PO attainments are collated so as to arrive at the average attainment for each PO.

The students have an opportunity to assess, express and communicate the impact of different course delivery formats / mechanisms used by the faculty during the semester, through the Course-end Survey. These are manually assessed by the respective faculty member and the Academic Coordinator / Program Assessment Committee as might be necessary.

Administrative setup for monitoring the attainment of POs and PSOs.

The following administrative setup is put in place to ensure the attainment of POs and PSOs:

- Program Coordinator
- Academic Coordinator
- Program Assessment Committee
- Department Advisory Board

Role and Responsibilities of the Program Coordinator:

- Interacts and maintains liaise on with key stakeholders, students, faculty, department head (HOD) and employer.
- Monitors and reviews the activities of each year in the program independently with course coordinators.
- Schedules program work plan in accordance with specifications of program objectives and outcomes.
- Conducts and interprets various surveys required to assess POs and PSOs.

Role and Responsibilities of the Academic Coordinator:

- Coordinates and supervise the faculty teaching the particular course in the module.
- Responsible for assessment of the course objectives and outcomes.
- Recommend and facilitate workshops, faculty development programs, meetings or conferences to meet the course outcomes.
- Analyzes results of particular course and recommends the Program coordinator and/or Head of the Department to take appropriate action.
- Liaise with students, faculty, program coordinator and Head of the Department to determine priorities and policies.

Role and Responsibilities of the Program Assessment Committee:

- Program Assessment Committee consists of Program Coordinator and faculty representatives

- Chaired by Program Coordinator, the committee monitors the attainment of POs and PSOs.
- Evaluates program effectiveness and proposes necessary changes.
- Motivates the faculty and students towards attending workshops, developing projects, working models, paper publications and research, assessing course content / delivery.
- Interacts with students, faculty and outside /community agencies (through their representation) in facilitating PSOs. PAC meets at least once in 6 months to review the program and submits report to the Department Advisory Board.

Role and Responsibilities of the Department Advisory Board (DAB):

- DAB consists of head of the department, program coordinators, and the representatives of key stakeholders.
- DAB chaired by head of the department, receives the report of the Program Assessment Committee and monitors the progress of the program, on current and future issues related to programs.
- Reviews, assesses, and monitors the attainment of the departmental PSOs.
- Develops and recommends new or revised program goals and objectives. DAB meets at least once in a year to review the programs.

CO Assessment Tools:

The various assessment tools used to evaluate COs and the frequency with which the assessment processes are carried out are listed. In each course, the level of attainment of each CO is compared with the predefined targets, if is not the course coordinator takes necessary steps for the improvement to reach the target. With the help of CO against PO/PSO mapping, the PO/PSO attainment is calculated by the program coordinator.

Table: Mapping of assessment tools to POs/PSOs with frequency of Assessment

Mode of Assessment	Assessment Tool	Description	Evaluation of course outcomes	Related PO/PSO	Frequency of Assessment
Direct	Theory internal examinations	**Two written examinations are conducted and its average marks are considered**	The questions in the internal examinations and assignment sheets are mapped against COS of respective course.	**PO1 to PO12**	Continuous
Direct	Assignments	**Two assignments are for each given course for continuous assessment average marks are considered**	Internal examinations and assignments are framed in such a way to cover all course outcomes	**PO1 to PO12**	Continuous
Direct	Day to day evaluation in Laboratory	**The day-to-day evaluation is considered**	The final attainment for each CO is calculated by taking average of the % attainment from day-to-day evaluation and internal lab examination	**PO1 to PO12**	Continuous
Direct	Internal Practical Examination	**Internal examination is conducted**		**PO1 to PO12**	Two per semester
Direct	End Semester Examination	**End Examination is conducted**	The questions in the end examinations are mapped against COS of respective course. The questions for end examinations are framed in such a way to cover all course outcomes	**PO1 to PO12**	One per semester

Direct	Industry oriented mini project/summer internship	**To test students' concepts in independent analysis. Two project reviews are conducted**	Two internal project reviews are conducted and average of these two review assessments are considered	**PO1 to PO12**	Minor Project Review in VII Semester
Direct	Project I & Project II	**To test students' concepts in design creative thinking and independent analysis three project reviews are conducted**	Continuous assessment is carried by the project review committee first review emphasizes on literature survey and problem identification, second review on design methodology and the third review on the validation of the model and documentation. The external examiner assessment is considered as another assessment tool for project work. Final CO attainment calculated from final CO attainment is calculated from	**PO1 to PO12**	Minor project-VII semester & Major Project-VIII semester
Direct	Technical Seminar	**To Test the students in knowledge in Recent Technical advancements and their Presentation Skills**	At end of semester a student has to Present the seminar and submit the report	**PO1 to PO12**	VIII Semester
Indirect	Alumni survey	**This survey gives the opinion of the student on the attainment of course outcomes**	At the end of the programme alumni survey is collected from alumni and considered for the PO attainment under indirect assessment.	**PO1 to PO12**	At the end of the program
Indirect	Graduate exit survey	**This survey gives the opinion of the graduate on the attainment of course outcomes**	At the end of the programme exit survey is collected from alumni and considered for the PO attainment under indirect assessment.	**PO1 to PO12**	At the end of the program

Procedure followed while assigning the values by mapping COs to POs.

- Select action verbs for a CO from different Bloom's levels based on the importance of the particular CO for the given course.
- Stick on to single action verbs while composing COs and use for multiple action verbs if the need arises.
- Values to CO-PO (technical POs in particular) matrix are assigned by

Judging the importance of the particular CO in relation to the POs. If the CO matches strongly with a

particular PO criterion, then 3 is assigned, if it matches moderately then 2 is assigned or less than 1 is assigned else marked with "–" symbol.

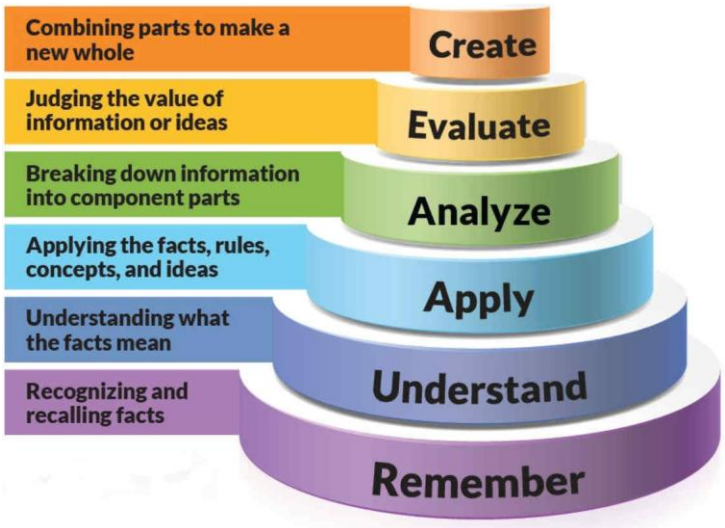
- If an action verb used in a CO is repeated at multiple Bloom's levels, then reconsider which Bloom's level is the best fit for that action verb.

Bloom's Taxonomy:

Bloom's Taxonomy is a classification of the different outcomes and skills that educators set for their students (learning outcomes). The taxonomy was proposed in 1956 by Benjamin Bloom, an educational psychologist at the University of Chicago. The terminology has been recently updated to include the following six levels of learning. These 6 levels can be used to structure the learning outcomes, lessons, and assessments of your course.

- **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory.
- **Understanding:** Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
- **Applying:** Carrying out or using a procedure for executing, or implementing.
- **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.
- **Evaluating:** Making judgments based on criteria and standards through checking and critiquing.
- **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.

Like other taxonomies, Bloom's is hierarchical, meaning that learning at the higher levels is dependent on having attained prerequisite knowledge and skills at lower levels. You will see Bloom's Taxonomy often displayed as a pyramid graphic to help demonstrate this hierarchy. We have updated this pyramid into a "cake-style" hierarchy to emphasize that each level is built on a foundation of the previous levels.



Attainment Level: Educational attainment refers to the highest level of education that a person has successfully completed. Successful completion of a level of education refers to the achievement of the learning objectives of that level, typically validated through the assessment of acquired knowledge, skills and competencies.

Category-A	Level 3	Level 2	Level 1
Internal (MID I & MID II)/Survey	60 % of students getting > 60% marks	50-60 % of students getting > 60% marks	40-50 % of students getting > 60% marks
Lab/Seminar/Project-Internal	>80%	50-80%	<50%
Lab/Seminar/Project-External	>70%	50-70-%	<50%
RTU	50%-100% Marks	50%-30% Marks	0%-30%
Overall	55-100%	55-40%	<40%

Assessment: A direct assessment program is a program that, in lieu of credit or clock hours as the measure of student learning, utilizes direct assessment of student learning, or recognizes the direct assessment of student learning by others.

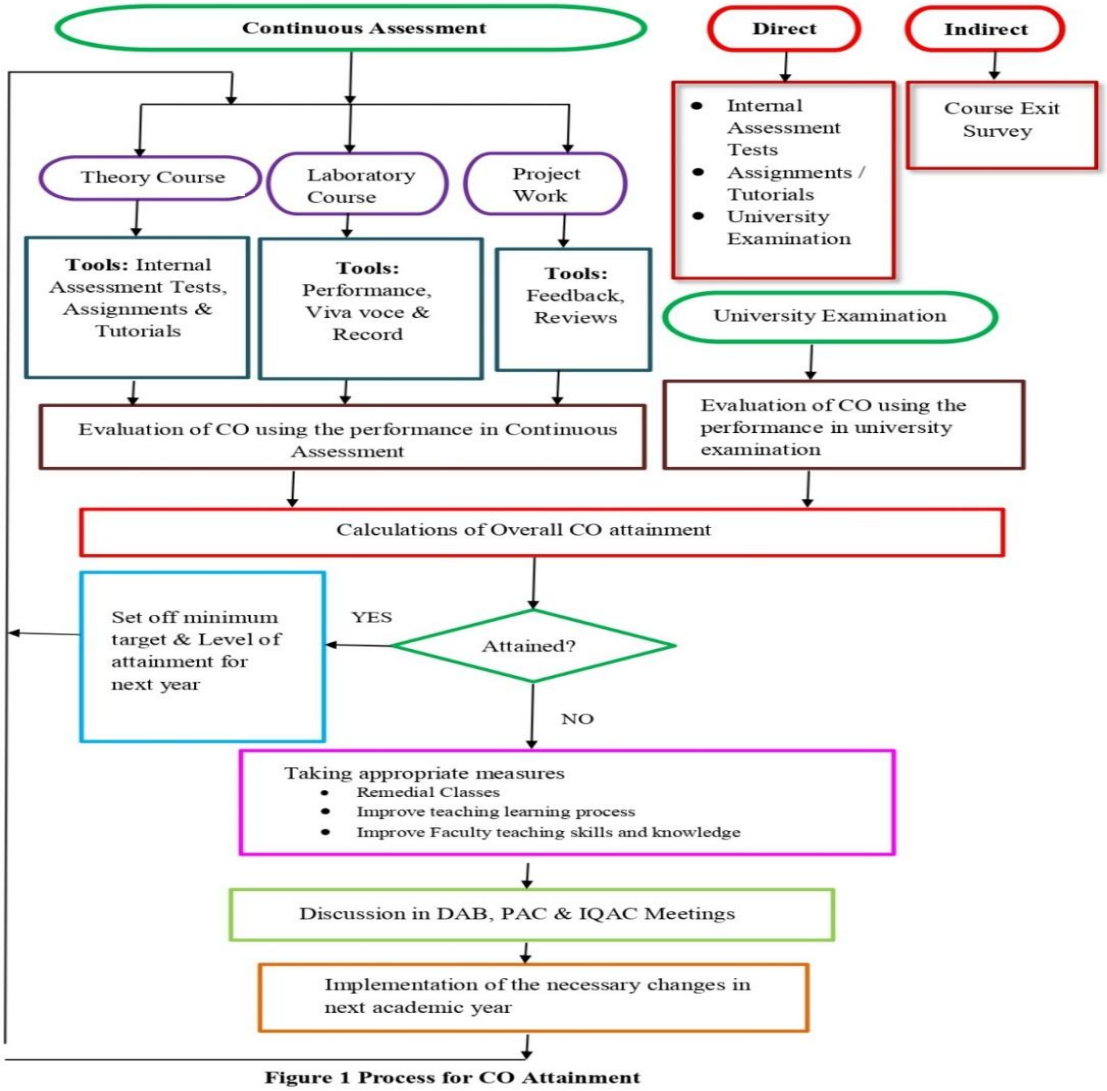


Figure 1 Process for CO Attainment

Evaluation Methods	Process
Internal Assessment Tests	Two Internal Assessment Tests are conducted per semester to evaluate the attainment of course outcomes. Each question is mapped with COs and blooms level.
Assignments & Tutorials	The tutorials and assignments are given to the students based on the subject nature. For four credit papers tutorials are mandatory. Tutorial and Assignment sheets are prepared by the faculty member with COs and levels.
Continuous Assessment & Model Exam (Laboratory Course)	The evaluation criteria for each experiment are based on performance, viva-voce and record mark. The attainment of COs is calculated through continuous assessment and model practical performance.
Project Reviews	• Three reviews are conducted periodically to monitor and evaluate the progress of the project using project rubrics. • Viva-Voce is conducted at the end of the semester as per university norms.
University Examination	At the end of each semester, final examination is conducted for Theory and Laboratory courses by University, in which question paper covers the entire syllabus and all the Cos are covered in the question papers.

Table: Details of Direct Assessment

Theory Courses:

For each theory course, faculty member calculates the course outcome attainment using University Examination and Internal Assessment Test. The attainment level will be calculated based on the average performance levels of both University Examination and Internal Assessment Test. The evaluation process of Internal Assessment Tests/Assignments/Tutorials/Group Discussion is counted for 30%and the remaining 70% will be given for university examination. Based on the level of CO attainment, the faculty member will decide whether to increase the competency level or change the content delivery method, assessment methods to improve attainment level for the course.

Assessment Tool		Marks		Frequency
CO	Internal Assessment Tests	20	30	Twice in a Semester
Attainment	University Examination	80	120	Once in a Semester

Table: Details of CO Attainment

Laboratory Courses:

For laboratory courses, the course outcome will be calculated based on performance, viva-voce, record work and model practical examination with the weightage of 60% for Continuous Internal Assessment and 40 % weightage for University Practical Examination. Based on the CO attainment level, the faculty member will decide whether to increase the competency level or enhance the practical knowledge of the students in order to improve attainment level for the laboratory course.

Assessment Tool		Weightage	Frequency
CO Attainment	Continuous Internal Assessment	60%	Every Week
	University Practical Examination	40%	Once in a Semester

Project Work Assessment:

For project work, Continuous Internal Assessment is based on the performance in the three reviews. The Course Attainment is calculated based on the three reviews and project Viva voce.

- Project review is conducted every month to review the progress of the project and the second review will be conducted in the presence of an industry expert.
- Suggestions are given to the students for their continuous update and improvement. Evaluation of each review is based on the parameters discussed in teaching learning process.

The faculty member will decide the competency level and attainment level for project work considering the average performance level of the students.

PO/PSO Assessment Tools:

Evaluation of attainment of POs and PSOs is based on direct and indirect assessment tools. Direct assessment of POs and PSOs is based on students' performance in Continuous Assessments and University Examination. Indirect assessment is based on Program Exit Survey, Alumni Survey and Course Exit Survey (Theory and Practical).

Direct Assessment:

Using Program Outcomes prescribed by NAAC, the faculty member evaluates the Program Outcomes and Program Specific Outcomes through Internal Assessment Tests, Assignments / Tutorial and Group Discussion. PO will be evaluated by the CO-PO Mapping with the attainment value for each course. For each course, every faculty member decides the competency level and attainment level.

The following table shows the tools and process for direct PO attainment.

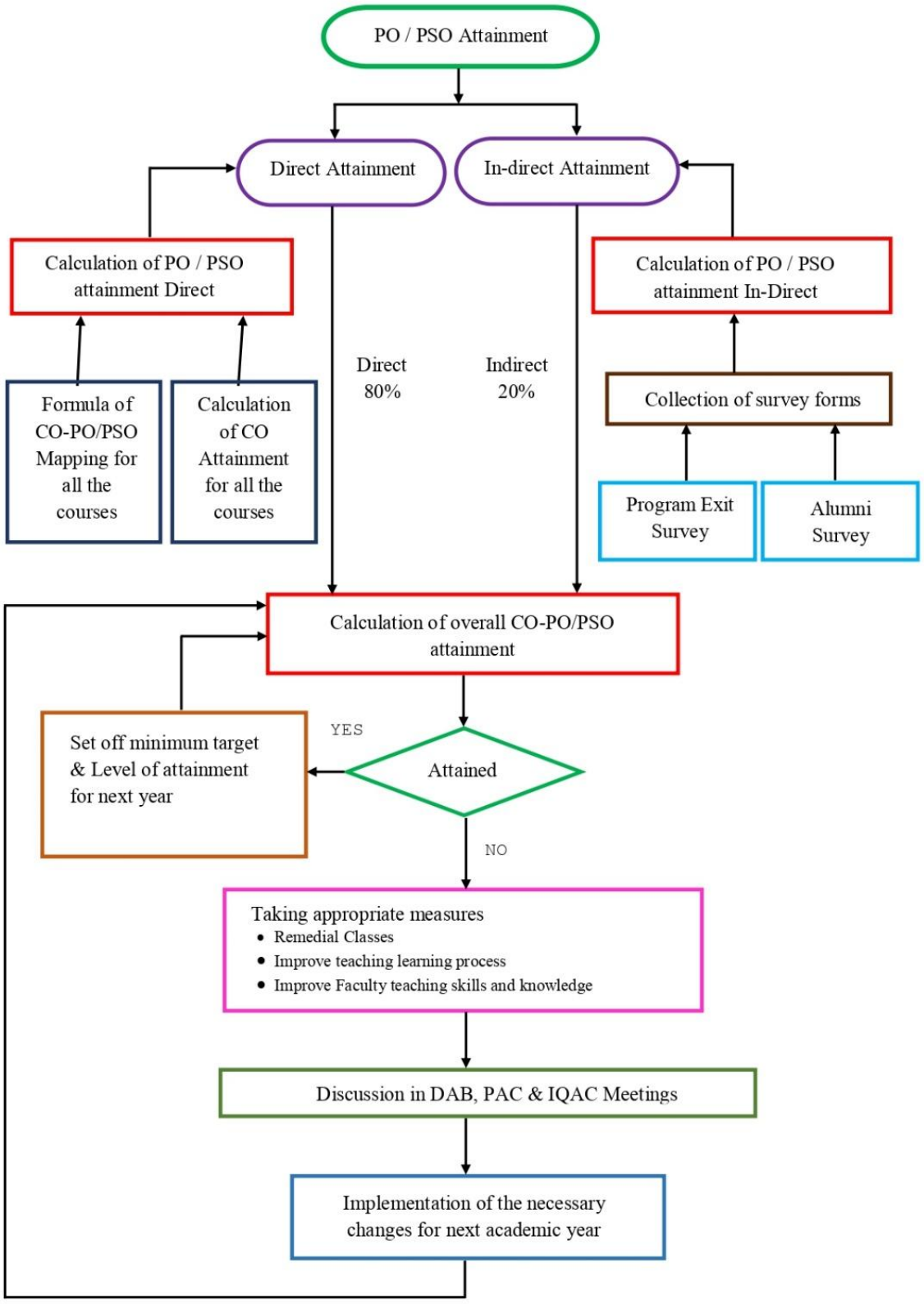


Figure 2 Process for PO/PSO Attainment

PO Attainment	Tools	Process
Direct (CO Attainment)	• Internal Assessment Test Assignments • Tutorials • Online Quiz • University Examination	• Assignments / Tutorials / online quizzes are given periodically for the entire course to attain the specific POs. • Three Internal Assessment Tests are conducted per semester to evaluate the student performance. • University Examination is conducted once in a semester as per University Schedule
	• Performance • Viva Voce • Record • Presentation • Group Discussion	• Student Contributionin laboratory is evaluated based on the performance, Viva Voce, Presentation and Record Work. • University Examination is conducted once in a semester as per University Schedule.
	• Project Reviews	• Students are divided into batches. Each batch consists of three to four students. • Supervisors are allotted for each group. • Zeroth reviews are conducted for the students to identify the area of project. • Three reviews are conducted periodically to monitor and evaluate the progress of the project. • Viva-Voce is conducted at the end of the semester.

Table: Direct Assessment for CO-PO

Indirect Assessment:

The following tools are used to assess the indirect assessment of attainment of COs, POs and PSOs. The assessment tools listed are used for both CO, PO – PSO attainment calculation.

S.No.	Tools used for Assessment processes	Batch…….	Batch…….	Batch…….	Batch…….
POs, PSOs Indirect Assessment Tools					
1	Program Exit Survey	-	-	-	-
2	Alumni Survey	-	-	-	-
CO Attainment Indirect Assessment Tool					
3	Course Exit Survey	-	-	-	-

Table: Indirect Assessment Tools

Course Exit Survey (Theory & Practical):

The course exit survey is process of collecting reviews on each course from the students at the end of each semester. It helps to improve the overall aspect of the course in future semesters. The survey covers the overall view about teaching and learning of the respective course. The survey form reveals the following attributes.

- Course Content- Quality of the content provided, incorporation of Outcome Based Education
- Course Delivery- Experience about the teaching methodologies, ICT tools, NPTEL resource utilization

- Course Assessment- Methodology of evaluation, feedbacks on assignments and tutorials
- General suggestions for improvement

Program Exit Survey:

It is a process of collecting satisfaction survey on the quality of education from the perspective of graduating students upon the completion of their program. Program Exit Survey is structured with 5 liker scale questions. The survey helps in identifying.

- Perception on the overall quality of teaching, learning and mentoring.
- Opinion about the support provided by the program in projects, modern tools and software's.
- Support provided for extra-curricular and co-curricular activities.
- Exposure to the competitive exams and personality development programs.
- Insight on imparting skills like entrepreneurship and societal responsibility through NSS, NGO and Club's Improvement on facilities.

Alumni Survey:

The alumni survey is conducted through the survey questionnaire after graduation towards the achievement of POs and PSOs. Survey form is structured with six sections with respect to,

- Personal information.
- Employment/higher studies/entrepreneurship- details.
- Technical, professional, communication and general skills at present towards RIT contribution.
- Experience at RIT in projects, extra-curricular, co-curricular activities, personality development, sports and NSS facilities.
- Suggestions for further improvement.
- Suggestions for bridging curriculum gap and other valuable inputs.

The following table shows the tools and process for Indirect PO attainment.

PO attainment	Tools	Process
Indirect	Program Exit Survey	On completion of program, feedback is obtained from each student about the entire program experience.
	Alumni Survey	During the alumni meet, graduation day the alumni survey is collected from the graduates based on the various parameters.

Table: Indirect Assessment Process

CHAPTER VI

PROGRAM SPECIFIC OUTCOMES (PSOs)

Session: 2019-20

Program Specific Outcome are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Bachelor of Technology Computer Engineering

PSO: 1 Software Development:

The proficiency to understand, apply and analyze the concepts of various fields of computer engineering like programming languages, data structures, algorithms, operating systems, databases, web design, security, networking, cloud computing and open-source platform.

PSO: 2 Computer Based Applied Science:

Understanding and applying knowledge of various computer systems, such as architecture, electronics, and hardware design. This expertise is built upon a solid foundation in both basic and applied science, encompassing areas like mathematics, physics, and electrical engineering.

PSO: 3 Career Skills:

The skills to apply, analyze and evaluate industry best practices by developing innovative projects and acquaintance of attitude required to work professionally, for higher studies and research, and to be an entrepreneur.

PSO: 1Infrastructure Development:

The graduates will have the ability to plan, design and quality execution of construction projects and ability to solve problems in the structural, construction management, hydraulics, geotechnical, transportation and environmental disciplines of civil engineering

PSO: 2Civil & Basic Sciences:

The ability to acquire fundamental knowledge of mathematics, basic sciences, civil construction drafting software and fundamental of computers.

PSO: 3Career & Life Adroitness:

Graduates will be able to cognizance of social awareness, interdisciplinary aspects and environmental necessity along with ethical responsibility to have a successful career and to become an entrepreneur.

Bachelor of Technology Electronics and Communication Engineering

PSO: 1 Communication Knowledge:

Graduate possesses the proficiency to understand, analyze, and apply the concepts of various fields of electronics and communication engineering.

PSO: 2 Electronics and Basic Science:

Graduate is able to acquire fundamental knowledge of electronics and communication, mathematics, basic sciences, and computer.

PSO: 3 Career and life Skills:

Graduate is capable of analyzing, evaluating, and applying industry best practices by developing innovative projects, and attaining of attitude required to work professionally, for higher studies, research, and to be an entrepreneur.

PSO: 1Power Engineering Skills:

Graduate possesses the ability to deal with complex electrical power problems by using modern engineering tools for the benefit of the society and should be able to communicate the same professionally.

PSO: 2Electrical and Basic Sciences: Graduate possesses the ability to apply fundamental knowledge of electrical power, basic sciences, mathematics, and computation to get the solutions of multi-disciplinary problems.

PSO: 3 Career and Life Skills:

Graduate possesses the skills to be either employable or develop entrepreneurship in the emerging areas like renewable and green energy, electric and hybrid vehicles and smart grids, and will be susceptive to life-long learning's.

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CHAPTER VII

COURSE OUTCOMES (COs)
Session: 2018-19

Course outcomes (COs) are direct statements that describe the essential and enduring disciplinary knowledge, abilities that students should possess and the depth of learning that is expected upon completion of a course. They are clearly specified and communicated. The Course Outcomes are prepared by the course coordinator in consultation with concerned faculty members teaching the same course.

DEPARTMENT OF APPLIED SCIENCES
Common for all branches in first year
Program Name: APPLIED SCIENCES Session 2018-19

Subject/Code No: Communication Skills & 1FY1-04

Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Comprehend the fundamental Principles, Types, and Methods of good communication.
CO2	Apply the basic structural and grammatical knowledge of the constituents for technical writing.
CO3	Develop the competence in writing skills related to various forms of technical and business communication n
CO4	Understand the genre of prose by reading loudly with correct pronunciation, stress intonation, and articulation of voice along with identifying and describing the connection between Literature and reality.
CO5	Develop the creativity and imagination through value-based genre of poetry by enhancing aesthetic and verbal ability.

Subject/Code No: Human Values & 1FY1-05/2FY1-05
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Comprehend co-relationship between "Values"; and "skills" to ensure persistent happiness and prosperity.
CO2	Evaluate the coexistence of the Human Being - Harmony in Myself.
CO3	Identify the role of harmony in family, society and universal order.
CO4	Develop and evaluate the holistic perception of harmony at all levels of existence.
CO5	Create harmony in professional and personal lives by understanding Co-existence between human being with nature.

Subject/Code No: Engineering Mathematics-I & 1FY2-01
Semester: I semester
Course Outcome

CO Number	CO Definition
CO1	Learn the concept of calculus to appraise improper integral, surface area and volume of solid of revolution of various laminas.
CO2	Differentiate the different techniques for convergence of sequence and series.
CO3	Differentiate the different techniques for convergence of sequence and series.
CO4	Application of Partial differentiation, problem-solving using concepts and techniques from PDE's.
CO5	Apply the concept of calculus to double integrals and change of variables Application of Multiple integration involving cubes, sphere, theorem of green gauss and stokes.

Subject/Code No: Engineering Mathematics-II & 2FY2-01
Semester: II semester
Course Outcome

CO Number	CO Definition
CO1	Comprehend the computational techniques and algebraic skills essential for the study of systems of linear equations, matrix algebra, Eigen values, Eigen vectors, orthogonality and diagonalization.
CO2	Recognize ODEs and interpret the various methods for solving differential equation of first order and first degree.
CO3	Differentiate the various applications of function of one variable in ODE of higher order.
CO4	Evaluate the multivariable function using the concept of PDEs of first order.
CO5	Apply the various uses of multivariable function and solve by the partial differential equation of higher order.

Subject/Code No: Engineering Physics & 1FY2-02 /2FY2-02
Course Outcome

CO Number	CO Definition
CO1	Comprehend the concepts of wave optics and phenomenon of interference and diffraction of light.
CO2	Recognize ODEs and interpret the various methods for solving differential equation of first order and first degree.
CO3	Apply the conceptual knowledge of coherence of light wave in different application of light wave and use in optical fiber communication.
CO4	Synthesize the scientific and engineering principles of materials science to identify the properties of material related to appropriate field of application.
CO5	Apply the laws of electromagnetic theory in propagation of wave and use in communication.

Subject/Code No: Engineering Chemistry &1FY2-03 /2FY2-03
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Describe the fundamental water quality for domestic and industrial purpose so that students will be able to describe impurities present in water, boiler troubles and removal of impurities.
CO2	Analyse the composition, characteristics and manufacturing methods of various types of solid, liquid and gaseous fuels and calculated calorific value of fuels for Industrial as well as domestic purposes
CO3	Classify the dry and wet corrosion mechanisms and their protection methods. To investigate deterioration of metal through corrosion
CO4	Understand the composition and manufacturing methods of engineering materials namely cement and glass and recognize and estimate various properties of lubricants in several engineering process.
CO5	Generating the generic drugs or medicines for various services in life long purpose by identifying the applications of organic reaction mechanism.

Subject/Code No: Programming for Problem Solving & 1FY3-06/2FY3-06
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Understand the fundamental concepts of computers, algorithms, flowcharts and problem solving techniques.
CO2	Translate the algorithms and flowcharts into C programs.
CO3	Analyse the debug process in C programming language and to express in written form.
CO4	Formulate a problem into functions and create modular code that can be reused.
CO5	Develop C programs to demonstrate the applications of derived data types such as arrays, pointers, strings and functions.

Subject/Code No: Basic Mechanical Engineering & 1FY3-07/2FY3-07
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Understand the concepts of thermodynamics, power plants, machine design, Manufacturing Engineering and Industrial Engineering.
CO2	Receive the basic knowledge of pump and IC engine.
CO3	Comprehend the concept, types and application of refrigerator and air conditioning system and Transmission of Power.
CO4	Explain the different Patterns, Molding, Casting, Forging and Extrusion of Primary Manufacturing Processes.
CO5	Describe the various process and uses of Welding, Brazing, Engineering materials and Heat treatment of steel.

Subject/Code No: Basic Electrical Engineering & 1FY3-08/2FY3-08
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Evaluate the concept and process of various AC and DC circuit related elements, sources, laws, methods and theorems.
CO2	Explore the knowledge of transformers and its uses in applying the acquired knowledge to solve electrical circuit problem.
CO3	Analyse the characteristics, significance, construction and working of various power electronic devices.
CO4	Understand electromechanical energy conversion process.
CO5	Explore knowledge of protective devices and energy consumption calculations.

Subject/Code No: Basic Civil Engineering & 1FY3-09/2FY3-09
Semester: I / II semester

CO Number	CO Definition
CO1	Understanding the scope, specialization, and role of civil engineer with impact of infrastructural development on economy of country.
CO2	Explain the Object, Principles & Types of Surveying, Analyses the Linear Measurements of surveying and evaluates the angular measurement through compass and leveling process through the various leveling instrument.
CO3	Analyse the importance of site selection, type of building Layout and Plan with introduction and components of Buildings & their functions.
CO4	Understanding the traffic and road safety and evaluate the Modes of Transportation, Causes of Accidents and Create the Road Safety Measures.
CO5	Classify the different types of pollutions, understand the Rainwater Harvesting, Global warming, Climate Change and solid Waste Management, Analyse the Primary and Secondary air pollutants,

Subject/Code No: Engineering Chemistry Lab& 1/2FY2-21
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Evaluate the strength of CuSO4.5H2O solution with the help of Hypo solution, Ferrous Ammonium Sulphate solution with the help of K2Cr2O7 solution and NaOH and Na2CO3 in an alkali
CO2	Analyse different properties of lubricating oil.
CO3	Analyse quality of coal by proximate analysis.
CO4	Evaluate various quality parameters of water like harness, DO, Chlorine in water
CO5	Understand about synthesis of generic drugs.

Subject/Code No: Engineering Physics Lab & 1/2FY2-20
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Understand the fundamental concepts of wave optics through the interference and diffraction experiment
CO2	Analyse the concept of light in dispersive power of material and height of a celestial object.
CO3	Describe and demonstrate the behavior of semiconductor characteristics.
CO4	Applying the knowledge to show the charging and discharging behavior of capacitor with time in form of electrical energy.
CO5	Interpret the properties of Laser light and application in optical communication through optical fiber.

Subject/Code No: Human Values Activities and Sports & 1/2FY1-23
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Course Introduction-Need, Basic Guidelines, Content and Process for Value Education
CO2	Understanding Harmony in the Human Being - Harmony in Myself
CO3	Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship
CO4	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence
CO5	Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values

Subject/Code No: Language Lab &1/ 2FY1-22
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	To understand Phonetic Symbols and Transcriptions
CO2	To enable students to participate in Extempore
CO3	To enable students to participate in Group Discussion
CO4	To improve writing skills of students by Dialogue Writing
CO5	To use LSRW skills successfully for leadership and teamwork to crack GD's and interview

Subject/Code No: Manufacturing Practices Workshop &1/ 2FY3-25
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Understand various tools, materials, instruments required for workshop operations.
CO2	Apply techniques to perform workshop operations with hand tools and power tools such as center lathe machine, drilling machine using given job drawing.
CO3	Understand application of the hand tools used in fitting, carpentry, foundry, welding shop, machine tools and sheet metal shop
CO4	Write a report related to hand tools and machine tools description referring to library books and laboratory manuals.
CO5	Apply safety consciousness along with team work.

Subject/Code No: Computer Programming Lab & 1/2FY3-24
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Understand and describe the structure of a C program to explain, write, compile and execute programs using input and output statements.
CO2	Classify and write programs by applying the decision control statements and loop control statements using different operators.
CO3	Classify and write programs by applying the decision control statements and loop control statements using different operators.
CO4	Design object based programs by creating new data type using structure and union.
CO5	Understand and use the concept of functions and file operations; moreover design new functions to solve module driven problems.

Subject/Code No: Basic Civil Engineering Lab & 1/2FY3-27
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Describe various sanitary fittings and water supply fittings.
CO2	Examine pH, Turbidity, Hardness and Total solids of given water sample.
CO3	Use of EDM and Total Station in the field.
CO4	Investigate the linear and angular measurements of the points on the ground and levelling.
CO5	Students will show an ability to communicate effectively and work as a team member ethically.

Subject/Code No: Basic Electrical Engineering Lab & 1/2FY3-26
Semester: I / II semester
Course Outcome

CO Number	CO Definition
CO1	Utilize a Cathode Ray Oscilloscope (CRO), along with various meters, to identify and observe the functioning of electronic components such as resistors, inductors, capacitors, diodes,diac, triac, transistors, and thyristors.
CO2	Measure the no-load current waveform using an oscilloscope and calculate transformer voltages, currents, power, and efficiency
CO3	Conduct various three-phase transformer connections to Analyse voltage and current relationships, while recording phase shifts between the primary and secondary sides.
CO4	Recognize the operational characteristics, cut-out sections, and speed behavior of DC machines, synchronous machines, single-phase, and three-phase induction machines
CO5	Create a torque-speed curve for a separately excited DC motor, examine the operation of DC-DC converters, DC-AC converters, and DC-AC converters for induction motor speed control, while providing an overview of the components in LT switchgear.

Subject/Code No: Computer Aided Engineering Graphics & 1FY3-28
Semester: I semester
Course Outcome

CO Number	CO Definition
CO1	Discuss the concept of engineering terminology, engineering scales and conic sections.
CO2	Apply the necessary skills in drawing and explaining orthographic projection of points, lines, and planes.
CO3	Understand and Draw projections of solids
CO4	Draw and classify the sections of solids.
CO5	Explain various commands and create drawing in AutoCAD.

Subject/Code No: Computer Aided Machine Drawing & 2FY3-29
Semester: II semester
Course Outcome

CO Number	CO Definition
CO1	Recall and understand the conventional representation of machine components and material, types of lines & dimensioning.
CO2	Explain concept of first and third angle projections and prepare drawing of simple machine elements, sectional views for various parts and assembly.
CO3	Draw and explain various types of temporary and permanent fasteners.
CO4	Draw free hand sketches of lines, materials and various components i.e. bearings, couplings, welded joints, pipe joints, valves etc.
CO5	Differentiate among the various commands and create 2D computer aided drawing software.

Bachelor of Technology in Computer Engineering

Program Name: Computer Engineering
Subject/Code No: Advanced Engineering Mathematics/3CS2-01
LTP: 3L+0T+0P Semester: 3rd
Course Outcome

CO Number	CO Definition
CO1	Recall and understand the fundamental concepts of probability and standard distributions which can describe real life phenomenon.
CO2	Analyze the various method of numerical solutions of Normal, Poisson and Binomial probability distribution.
CO3	Formulate the optimization problems in mathematical form with classification.
CO4	Interpret non-linear optimization problems and solve by appropriate methods.
CO5	Demonstrate linear optimization problems and solve by standard methods.

Subject/Code No: Technical Communication/3CS1-02
LTP: 2L+0T+0P Semester: 3rd
Course Outcome

CO Number	CO Definition
CO1	Understand the process of technical communication in terms of LSRW.
CO2	Apply the concept of Technical Materials/Texts in various technical documents.
CO3	Enhance the skills in the process of technical communication in terms of LSRW.
CO4	Implement the basic concepts of technical communication in Technical Reports, articles and their formats.

Subject/Code No: Digital Electronics/3CS3-04
LTP: 3L+0T+0P Semester: 3rd
Course Outcome

CO Number	CO Definition
CO1	Demonstrate basic principles of digital circuits and different number systems
CO2	Distinguish logic expressions and circuits using Boolean laws and K-map
CO3	Differentiate types of digital electronic circuits and also the different logic families involved in the digital system to prepare the most simplified circuits using various mapping and mathematical methods.
CO4	Design various types of memoryless element digital electronic circuits for particular operation within the realm of economic, performance, efficiency, user friendly and environmental constraints.
CO5	Design various types of memory element digital electronic circuits for particular operation within the realm of economic, performance, efficiency, user friendly and environmental constraints.

Subject/Code No: Data Structures and Algorithms/3CS4-05
LTP: 3L+0T+0P Semester: 3rd
Course Outcome

CO Number	CO Definition
CO1	Recognize fundamental Stack operations to address a range of engineering problems.
CO2	Relate the principles of Queues and Linked Lists to offer solutions for computer-based issues.
CO3	Discover different Search and Sorting methods to rationalize their application in diverse scenarios.
CO4	Practice the concept of Trees and their operations to furnish valid solutions.
CO5	Compare a variety of techniques that can be employed with Graphs and Hashing.

Subject/Code No: Object Oriented Programming/3CS4-06
LTP: 3L+0T+0P Semester: 3rd
Course Outcome

CO Number	CO Definition
CO1	Describe the Object Oriented Programming paradigm with the concept of objects and classes.
CO2	Explain the memory management techniques using constructors, destructors and pointers
CO3	Classify and demonstrate the various Inheritance techniques.
CO4	Understand how to apply polymorphism techniques on the object oriented problem.
CO5	Summarize the exception handling mechanism, file handling techniques and Use of generic programming in Object oriented programming

Subject/Code No: Software Engineering/3CS4-07
LTP: 3L+0T+0P Semester: 3rd
Course Outcome

CO Number	CO Definition
CO1	Recognize different software life cycle models and testing techniques to develop real time projects.
CO2	Identify cost estimation and risk analysis in project management.
CO3	Interpret and deduce the engineering process of software requirement analysis.
CO4	Apply procedural design methods to architect software systems.
CO5	Collaborate the concept of object-oriented analysis and design in software development process.

Subject/Code No: Data Structures and Algorithms Lab/3CS4-21
LTP: 0L+0T+3PSemester:3rd
Course Outcome

CO Number	CO Definition
CO1	Recognize fundamental Stack and Queue operations to address a range of engineering problems.
CO2	Relate the principles of Linked Lists to offer solutions for computer-based issues.
CO3	Discover different Search and Sorting methods to rationalize their application in diverse scenarios.
CO4	Devise diverse operations on non-linear data structures such as trees and graphs.
CO5	Propose a solution for a provided engineering problem utilizing Stack, Queue, Linked List, Tree and Sorting

Subject/Code No: Object Oriented Programming Lab/3CS4-22
LTP:0L+0T+3P Semester: 3rd
Course Outcome

CO Number	CO Definition
CO1	Create and explain Basic C++ Program using i/o variables and structures.
CO2	Apply object oriented programming concepts using class and objects
CO3	Design and assess the classes for code reuse
CO4	Analysis and Apply the generic classes concepts in programming problem
CO5	Illustrate and evaluate the file Input Output mechanisms

Subject/Code No: Software Engineering Lab/3CS4-23
LTP: 0L+0T+3PSemester:3rd
Course Outcome

CO Number	CO Definition
CO1	Observe the requirements specification, function oriented design using Software Analysis and Software Design of given project and relate the use of appropriate CASE tools and other tools in the software life cycle.
CO2	Translate Software Requirements Specification (SRS) for a given problem in IEEE template.
CO3	Select DFD model (level-0, level-1 DFD and Data dictionary) of the project.
CO4	Prepare all Structure and Behavior UML diagram of the given project.
CO5	Test/Evaluate "Project Libre" a project management software tool to manage files.

Subject/Code No: Digital Electronics Lab/3CS4-24
LTP: 0L+0T+3P Semester: 3rd
Course Outcome

CO Number	CO Definition
CO1	Demonstrate the basics of logic gates.
CO2	Demonstrate basic combinational circuits and verify their functionalities.
CO3	Apply the working mechanism and design guidelines of different sequential circuits in the digital system design.
CO4	Construct different types of counter for real time digital systems.
CO5	Distinguish the different types of shift registers.

Subject/Code No: Discrete Mathematics Structure/4CS2-01
LTP: 3L+0T+0P Semester: 4th
Course Outcome

CO Number	CO Definition
CO1	Describe basic concept of Sets, Relations, Functions and Discrete Structure and apply appropriate methods to solve the problems.
CO2	Describe the concept of mathematical logic to create the problem in appropriate form and test for validity of the problem.
CO3	Apply fundamental mathematical concepts such as sets, relations, Combinatorics technique to formulate the problems and solve by appropriate method.
CO4	Interpret the concept of groups, ring and field to analyze the complex problems.
CO5	Demonstrate the model of real world problems using concept of Graph and solve the problems by standard result and graph algorithms.

Subject/Code No: Managerial Economics and Financial Accounting/4CS1-03
LTP: 2L+0T+0P Semester: 4th
Course Outcome

CO Number	CO Definition
CO1	Recognize and describe the fundamental concepts of Economics and Financial Management and define the meaning of national income, demand, supply, cost, market structure, and balance
CO2	Calculate and Classify the domestic product, national product and elasticity of price on demand and supply.
CO3	Draw the cost graphs, revenue graphs and forecast the impact of change in price in various perfect as well as imperfect market structures.
CO4	Compare the financial statements to interpret the financial position of the firm and evaluate the project investment decisions.

Subject/Code No: Microprocessor & Interfaces/4CS3-04
LTP: 3L+0T+0P Semester: 4th
Course Outcome

CO Number	CO Definition
CO1	Classify the basic operations of Microprocessor and microcontroller using their pin and architectural diagram, and also about area of manufacturing and performance.
CO2	Practice of Knowledge about programming proficiency, using various addressing modes and data transfer instructions of microprocessor and microcontroller.
CO3	Evaluate the measures of Assembly Language Programming.
CO4	Discriminate the interfacing of various circuits with microprocessor.
CO5	Compare the different programming logic applications with 8085 microprocessor.

Subject/Code No: Database Management System/4CS4-05:
LTP: 3L+0T+0P Semester: 4th
Course Outcome

CO Number	CO Definition
CO1	Tabulate Database System with the help of Entity Relationship Diagram that visualizes a database system implemented in a real-world scenario.
CO2	Apply data deduction and manipulation techniques using query languages on a variety of databases.
CO3	Use normal forms in the process of enhancing the database schema through refinement techniques.
CO4	Create transaction plans incorporating diverse scheduling types.
CO5	Generalize and assess the effectiveness of concurrency control mechanisms and recovery systems.

Subject/Code No: Theory of Computation/4CS4-06:
LTP: 3L+0T+0PSemester:4th
Course Outcome

CO Number	CO Definition
CO1	Apply the knowledge of different types of grammar; he/she can analyze the all types of grammar and evaluate the relationship among them.
CO2	Differentiate the concept of regular expression and finite automaton and apply the knowledge to compare the procedure for writing regular expression for an automaton or vice versa
CO3	Apply the knowledge of Context Free grammar; he/she can generate the Context free grammar and Pushdown Automaton for evaluating the CFG.
CO4	Apply the knowledge of Turing Machine he/she can analyze the Type-0 grammar and can design and evaluate the Turing Machine
CO5	Apply the knowledge of Pumping Lemma Theorem students can check whether the given grammar Regular grammar/Context Free Grammar or not

Subject/Code No: Data Communication and Computer Networks/4CS4-07
LTP: 3L+0T+0P Semester: 4th
Course Outcome

CO Number	CO Definition
CO1	Able to identify the principles of layered protocol architecture; be able to recognize and generalize the system functions in the correct protocol layer and further illustrate how the layers
CO2	State and cite mathematical problems for data-link and network protocols.
CO3	Use network layer protocols and calculate number of subnets required for a network.
CO4	Compute the reliability of data transfer over transport layer by glossy channel bit errors problem.
CO5	Select and plan for common services, system services, such as name and address lookups, and communications applications.

Subject/Code No: Microprocessor & Interfaces Lab/4CS4-21
LTP: 0L+0T+2PSemester:4th
Course Outcome

CO Number	CO Definition
CO1	Analyze the fundamentals of assembly level programming
CO2	Apply interfacing concept between input and output devices.
CO3	Elaborate the interfacing of various other devices with microprocessor.
CO4	Compose the various programs on different problems using Assembly Language Programming.
CO5	Implement standard microprocessor real time interfaces including digital-to-analog converters and analog-to-digital converters

Subject/Code No: Database Management System Lab/4CS4-22
LTP: 0L+0T+3P Semester: 4th
Course Outcome

CO Number	CO Definition
CO1	Create and execute a database schema for a specified problem domain.
CO2	Manage integrity constraints within a database using a relational database management system (RDBMS).
CO3	Construct and Devise a graphical user interface (GUI) application using a fourth-generation programming language (4GL).
CO4	Composing PL/SQL code encompassing stored procedures, stored functions, cursors, and packages.
CO5	Produce SQL and Procedural interfaces to SQL comprehensively.

Subject/Code No: Network Programming Lab/4CS4-23
LTP: 0L+0T+3PSemester:4th
Course Outcome

CO Number	CO Definition
CO1	Identify the functioning of various networking equipment's
CO2	Illustrate the LAN Installation techniques and Configurations techniques
CO3	Solving various Error correcting techniques and framing methods
CO4	Practice the programs for client and server involving UDP/TCP sockets using socket programming.
CO5	Estimate the communication between client and server using Network Simulator.

Subject/Code No: Linux Shell Programming Lab/4CS4-24
LTP: 0L+0T+2P Semester: 4th
Course Outcome

CO Number	CO Definition
CO1	Summarize the concepts and commands in UNIX.
CO2	Construct the directory layout of a typical UNIX system, maintain, and secure UNIX directories
CO3	Illustrate the knowledge to use the several shell quoting mechanism correctly.
CO4	Construct regular expression using filters and various commands to express the patterns.
CO5	Write simple scripts to develop basic command output

Subject/Code No: Java Lab/4CS4-24
LTP: 0L+0T+2P Semester: 4th
Course Outcome

CO Number	CO Definition
CO1	Express and restate fundamentals of java, and tools for program designing environments.
CO2	Construct classes and implement the principles of method overloading, inheritance, and access controls within those classes.
CO3	Develop Java packages and incorporate the concept of interfaces, along with importing these packages in Java.
CO4	Formulate the application by managing file operations, handling exceptions, and implementing threads.
CO5	Create applications utilizing Java applets and design various polygons. This task involves the application of knowledge and the synthesis of design skills

Subject/Code No: COMPUTER ARCHITECTURE/5CS1
LTP: 2L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Implement register transfer with the help of micro operations.
CO2	Analyze basic of computer organization, instructions, RISC & CISC characteristics.
CO3	Apply integer and floating type computer arithmetic techniques.
CO4	Analyze basics of memory organization, allocation and management schemes.
CO5	To assess modes of transfer and input output interface, interrupts and DMA Processing

Subject/Code No: DIGITAL LOGIC DESIGN/5CS2
LTP: 3L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	To demonstrate Hardware Description Languages and their use in digital logic design.
CO2	To design a digital system, components or process to meet desired needs within realistic constraints.
CO3	To design different controllers using JK and D flip flop.
CO4	To Analyze the asynchronous circuits, concepts of different hazards.
CO5	To understand the concept of FPGA, Technology mapping of FPGA.

Subject/Code No: TELECOMMUNICATION FUNDAMENTALS/5CS3
LTP: 3L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Analyze data transmission method over with wire and wireless communication.
CO2	Analyze the errors and its occurrence in data communication data link control.
CO3	Demonstrate the concept of wireless LAN and Their different types.
CO4	Apply the TDMA and space time division multiplexing
CO5	Apply the concept of spread spectrum techniques in wireless communication

Subject/Code No: DATABASE MANAGEMENT SYSTEM/5CS4
LTP: 3L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Design Database System with the help of Entity relationship Diagram for Real World Application
CO2	Deduct data using query language from any Database
CO3	Apply normal forms for database schema refinement
CO4	Design transaction with different types of schedule
CO5	Evaluate concurrency control mechanism and Recovery system

Subject/Code No: OPERATING SYSTEM/5CS5
LTP:3L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Explore the concept of Operating Systems with its need and basic functions
CO2	Analyze Process scheduling techniques and Inter Process Communication so that Real World Classical Problems can be solved.
CO3	Design the techniques for deadlock prevention, avoidance and detection with better memory management.
CO4	Analysis of Memory Management Techniques and Page Replacement Algorithms to formulate Free Space Management with concept of virual memory
CO5	Demonstrate the knowledge File system, Input/ Output Systems and various disk scheduling algorithms by having case studies

Subject/Code No: ADAVNCED DATA STRUCTURE/5CS6
LTP: 2L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Analyze various operations on Weight Balanced Trees such as Red-Black tree, Huffman tree and 2-3 tree and their augmentation.
CO2	Design amortized analysis on data structures, including Mergable heaps, 2-3-4 Trees, and Fibonacci Heap.
CO3	Apply Graph theory and related algorithms on Flow Networks and Spanning trees.
CO4	Implement various sorting networks algorithms and perform operations on disjoint sets.
CO5	Evaluate the numerical algorithms such as CRT, RSA, Primality testing and tegerfactorization.

Subject/Code No: DATABASE MANAGEMENT SYSTEM LAB/5CS7
LTP: 0L+0T+2P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Transform an information model into a relational database schema and to use a DDL and utilities.
CO2	Create SQL interface of a multi-user relational DBMS for preparing ER Diagram.
CO3	Explore desktop database package to populate, maintain, and query a database.
CO4	Design database and writing applications for manipulation of data.
CO5	Formulate query, using SQL, solutions to a broad range of query and data update problems.

Subject/Code No: SYSTEM DESIGN IN UML LAB/5CS8
LTP: 0L+0T+2P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Develop a business model & Analyze the boundary and interaction between system and user
CO2	Create Communication model with help of Modern tool usage .
CO3	Analyze communication model and make dynamic model using state charts and activity graph
CO4	Assess class model and create physical component model which includes both software and hardware components
CO5	Create the physical architecture and deploy the various components on that hardware architecture.

Subject/Code No: OPERATINGSYSTEMSIMULATIONLAB/5CS9
LTP: 0L+0T+2P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Analyze of algorithms that can schedule processes in various manners
CO2	Implementation of Inter Process Communication for real world problems.
CO3	Evaluate of various memory management techniques so that free space management.
CO4	Apply of various Page Replacement techniques for effective utilization of memory
CO5	Analyze of various disk scheduling algorithms

Subject/Code No: DIGITAL HARDWARE DESIGN LAB/5CS10
LTP: L+0T+2P Semester: 5th
Course Outcome

CO Number	CO Definition
CO1	Implement digital/computer circuits with modern design tools.
CO2	Analysis the behavior of a digital logic circuit (analysis).
CO3	Synthesis descriptions of logical problems to efficient digital logic circuits.
CO4	Integrate previously designed components into a large-scale system to meet specified requirements
CO5	Apply practical knowledge on the application of digital hardware

Subject/Code No: COMPUTER NETWORKS /6CS1
LTP: 3L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	Evaluate the reliability of data transfer over transport layer by lossy channel bit errors problem.
CO2	Apply network layer protocols and calculate number of subnets required for a network.
CO3	Analyze flow control and to apply protocols for communication over transport layer.
CO4	Design the handshaking process for connection establishment and connection release.
CO5	Demonstrate for common services, system services, such as name and address lookups, and communications applications.

Subject/Code No: DESIGN AND ANALYSIS OF ALGORITHMS /6CS2
LTP: 2L+0T+0P Semester:6th
Course Outcome

CO Number	CO Definition
CO1	Evaluate the algorithm correctness and efficiency.
CO2	Apply Dynamic Programming to solve real time problems.
CO3	Formulation design and analysis of various pattern matching algorithms and of assignment problem.
CO4	Evaluate the randomized algorithm using Min-Cut, 2-SAT etc.
CO5	Identify behaviors of algorithms and the notion of various classes of algorithms.

Subject/Code No: THEORY OF COMPUTATION /6CS3
LTP: 3L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	Apply the knowledge of different types of grammar, along with the relationship among them.
CO2	Analyze the concept of regular expression and finite automaton
CO3	Generate the Context free grammar and Pushdown Automaton for evaluating the CFG.
CO4	Design Turing Machine in reference of Type-0 grammar
CO5	Apply the knowledge of Pumping Lemma Theorem

Subject/Code No: COMPUTER GRAPHICS AND MULTIMEDIA TECHNIQUES /6CS4
LTP: 2L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	Analyze basic of principles computer graphics, the geometrical and mathematical
CO2	Problems with reference to computers and evaluate various algorithmic solutions.
CO3	Implement transformation methods and clipping algorithms.
CO4	Analyze algorithms of Hidden Lines and Surfaces to create curves.
CO5	Implementation various illumination models and color models.

Subject/Code No: EMBEDDED SYSTEM DESIGN /6CS5
LTP: 3L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	Explore of working principle of embedded system, tool and components required to design an embedded system
CO2	Analyze Interrupt latency, scheduling architecture for embedded system design.
CO3	Analyze RTOS and Semaphore for embedded system design.
CO4	Apply knowledge about Hard real-time and soft real time system principles..
CO5	Apply knowledge of Embedded Software development tools for Host and target systems Like cross compilers, linkers, and locators for embedded systems and analyze In-circuit emulators and monitors.

Subject/Code No: ARTIFICIAL INTELLIGENCE /6CS6.2
LTP: 2L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	Analyze different approaches of AI important AI techniques, including in particular search, knowledge representation, planning and constraint management
CO2	Interpret the modern view of AI as the study of agents that receive percepts from the environment and perform actions.
CO3	Explore awareness of AI facing major challenges and the complexity of typical problems within the field.
CO4	Assess critically the techniques presented and apply them to real world problems.
CO5	Apply advance approach of AI such as intelligence system and expert system.

Subject/Code No: JAVA PROGRAMMING LAB /6CS7
LTP: 2L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	Understand fundamentals of java, and tools for program designing environments.
CO2	Apply concept of overloading, inheritance and access controls to class.
CO3	Apply the concept of interfaces and importing the packages in java.
CO4	Design the application by handling files, Exceptions and threads.
CO5	Develop the applications using applets and design some polygons.

Subject/Code No: COMPUTER GRAPHICS AND MULTIMEDIA TECHNIQUES LAB /6CS8
LTP: 0L+0T+3P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	To Implement of program functions to draw different graphics primitives.
CO2	To analysis of various graphics drawing algorithms to draw basic objects of graphics.
CO3	To apply various transformations techniques on graphical objects.
CO4	To apply various clipping algorithms and then filling methods on various graphical objects.
CO5	To design and create a small applications in programming language.

Subject/Code No: DESIGN AND ANALYSIS OF ALGORITHMS LAB /6CS9
LTP: 0L+0T+3P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	Analyze the complexity of the basic algorithms.
CO2	Apply sorting algorithms on real time problem.
CO3	Create binary search tree using various algorithms.
CO4	Implement minimum spanning tree algorithms
CO5	Analyze the complexity of the basic algorithms.

Subject/Code No: EMBEDDED SYSTEM DESIGN LAB /6CS10
LTP: 0L+0T+3P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	Demonstrate the selection procedure of Processors in the Embedded domain.
CO2	Develop existing embedded systems by formulating the system design problem including the design constraints.
CO3	Develop the embedded systems platform for future applications.
CO4	Implementing several embedded systems with particular focus on the interaction between multiple devices.
CO5	Visualize the role of Real time Operating Systems in Embedded System.

Subject/Code No: HUMANITIES AND SOCIAL SCIENCE/6CS11
LTP: 0L+0T+3P Semester: 6th
Course Outcome

CO Number	CO Definition
CO1	List various data types in python and use them to solve basic python programs.
CO2	Describe Conditional statements and Looping structures concepts in python and apply these to create searching and sorting programs.
CO3	Explain usage of List, Tuples, Set, Dictionary and Strings and use these to solve programming problems in different ways.
CO4	Discuss file handling concepts and apply them to create basic data handling programs.
CO5	Understand various built-in python functions and formulate user-defined functions.

Subject/Code No: Cloud Computing/7CS1A
LTP: 3L+0T+0PSemester: 7th
Course Outcome

CO Number	CO Definition
CO1	Recognize the progression of cloud computing and its practical uses over time
CO2	Evaluate the structure, framework, and various models of cloud computing's design and architecture.
CO3	Measure an appraisal of virtualization technology and data centers, including their applications within the context of cloud computing.
CO4	Write the understanding of security concerning data, data centers, and cloud services.
CO5	Explain cloud services such as AWS and Google App Engine in terms of their integration capabilities with cloud applications.

Subject/Code No: Information Security System/7CS2A
LTP: 3L+0T+0P Semester: 7th
Course Outcome

CO Number	CO Definition
CO1	Identify services that enhance the security and its mechanism.
CO2	Classify security attacks on information over network. Describe and apply classical encryption techniques.
CO3	Compare conventional encryption algorithms & public key cryptography, and design Encryption algorithm to provide the Integration and confidentiality of a message.
CO4	Understand the concept of hash function with application and message authentication code in security system
CO5	Classify key management schemes and discuss web security and transport level security protocols.

Subject/Code No: Data Mining & ware Housing/7CS3A
LTP: 3L+0T+0P Semester: 7th
Course Outcome

CO Number	CO Definition
CO1	Apply preprocessing techniques over raw data and provide suitable input for range of data mining algorithms.
CO2	Apply appropriate association rule mining algorithms & statistical measures on data.
CO3	Create solutions to real life problems using different data mining techniques like classification, prediction & clustering.
CO4	Design data warehouse with dimensional modeling
CO5	Apply OLAP operations & Discover the knowledge imbibed in the high dimensional system.

Subject/Code No: Computer Aided Design for VLSI/7CS4A
LTP: 3L+0T+0P Semester: 7th
Course Outcome

CO Number	CO Definition
CO1	Analyze digital circuits, incorporating into a VLSI chip. also expected to understand various design methodologies such as custom, semi-custom, standard cell, arrayed logic, sea-of-gates.
CO2	Explore various contemporary techniques for the design, Simulation.
CO3	Apply simulation, synthesis and optimization on digital circuit.
CO4	Design the Layout, routing, placement of a VLSI Chip.
CO5	Optimize performance of h/w through CAD tools with floor planning, placement and routing.

Subject/Code No: Compiler Construction/7CS5A
LTP: 3L+0T+0P Semester: 7th
Course Outcome

CO Number	CO Definition
CO1	Analysis the working of compiler by understanding its different phases.
CO2	Apply and implement different types of Parsing algorithms.
CO3	Evaluate between different types of Intermediate code generations.
CO4	Classify the different storage organization techniques
CO5	Analyze the different issues in the design of the code generator and basic block control flow graph.

Subject/Code No: Advance Database Management Systems/7CS6.1A
LTP: 3L+0T+0P Semester: 7th
Course Outcome

CO Number	CO Definition
CO1	Analyze the processes involved in query optimization which impact on database operation and design
CO2	Analyze the database functions and packages suitable for enterprise database application development and management
CO3	Evaluate alternative designs and architectures for databases.
CO4	Apply the database solutions for data access and its Security measures.
CO5	Create the design of database systems for the solution of an applications.

Subject/Code No: Web Development Lab/7CS7A
LTP: 0L+0T+2P Semester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition
CO1	Apply the basic knowledge of web development using knowledge of HTML and CSS elements.
CO2	Create student registration form entry using validation through JavaScript.
CO3	Identify basic configuration of Web Servers. Design a dynamic web page using JSP, PHP and ASP
CO4	Analysis and Interpretation for Dynamic Web Page using JSP and JDBC.
CO5	Apply the concept of Session in Web Page and demonstrate the knowledge of Ajax development.

Subject/Code No: VLSI Physical Design Lab/7CS8A
LTP: 0L+0T+3P Semester: 7th
Course Outcome

CO Number	CO Definition
CO1	Design digital circuits, incorporating into a VLSI chip.
CO2	Explore various contemporary techniques for the design, Simulation.
CO3	Apply simulation, synthesis and optimization of digital circuit.
CO4	Implementation and Design the Layout, routing, placement of a VLSI Chip.
CO5	Optimize performance of h/w through CAD tools with floor planning, placement and routing.

Subject/Code No: Compiler Design Lab/7CS9A
LTP: 0L+0T+3P Semester: 7th
Course Outcome

CO Number	CO Definition
CO1	Identify different kinds of tokens and lexemes.
CO2	Analyze scanning by using the concept of finite state automation, parse tree.
CO3	Deploy intermediate code for various statements in a programming language concept
CO4	Deploy heap structure for storage
CO5	Deploy various language patterns using lex tools they are also able to parse.

Subject/Code No: Mobile Computing/8CS1A
LTP: 3L+0T+0P Semester:8th
Course Outcome

CO Number	CO Definition
CO1	Analyze the principles of mobile computing technologies and Evaluate Mobility management Techniques.
CO	Interpret Data dissemination and management and evaluate mobile middleware.
CO3	Assess Service Discovery and Evaluate standardization Methods.
CO4	Apply Mobile IP, Mobile TCP, Database systems in mobile environments, and assess World Wide Web.
CO5	Analyze Ad Hoc networks, evaluate and practice Routing protocols.

Subject/Code No: Digital Image Processing/8CS2A
LTP: 3L+0T+0P Semester: 8th
Course Outcome

CO Number	CO Definition
CO1	Illustrate the fundamental concepts of Digital Image Processing System
CO2	Demonstrate various transformations and filtering techniques on Images in different domains.
CO3	Distinguish the causes for image degradation and compare the image restoration techniques.
CO4	Distinguish various image compression and segmentation techniques.
CO5	Categorize different image segmentation and representation algorithms and techniques

Subject/Code No: Distributed System/8CS3A
LTP: 3L+0T+0P Semester: 8th
Course Outcome

CO Number	CO Definition
CO1	Illustration of various architectures used to design distributed systems along with different types of operating systems.
CO2	Analysis of concurrent programming with inter process communication techniques, such as remote method invocation, remote events.
CO3	Evaluation of various distributed file system through case studies.
CO4	Analysis of distributed shared memory models and their failures in distributed computation.
CO5	Analyze various faults and their consequences and replicated data management through exploration different types of Distributed Systems.

Subject/Code No: Real Time System/8CS4.2A
LTP: 3L+0T+0P Semester: 8th
Course Outcome

CO Number	CO Definition
CO1	Analyze the concepts of Real-Time systems and modeling
CO2	Explore the functionality in real-time systems, their architecture and inner behavior.
CO3	Evaluate the multi-task scheduling algorithms for periodic tasks performance of scheduling.
CO4	Apply scheduling algorithms for aperiodic, and sporadic tasks as well as examine the impact of scheduling
CO5	Design of protocols related to real-time communication

Subject/Code No: UNIX NETWORK PROGRAMMING & SIMULATION LAB/8CS5A
LTP: 0L+0T+3P Semester: 8th
Course Outcome

CO Number	CO Definition
CO1	Analyze the functionality of various distributions of Unix via. BSD, POSIX.
CO2	Develop the programs for client and server involving UDP/TCP sockets using socket programming.
CO3	Evaluate interoperability between IPV4 & IPV6.
CO4	Implement the functionality of FORK function for system call
CO5	Evaluate the communication between client and server using Network Simulator.

Subject/Code No: FPGA LAB/8CS6A
LTP: 0L+0T+3P Semester: 8th
Course Outcome

CO Number	CO Definition
CO1	Design the various continuous, discrete analog and digital signals with the use of sampling and quantization
CO2	Evaluate the various parameters of the different signals
CO3	Design the various filters and calculate the parameter for their characteristics.
CO4	Apply digital design flows for system design and recognize the trade-offs involved Design state machines to control complex systems
CO5	Simulate the transmission and reception of signal of different digital modulation techniques

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Subject/Code No: Digital Image Processing Lab/8CS7A
LTP: 0L+0T+2P Semester: 8th
Course Outcome

CO Number	CO Definition
CO1	Apply image enhancement operation and image Arithmetic Operations on a given image
CO2	Demonstrate image restoration and histogram processing on images
CO3	Distinguish and compare various Noise and filtering algorithms on images
CO4	Illustrate image restoration and segmentation techniques on an image
CO5	Apply pattern recognition techniques on images using features extraction

Bachelor of Technology in Civil Engineering

Program Name: Civil Engineering
Session: 2018-19

S. No.	Course Code	Course Name	CO No.	Course Outcomes
1	3CE2-01	Advance Engineering Mathematics-I	CO 1	Conduct investigations on interpolation and numerical integration based real world problems.
			CO 2	Analyse the various numerical methods and evaluate solution of problems based on differential equations, polynomial equations and Transcendental equations.
			CO 3	Evaluate Laplace transform and inverse Laplace transforms to solve Initial Value Problem (IVP).
			CO 4	Apply Fourier transforms and inverse Fourier transforms to solve Initial Value Problem (IVP) and Boundary Value Problem (BVP).
			CO 5	Apply Z-transform in discrete system and evaluate solution of problems based on recurrence relations.
2	3CE1-02	Technical Communication	CO 1	Apply basics of grammar, common error in writing and speaking, study of advanced grammar, editing strategies to achieve appropriate technical style of official documents such as Project Reports, Manuals, and Minutes of Meetings.
			CO 2	Investigate, judge and assess their linguistic ability which will get enhanced by Identifying key principles and delivery techniques of effective public speaking (listening, speaking, writing, reading)
			CO 3	Outline Notes and create different kinds of technical documents, plan information collection along with analyzing factors and strategies for Information design and document design in a organization.
			CO 4	Create emails and memos intended for an audience within the same company or team as well as to design Resume, Job Application, and Technical Reports.
			CO 5	Apply and Analyse the relation between load, shear force, bending moment and slope deflection.
3	3CE3-04	Engineering Mechanics	CO 1	Analyse and evaluate Fundamental laws of mechanics.
			CO 2	Evaluate structure by methods of joints and method of section.
			CO 3	Differentiate the concept of Moment of Inertia of any section.
			CO 4	Analyse the principal of virtual works, different types of friction, Spring and their arrangement
			CO 5	Relate stresses and strain for a structure.

4	3CE4-05	Surveying	CO 1	Analyse the importance of surveying and apply the methods for measuring angles and directions using various instruments.
			CO 2	Evaluate RL using levelling instruments of a given area.
			CO 3	Analyse the different type of curve in field.
			CO 4	Apply the concept of tachometry and photogrammetric in field.
			CO 5	Create the setting out of work using different instruments (Total station and EDM).
5	3CE4-06	Fluid Mechanics	CO 1	Understand various types of fluid and its properties.
			CO 2	Apply & Analyse various pressures at a point in a static fluid, equilibrium condition and stability concept for floating bodies.
			CO 3	Explain types, behaviour and various phenomenon to estimate the fluid discharge.
			CO 4	Apply the concept of Euler, Bernoulli's and momentum equation.
			CO 5	Evaluate the concept of laminar flow through pipes, its characteristics and losses.
6	3CE4-07	Building Materials and Construction	CO 1	Understand various types of fluid and its properties.
			CO 2	Apply & Analyse various pressures at a point in a static fluid, equilibrium condition and stability concept for floating bodies.
			CO 3	Explain types, behaviour and various phenomenon to estimate the fluid discharge.
			CO 4	Apply the concept of Euler, Bernoulli's and momentum equation.
			CO 5	Evaluate the concept of laminar flow through pipes, its characteristics and losses.
7	3CE4-08	Engineering Geology	CO 1	Understand and evaluate the geology: Branches and Scope of Geology and the concepts of various geological materials and weathering processes.
			CO 2	Analyse and evaluate the properties, behaviour and engineering significance of different type of rocks and minerals.
			CO 3	Interpret and Analyse different type of geological features: Fold, Fault, Joints and Unconformities.
			CO 4	Relate and evaluate Geophysical methods for Subsurface Analysis and understand the site selection parameters for Dam& Tunnel.
			CO 5	Create and evaluate the basic concept of remote sensing & GIS in various fields of Civil Engineering.
8	3CE4-21	Surveying Lab	CO1	Use different conventional instruments of measurements in surveying in length, angle, levelling measurements.
			CO2	Apply the procedures involved in field work and to work as a surveying team.
			CO3	Determine the Height of an object by trigonometric levelling
			CO4	Discuss and determine the modern tool of measurement in surveying like EDM, Total station etc.
			CO5	Conduct a survey, collect field data and plot them on a paper

9	3CE4-22	Fluid Mechanics Lab	**CO1**	Able to demonstrate the basic properties and characteristics of incompressible fluid in laboratory.
			CO2	Able to demonstrate fundamental theorems governing fluid flows i.e., continuity, energy and momentum in laboratory.
			CO3	Able to measure different fluid properties using various type of equipment's like measurement of flow, pressure velocity and head loss.
			CO4	Classify the various pressure measuring devices.
10	3CE4-23	Computer Aided Civil Engineering Drawing	**CO1**	Draw Orthographic projections of Lines, Planes, and Solids
			CO2	Construct Isometric Scale, Isometric Projections and Views
			CO3	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids
			CO4	Draw projections of lines, planes, solids, isometric projections and sections of solids including Cylinders, cones, prisms and pyramids using AutoCAD
11	3CE4-24	Civil Engineering Materials Lab	**CO1**	To study about selection criteria and uses of common building stones and dressing of stones.
			CO2	To understand the types and properties of bricks and their determination as per IS code such as water absorption, compressive strength, effloresces, dimension and tolerance test.
			CO3	To know raw material of cements.
			CO4	To study the various properties of material i.e glass, kotastone etc.
12	3CE4-25	Geology Lab	**CO1**	Students should be able to learn the significance of earth and its minerals.
			CO2	Students should be able to learn the significance of rocks and its engineering properties.
			CO3	Students should be able to understand the application of geology knowledge to civil engineering construction.
			CO4	To know about various applications of remote sensing techniques.
13	4CE2-01	Advance Engineering Mathematics-II	**CO 1**	Apply concept of probability and evaluate solutions of real world problems.
			CO 2	Analyse standard probability distributions and evaluate solutions of real world problems.
			CO 3	Estimate the relationship between variables of databases of the problems in quantify and qualitative forms and solve problems by methods of correlation, regression and Rank correlation.
			CO 4	Explore the relationship between variables of databases of the problems and evaluate standard form of the problem by the method of least squares (Method of curve fitting).
			CO 5	Conduct investigation on hypothesis testing in statistical problems and evaluate solution of problem in appropriate form.

14	4CE1-03	Managerial Economics & Financial	**CO 1**	Determine the objectives, nature, scope, role & responsibilities of a manager of a business undertaking.
			CO 2	Predict the demand for a product or product mix of a company & to Analyse various factors influencing demand elasticity. Forecast & compute the future sales level of a product by using various quantitative & qualitative techniques and with the help of past sales data.
			CO 3	Differentiate the meaning, importance, sources, & uses of capital in an enterprise and to estimate the working capital requirements.
			CO 4	Know the meaning, importance, steps, methods, uses & limitations of Capital Budgeting & Market Structure.
			CO 5	Interpret, Analyse, discuss & comment on the financial performance of a business unit through liquidity leverage, coverage, turn over & profitability ratios.
15	4CE3-04	Basic Electronics for Civil Engineering Applications	**CO 1**	Understand the concepts of Digital Electronics.
			CO 2	Interpret the Basic Electronics in measurements in Civil Engineering applications.
			CO 3	Analyse and equip with Errors in measurements systems and to expose to Data Acquisition and Processing.
			CO 4	Apply skills of Sensors and to explain Various Sensor Characteristics.
			CO 5	To share them Image processing Tools and Mat lab codes on Images.
16	4CE4-05	Strength of Materials	**CO 1**	Understand and apply the concept of stress and strains and to evaluate stress and strains in different members.
			CO 2	Apply and Analyse the Bending moment, Shear force and Axial thrust diagrams for statically determinate beams and the distribution of bending and shear stresses for simple and composite sections.
			CO 3	Interpret and compare the elementary concepts of torsion, shear stress in solid and hollow circular shafts.
			CO 4	Evaluate the short and long columns subjected to various loading conditions.
			CO 5	Apply and Analyse the relation between load, shear force, bending moment and slope deflection.
17	4CE4-06	Hydraulics Engineering	**CO 1**	Understand dimensional analysis and Analyse the various models, concepts and characteristics of boundary layer and turbulent flow.
			CO 2	Classify steady, unsteady, uniform and non-uniform flow, to apply and evaluate gradually and rapidly varied flow in open channel flow
			CO 3	Identify about the working of hydraulic machines like pumps, turbines: To apply and relate the performance of hydraulic machines
			CO 4	Describe about hydrological phenomenon, unit hydrograph, Analyse the rainfall, and properties of aquifer: to Analyse and estimate the runoff and peak runoff rate.
			CO 5	Apply and estimate water requirement, delta, duty and base and various aspects of Design of Canal: To understand various approaches of cross section of channels and silt control in canals and Analyse Kennedy's theory and Lacey's theory.

18	4CE4-07	Building Planning	**CO 1**	Understand and Analyse the different types of buildings, criteria for location and site selection and the different methods of drawing sun chart and sun shading devices.
			CO 2	Apply and Analyse the Climatic and comfort Consideration using climate modulating devices and evaluate the orientation criteria for tropical climate with the consideration of Building Bye Laws and NBC Regulations.
			CO 3	Evaluate the principles of Planning and different factors affecting planning including Vastu Shastra in Modern Building planning.
			CO 4	Interpret and compare the functional design and Accommodation requirements of different Buildings.
			CO 5	Relate the Services in Buildings.
19	4CE4-08	Concrete Technology	**CO 1**	Apply the knowledge of properties and role of various ingredients like cement, aggregate, admixtures etc. to produce good quality concrete.
			CO 2	Analyse properties of fresh and harden concrete by examining in lab and perform destructive, semi-destructive and non-destructive tests for concrete.
			CO 3	Categorize the concrete manufacturing process and selecting right step by step process to achieve workable, durable of fresh and harden concrete.
			CO 4	Design the concrete mix with suitable chemical admixture; this fulfils the required properties for fresh and hardened concrete.
			CO 5	Create the advance concrete and develop such concrete by adding and manipulating composition.
20	4CE4-21	Material Testing Lab	**CO1**	Explain basic properties of materials.
			CO2	Identify the test to be conducted for different properties of building materials.
			CO3	Test for different properties of building materials.
			CO4	Analyse the test results for different properties.
21	4CE4-22	Hydraulics Engineering Lab	**CO1**	Describe the equipments used for behaviour and measurement of fluid in hydraulic structure
			CO2	Apply characteristics of Pelton Wheel ,hydraulic jump and Centrifugal Pump in civil engineering
			CO3	Analyse the discharge by using various instruments like venturimeter Broad crested weir.
			CO4	Evaluate momentum equation, Manning'& Chezy's coefficient of roughness for the bed of a given flume.
22	4CE4-23	Building Drawing	**CO1**	Create drawing of basic components of buildings.
			CO2	Identify the components of different buildings required as per their functional need.
			CO3	Create drawing of building masonry.
			CO4	Draw the plan, section and elevation of a building

23	4CE4-24	Advanced Surveying Lab	**CO1**	Identify the instruments required for a particular survey problem
			CO2	Device a method to fulfill the desired objective.
			CO3	Conduct the survey experiment using appropriate instruments and procedure.
			CO4	Analyse the data obtained and get the results after necessary computations.
24	4CE4-25	Concrete Lab	**CO1**	Explain the Quality control test on ingredients of concrete.
			CO2	Conduct Quality Control test on ingredients of fresh and hardened concrete.
			CO3	Analyse the test on fresh and hardened concrete and Non-destructive test on concrete.
			CO4	Design the concrete mix.
25	5CE1A	Theory of Structures-I	**CO 1**	Apply the basic concept of Static and Kinematic determinacy and to, analyze & differentiate the beam and frame among various classical methods.
			CO 2	Apply, Analyze & Interpret the data for simply supported Continuous beam by Moment Distribution method.
			CO 3	Differentiate among various types of structures and Examine & Produce the Structure by Strain Energy method and Unit Load Method.
			CO 4	Implement and categorized the structure by Column Analogy and Kani's Method for beam and Frame Structures.
			CO 5	Analyze and Evaluate the Frame by using three different methods and Build & differentiate among these methods.
26	5CE2A	Environmental Engineering -I	**CO 1**	Apply the basic concept of Static and Kinematic determinacy and to, analyze & differentiate the beam and frame among various classical methods.
			CO 2	Apply, Analyze & Interpret the data for simply supported Continuous beam by Moment Distribution method.
			CO 3	Differentiate among various types of structures and Examine & Produce the Structure by Strain Energy method and Unit Load Method.
			CO 4	Implement and categorized the structure by Column Analogy and Kani's Method for beam and Frame Structures.
			CO 5	Analyze and Evaluate the Frame by using three different methods and Build & differentiate among these methods.
27	5CE3A	Geotechnical Engineering -I	**CO 1**	Apply the properties of soil like water content, specific gravity, void ratio etc.
			CO 2	Analyze the different types of structures of soil, concept of Capillary and Permeability.
			CO 3	Apply and analyze the different types of stresses in soil.
			CO 4	Identify the Shear strength of soil and different tests of soil on Shear strength.
			CO 5	Apply and analyze the Principles of soil compaction and soil stabilization

28	5CE4A	Surveying II	**CO 1**	Evaluate trigonometric formulas for leveling: RL for various field and instrument conditions.
			CO 2	Analyze the different types of curves.
			CO 3	Analyze the triangulation with proper station requirements for surveying.
			CO 4	Analyze various errors in measurement of angles, distances and reduce levels
			CO 5	Apply field astronomy using modern instruments
29	5CE5A	Building Design	**CO 1**	Apply the concept of design loads & structural Systems.
			CO 2	Analyze the concept of lateral loads in respect of wind load
			CO 3	Implement and analyze the concept of lateral loads in respect of Earthquake loads
			CO 4	Analyze & evaluate of masonry and framed buildings
			CO 5	Analyze & evaluate of mass housing and special roofs with different types
30	5CE6.3A	Solid Waste Management	**CO 1**	Apply the concept of design loads & structural Systems.
			CO 2	Analyze the concept of lateral loads in respect of wind load
			CO 3	Implement and analyze the concept of lateral loads in respect of Earthquake loads
			CO 4	Analyze & evaluate of masonry and framed buildings
			CO 5	Analyze & evaluate of mass housing and special roofs with different types
31	5CE7A	Environmental Engineering Lab-I	**LO1**	Explain the quality parameters of water and unit processes for the treatment of water.
			LO2	Analyse the characteristics and quality parameters of water with the help of tests.
			LO3	Design different water and waste water treatment unit processes.
32	5CE8A	Geotechnical Engineering Lab-I	**LO1**	Understand the procedure to classify the coarse grained and fine grained soil.
			LO2	Evaluate the index properties of soil.
			LO3	Determine the engineering properties of soil.
33	5CE9A	Surveying Lab-II	**LO1**	Conduct survey and collect field data
			LO2	Prepare field notes from survey data
			LO3	Interpret survey data and compute areas and volumes
34	5CE10A	Computer Aided Building Design	**LO1**	Draw Orthographic projections of Lines, Planes, and Solids
			LO2	Construct Isometric Scale, Isometric Projections and Views
			LO3	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids
			LO4	Draw projections of lines, planes, solids, isometric projections and sections of solids including Cylinders, cones, prisms and pyramids using AutoCAD
35	5CE11A	Structural Engineering Lab	**LO1**	Verify theoretical formulas by conducting experiments.
			LO2	Analyze statically determinate beams, trusses.
			LO3	Students will be able to analyze arch structures.
			LO4	Obtain the influence lines for statically determinate and indeterminate structures. 5. Determine deflections of beams and frames using classical methods

36	6CE1A	TOS-II	**CO 1**	Apply the basic principles of SFD & BMD for the rolling loads and mathematical problems with reference to rolling loads and ILD.
			CO 2	Distinguish between types of arches and evaluate the stability of arches.
			CO 3	Classify the concept of cables and suspension bridges.
			CO 4	Analyze the concept of unsymmetrical bending and shear centre.
			CO 5	Apply the matrix method for displacement calculations in structures.
37	6CE2A	Geotechnical Engineering-II	**CO 1**	Apply and evaluate stresses in soil under surface loadings by different methods of analysis.
			CO 2	Apply and evaluate the concept of compressibility & consolidation under different conditions.
			CO 3	Classify the different types of slopes and their stability.
			CO 4	Apply and analyze the earth pressure theory.
			CO 5	Identify and apply the various methods of estimation of bearing capacity of shallow foundation at different loadings and water level conditions using different methods.
38	6CE3A	Environmental Engineering-II	**CO 1**	Evaluate the various wastewater parameters and sewage quality parameters with creation of the quality assessment equipment.
			CO 2	Analyze the various types of sewerage system with application of the hydraulic design of sewer lines in various terrain.
			CO 3	Apply and analyze the various treatment processes for wastewater with consideration of sustainable or economical uses.
			CO 4	Classify the various methods for disposal of sewage by dilution, self purification and sewage farming and evaluating the various types of plumbing systems in buildings.
			CO 5	Identify the practical solutions of the air and noise pollution with the effective solution for reduction of pollution and also differentiate the pollution of greenhouse effect and acid rain.
39	6CE4A	Design of Concrete Structure-I	**CO 1**	Use the stress strain behaviour of steel and concrete & concept of working stress and limit state methods.
			CO 2	Analyzing the singly and doubly reinforced beam.
			CO 3	Apply limit state design for flexure, shear, torsion, bond and anchorage and development length.
			CO 4	Classify one way and two way concrete slab according IS 456 -2000.
			CO 5	Analyze the behaviour of columns subjected to eccentric load and use of interaction diagrams and study the design of various foundations.

40	6CE5A	Transportation engineering-I	**CO 1**	Discuss the planning, characteristics and development of the transportation system.
			CO 2	Analyze the various properties, procedures of road construction material and equipment.
			CO 3	Classify the various road cross section elements and curves.
			CO 4	Analyse the several road traffic engineering studies and awareness regarding design of informatory and warning indications.
			CO 5	Design the plain and hilly pavement by various methods considering different factors.
41	6CE6.1A	Remote Sensing & GIS	**CO 1**	Evaluate Photogrammetric and apply principles of Photogrammetric to create maps and their substitutes
			CO 2	Analyze the basic concept of remote sensing.
			CO 3	Evaluate and analyse different types of platforms, sensors and their characteristics in Remote Sensing.
			CO 4	Analyze and create the different type of information from different remote sensing data products using various image processing techniques.
			CO 5	Create the basic concept of GIS and analyze the use of GIS tools for civil engineering purposes.
42	6CE7A	Geotechnical Engineering Lab-II	**LO1**	Implement and analyze the properties of soil such as Grain size distribution, specific Gravity, liquid limit, plastic limit and density etc.
			LO2	Classify C-Ø values by unconfined compression Test Apparatus, Direct Shear Test Apparatus and Triaxial Test.
			LO3	Evaluate the differential free swell index, swelling pressure, CBR of soil.
			LO4	Interpret the compressibility parameters of soil by consolidation test,permeability of soil by constant and falling head methods.
			LO5	Apply and analyze the Design concepts.
43	6CE8A	Environmental Engineering Lab-II	**LO1**	LO1: Define water and waste water treatment plant process and design
			LO2	LO2: Discuss various methods to measure air, noise, water and waste water pollution
			LO3	LO3: Apply various equipment, technology to demonstrate air , noise pollution, water and waste water treatment process
			LO4	LO4: Examine and analyze the quantification of air and noise pollutants, water and waste water pollution
44	6CE9A	Concrete Structures Design-I	**LO1**	Assess the bending moment and shear force for beams, columns, slabs and footings.
			LO2	Analyze the design parameters of the flexural members to fulfill the requirements of WSM and Limit state of Collapse for Flexure, shear and torsion.
			LO3	Design of flexural members for flexure, shear, bond, development length & curtailment of bar to fulfill the criteria of Limit State of Collapse for Flexure, shear and Torsion.
			LO4	Analyze and design of column and column footings economically and suitably recommend the appropriate type according to site conditions
			LO5	Analyze and design of RCC components and Building with using Software tools

45	6CE10A	Road Material Testing Lab	**LO1**	Characterization of the pavement materials
			LO2	Perform quality control tests on pavements and pavement materials
			LO3	Estimate earth work from longitudinal and cross-section details of design grade intersections
46	7CE1A	Water Resources Engineering-I	**CO 1**	Apply and analyze the functions, advantages of present status of irrigation in India and water harvesting and conservation.
			CO 2	Discuss the role of command area development authority and Canal Irrigation. To Analyze and Evaluate the design of channels, regime and semi theoretical approaches.
			CO 3	Apply and Distribution of Canal Water. To apply and evaluate different stages of rivers, and river training & bank protection works.
			CO 4	Analyze and Apply Water Logging Causes and types of channels lining and design of lined channels.
			CO 5	Use the Hydrology and Hydrologic cycle and evaluate Application to Engineering problems, measurement of rainfall, rain gauge, peak flow, flood frequency method
47	7CE2A	Design of Steel Structures-I	**CO 1**	Apply and analyze the types of steel, their broad specifications and Plastic analysis of steel structures.
			CO 2	Design the bolted and welded connections under axial and eccentric loadings.
			CO 3	Implement and analyze the Compression Member.
			CO 4	Classify and design the beams and their connections.
			CO 5	Analyze the column bases, Slab base, gusseted base for axial and eccentric compressive load.
48	7CE3A	Design of Concrete Structures-II	**CO 1**	Compare the concept of Pre-Tension & Post- Tension concrete and students are able to Analyze and Apply the concept of Pre-Tension & Post- Tension on rectangular Prestressed concrete Section.
			CO 2	Classify Torsion and different types of beam and Analyse & Evaluate the three types of Beams by using Indian Standard Code:456-2000.
			CO 3	Differentiate and apply the types of Tank and Dome using Indian Standard code: 3370-Part2-2009.
			CO 4	Describe the basic concept of Yield Line Theory & its applications & students are able to differentiate, Evaluate and analyse the different types of Retaining walls.
			CO 5	Classify the bridge and Culvert and students are able to apply and analyse the slab culvert and T- Bridge for IRC Loading by using Indian Stand Code: IRC 6-1966 and IRC 21-2000.
49	7CE4A	Transportation engineering-II	**CO 1**	Classify the various permanent way components, features, maintenance, and signal systems.
			CO 2	Apply and design the points and crossings, at surface, elevated and underground railway system conditions.
			CO 3	Design the various geometric attributes and gauge widening in the railway system.
			CO 4	Analyze the several components of airport engineering.
			CO 5	Design airport pavement by using various methods.

50	7CE5A	Application of Numerical Methods in Civil Engineering	**CO 1**	Discuss the decimal and binary number system and understand the concept of Accuracy, Errors and approximations for solution of problems.
			CO 2	Explain basic concepts of iterative methods and apply appropriate iterative methods for numerical solutions of nonlinear equations.
			CO 3	Execute the basic concept of matrices and understand consistency of the system of equations for solving linear systems of equations by direct methods.
			CO 4	Apply the concept of iterative methods and create the approximate solution of the linear system of equations by use of appropriate iterative methods.
			CO 5	Discuss the concept of finite differences, analyze the various methods and apply knowledge of interpolation for solution of engineering problems.
51	7CE6.1A	Advanced Transportation Engineering	**CO 1**	Classify the different traffic studies and also to apply & analyze the traffic data by various methods.
			CO 2	Apply the various methods for traffic engineering and also to solve out the problems based on distribution.
			CO 3	Analyze the principles of roads & signals and also design the various roads and signals in traffic engineering.
			CO 4	Analyze the various traffic laws and regulations & also to evaluate the various types of markings and signs.
			CO 5	Evaluate the effect of traffic on the environment and to understand & remember the various road safety measures.
52	7CEPR	Project-I	**LO1**	Team work to select an engineering problem and its solution
			LO2	Formulate the problem and design using modern technologies and new software learning
			LO3	Develop the engineering solutions by considering society and environment
			LO4	Applying solution considering societal, health, safety, legal and cultural issues
			LO5	Analysis and explanation of data to provide the valid conclusions.
			LO6	Use of management principles in project functioning and consider the multidisciplinary environments.
			LO7	To work effectively in Project as an individual member and team by following the ethical principles
			LO8	Communicate effectively for various activities with help of reports, presentations and verbal communication that can help in life-long learning.
53	7CE7A	Design of Water Resource Structures-I	**LO1**	LO1) Explain the basic concept of water resource engineering, canals, dams, well irrigation, cross drainage structure and hydrology.
			LO2	LO2) Apply the water resource concept in irrigation system, canals, diversion head works, dams, well irrigation, cross-drainage structure and hydrology.
			LO3	LO3) Analyze the water requirement of crop, seepage losses in dam, forces acting on dam, run off and rain fall.
			LO4	LO4) Design of canal, surface and subsurface flows, dams like embankment and gravity dam, tube well.

54	7CE8A	Steel Structures Design-I	**LO1**	Analyze steel sections used in steel structures and the suitable sections for design.
			LO2	Analyzing the different kinds of connection used in steel structures and being able to create the compression and tension member.
			LO3	Create the laterally supported and unsupported steel beams and analyze the gantry girder, plate girder and laterally loaded steel members.
			LO4	Analyze and apply the different type's column bases.
			LO5	Analyze and create the truss girder and foot over bridge.
55	7CE9A	Concrete Structures Design-II	**LO1**	To understanding basic philosophy of Working Stress and Limit State Design of RCC structures.
			LO2	To design different structural components like beams, columns, slabs etc.
			LO3	To design different structural frames.
56	7CE10A	Application of Numerical Methods in Civil Engineerinng Lab	**LO1**	To know about how to make engineering easy and more interesting.
			LO2	To understand application of numerical methods.
			LO3	To application of numerical methods to make program in language C.
57	7CETR	Practical Training & Industrial Visit	**LO1**	Participate in the projects in industries during his or her industrial training.
			LO2	Describe use of advanced tools and techniques encountered during industrial training and visit.
			LO3	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.
			LO4	Develop awareness about general workplace behavior and build interpersonal and team skills.
			LO5	Prepare professional work reports and presentations.
58	7CEPR	Project-I	**CO 1**	Team work to select an engineering problem and its solution
			CO 2	Formulate the problem and design using modern technologies and new software learning
			CO 3	Develop the engineering solutions by considering society and environment
			CO 4	Applying solution considering societal, health, safety, legal and cultural issues
			CO 5	Analysis and explanation of data to provide the valid conclusions.
			CO 6	Use of management principles in project functioning and consider the multidisciplinary environments.
			CO 7	To work effectively in Project as an individual member and team by following the ethical principles
			CO 8	Communicate effectively for various activities with help of reports, presentations and verbal communication that can help in life-long learning.
59	8CE1A	Water Resources Engineering-II	**CO 1**	Classify and design the Regulation of works and Drainage Structure.
			CO 2	Apply and analyze the surface and subsurface flows, using Bligh's and Khosla's theory, also describe the weirs and barrages.
			CO 3	Implement and analyze the Embankment Dams and Gravity Dams with the stability and seepage analysis.
			CO 4	Select and evaluate spillways and gates, general features of hydroelectric schemes, elements of power house structure, selection of turbines and cavitations.
			CO 5	Evaluate the impact of water projects on river regimes and environment. To analyze the Reservoir sedimentation and water shed management using optimization techniques and system approach and G.I.S. and Computer aided irrigation design.

60	8CE2A	Design of Steel Structures-II	**CO 1**	Differentiate the Gantry girder and Roof Truss and also Apply & analyse the Gantry girder and Roof Truss with help of Indian Standard Code: 800-2007, IS: 875-Part-III and understand the application of Tubular Sections.
			CO 2	Classify and evaluate the welded section & bolted Section using Design Specification IS: 800-2007.
			CO 3	Design the bridge, Categorization & Produced the Deck Type Bridge with help of Indian Standard Bridge Rule Code.
			CO 4	Design of bridge and differentiate the Foot over Bridge & Truss Girder Bridge with help of Indian Bridge Rule Code.
			CO 5	Differentiate explanation of the types of tank and analyse among these tank with the help of Indian Standard Code: IS 804-1967, IS 805-1968.
61	8CE3A	PPCM	**CO 1**	Discuss the financial evaluation of the project and also to differentiate the various construction project techniques.
			CO 2	Evaluate the different project management techniques and also analyze the methods of network for various projects.
			CO 3	Solve the problems related to project cost and time control and also to understand the cost and time for various projects.
			CO 4	Discuss the skills of contract management and also to evaluate the various contracts and tenders
			CO 5	Discover about the safety measures at construction sites and also to remember and understand the various environment and social aspects of construction projects.
62	8CE4.2A	Advance Foundation Engineering	**CO 1**	Discuss the various methods of estimation of bearing capacity of shallow foundation at different loading and water level conditions.
			CO 2	Evaluate the settlement under shallow foundation by various methods available with reference to Indian Standards.
			CO 3	Classify different types of pile with their use, modes of failure and to estimate bearing capacity and settlement of pile foundation at various conditions.
			CO 4	Analyze the behavior of collapsible and expansive soils also design practices of foundation for these soils.
			CO 5	Classify common types of raft, modes of failure and to measure bearing capacity, settlement of raft and well foundation at various conditions.
63	8CEPR	Project	**CO 1**	Team work to select an engineering problem and its solution
			CO 2	Formulate the problem and design using modern technologies and new software learning
			CO 3	Develop the engineering solutions by considering society and environment
			CO 4	Applying solution considering societal, health, safety, legal and cultural issues
			CO 5	Analysis and explanation of data to provide the valid conclusions.
			CO 6	Use of management principles in project functioning and consider the multidisciplinary environments.
			CO 7	To work effectively in Project as an individual member and team by following the ethical principles
			CO 8	Communicate effectively for various activities with help of reports, presentations and verbal communication that can help in life-long learning.

64	8CE5A	Design of Water Resource Structures-II	**LO 1**	Classify and design the Regulation of works and Drainage Structure.
			LO 2	Apply and analyze the surface and subsurface flows, using Bligh's and Khosla's theory, also describe the weirs and barrages.
			LO 3	Implement and analyze the Embankment Dams and Gravity Dams with the stability and seepage analysis.
			LO 4	Select and evaluate spillways and gates, general features of hydroelectric schemes, elements of power house structure, selection of turbines and cavitations.
			LO 5	Evaluate the impact of water projects on river regimes and environment. To analyze the Reservoir sedimentation and water shed management using optimization techniques and system approach and G.I.S. and Computer aided irrigation design.
65	8CE6A	Professional Practice & Estimating	**LO1**	Understand the basic concepts of Different types of Knots, Different types of plan layout in field and type of scaffolding and ladders.
			LO2	Identify the preparation Specification and bar bending schedule for reinforcement works.
			LO3	Analysis of Estimation and Valuation methods of buildings and properties.
66	8CE7A	Steel Structures Design-II	**LO1**	Explain the fundamental concept of structural steel, plastic analysis, basic steel structure elements, plate girder, gantry girder, roof trusses & truss girder bridges.
			LO2	Apply the concept of mechanism method, shape factor, connection types, basic steel structure elements, plate girder, gantry girder & roof trusses in steel structures.
			LO3	Analyze the basic steel structural members, plate girder, gantry girder, roof trusses and case studies on steel structures as per the concept of Indian Standard.
67	8CE8A	Design of Foundations	**LO1**	To understand the significance and determine the load bearing capacity for shallow foundation.
			LO2	To analyse the settlement behaviour of different type of soil.
			LO3	To calculate the load bearing capacity for deep foundation
			LO4	To apply the behaviour of different type of soil under different conditions.
			LO5	To design the various parameters of raft and well foundations
68	8CE9A	Structural Analysis by Matrix Methods	**LO1**	To distinguish statically determinate and redundant structural systems.
			LO2	To analyses a suitable method for the structural system.
			LO3	To calculate the forces in axially loaded member.
			LO4	To know the deflection in axially loaded member.
			LO5	To know the behavior of the frame and truss structure by flexibility and stiffness method
69	8CESM	Seminar	**LO1**	Discover potential research areas and conduct a survey of several available literatures in the preferred field of study.
			LO2	Compare and contrast the several existing solutions for research challenge.
			LO3	Report and present the findings of the study conducted in the preferred domain.

70	8CEPR	Project	**CO 1**	Team work to select an engineering problem and its solution
			CO 2	Formulate the problem and design using modern technologies and new software learning
			CO 3	Develop the engineering solutions by considering society and environment
			CO 4	Applying solution considering societal, health, safety, legal and cultural issues
			CO 5	Analysis and explanation of data to provide the valid conclusions.
			CO 6	Use of management principles in project functioning and consider the multidisciplinary environments.
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Bachelor of Technology in Electronics and Communication Engineering
Program Name: Electronics and Communication Engineering
Session: 2018-19

Second Year	
COURSE : 3EC2-01	**ADVANCED MATHEMATICS**
3EC2-01.1	Students will be able to find asymptotes of the curve.
3EC2-01.2	Students will be able to study the different characteristics of the Cartesian and polar curves.
3EC2-01.3	Students will be able to find area & volume of the bounded curves using integration and special function.
3EC2-01.4	Students will be able to solve the partial differentiation and they can use in error and approximation, also for maxima- minima of two variables.
3EC2-01.5	Students can apply the concept of displacement, velocity & acceleration as vectors and how to determine them, as well as able to convert one type of field to other type.
COURSE : 3EC1-02	**TECHNICAL COMMUNICATION**
3EC2-02.1	Students will be able to synthesize sentences in English, write Stories, Essays, Poems and other compositions.
3EC2-02.2	Students will be able to comprehend and compose professional reports, executive summaries paragraphs and will be able to develop effective conversation.
3EC2-02.3	Students can present themselves well in front of mass audience on a variety of topics including short stories.
3EC2-02.4	Students understand basics of structured conversation to make their point of views clear to the listeners in the form of essay writing.
3EC2-02.5	Students will be able to draw inferences from Stories , Poems and Articles and express that in their own words.
COURSE : 3EC3-04	**POWER GENERATION PROCESS**
3EC3-04.1	Students will be able to understand the various conventional power stations with their operation and their efficiency.
3EC3-04.2	Students will be able to understand various renewable and non-renewable sources and their impact on the environment.
3EC3-04.3	Students will be able to understand various loads and load curves along with load and diversity factor.
3EC3-04.4	Students will be able to understand various power factor improvement techniques.
3EC3-04.5	Students will be able to understand power plant economics along with various constraints.
COURSE : 3EC4-05	**ELECTRICAL CIRCUIT ANALYSIS**
3EC4-05.1	Students will be able to understand the concept of elementary idea of basic circuits.
3EC4-05.2	Students will be able to apply network theorems for solving complex problem in electrical networks.
3EC4-05.3	Students will able to understand 3 phase system.
3EC4-05.4	Students will be able to understand the applications of Fourier series in non-sinusoidal waves.
3EC4-05.5	Students will be able to understand time domain and frequency domain analysis of circuits.
COURSE : 3EC4-06	**ANALOG ELECTRONICS**
3EC4-06.1	Students will be able to understand the working of semiconductor devices and effective analysis of Fermi levels in PN junction.
3EC4-06.2	Students will be able to understand the concept of diodes and transistors with their characteristics and applications.

3EC4-06.3	Students will be able to understand application of diode and construction, characteristics and principle of UJT.
3EC4-06.4	Students will be able to understand the various parameter and configurations of transistors.
3EC4-06.5	Students will be able to understand the operating principle and analysis of JFET & MOSFET.
COURSE : 3EC4-07	**ELECTRICAL MACHINE-I**
3EC4-07.1	Understand electrical principle, laws, and working of DC machines
3EC4-07.2	Analyze the construction and characteristics and application of various type of DC generators
3EC4-07.3	Analyze the construction and characteristics and application of various type of DC motors and testing of motors according to Indian standard.
3EC4-07.4	Understand electrical principle, laws, and working of 1 phase transformer and losses and also conduct various test on the transformer.
3EC4-07.5	Understand electrical principle, laws, and working of 3 phase transformer and losses and also conduct various test on the transformer.
COURSE : 3EC4-08	**ELECTROMAGNETIC FIELD**
3EC4-08.1	Apply vector calculus in orthogonal coordinate system
3EC4-08.2	Analyze behavior of static electric fields in standard configurations.
3EC4-08.3	Analyze behavior of dynamic electric fields in standard configurations
3EC4-08.4	Analyze behavior of static magnetic fields in standard configurations
3EC4-08.5	Analyze behavior of dynamic magnetic fields in standard configurations
COURSE : 3EC4-21	**ANALOG ELECTRONICS LAB**
3EC4-21.1	Students will be able to understand the working and applications of basic electronics measuring devices.
3EC4-21.2	Students will be able to understand V-I characteristics of pn junction and zener diode along with applications.
3EC4-21.3	Students will be able to understand the characteristics of single stage and two stage RC coupled amplifier to determine various parameters.
3EC4-21.4	Students will be able to understand the working of half wave and bridge rectifier to determine various parameters.
3EC4-21.5	Students will be able to understand the characteristics of BJT in various configurations along with their operation and to calculate the various parameters.
COURSE : 3EC4-22	**ELECTRICAL MACHINE-I LAB**
3EC4-22.1	Understand electrical principle, laws, and working of DC machines
3EC4-22.2	Analyze the construction and characteristics and application of various type of DC generators
3EC4-22.3	Analyze the construction and characteristics and application of various type of DC motors and testing of motors according to Indian standard.
3EC4-22.4	Understand electrical principle , laws, and working of 1 phase transformer and losses . and also conduct various test on the transformer.
3EC4-22.5	Understand electrical principle , laws, and working of 3 phase transformer and losses . and also conduct various test on the transformer.
COURSE : 3EC4-23	**ELECTRICAL CIRCUIT DESIGN LAB**
3EC4-23.1	Students will be able to understand the basic circuit symbols and their functions.
3EC4-23.2	Students will be able to understand basic concept and verification of various AC & DC theorems.

3EC4-23.3	Students will be able to understand DC analysis of resistors networks.
3EC4-23.4	Students will be able to understand AC and transient analysis of RC and RL circuits.
3EC4-23.5	Students will be able to understand the concept of resonance circuits to determine various characrtristics.
COURSE : 4EC2-01	**BIOLOGY**
4EC2-01.1	Students will be able to understand fundamentals of Biology
4EC2-01.2	Students will be able to learn and understand the categorization of Biology
4EC2-01.3	Students will be able to learn basic concepts of genetics
4EC2-01.4	Students will be able to understand Biomolecules
COURSE : 4EC1-03	**MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING**
4EC1-03.1	Students will be able to understand the different aspects of political and contemporary issues.
4EC1-03.2	Students will be able to understand the social aspects important for livelihood.
4EC1-03.3	Students will be able to understand the basic concept of economics.
4EC1-03.4	Students will be able to understand the various business problems with their solutions.
4EC1-03.5	Students will be able to understand the economic aspect in terms of economic factor.
COURSE : 4EC3-04	**ELECTRONIC MEASUREMENT AND INSTRUMENTAION**
4EC3-04.1	Students will be able to understand the construction and operation of various measuring instrument.
4EC3-04.2	Students will be able to understand the concepts and measurement of electrical power using poly-phase metering, CT and PT.
4EC3-04.3	Students will be able to understand the construction and operation of different potentiometer with their applications.
4EC3-04.4	Students will be able to understand the classification and measurement of low, medium and high resistance by different methods.
4EC3-04.5	Students will be able to understand the construction and working principle of various AC bridges.
COURSE : 4EC4-05	**ELECTRICAL MACHINE-II**
4EC4-05.1	To study emf equation, mmf of thrEC phase AC winding, production of rotating magnetic field, types of AC windings
4EC4-05.2	To study about Polyphase Induction Motor
4EC4-05.3	To analyze Single Phase Induction Motor & Special Machines
4EC4-05.4	To illustrate concepts Synchronous Generators
4EC4-05.5	To analyze the concept of Synchronous Motors
COURSE : 4EC4-06	**POWER ELECTRONICS**
4EC4-06.1	Students will learn and understand the concept so power swithing devices
4EC4-06.2	Students will be able to understand the operation and applications of thyristor based rectifiers
4EC4-06.3	Students will be able to understand the operation and applications of Buck and Boost dc-dc converters
4EC4-06.4	Students will be able to understand the operation and applications of Single phase inverters
4EC4-06.5	Students will be able to understand the operation and applications of thrEC phase inverters
COURSE : 4EC4-07	**SIGNAL & SYSTEMS**
4EC4-07.1	Generate and characterize various continuous and discrete time signals

4EC4-07.2	Perform the basic operations on the signals
4EC4-07.3	Design and analyze linear time-invariant (LTI) systems and compute its response
4EC4-07.4	Analyze the spectral characteristics of signals using Fourier analysis.
4EC4-07.5	Analyze the systems using Laplace transform and Z-transform
COURSE : 4EC4-08	**DIGITAL ELECTRONICS**
4EC4-08.1	Students will be able to understand the structure of various number systems and its application in digital design.
4EC4-08.2	Students will be able to understand the different characteristics of the logic gate.
4EC4-08.3	Students will be able to understand the different minimization techniques.
4EC4-08.4	Students will be able to understand analyze and design various combinational circuits.
4EC4-08.5	Students will be able to understand analyze and design various sequential circuits.
COURSE : 4EC4-21	**ELECTRICAL MACHINE-II LAB**
4EC4-21.1	Students will be able to understand fundamental of AC machines and types of windings.
4EC4-21.2	Students will be able to understand the construction, operation and various characteristics of 3-phase Induction Motor.
4EC4-21.3	Students will be able to understand the construction and operation of various single phase motors.
4EC4-21.4	Students will be able to understand the construction and working of alternators with their applications.
4EC4-21.5	Students will be able to understand the construction and operation of synchronous motor with their applications.
COURSE : 4EC4-22	**POWER ELECTRONICS LAB**
4EC4-22.1	Students will learn and understand the concept so power swithing devices
4EC4-22.2	Students will be able to understand the operation and applications of thyristor based rectifiers
4EC4-22.3	Students will be able to understand the operation and applications of Buck and Boost dc-dc converters
4EC4-22.4	Students will be able to understand the operation and applications of Single phase inverters
4EC4-22.5	Students will be able to understand the operation and applications of thrEC phase inverters
COURSE : 4EC4-23	**DIGITAL ELECTRONICS LAB**
4EC4-23.1	Students will be able to understand the verification of truth tables of various logic gates.
4EC4-23.2	Students will be able to understand the realization of Adder and subs tractor.
4EC4-23.3	Students will be able to understand the verification of truth tables of various multiplexer and demultiplexer.
4EC4-23.4	Students will be able to understand verification of truth table of various flip flops.
4EC4-23.5	Students will be able to perform input/ output operation of different types of registers.

Third Year

COURSE : 5EC1	**Signal & System**
5EC1.1	Understand the mathematical representation and classifications of signals like odd-even, periodic – non periodic, continuous –discrete etc.
5EC1.2	Able to check various properties like causality, time –variance, stability, memory etc.
5EC1.3	Apply convolution for finding response of LTI systems that is used in performance analysis of Analog and Digital Communication Systems.
5EC1.4	Understanding of Fourier series and Fourier transform of different signals for spectrum analysis.
5EC1.5	Able to perform Laplace and Z transform for stability and causality analysis of various communication and control systems.
COURSE : 5EC2	**Linear Integrated Circuits**
5EC2.1	Learn about the basic concepts for the circuit configuration for the design of linear integrated circuits and develops skill to solve engineering problems.
5EC2.2	Identify different configurations of op-amp analyze the parameters of op-amp and observe the frequency response of operational-amplifier.
5EC2.3	Develop skills to design simple filter circuits and various amplifiers and can solve problems related to it.
5EC2.4	Understand & demonstrate different applications based on operational-amplifier.
5EC2.5	Understand analog multiplier and PLL & demonstrate different applications based on it.
COURSE : 5EC3	Telecommunication Engineering
5EC3.1	After completion of this course, students will be able to –
5EC3.2	Analyze and interpret the voltage and current distributions on the transmission lines.
5EC3.3	Use the smith chart as a graphical tool to solve impedance matching issues.
5EC3.4	Demonstrate broad knowledge of filters and equalizers design for various applications.
5EC3.5	Analyze basic telecommunication traffic theory.

COURSE : 5EC4	**Analog Communication**
5EC4.1	Analyze the effect of noise in communication system.
5EC4.2	Comprehend the concept of amplitude modulation and demodulation techniques.
5EC4.3	Understand the concept of angle modulation and demodulation techniques.
5EC4.4	Compare the performance of amplitude and frequency modulation on the basis of noise.
5EC4.5	Analyze a continuous signal in discrete form and basic understanding of pulse modulation.
COURSE : 5EC5	**Microwave Engineering-I**
5EC5.1	Students will able to apply knowledge & critical understanding of basic concepts, facts and principles of microwave Engineering.
5EC5.2	Students will apply theoretical part of Microwave engineering to implements the microwave network analysis.
5EC5.3	Understand the basic operating principles of Microwave passive components.
5EC5.4	Design a simple Microwave measurements system using various components.
5EC5.5	Students will able to correlate theory and numerical skills to the design of microwave integrated circuit.
COURSE : 5EC6.2	**Biomedical Instrumentation**
5EC6.2.1	Understand the human body & its electrical, mechanical & chemical activities.
5EC6.2.2	Knowledge of bio potentials in human body with neuron potential.
5EC6.2.3	Understand biomedical instruments used in clinical laboratories for the measurement of pH, ESR, Hb, O2 & CO2 concentration in blood.
5EC6.2.4	Create an interest & in depth knowledge regarding safety measurement issues, patient care & bio telemetry techniques, physiological studies of bio potential, its effect on cardiac & neural system of human body.
5EC6.2.5	Electro- physiological studies of human heart for PSVT & SNRT studies have to be learnt.
COURSE : 5EC7	**Electronics Engineering Design Lab**
5EC7.1	Understand circuit operation of the op

5EC7.2	Design and implement amplifiers and their applications in different modes of op
5EC7.3	Design and implement differentiator, integrator circuits and filter circuits using op
5EC7.4	Design and implement different oscillators using op
5EC7.5	Understand circuit operation of the 555 timer IC and implement different applications based on IC
COURSE : 5EC8	**Microwave Engineering Lab**
5EC8.1	Understand the operation and working of various tubes or sources for the transmission of the microwave frequencies.
5EC8.2	To study simple microwave circuits like matching circuits, couplers, rat race hybrid ring, amplifiers & measure their characteristics.
5EC8.3	Identify different microwave components and perform measurements on them.
5EC8.4	Learn about various micro strip devices used for the transmission of microwave frequencies.
5EC8.5	Analyse and identify different modes of klystron power supply.
COURSE : 5EC9	**Communication Lab-I**
5EC9.1	Comprehend various modulation, demodulation techniques used in analog communication system
5EC9.2	Analyze various parameters of transmission line.
5EC9.3	Analyze various pulse modulation techniques used in communication systems.
5EC9.4	Comprehend various multiplexing techniques used in communication systems.
5EC9.5	Understand the concept of sampling and reconstruction of signal.
COURSE : 5EC10	**Signal Processing Lab-I**
5EC10.1	Simulate continuous and discrete elementary time signals (periodic and non- periodic).
5EC10.2	Understand and analyze the basics of different signals.
5EC10.3	Simulate convolution operation and different arithmetic operations.
5EC10.4	Generate random signals with arbitrary distributions and calculate the mean and variance.
5EC10.5	Generate probability density functions and calculate the mean and variance.

COURSE :5EC11	**Profession Ethics & Disaster Management**
5EC11.1	Know the ethical behaviour of an engineer and would be sensitive to the core values.
5EC11.2	Apply one's own values in ethical issues.
5EC11.3	Understand how the modern disaster manager is involved with pre-disaster and post-disaster activities.
5EC11.4	Understand the work objectives of the disaster manager.
5EC11.5	Identify the key personnel or specialists related to disaster management and associate them with the types of disasters and phases in which they are useful.
COURSE : 6EC1	**Microwave Engineering-II**
6EC1.1	Gain Knowledge about the Waveguides, Impedance transformation and matching for microwave frequencies
6EC1.2	Understand Varactor and PIN diodes and their applications
6EC1.3	Learn about different devices like microwave transistors, couplers etc.
6EC1.4	Analyze the difference between conventional tubes and microwave tubes for transmission of EM waves.
6EC1.5	Gain knowledge about microwave amplifiers.
COURSE : 6EC2	**Microprocessors**
6EC1.1	Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
6EC1.2	Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.
6EC1.3	Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor.
6EC1.4	Understand and devise techniques for faster execution of instructions improve speed of operations and enhance performance of microprocessors.

6EC1.5	Interpret & Solve various automation based problems using microprocessor concepts like interfacing, interrupts, stacks & subroutines
COURSE : 6EC3	**Industrial Electronics**
6EC3.1	Understand operational Characteristics of Power Semiconductor Devices.
6EC3.2	Understand working and applications of Phase Controlled Converters and Inverters.
6EC3.3	Understand operational Characteristics of Choppers and Power Supplies.
6EC3.4	Understand control of electric motors through DC-DC converters, AC converters etc.
6EC3.5	Understand the operation of Stepper Motors, Induction heating and Dielectric heating control.
COURSE : 6EC4	**Digital Communication**
6EC4.1	Understand various pulse code modulation techniques for digital data transmission.
6EC4.2	Select the relevant line coding technique for specific data transmission applications
6EC4.3	Analyse various digital modulation techniques for digital communication.
6EC4.4	Understand the channel capacity calculations for data transmission
6EC4.5	Apply relevant error control coding technique for transmitting information
COURSE : 6EC5	**Control System**
6EC5.1	Obtain the transfer function of any control system and analyze electromechanical systems using mathematical modeling.
6EC5.2	Determine Transient and Steady State behavior of systems using standard test signals.
6EC5.3	Determine linear and non-linear systems for steady state errors and also determine absolute and relative stability.
6EC5.4	Perform Frequency-domain analysis using plots like Bode plot, M and N loci, Nicholas charts.

6EC5.5	Design a stable control system, satisfying requirements of stability and reduced steady state error.
COURSE : 6EC6.3	**Optical Fiber Communication**
6EC6.2.1	Understand the basics of optical fiber and manufacturing process of the fiber.
6EC6.2.2	Define the structures and working principle of optical sources.
6EC6.2.3	Gain the knowledge of different types of optical detectors and optical connectors.
6EC6.2.4	Understand the methods to measure the optical fiber parameters.
6EC6.2.5	Learn different active and passive optical devices used in optical fiber system.
COURSE : 6EC7	**Communication Lab-II**
6EC7.1	Understand baseband and band pass digital modulation techniques.
6EC7.2	Analyze digital converters like PCM, DM etc.
6EC7.3	Convert binary stream into electrical pulse using different line coding formats.
6EC7.4	Apply the knowledge of channel coding in communication system.
6EC7.5	Understand the Multiplexing and De-multiplexing of different signals in digital communication system.
COURSE : 6EC8	**Microprocessor Lab**
6EC8.1	Understand the taxonomy of microprocessors and knowledge of contemporary microprocessors.
6EC8.2	Demonstrate programming using the various addressing modes and instruction set of 8085 microprocessor
6EC8.3	Design structured, well commented, understandable assembly language programs to provide solutions to real world control problems.
6EC8.4	An in-depth knowledge of applying the concepts on real- time applications

6EC8.5	Practice different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy in practical experimental observations in comparison.
COURSE : 6EC9	**RF Simulation Lab**
6EC9.1	Student will able to learn microwave network theory and the use of scattering matrix,
6EC9.2	Identify the application of microwave components in the design of useful systems such as radars, receivers, etc.
6EC9.3	Student will able to design and fabricate microwave component or device using micro strip technology
6EC9.4	Demonstrate broad knowledge about RF basic concepts, RF amplifier and RF filter design
6EC9.5	Carryout the designing of RF amplifier using microwave BJT and microwave FET.
COURSE : 6EC10	**Industrial Electronics Lab**
6EC10.1	Understand the characteristics of SCR and its triggering using RC and UJT triggering circuits.
6EC10.2	Understand AC voltage regulators using TRIAC, antiparallel thyristors, TRIAC and DIAC as well as pulse generation using DSP/FPGA platform.
6EC10.3	Study single-phase bridge converter, single-phase cycloconverter and single-phase dual converter along with dc motor speed control.
6EC10.4	Perform experiment on single phase PWM inverter, buck, boost and buck-boost regulators.
6EC10.5	Perform speed control of DC motor using a chopper and induction motors using single phase AC voltage regulator along with open loop & closed loop motor control.
COURSE : 6EC11	**Personality Development and General Aptitude**
6EC11.1	Make students appreciate the notion and components of personality, thereby to apply the Acquired information to themselves and to march towards brilliance in their respective academic and professional careers..
6EC11.2	Enable students to keep themselves abreast of general knowledge and current affairs.
6EC11.3	Bring out creativity and other latent talents with right goal setting so that self- esteem gets enhanced.
6EC11.4	Sharpen memory skills and other study skills vital for academic and professional excellence.
6EC11.5	Give training for positive thinking to keep the students in a good stead at the time of crisis

Final Year	
COURSE : 7EC1	**Antenna & Wave Propagation**
7EC1.1	Understand antenna terminology and radiation mechanism of an antenna
7EC1.2	Understand basic concepts of antenna array and design different antenna arrays.
7EC1.3	Design different types of antennas and understand their structures, applications and measurement techniques of different antenna parameters.
7EC1.4	Gain knowledge of different modes of propagation of radio waves.
7EC1.5	Learn about ionospheric propagation and its parameters by analysing effect of different environmental condition on propagation.
COURSE : 7EC2	**Digital Signal Processing**
7EC2.1	Understand the DT signal processing techniques.
7EC2.2	Analyze the LTI Systems using different transform methods.
7EC2.3	Understand the block diagram & Structures of FIR & IIR system.
7EC2.4	Design IIR & FIR filter using different methods.
7EC2.5	Implement FFT algorithm for different applications.
COURSE :7EC3	**Digital Image Processing**
7EC3.1	Understand image formation and the role of different color formats.
7EC3.2	Compute the effect of intensity transformations on an image and apply the spatial and frequency domain filtering.
7EC3.3	Describe the techniques for image enhancement and image restoration in a degraded environment.
7EC3.4	Analyze the effect and requirement of morphological operations for an image and its applications.
7EC3.5	Understand the requirement of image compression and image segmentation for solving the real life problems.
COURSE :7EC4	**Wireless Communication**
7EC4.1	Understand how radio signals can be used to carry information in a spectrally efficient manner
7EC4.2	Able to know how radio signals can be used to carry information in a power efficient manner.
7EC4.3	Gain insights into how diversity afforded by radio propagation can be exploited to improve performance.
7EC4.4	Have an understanding of design considerations for how to effectively share spectrum through multiple access.
7EC4.5	Gain knowledge and awareness of the technologies used in Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA) and Wi-Fi Networks.

COURSE :7EC5	VLSI Design
7EC5.1	Understand basic MOS transistors with fabrication process and aspects of threshold voltage, with body effect to analyze MOS transistor circuit Model
7EC5.2	Identify different MOS inverter technologies and determine inverter parameters to verify speed and power dissipation analysis.
7EC5.3	Understand the basic physical design and layout issues of simple gates and complex CMOS circuits.
7EC5.4	Design different dynamic CMOS VLSI circuits and have knowledge of memory circuits
7EC5.5	Understand ECAD tools for design of VLSI circuit with Custom /ASIC design and basics of hardware description language like VHDL.
COURSE : 7EC6.2	VHDL
7EC6.2.1	Construct test and debug digital network using VHDL
7EC6.2.2	Apply concepts of programming language with modeling styles
7EC6.2.3	Analyze Simulation approaches for combinational circuit design.
7EC6.2.4	Show awareness about synchronous & Asynchronous circuits.
7EC6.2.5	Use VHDL in Memory organization & design concepts.
COURSE : 7EC7	Signal and Image Processing Lab
7EC7.1	Understand the importance of histogram in enhancement of images.
7EC7.2	Represent image in different color formats.
7EC7.3	Perform the morphological operations in analyzing the image structure.
7EC7.4	Apply thresholding and filtering for image enhancement in spatial and frequency domains.
7EC7.5	Design and simulate the digital filters and process digital signals.
COURSE : 7EC8	Wireless Communication Lab
7EC8.1	Measure various antenna radiation characteristics in operating band.
7EC8.2	Analyze the array of rectangular patch antennas.
7EC8.3	Gain the knowledge of satellite communication and Radar technology through experimental setup.
7EC8.4	Calculate the factors that affect the power received by the receiving antenna.
7EC8.5	Understand the working of GPS receiver and CDMA-DSSS systems.
COURSE : 7EC9	Practical Training Seminar

7EC9.1	Get an exposure of real time industry working scenario.
7EC9.2	Identify their interest and future aspects in different industries.
7EC9.3	Correlate the knowledge between theory and practical exposure during training.
7EC9.4	Students become more aware of industry practices and regulations during industrial training.
7EC9.5	Present their ideas for the betterment of engineering society based on industrial training.
COURSE : 7EC10	**Project Stage-I**
7EC10.1	Acquire documentation, project management and Problem solving skills.
7EC10.2	Identify, analyze and solve real-life problems.
7EC10.3	Develop Professionalism, team work ability.
7EC10.4	Develop oral as well as written presentation skills.
7EC10.5	Make comprehensive use of the technical knowledge gained from previous courses.
COURSE : 8EC1	**IC Technology**
8EC1.1	Understand semiconductor crystal growth techniques and wafer preparation steps.
8EC1.2	Learn procedure of doping semiconductor material using diffusion and ion implantation methods and techniques of growing SiO2 layer.
8EC1.3	Gain the knowledge of various chemical vapour deposition and epitaxial layer growth techniques for deposition of any layer of semiconductor or insulator over other semiconductors.
8EC1.4	Understand various pattern transfer and etching methods like photolithography / optical lithography, plasma, dry & wet etching techniques.
8EC1.5	Know VLSI process integration steps and classification of CMOS logic families for basic MOS device.
COURSE :8EC2	**Radar & TV Engineering**
8EC2.1	Gain the knowledge of RADAR working and navigational aids.
8EC2.2	Understand TV standards, different camera and picture tubes for proper transmission and reception of TV signals
8EC2.3	Gain the knowledge of TV signal processing and generation of colour and chrominance signal.
8EC2.4	Learn the designing principle of TV receiver with its working
8EC2.5	Understand the concepts of various modern TV systems.
COURSE : 8EC3	**MEMS & Nanotechnology**

8EC3.1	Understand the fundamental principles of Nanotechnology, its approach and electronic structure of nanomaterials along with the effect of crystal size on density of states and band gap.
8EC3.2	Understand different silicon processing methods and various nanolithography techniques.
8EC3.3	Gain knowledge of different characterization techniques and analyze the properties of nanomaterials.
8EC3.4	Analyze electrical, magnetic, mechanical and optical properties of nanomaterials & find their applications in various fields.
8EC3.5	Understand MEMS and micro systems, their application as pressure sensor packaging techniques.
COURSE : 8EC4	**Microcontroller & Embedded System**
8EC4.1	Apply Knowledge of basic concepts and Principles of 8051 Microcontroller.
8EC4.2	Will create interest in Design interfacing Circuits like Traffic light interfacing ,Elevator interfacing , Seven segment & LCD interfacing.
8EC4.3	It will enhance ability of students to identify Assembly language programming and Embedded c language with the help of Modern tool.
8EC4.4	Apply Knowledge of Embedded system , SOC, and RTOS in various Engineering Problem Analysis.
8EC4.5	Analyze abstract problem and apply a combination of hardware and software to adderess the problem.
COURSE : 8EC5	**RF Fabrication Lab**
8EC5.1	Understand the designing, fabrication and measurement of different planar transmission lines.
8EC5.2	Design microwave couplers, filters, dividers on CST software.
8EC5.3	Fabricate microwave components and measure the reflection coefficient parameter with CST.
8EC5.4	Design and fabricate RF amplifier using microwave BJT.
8EC5.5	LO-5 Design and fabricate microwave component or device using micro strip technology.
COURSE : 8EC6	**Industrial Electronics & Management**
8EC6.1	Learn objectives of industrial firms like profit maximization, higher dividends for shareholders etc. Importance of economy of scale and organizational needs, seeking cooperation of society in investment.
8EC6.2	Understand the importance of Labour Legislations and need for promoting dignity of labour. Understand production management.
8EC6.3	Comprehend principles of management and organization staffing, directing, controlling, coordination and Decision making.
8EC6.4	Gain knowledge of new industrial policy like critical analysis, role of technology and entrepreneurship in industrial development etc.

8EC6.5	LO-5 Learn importance of human resource management, man power planning and Inventory control.
COURSE :8EC7	**VLSI & Optical Fiber Lab**
8EC7.1	Understand basic operating principles of single mode, multimode fibers, light sources, detectors, amplifiers and passive optical devices.
8EC7.2	Interpret the losses in optical fiber such as dispersion, scattering, absorption, nonlinear effects, fiber alignment and splicing.
8EC7.3	Design and simulate the schematic and layouts of various digital CMOS logic circuits using EDA tool.
8EC7.4	Design and simulate different combinational and sequential circuits using VHDL language.
8EC7.5	LO-5 Describe principal parts in programmable circuits (PLD, FPGA, ASIC) and describe procedure for designing of small designs in programmable circuits.
COURSE : 8ECPR	**Project Stage-II**
8ECPR.1	Acquire System integration skills, hardware software interfacing.
8ECPR.2	Design and test an electronic circuit with specified needs.
8ECPR.3	Apply project management skills (scheduling work, procuring parts, and documenting expenditures and working within the confines of a deadline).
8ECPR.4	Develop and demonstrate troubleshooting ability in electronic technology.
8ECPR.5	LO-5 Communicate technical information by means of written and oral reports.
COURSE :8ECSM	**Seminar**
8ECSM.1	Acquire surveying ability to identify need of invention.
8ECSM.2	Identify and analyze the solution to existing problem.
8ECSM.3	Develop an ability of explanation of complex technology in a logical and convincing way.
8ECSM.4	Develop good communication and presentation skill.
8ECSM.5	LO-5 Make comprehensive use of the technical knowledge gained from literature survey.

Bachelor of Technology in Electrical Engineering
Program Name: Electrical Engineering
Session: 2018-19

Second Year	
COURSE : 3EE2-01	**ADVANCED MATHEMATICS**
3EE2-01.1	Students will be able to find asymptotes of the curve.
3EE2-01.2	Students will be able to study the different characteristics of the Cartesian and polar curves.
3EE2-01.3	Students will be able to find area & volume of the bounded curves using integration and special function.
3EE2-01.4	Students will be able to solve the partial differentiation and they can use in error and approximation, also for maxima- minima of two variables.
3EE2-01.5	Students can apply the concept of displacement, velocity & acceleration as vectors and how to determine them, as well as able to convert one type of field to other type.
COURSE : 3EE1-02	**TECHNICAL COMMUNICATION**
3EE2-02.1	Students will be able to synthesize sentences in English, write Stories, Essays, Poems and other compositions.
3EE2-02.2	Students will be able to comprehend and compose professional reports, executive summaries paragraphs and will be able to develop effective conversation.
3EE2-02.3	Students can present themselves well in front of mass audience on a variety of topics including short stories.
3EE2-02.4	Students understand basics of structured conversation to make their point of views clear to the listeners in the form of essay writing.
3EE2-02.5	Students will be able to draw inferences from Stories , Poems and Articles and express that in their own words.
COURSE : 3EE3-04	**POWER GENERATION PROCESS**
3EE3-04.1	Students will be able to understand the various conventional power stations with their operation and their efficiency.
3EE3-04.2	Students will be able to understand various renewable and non-renewable sources and their impact on the environment.
3EE3-04.3	Students will be able to understand various loads and load curves along with load and diversity factor.
3EE3-04.4	Students will be able to understand various power factor improvement techniques.
3EE3-04.5	Students will be able to understand power plant economics along with various constraints.
COURSE : 3EE4-05	**ELECTRICAL CIRCUIT ANALYSIS**
3EE4-05.1	Students will be able to understand the concept of elementary idea of basic circuits.
3EE4-05.2	Students will be able to apply network theorems for solving complex problem in electrical networks.
3EE4-05.3	Students will able to understand 3 phase system.
3EE4-05.4	Students will be able to understand the applications of Fourier series in non sinusoidal waves.
3EE4-05.5	Students will be able to understand time domain and frequency domain analysis of circuits.

COURSE : 3EE4-06	ANALOG ELECTRONICS
3EE4-06.1	Students will be able to understand the working of semiconductor devices and effective analysis of Fermi levels in PN junction.
3EE4-06.2	Students will be able to understand the concept of diodes and transistors with their characteristics and applications.
3EE4-06.3	Students will be able to understand application of diode and construction, characteristics and principle of UJT.
3EE4-06.4	Students will be able to understand the various parameter and configurations of transistors.
3EE4-06.5	Students will be able to understand the operating principle and analysis of JFET & MOSFET.
COURSE : 3EE4-07	**ELECTRICAL MACHINE-I**
3EE4-07.1	Understand electrical principle, laws, and working of DC machines
3EE4-07.2	Analyze the construction and characteristics and application of various type of DC generators
3EE4-07.3	Analyze the construction and characteristics and application of various type of DC motors and testing of motors according to Indian standard.
3EE4-07.4	Understand electrical principle , laws, and working of 1 phase transformer and losses . and also conduct various test on the transformer.
3EE4-07.5	Understand electrical principle , laws, and working of 3 phase transformer and losses . and also conduct various test on the transformer.
COURSE : 3EE4-08	**ELECTROMAGNETIC FIELD**
3EE4-08.1	Apply vector calculus in orthogonal coordinate system
3EE4-08.2	Analyze behavior of static electric fields in standard configurations.
3EE4-08.3	Analyze behavior of dynamic electric fields in standard configurations
3EE4-08.4	Analyze behavior of static magnetic fields in standard configurations
3EE4-08.5	Analyze behavior of dynamic magnetic fields in standard configurations
COURSE : 3EE4-21	**ANALOG ELECTRONICS LAB**
3EE4-21.1	Students will be able to understand the working and applications of basic electronics measuring devices.
3EE4-21.2	Students will be able to understand V-I characteristics of pn junction and zener diode along with applications.
3EE4-21.3	Students will be able to understand the characteristics of single stage and two stage RC coupled amplifier to determine various parameters.
3EE4-21.4	Students will be able to understand the working of half wave and bridge rectifier to determine various parameters.
3EE4-21.5	Students will be able to understand the characteristics of BJT in various configurations along with their operation and to calculate the various parameters.
COURSE : 3EE4-22	**ELECTRICAL MACHINE-I LAB**
3EE4-22.1	Understand electrical principle, laws, and working of DC machines
3EE4-22.2	Analyze the construction and characteristics and application of various type of DC generators
3EE4-22.3	Analyze the construction and characteristics and application of various type of DC motors and testing of motors according to Indian standard.

3EE4-22.4	Understand electrical principle , laws, and working of 1 phase transformer and losses . and also conduct various test on the transformer.
3EE4-22.5	Understand electrical principle , laws, and working of 3 phase transformer and losses . and also conduct various test on the transformer.
COURSE : 3EE4-23	**ELECTRICAL CIRCUIT DESIGN LAB**
3EE4-23.1	Students will be able to understand the basic circuit symbols and their functions.
3EE4-23.2	Students will be able to understand basic concept and verification of various AC & DC theorems.
3EE4-23.3	Students will be able to understand DC analysis of resistors networks.
3EE4-23.4	Students will be able to understand AC and transient analysis of RC and RL circuits.
3EE4-23.5	Students will be able to understand the concept of resonance circuits to determine various characrtristics.
COURSE : 4EE2-01	**BIOLOGY**
4EE2-01.1	Students will be able to understand fundamentals of Biology
4EE2-01.2	Students will be able to learn and understand the categorization of Biology
4EE2-01.3	Students will be able to learn basic concepts of genetics
4EE2-01.4	Students will be able to understand Biomolecules
COURSE : 4EE1-03	**MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING**
4EE1-03.1	Students will be able to understand the different aspects of political and contemporary issues.
4EE1-03.2	Students will be able to understand the social aspects important for livelihood.
4EE1-03.3	Students will be able to understand the basic concept of economics.
4EE1-03.4	Students will be able to understand the various business problems with their solutions.
4EE1-03.5	Students will be able to understand the economic aspect in terms of economic factor.
COURSE : 4EE3-04	**ELECTRONIC MEASUREMENT AND INSTRUMENTAION**
4EE3-04.1	Students will be able to understand the construction and operation of various measuring instrument.
4EE3-04.2	Students will be able to understand the concepts and measurement of electrical power using poly-phase metering, CT and PT.
4EE3-04.3	Students will be able to understand the construction and operation of different potentiometer with their applications.
4EE3-04.4	Students will be able to understand the classification and measurement of low, medium and high resistance by different methods.
4EE3-04.5	Students will be able to understand the construction and working principle of various AC bridges.
COURSE : 4EE4-05	**ELECTRICAL MACHINE-II**
4EE4-05.1	To study emf equation, mmf of three phase AC winding, production of rotating magnetic field, types of AC windings
4EE4-05.2	To study about Polyphase Induction Motor
4EE4-05.3	To analyze Single Phase Induction Motor & Special Machines
4EE4-05.4	To illustrate concepts Synchronous Generators

4EE4-05.5	To analyze the concept of Synchronous Motors
COURSE : 4EE4-06	**POWER ELECTRONICS**
4EE4-06.1	Students will learn and understand the concept so power swithing devices
4EE4-06.2	Students will be able to understand the operation and applications of thyristor based rectifiers
4EE4-06.3	Students will be able to understand the operation and applications of Buck and Boost dc-dc converters
4EE4-06.4	Students will be able to understand the operation and applications of Single phase inverters
4EE4-06.5	Students will be able to understand the operation and applications of three phase inverters
COURSE : 4EE4-07	**SIGNAL & SYSTEMS**
4EE4-07.1	Generate and characterize various continuous and discrete time signals
4EE4-07.2	Perform the basic operations on the signals
4EE4-07.3	Design and analyze linear time-invariant (LTI) systems and compute its response
4EE4-07.4	Analyze the spectral characteristics of signals using Fourier analysis.
4EE4-07.5	Analyze the systems using Laplace transform and Z-transform
COURSE : 4EE4-08	**DIGITAL ELECTRONICS**
4EE4-08.1	Students will be able to understand the structure of various number systems and its application in digital design.
4EE4-08.2	Students will be able to understand the different characteristics of the logic gate.
4EE4-08.3	Students will be able to understand the different minimization techniques.
4EE4-08.4	Students will be able to understand analyze and design various combinational circuits.
4EE4-08.5	Students will be able to understand analyze and design various sequential circuits.
COURSE : 4EE4-21	**ELECTRICAL MACHINE-II LAB**
4EE4-21.1	Students will be able to understand fundamental of AC machines and types of windings.
4EE4-21.2	Students will be able to understand the construction, operation and various characteristics of 3-phase Induction Motor.
4EE4-21.3	Students will be able to understand the construction and operation of various single phase motors.
4EE4-21.4	Students will be able to understand the construction and working of alternators with their applications.
4EE4-21.5	Students will be able to understand the construction and operation of synchronous motor with their applications.
COURSE : 4EE4-22	**POWER ELECTRONICS LAB**
4EE4-22.1	Students will learn and understand the concept so power swithing devices
4EE4-22.2	Students will be able to understand the operation and applications of thyristor based rectifiers
4EE4-22.3	Students will be able to understand the operation and applications of Buck and Boost dc-dc converters
4EE4-22.4	Students will be able to understand the operation and applications of Single phase inverters
4EE4-22.5	Students will be able to understand the operation and applications of three phase inverters

COURSE : 4EE4-23	DIGITAL ELECTRONICS LAB
4EE4-23.1	Students will be able to understand the verification of truth tables of various logic gates.
4EE4-23.2	Students will be able to understand the realization of Adder and subs tractor.
4EE4-23.3	Students will be able to understand the verification of truth tables of various multiplexer and demultiplexer.
4EE4-23.4	Students will be able to understand verification of truth table of various flip flops.
4EE4-23.5	Students will be able to perform input/ output operation of different types of registers.

Third Year	
COURSE : 5EE1	**POWER ELECTRONICS**
5EE1.1	Students will be able to understand working of various power semiconductor devices and their characteristics.
5EE1.2	Students will be able to understand working, characteristics and Protections of SCR.
5EE1.3	Students will be able to design and draw waveform of the different types of single phase converters at various load condition.
5EE1.4	Students will be able to design and draw waveform of the different types of three phase converters and three phase dual converters.
5EE1.5	Students will be able to understand various power factor improvement techniques in converters.
COURSE : 5EE2	**MICROPROCESSOR & COMPUTER ARCHITECTURE**
5EE2.1	Students will be able to understand the general architecture and operations of 8085 microprocessor along with its organization.
5EE2.2	Students will be able to design, code and debug assembly language programs.
5EE2.3	Students will be able to interface and study various microprocessor chips along with their application.
5EE2.4	Students will be able to understand the general architecture and operations of 8086 microprocessor along with its instruction set.
5EE2.5	Students will be able to analyze and relate the performance of computers and its architecture to real-life applications.
COURSE : 5EE3	**CONTROL SYSTEM**
5EE3.1	Students will be able to understand and draw the mathematical model of open loop and close loop systems with their applications.
5EE3.2	Students will be able to understand transient and steady state analysis of LTI system.
5EE3.3	Students will be able to understand the concept of stability using Routh's Hurwitz and root locus techniques.
5EE3.4	Students will be able to understand frequency response analysis and stability in frequency domain.
5EE3.5	Students will be able to understand design of various compensation techniques and controllers.

COURSE : 5EE4	DATABASE MANAGEMENT SYSTEM
5EE4.1	Students will be able to understand basic architecture of DBMS.
5EE4.2	Students will be able to understand concepts of Database Design.
5EE4.3	Students will be able to understand concepts of SQL, DDL and DML.
5EE4.4	Students will be able to understand concepts of RDBMS.
5EE4.5	Students will be able to understand concepts of transaction management, concurrency control, deadlock handling and recovery system.
COURSE : 5EE5	**TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER**
5EE5.1	Students will be able to understand the Basic principles of Supply and distribution systems.
5EE5.2	Students will be able to understand various types and materials of conductors.
5EE5.3	Students will be able to understand the basic concept of mechanical features of overhead transmission lines.
5EE5.4	Students will be able to understand the concepts of Inductance and capacitance in various types of transmission line.
5EE5.5	Students will be able to understand the Generalized ABCD Line Constants, Corona and Ferranti effect in transmission line.
COURSE : 5EE6.2	**PRINCIPLE OF COMMUNICAITON SYSTEM**
5EE6.2.1	Students will be able to understand the concepts of Noise Effects in Communication Systems
5EE6.2.2	Students will be able to understand the basic concepts of Amplitude Modulation & detector circuits.
5EE6.2.3	Students will be able to understand the concepts of Frequency Modulation. And Demodulation
5EE6.2.4	Students will be able to understand and calculate the signal to Noise ratio in AM and FM, demodulator.
5EE6.2.5	Students will be able to understand the concepts of Pulse Modulation Systems
COURSE : 5EE7	**POWER ELECTRONICS LAB**
5EE7.1	Students will be able to understand the concepts of Noise Effects in Communication Systems
5EE7.2	Students will be able to understand the basic concepts of Amplitude Modulation & detector circuits.
5EE7.3	Students will be able to understand the concepts of Frequency Modulation. And Demodulation
5EE7.4	Students will be able to understand and calculate the signal to Noise ratio in AM and FM, demodulator.
5EE7.5	Students will be able to understand the concepts of Pulse Modulation Systems
COURSE : 5EE8	**MICROPORCESSOR LAB**
5EE8.1	Students will be able to understand the basic knowledge of 8085 microprocessor kit.
5EE8.2	Students will be able to understand the knowledge of programming of addition, subtraction, searching and sorting using assembly language.
5EE8.3	Students will be able to the programming of multiplication and division using assembly language.
5EE8.4	Students will be able to understand the various techniques used for transfer of block of data.

5EE8.5	Students will be able to understand the various code conversion techniques using 8085.
COURSE : 5EE9	**SYSTEM PROGRAMMING LAB**
5EE9.1	Students will be able to understand the basics of matrix and array operations in MATLAB.
5EE9.2	Students will be able to understand the concept of scripts and function files.
5EE9.3	Students will able to understand various conditional statements.
5EE9.4	Students will be able to understand multi-dimensional matrices and structures in MATLAB.
5EE9.5	Students will able to learn MATLAB Applications in linear algebra curve fitting and interpolation, numerical integration andOrdinary differential equation.
COURSE : 5EE10	**DATABASE MANAGEMENT SYSTEM LAB**
5EE10.1	Students will able to understand the concept of DDL statement.
5EE10.2	Students will able to understand the concept of DML and DCL.
5EE10.3	Students will able to understand database connectivity and embedded SQL.
5EE10.4	Students will able to understand connectivity of front end HLL with back end database.
5EE10.5	Students can implement the concept of database to prepare a project.
COURSE :5EE11	**PROFESSIONAL ETHICS AND DISASTER MANAGEMENT**
5EE11.1	Students will be able to understand the concept of values and social values.
5EE11.2	Students will be able to understand the concept of corporate culture in companies and firms.
5EE11.3	Students will be able to understand ethical aspect in their corporate culture and individual behaviour.
5EE11.4	Students will be able to understand the causes, impact and prevention of various types of disaster
5EE11.5	Students will be able to understand practical scenario of ethical and moral values with the help of real time case studies.
COURSE : 6EE1	**MODERN CONTROL THEORY**
6EE1.1	Students will be able to understand to understand concept of Linearity and State Space Approach of Control System Analysis.
6EE1.2	Students will be able to understand the concept of State Space Representation using various method and block diagram representation of state model.
6EE1.3	Students will be able to understand the concept and solution of state equations.
6EE1.4	Students will be able to understand the concept of Digital Control Systems and block diagram analysis of sampled data systems.
6EE1.5	Students will be able to understand the concept of accuracy and stability criteria.

COURSE : 6EE2	HIGH VOLTAGE ENGINEERING
6EE1.1	Students will be able to understand the concepts of Breakdown in Gases, solid and liquids and also the application of them in power system.
6EE1.2	Students will be able to understand the concepts of high DC voltage, high AC voltage, impulse voltage generation and their measurement.
6EE1.3	Students will be able to understand the concepts of Non-destructive Insulation Tests and Partial Discharges.
6EE1.4	Students will be able to understand the various causes of over voltages.
6EE1.5	Students will be able to understand the concept of travelling waves on transmission lines along with its attenuation.
COURSE : 6EE3	**SWITCHGEAR AND PROTECTION**
6EE3.1	Students will be able to understand operation and working of static relays, comparators, and static over current relays.
6EE3.2	Students will be able to understand the concepts of static differential relay schemes and static distance relays.
6EE3.3	Students will be able to understand the scheme of carrier current protection, and performance of distance protection.
6EE3.4	Students will be able to understand the concepts of electric arc and arc interruption theory in circuit breakers and its characteristics.
6EE3.5	Students will be able to understand the various types and selection of circuit breakers.
COURSE : 6EE4	**ADVANCED POWER ELECTRONICS**
6EE4.1	Students will be able to understand the concept of single phase and three phase ac voltage.
6EE4.2	Students will be able to understand the operation of various types of cyclo-converters.
6EE4.3	Student will be able to understand the operation of single phase and three phase bridge inverter with its control strategies.
6EE4.4	Students will be able to understand the working of various resonant pulse inverters.
6EE4.5	Students will be able to understand the concepts of SMPS and resonant AC power supplies.
COURSE : 6EE5	**SMART GRID TECHNOLOGY**
6EE5.1	Students will be able to understand the need for smart grid along with its challenge and benefits.
6EE5.2	Students will be able to understand various smart grid technologies and various control strategies.
6EE5.3	Students will be able to understand the concept of Smart Meters and Advanced Metering Infrastructure.
6EE5.4	Students will be able to understand the concept of Power Quality management.
6EE5.5	Students will be able to understand the concept of High Performance Computing for Smart Grid Applications.

COURSE : 6EE6.2	POWER SYSTEM INSTRUMENTATION
6EE6.2.1	Students will be able to understand the different types of errors and its calculation.
6EE6.2.2	Students will be able to understand the Construction & Operating Characteristics of various transducers.
6EE6.2.3	Students will be able to understand different methods of signal conditioning and their application.
6EE6.2.4	Students will be able to measure various parameters of power system.
6EE6.2.5	Students will be able to analyze the behaviour of CVT and CT in power system.
COURSE : 6EE7	CONTROL SYSTEM LAB
6EE7.1	Students will be able to understand the 2nd order control system and obtain time response specification.
6EE7.2	Students will be able to understand the frequency response of various compensating Networks,
6EE7.3	Students will be able to understand the concept of stability and draw Bode plots for 2nd order control system.
6EE7.4	Students will be able to understand the designing 1st order R-C circuits and observe its response with various types of input.
6EE7.5	Students will be able to understand the characteristics of ac servomotor and potentiometer.
COURSE : 6EE8	POWER SYSTEM LAB
6EE8.1	Students will be able to find sequence components of currents in transformers.
6EE8.2	Students will be able to understand the concept and working of a gas actuated Buchholz relay.
6EE8.3	Students will be able to learn designing of a HV transmission line.
6EE8.4	Students will be able to understand the concept and working of various components of grid substation and safety parameters.
6EE8.5	Students will be able to understand the working of various relay and their characteristics.
COURSE : 6EE9	ADVANCED POWER ELECTRONICS LAB
6EE9.1	Students will be able to understand the working and testing of AC voltage regulators.
6EE9.2	Students will be able to understand the concept of speed Control of a single-phase induction motor and dc motor.
6EE9.3	Students will be able to understand the concept of quadrant operation of choppers.
6EE9.4	Students will be able to understand the various types of regulators and PWM inverter.
6EE9.5	Students will be able to understand the concept of DC circuit breaker and zero voltage switching.
COURSE : 6EE10	SMART GRID LAB
6EE10.1	Students will able to understand the need of different components of smart grid.
6EE10.2	Students will able to understand the simulation of hybrid system design.
6EE10.3	Students will able to understand the concept of power quality issues.

6EE10.4	Students will able to understand the concept of power quality measurement devices.
6EE10.5	Students will able to understand the practical aspects of power plants.
COURSE : 6EE11	**ENTREPRENEURSHIP DEVELOPMENT**
6EE11.1	Student will be able to understand the definition, qualities and competencies and various aspects of entrepreneurs.
6EE11.2	Student will be aware about the various steps and financial support system for starting own business.
6EE11.3	Students will be able to understand the identification and selection of business opportunities and different survey for customer satisfaction.
6EE11.4	Students will be able to understand the concepts of business crises and government policies for entrepreneurs.
6EE11.5	Student will be able to understand the scope and area of future in entrepreneurship with assessment of detailed project report.

Final Year	
COURSE : 7EE1	**POWER SYSTEM PLANNING**
7EE1.1	Students will be able to understand the structure and forecasting of power system.
7EE1.2	Students will be able to understand various government policies related to power system interconnection.
7EE1.3	Students will be able to calculate load and state estimation in power system.
7EE1.4	Students will be able to understand various environment effects of different power plants.
7EE1.5	Students will be able to understand operating, maintenance and expansion of power plants.
COURSE : 7EE2	**POWER SYSTEM ANALYSIS**
7EE2.1	Students will be able to understand per unit quantities and admittance model for three phase system.
7EE2.2	Students will be able to understand symmetrical fault analysis and Impedance model for three phase system.
7EE2.3	Students will be able to understand symmetrical components and fault analysis.
7EE2.4	Students will be able to understand the concepts of Unsymmetrical Fault Analysis
7EE2.5	Students will be able to understand the concepts of load flow analysis.
COURSE :7EE3	**ARTIFICIAL INTELLIGENCE TECHNIQUES**
7EE3.1	Students will be able to understand the concepts of Artificial Intelligence and knowledge based Expert systems.
7EE3.2	Students will be able to understand the concepts of knowledge representation along with control strategies.
7EE3.3	Students will be able to understand the concepts of artificial neural network and perceptron learning algorithms.
7EE3.4	Students will be able to understand the basic concepts and algorithms in learning ANN.
7EE3.5	Students will be able to understand the concepts of fuzzy Logic, defuzzification, and Genetic Algorithm.

COURSE :7EE4	NON CONVENTIONAL ENERGY SOURCES
7EE4.1	Students will be able to understand the basic concepts of conventional and non-conventional energy sources.
7EE4.2	Students will be able to understand basic concept of various solar collectors along with generation of solar energy.
7EE4.3	Students will be able to understand basic principle of wind energy conversion and various basic electrical wind generation schemes.
7EE4.4	Students will be able to understand the concepts of geothermal energy along with its applications.
7EE4.5	Students will be able to understand the basic requirement of nuclear fission and nuclear fusion along plasma confinement.
COURSE :7EE5	**POWER SYSTEM ENGINEERING**
7EE5.1	Students will be able to understand the concepts of various curves of thermal generating units and economics operation of power system.
7EE5.2	Students will be able to understand the concepts of various types of power system stability.
7EE5.3	Students will be able to understand the concepts of transient stability and its application under basic power system disturbances.
7EE5.4	Students will be able to understand the concepts of various types of excitation systems and their control along with advantages and problems of inter connected power systems.
7EE5.5	Students will be able to understand the principle of tap changing transformer along with basic concepts of series compensation of transmission lines.
COURSE : 7EE6.2	**COMPUTER AIDED DESIGN OF ELECTRICAL MACHINES**
7EE6.2.1	Students will be able to understand the basic principles of electrical machine design and magnetic circuit calculation.
7EE6.2.2	Students will be able to understand the concepts of heating, cooling and various ratings of electrical machines
7EE6.2.3	Students will be able to understand the computer aided design of transformers with optimization concepts.
7EE6.2.4	Students will be able to understand the computer aided design of synchronous machines along with its flow charts.
7EE6.2.5	Students will be able to understand the computer aided design of induction machines along with its flow charts.
COURSE : 7EE7	**POWER SYSTEM PLANNINGLAB**
7EE7.1	Students will be aware about the status of national and regional planning for power system.
7EE7.2	Students will be able to understand the various components used in power systems and various planning tools of power systems.
7EE7.3	Students will be able to model the electrical forecasting technique.
7EE7.4	Students will be able to understand the concept of Transmission and distribution planning.
7EE7.5	Students will be able to understand the concept of tariff and rural electrification.
COURSE : 7EE8	**POWER SYSTEM MODELLING AND SIMULATION LAB**
7EE8.1	Student will be able to simulate swing equation in MATLAB.
7EE8.2	Student will be able to model synchronous and induction machines.
7EE8.3	Student will be able simulate various circuits using circuit maker.
7EE8.4	Student will be able to model and simulate synchronous machine with PSS and FACTS controllers.

7EE8.5	Student will be able to understand FACTS Controller designs with FACT devices for SMIB system
COURSE : 7EE9	**INDUSTRIAL ECONOMICS AND MANAGEMENT**
7EE9.1	Student will be able to understand the concepts of Banking sector, roles of commercial bank, RBI, principle and sources of taxation.
7EE9.2	Student will be able to understand the various aspects of management principles.
7EE9.3	Student will be able to understand the various aspects of production and project management.
7EE9.4	Student will be able to understand the process of human resource management.
7EE9.5	Student will be able to understand the process of finance and account management.
COURSE : 7EE10	**PRACTICAL TRAINGING AND INDUSTRIAL VISIT**
7EE10.1	Student will get an exposure of real time industry working scenario.
7EE10.2	Student will be able to identify their interest and future aspects in different industries.
7EE10.3	Student will be able to correlate the knowledge between theory and practical exposure during training.
7EE10.4	Students become more aware of industry practices and regulations during industrial training.
7EE10.5	Students will able to present their ideas based on industrial training and entrepreneurship development.
COURSE : 7EEPR	**PROJECT – I**
7EEPR.1	Student will be able to analyze problem occurred during the completion of a project.
7EEPR.2	Student will learn about how the given task can be completed within time as a team.
7EEPR.3	Student will be able to work on a project with analyzing optimal cost for completion without compromising the efficiency.
7EEPR.4	Student will have hands on practice on various equipments.
7EEPR.5	Students will be able to strengthen the research and development in recent technologies.
COURSE : 8EE1	**EHV AC/DC TRANSMISSION**
8EE1.1	Students will be able to understand the concepts of EHV AC transmission systems.
8EE1.2	Students will be able to understand the concepts and various methods of load frequency control.
8EE1.3	Students will be able to understand the various methods of voltage control and static VAR compensators.
8EE1.4	Students will be able to understand the various types of FACTS controllers.
8EE1.5	Students will be able to understand the concepts of HVDC Transmission and their applications.

COURSE :8EE2	ELECTRICAL DRIVES AND THEIR CONTROL
8EE2.1	Students will be able to understand the dynamics of electric drives with drive parameters.
8EE2.2	Students will be able to understand the concepts of DC drives along with braking and speed control strategies.
8EE2.3	Students will be able to understand the concepts of induction motor drives along with braking and speed control techniques from voltage source.
8EE2.4	Students will be able to understand the concepts of speed control of induction motor drive.
8EE2.5	Students will be able to understand the concepts of synchronous motor drive under VSI and CSI.
COURSE : 8EE3	PROTECTION OF POWER SYSTEM
8EE3.1	Students will be able to understand the various types of fault along with construction and errors in CTs and PTs.
8EE3.2	Students will be able to understand the concepts of various types of over current directional over current relay along with protection schemes.
8EE3.3	Students will be able to understand the concepts of stator and rotor protection of generator.
8EE3.4	Students will be able to understand the concepts of various types of transformer and busbar protections.
8EE3.5	Students will be able to understand the concepts of various types of transmission line protection.
COURSE : 8EE4	FACTS DEVICES AND THEIR CONTROL
8EE4.1	Students will be able to understand the concepts of power flow control of AC transmission line along with various types of FACTS.
8EE4.2	Students will be able to understand the various topologies of voltage source converters and static shunt compensators.
8EE4.3	Students will be able to understand the concepts of static series compensators with its applications.
8EE4.4	Students will be able to understand the concepts of static voltage and phase angle regulators.
8EE4.5	Students will be able to understand the concepts of unified power flow controller and interline power flow controller along with its applications.
COURSE : 8EE5	COMPUTER BASED POWER SYSTEM LAB
8EE5.1	Student will be able to understand and verify the various fault analysis using MATLAB.
8EE5.2	Student will be able to understand and verify load flow analysis by different techniques using MATLAB.
8EE5.3	Student will be able to understand the concepts of voltage and overload security analysis using MATLAB.
8EE5.4	Student will be able to understand the concept of economic load dispatch with different methods.
8EE5.5	Student will be able to understand the transient stability analysis using MATLAB.
COURSE : 8EE6	ELECTRICAL DRIVES AND THEIR CONTROL LAB

8EE6.1	Students will be able to understand the concepts of firing circuits in converters at different load conditions.
8EE6.2	Students will be able to understand the concept and testing of 3 phase ac voltage regulators.
8EE6.3	Students will be able to understand the concept of speed control of different types of dc motors.
8EE6.4	Students will be able to understand the concept of speed control of different types of ac motors.
8EE6.5	Students will be able to understand the concepts of different types of three phase converters.
COURSE :8EE7	**HIGH VOLTAGE ENGINEERING LAB**
8EE7.1	Students will be able to test the various parameters of transformer oil.
8EE7.2	Students will be able to test the various parameters of insulating materials and study their applications.
8EE7.3	Students will be able to understand the process of direct and indirect testing of circuit breakers.
8EE7.4	Students will be able to understand high voltage testing of different electrical equipment.
8EE7.5	Students will be able to design an EHV transmission line.
COURSE : 8EEPR	**PROJECT – II**
8EEPR.1	Students are able to implement engineering skills in a real-world environment.
8EEPR.2	Students are able to function on multi-disciplinary teams.
8EEPR.3	Students are able to identify, formulate, and solve engineering problems.
8EEPR.4	Student knows how to design an efficient system with optimum criteria and within given time limit.
8EEPR.5	Students gain exposure to principles of leadership, project management and thus improve their marketability.
COURSE :8EESM	**SEMINAR**
8EESM.1	Students will be able to give presentation on recent topics.
8EESM.2	Students will be able to enhance their communication skills and confidence level.
8EESM.3	Students will be able to improve their knowledge about contemporary issues.
8EESM.4	Students will be able to accumulate knowledge based on different learning tools such as literature review and web searching.
8EESM.5	Student will be able to develop the overall personality

POORNIMA
INSTITUTE OF ENGINEERING & TECHNOLOGY

CHAPTER VIII

Department of Applied Sciences
Program wise CO-PO Mapping
Session: 2018-19
Common for all branches of first year

Subject/Code No: Communication Skills & 1FY1-04 LTP: 2+0+0
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Comprehend the fundamental Principles, Types and Methods of good communication.	2	-	-	-	2	2	-	2	2	3	-	2
CO2	Apply the basic structural and grammatical knowledge of the constituents for technical writing.	1	-	-	-	3	1	-	1	1	3	-	3
CO3	Develop the competence in writing skills related to various forms of technical and business communication	1	-	-	-	3	1	-	1	1	3	-	3
CO4	Understand the genre of prose by reading loudly with correct pronunciation, stress intonation, and articulation of voice along with identifying and describing the connection between Literature and reality.	-	-	-	-	1	1	-	1	1	3	-	3
CO5	Develop the creativity and imagination through value-based genre of poetry by enhancing aesthetic and verbal ability.	-	-	-	-	1	1	-	1	1	3	-	3

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Human Values & 1FY1-05/2FY1-05 LTP: 2+0+0
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Comprehend Co-relationship between "Values"; and "skills" to ensure persistent happiness and prosperity.	-	-	-	-	-	3	2	3	-	-	-	3
CO2	Evaluate the coexistence of the Human Being - Harmony in Myself.	-	-	-	-	-	2	2	2	-	-	-	3
CO3	Identify the role of harmony in family, society and universal order.	-	-	-	-	-	2	1	2	-	-	-	3
CO4	Develop and evaluate the holistic perception of harmony at all levels of existence.	-	-	-	-	-	1	3	3	-	-	-	3
CO5	Create harmony in professional and personal lives by understanding Co-existence between human being with nature.	-	2	-	-	-	-	3	3	-	-	-	2

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: ENGINEERING MATHEMATICSI &1FY2-01 LTP: 4+1+0
Semester: I semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Learn the concept of calculus to appraise improper integral, surface area and volume of solid of revolution of various laminas.	3	2	2	1	1	1	1	-	-	-	-	2
CO2	Differentiate the different techniques for convergence of sequence and series.	3	2	2	2	1	1	1	-	-	-	-	2
CO3	Analyze continuity, differentiability to solve the periodically extended function over the range using the concept of Fourier series.	2	2	2	2	1	1	-	-	-	-	-	1
CO4	Application of Partial differentiation, problem-solving using concepts and techniques from PDE's.	2	2	2	2	1	1	-	-	-	-	-	2
CO5	Apply the concept of calculus to double integrals and change of variables Application of Multiple integration involving cubes, sphere, theorem of green gauss and stokes	2	2	2	2	2	2	-	-	-	-	-	2

Program Name: APPLIED SCIENCES Session 2018-19

Subject/Code No: ENGINEERING MATHEMATICS-II & 2FY2-01 LTP: 4+1+0

Semester: II semester

Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Comprehend the computational techniques and algebraic skills essential for the study of systems of linear equations, matrix algebra, Eigen values, Eigen vectors, orthogonality and diagonalization.	3	2	2	1	1	1	1	-	-	-	-	2
CO2	Recognize ODEs and interpret the various methods for solving differential equation of first order and first degree.	3	2	2	2	1	1	1	-	-	-	-	2
CO3	Differentiate the various applications of function of one variable in ODE of higher order.	2	2	2	2	1	1	-	-	-	-	-	1
CO4	Evaluate the multivariable function using the concept of PDEs of first order.	2	2	2	2	1	1	-	-	-	-	-	2
CO5	Apply the various uses of multivariable function and solve by the partial differential equation of higher order.	2	2	2	2	2	2	-	-	-	-	-	2

Program Name: APPLIED SCIENCES Session 2018-19

Subject/Code No: Engineering Physics &1FY2-02 /2FY2-02 LTP: 4+1+0

Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Comprehend the concepts of wave optics and phenomenon of interference and diffraction of light.	3	3	2	-	-	-	-	-	-	-	-	1
CO2	Recognize ODEs and interpret the various methods for solving differential equation of first order and first degree.	3	3	2	-	-	-	-	-	-	-	-	1
CO3	Apply the conceptual knowledge of coherence of light wave in different application of light wave and use in optical fiber communication.	3	3	2	-	-	-	-	-	-	-	-	1
CO4	Synthesize the scientific and engineering principles of materials science to identify the properties of material related to appropriate field of application.	3	2	1	1	-	-	-	-	-	-	-	1
CO5	Apply the laws of electromagnetic theory in propagation of wave and use in communication.	3	3	2	-	-	-	-	-	-	-	-	1

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Engineering Chemistry &1FY2-03 /2FY2-03 LTP: 4+1+0
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Describe the fundamental water quality for domestic and industrial purpose so that students will be able to describe impurities present in water, boiler troubles and removal of impurities.	3	2	-	1	-	2	1	-	1	-	-	1
CO2	Analyze the composition, characteristics and manufacturing methods of various types of solid, liquid and gaseous fuels and calculated calorific value of fuels for Industrial as well as domestic purposes	3	2	-	1	-	2	1	-	1	-	-	1
CO3	Classify the dry and wet corrosion mechanisms and their protection methods. To investigate deterioration of metal through corrosion	2	1	-	2	-	2	2	1	-	-	-	2
CO4	Understand the composition and manufacturing methods of engineering materials namely cement and glass and recognize and estimate various properties of lubricants in several engineering process.	2	1	-	-	-	2	3	1	1	-	1	2
CO5	Generating the generic drugs or medicines for various services in life long purpose by identifying the applications of organic reaction mechanism.	2	1	-	-	-	2	2	1	1	-	1	3

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Programming For Problem Solving & 1FY3-06/2FY3-06 LTP: 2+0+0
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand the fundamental concepts of computers, algorithms, flowcharts and problem solving techniques.	2	2	2	2	-	2	-	-	-	-	-	2
CO2	Translate the algorithms and flowcharts into C programs.	3	3	-	-	-	-	-	-	-	-	-	-
CO3	Analyze the debug process in C programming language and to express in written form.	-	3	-	3	-	-	-	-	-	-	-	-
CO4	Formulate a problem into functions and create modular code that can be reused.	1	1	1	1	1	-	-	-	2	-	1	-
CO5	Develop C programs to demonstrate the applications of derived data types such as arrays, pointers, strings and functions.	1	2	1	2	-	-	-	-	3	-	1	-

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Basic Mechanical Engineering & 1FY3-07/2FY3-07 LTP: 3+1+0
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand the concepts of thermodynamics, power plants, machine design, Manufacturing Engineering and Industrial Engineering..	3	2	2	2	-	2	-	-	-	-	-	2
CO2	Receive the basic knowledge of pump and IC engine.	3	2	2	2	-	2	-	-	-	-	-	2
CO3	Comprehend the concept, types and application of refrigerator and air conditioning system and Transmission of Power.	3	2	2	2	-	2	-	-	-	-	-	2
CO4	Explain the different Patterns, Molding, Casting, Forging and Extrusion of Primary Manufacturing Processes.	3	2	2	2	-	2	-	-	-	-	-	1
CO5	Describe the various process and uses of Welding, Brazing, Engineering materials and Heat treatment of steel.	3	2	2	2	-	2	-	-	-	-	-	1

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Basic Electrical Engineering & 1FY3-08/2FY3-08 LTP: 3+1+0
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Evaluate the concept and process of various AC and DC circuit related elements, sources, laws, methods and theorems.	2	2	2	2	-	2	-	-	-	-	-	-
CO2	Explore the knowledge of transformers and its uses in applying the acquired knowledge to solve electrical circuit problem.	3	3	3	3	-	3	-	-	-	-	-	-
CO3	Analyze the characteristics, significance, construction and working of various power electronic devices.	3	3	3	3	-	3	-	-	-	-	-	-
CO4	Understand electromechanical energy conversion process.	3	3	3	3	-	3	-	-	-	-	-	-
CO5	Explore knowledge of protective devices and energy consumption calculations.	3	3	3	3	-	3	-	-	-	-	-	-

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Basic Civil Engineering & 1FY3-09/2FY3-09 LTP: 2+0+0
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understanding the scope, specialization, and role of civil engineer with impact of infrastructural development on economy of country.	-	-	3	1	-	3	1	-	-	-	-	3
CO2	Explain the Object, Principles & Types of Surveying, analyzes the Linear Measurements of surveying and evaluates the angular measurement through compass and leveling process through the various leveling instrument.	2	-	-	-	2	2	-	-	-	-	2	-
CO3	Analyze the importance of site selection, type of building Layout and Plan with introduction and components of Buildings & their functions.	2	-	-	-	-	2	2	-	-	-	-	-
CO4	Understanding the traffic and road safety and evaluate the Modes of Transportation, Causes of Accidents and Create the Road Safety Measures.	-	-	3	-	-	3	-	-	-	-	-	2
CO5	Classify the different types of pollutions, understand the Rainwater Harvesting, Global warming, Climate Change and solid Waste Management, analyze the Primary and Secondary air pollutants,	-	-	-	-	-	-	3	-	3	-	-	-

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Engineering Chemistry Lab & 1/2FY2-21LTP:0+0+2
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Evaluate the strength of CuSO4.5H2O solution with the help of Hypo solution, Ferrous Ammonium Sulphate solution with the help of K2Cr2O7 solution and NaOH and Na2CO3 in an alkali	2	-	-	-	-	2	2	2	2	-	-	2
CO2	Analyze different properties of lubricating oil.	2	3	-	-	-	2	2	-	-	-	-	2
CO3	Analyze quality of coal by proximate analysis.	3	3	-	-	-	-	-	-	-	-	-	-
CO4	Evaluate various quality parameters of water like harness, DO, Chlorine in water	2	2	-	-	-	2	-	2	2	-	-	2
CO5	Understand about synthesis of generic drugs.,	3	-	-	-	-	-	-	-	-	-	-	3

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Engineering Physics Lab &1/2FY2-20LTP: 0+0+2
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand the fundamental concepts of wave optics through the interference and diffraction experiment	3	2	1	-	-	-	-	-	2	-	-	-
CO2	Analyze the concept of light in dispersive power of material and height of a celestial object.	3	2	1	-	-	-	-	-	2	-	-	-
CO3	Describe and demonstrate the behavior of semiconductor characteristics.	3	3	2	-	-	-	-	-	2	-	-	-
CO4	Applying the knowledge to show the charging and discharging behavior of capacitor with time in form of electrical energy.	3	3	2	-	-	-	-	-	2	-	-	-
CO5	Interpret the properties of Laser light and application in optical communication through optical fiber.	3	3	2	-	-	-	-	-	2	-	-	-

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Human Values Activities and Sports & 1/2FY1-23LTP:0+0+2
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Course Introduction-Need, Basic Guidelines, Content and Process for Value Education	-	-	3	-	-	-	-	-	-	-	-	-
CO2	Understanding Harmony in the Human Being - Harmony in Myself	-	-	3	-	-	3	3	3	3	3	3	-
CO3	Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship	-	-	3	-	-	3	3	3	3	3	3	3
CO4	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence	-	-	3	-	-	3	3	3	3	3	-	3
CO5	Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values	-	-	3	-	-	3	3	3	3	3	3	3

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Language Lab &1/ 2FY1-22LTP: 0+0+2
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	To understand Phonetic Symbols and Transcriptions	-	-	-	-	-	-	-	-	-	-	3	3
CO2	To enable students to participate in Extempore	-	2	3	-	2	-	-	-	-	2	-	2
CO3	To enable students to participate in Group Discussion	-	3	3	-	-	-	-	-	-	3	-	3
CO4	To improve writing skills of students by Dialogue Writing	-	3	3	-	-	-	-	-	-	3	-	3
CO5	To use LSRW skills successfully for leadership and teamwork to crack GD's and interview	-	2	3	-	2	-	-	-	-	2	-	2

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Manufacturing Practices Workshop &1/ 2FY3-25LTP: 0+0+3
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand various tools, materials, instruments required for workshop operations.	-	-	-	-	-	-	-	-	-	-	3	3
CO2	Apply techniques to perform workshop operations with hand tools and power tools such as center lathe machine, drilling machine using given job drawing.	3	2	2	-	2	-	-	-	2	-	-	2
CO3	Understand application of the hand tools used in fitting, carpentry, foundry, welding shop, machine tools and sheet metal shop	3	2	2	-	2	-	-	-	-	-	-	2
CO4	Write a report related to hand tools and machine tools description referring to library books and laboratory manuals.	2	2	-	-	2	-	-	-	2	3	-	2
CO5	Apply safety consciousness alongwith team work.	2	-	-	-	-	-	-	-	3	2	-	-

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Computer Programming Lab &1/2FY3-24LTP:0+0+3
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand and describe the structure of a C program to explain, write, compile and execute programs using input and output statements.	3	2	2	2	-	-	-	-	-	-	-	2
CO2	Classify and write programs by applying the decision control statements and loop control statements using different operators.	3	3	2	3	-	-	-	-	-	-	2	-
CO3	Formulate, analyze and solve the problem by writing programs using pointers, arrays and strings.	2	3	2	-	-	-	-	-	2	-	2	-
CO4	Design object-based programs by creating new data type using structure and union.	-	3	1	3	-	-	-	-	3	-	1	-
CO5	Understand and use the concept of functions and file operations; moreover, design new functions to solve module driven problems.	2	2	2	3	-	-	-	-	-	-	2	-

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Basic Civil Engineering Lab &1/2FY3-27LTP: 0+0+2
Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Describe various sanitary fittings and water supply fittings.	-	1	-	-	-	2	-	2	3	-	-	2
CO2	Examine pH, Turbidity, Hardness and Total solids of given water sample.	-	-	-	-	-	2	3	2	-	2	-	2
CO3	Use of EDM and Total Station in the field.	-	-	-	-	-	2	-	2	-	-	-	3
CO4	Investigate the linear and angular measurements of the points on the ground and levelling.	-	-	-	-	-	2	2	2	3	2	-	2
CO5	Students will show an ability to communicate effectively and work as a team member ethically.	-	-	-	-	-	2	2	2	3	2	-	2

Subject/Code No: Basic Electrical Engineering Lab &1/2FY3-26
LTP: 0+0+2Semester: I / II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Utilize a Cathode Ray Oscilloscope (CRO), along with various meters, to identify and observe the functioning of electronic components such as resistors, inductors, capacitors, diodes,diac, triac, transistors, and thyristors.	3	3	3	-	-	-	-	-	-	-	-	3
CO2	Measure the no-load current waveform using an oscilloscope and calculate transformer voltages, currents, power, and efficiency	3	3	3	-	-	-	-	-	-	-	-	3
CO3	Conduct various three-phase transformer connections to analyze voltage and current relationships, while recording phase shifts between the primary and secondary sides.	3	3	3	-	-	-	-	-	-	-	-	3
CO4	Recognize the operational characteristics, cut-out sections, and speed behavior of DC machines, synchronous machines, single-phase, and three-phase induction machines	3	3	3	-	-	-	-	-	-	-	-	3
CO5	Create a torque-speed curve for a separately excited DC motor, examine the operation of DC-DC converters, DC-AC converters, and DC-AC converters for induction motor speed control, while providing an overview of the components in LT switchgear.	3	3	3	-	-	-	-	-	-	-	-	3

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Computer Aided Engineering Graphics & 1FY3-28LTP:0+0+2
Semester: I semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Discuss the concept of engineering terminology, engineering scales and conic sections.	2	-	-	-	3	2	-	-	3	2	-	2
CO2	Apply the necessary skills in drawing and explaining orthographic projection of points, lines, and planes.	2	-	3	-	3	2	-	-	-	-	-	3
CO3	Understand and Draw projections of solids	3	2	3	2	3	-	-	-	-	-	-	-
CO4	Draw and classify the sections of solids.	3	2	3	2	3	-	-	-	-	-	-	-
CO5	Explain various commands and create drawing in AutoCAD.	2	-	3	-	3	-	-	-	-	-	-	2

Program Name: APPLIED SCIENCES Session 2018-19
Subject/Code No: Computer Aided Machine Drawing&2FY3-29LTP:0+0+2
Semester: II semester
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Recall and understand the conventional representation of machine components and material, types of lines & dimensioning.	2	-	-	-	3	2	-	-	3	2	-	2
CO2	Explain concept of first and third angle projections and prepare drawing of simple machine elements, sectional views for various parts and assembly.	2	-	3	-	3	2	-	-	-	-	-	3
CO3	Draw and explain various types of temporary and permanent fasteners.	3	2	3	2	3	-	-	-	-	-	-	-
CO4	Draw free hand sketches of lines, materials and various components i.e. bearings, couplings, welded joints, pipe joints, valves etc.	3	2	3	2	3	-	-	-	-	-	-	-
CO5	Differentiate among the various commands and create 2D computer aided drawing software.	2	-	3	-	3	-	-	-	-	-	-	2

Bachelor of Technology in Computer Engineering

Program Name: Computer Engineering
Subject/Code No: Advanced Engineering Mathematics/3CS2-01
LTP:3L+0T+0P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Recall and understand the fundamental concepts of probability and standard distributions which can describe real life phenomenon.	3	3		2						2		3
CO2	Analyze the various methods of numerical solutions of Normal, Poisson and Binomial probability distribution.	3	3	3	3						3		3
CO3	Formulate the optimization problems in mathematical form with classification.	2	2	2	2								2
CO4	Interpret non-linear optimization problems and solve by appropriate methods.	3	3	3	3								2
CO5	Demonstrate linear optimization problems and solve by standard methods.	2	2	2	2								2

Subject/Code No: Technical Communication/3CS1-02
LTP: 2L+0T+0P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand the process of technical communication in terms of LSRW.									1	3		1
CO2	Apply the concept of Technical Materials/Texts in various technical documents.										3		1
CO3	Enhance the skills in the process of technical communication in terms of LSRW.									1	3		1
CO4	Implement the basic concepts of technical communication in Technical Reports, articles and their formats.										3		2

Subject/Code No: Digital Electronics/3CS3-03
LTP: 3L+0T+0P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Demonstrate basic principles of digital circuits and different number systems	3	3	3	2	1							1
CO2	Distinguish logic expressions and circuits using Boolean laws and K-map	3	3	3	2	1							1
CO3	Differentiate types of digital electronic circuits and also the different logic families involved in the digital system to prepare the most simplified circuits using various mapping and mathematical methods.	3	3	3	1	1	1						1
CO4	Design various types of memoryless element digital electronic circuits for particular operation within the realm of economic, performance, efficiency, user friendly and environmental constraints.	3	3	3	1	1	1						1
CO5	Design various types of memory element digital electronic circuits for particular operation within the realm of economic, performance, efficiency, user friendly and environmental constraints.	3	3	3	1	1	1						1

Subject/Code No: Data Structures and Algorithms/3CS3-05
LTP: 3L+0T+0P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Recognize fundamental Stack operations to address a range of engineering problems.	3	2	2	2	2		1	1	1			
CO2	Relate the principles of Queues and Linked Lists to offer solutions for computer-based issues.	2	2	2	2	2	2	2	1	1		1	1
CO3	Discover different Search and Sorting methods to rationalize their application in diverse scenarios.	2	2	2	2	2	2	1		1		1	1
CO4	Practice the concept of Trees and their operations to furnish valid solutions.	2	2	2	1	1	2	1					1
CO5	Compare a variety of techniques that can be employed with Graphs and Hashing.	2	2	2	2	1	1			1			1

Subject/Code No: Object Oriented Programming/3CS3-06
LTP: 3L+0T+0P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Describe the Object Oriented Programming paradigm with the concept of objects and classes.	3	3	2	3	3							
CO2	Explain the memory management techniques using constructors, destructors and pointers	3	3	2	2	2							
CO3	Classify and demonstrate the various Inheritance techniques.	3	3	2	2	2							
CO4	Understand how to apply polymorphism techniques on the object oriented problem.	3	3	2	2	2							
CO5	Summarize the exception handling mechanism, file handling techniques and Use of generic programming in Object oriented programming	3	3	3	3	3							

Subject/Code No: Software Engineering/3CS3-07
LTP: 3L+0T+0P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Recognize different software life cycle models and testing techniques to develop real time projects.	2	3	1					1	2		1	1
CO2	Identify cost estimation and risk analysis in project management.	1	2			2				1		2	1
CO3	Interpret and deduce the engineering process of software requirement analysis.	1	2				2			1		1	1
CO4	Apply procedural design methods to architect software systems.			3	2	1					1	1	1
CO5	Collaborate the concept of object-oriented analysis and design in software development process.			3	2					2			1

Subject/Code No: Data Structures and Algorithms Lab/3CS3-21
LTP: 0L+0T+3P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Recognize fundamental Stack and Queue operations to address a range of engineering problems.	3	2	2	1	1							1
CO2	Relate the principles of Linked Lists to offer solutions for computer-based issues.	2	2	2	2								
CO3	Discover different Search and Sorting methods to rationalize their application in diverse scenarios.	2	1	1	2								
CO4	Devise diverse operations on non-linear data structures such as trees and graphs.	2	2	1	1								
CO5	Propose a solution for a provided engineering problem utilizing Stack, Queue, Linked List, Tree and Sorting	2	2	2									

Subject/Code No: Object Oriented Programming Lab/3CS3-22
LTP: 0L+0T+3P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Create and explain Basic C++ Program using i/o variables and structures.	2	1			1							
CO2	Apply object oriented programming concepts using class and objects	2	2	1		2							
CO3	Design and assess the classes for code reuse	2	2	1		2							
CO4	Analysis and Apply the generic classes concepts in programming problem	2	1	1		2							
CO5	Illustrate and evaluate the file Input Output mechanisms	3	1	1	1	2							

Subject/Code No: Software Engineering Lab/3CS3-23
LTP: 0L+0T+3P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Observe the requirements specification, function oriented design using Software Analysis and Software Design of given project and relate the use of appropriate CASE tools and other tools in the software life cycle.	2	1										
CO2	Translate Software Requirements Specification (SRS) for a given problem in IEEE template.	1	1							1	1	1	1
CO3	Select DFD model (level-0, level-1 DFD and Data dictionary) of the project.	1	1	1									
CO4	Prepare all Structure and Behavior UML diagram of the given project.		1	1	1	1							
CO5	Test/Evaluate “Project Libre” a project management software tool to manage files.	1		1		1				1		1	

Subject/Code No: Digital Electronics Lab/3CS3-23
LTP: 0L+0T+3P Semester: 3rd
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Demonstrate the basics of logic gates	1	1	1						1	1		1
CO2	Demonstrate basic combinational circuits and verify their functionalities	2	1	1		1				1	1		1
CO3	Apply the working mechanism and design guidelines of different sequential circuits in the digital system design	1	1	2		1				1	1		1
CO4	Construct different types of counter for real time digital systems	1	1	2		1				1	1		1
CO5	Distinguish the different types of shift registers	1	1	1						1	1		1

Subject/Code No: Discrete Mathematics Structure/4CS2-01
LTP: 3L+0T+0P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Describe basic concept of Sets, Relations, Functions and Discrete Structure and apply appropriate methods to solve the problems.	3	3	3	3								3
CO2	Describe the concept of mathematical logic to create the problem in appropriate form and test for validity of the problem.	3	3	3	3								3
CO3	Apply fundamental mathematical concepts such as sets, relations, Combinatorics technique to formulate the problems and solve by appropriate method.	3	3	3	3								3
CO4	Interpret the concept of groups, ring and field to analyze the complex problems.	2	2	2									2
CO5	Demonstrate the model of real world problems using concept of Graph and solve the problems by standard result and graph algorithms.	2	2	2	2								2

Subject/Code No: Managerial Economics and Financial Accounting/4CS1-03
LTP: 2L+0T+0P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Recognize and describe the fundamental concepts of Economics and Financial Management and define the meaning of national income, demand, supply, cost, market structure, and balance sheet.		3		3		2	2	1				2
CO2	Calculate and Classify the domestic product, national product and elasticity of price on demand and supply.		1	3	2		1	1				2	2
CO3	Draw the cost graphs, revenue graphs and forecast the impact of change in price in various perfect as well as imperfect market structures.		1	3	2		1		1	1		2	1
CO4	Compare the financial statements to interpret the financial position of the firm and evaluate the project investment decisions.		2	2	2					1		2	1

Subject/Code No: Microprocessor & Interfaces/4CS3-03
LTP: 3L+0T+0P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Classify the basic operations of Microprocessor and microcontroller using their pin and architectural diagram, and also about area of manufacturing and performance.	3	3	2	2	3							
CO2	Practice of Knowledge about programming proficiency, using various addressing modes and data transfer instructions of microprocessor and microcontroller.	3	3	3		3							2
CO3	Evaluate the measures of Assembly Language Programming.	3	3	3	2	3							
CO4	Discriminate the interfacing of various circuits with microprocessor.	3	3	3	1	2							
CO5	Compare the different programming logic applications with 8085 microprocessor.	3	3	2	2	2							

Subject/Code No: Database Management System/4CS3-05
:LTP: 3L+0T+0P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Tabulate Database System with the help of Entity Relationship Diagram that visualizes a database system implemented in a real-world scenario.	3	2	3		3							
CO2	Apply data deduction and manipulation techniques using query languages on a variety of databases.	3	2		3								
CO3	Use normal forms in the process of enhancing the database schema through refinement techniques.	3	3	2	1								
CO4	Create transaction plans incorporating diverse scheduling types.	3	3	2									
CO5	Generalize and assess the effectiveness of concurrency control mechanisms and recovery systems.	3	2										

Subject/Code No: Theory of Computation/4CS3-06:
LTP: 3L+0T+0P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Apply the knowledge of different types of grammar; he/she can analyze the all types of grammar and evaluate the relationship among them.	3	2			2			1	1	2		2
CO2	Differentiate the concept of regular expression and finite automaton and apply the knowledge to compare the procedure for writing regular expression for an automaton or vice versa	3	2			1			1	2	3		3
CO3	Apply the knowledge of Context Free grammar; he/she can generate the Context free grammar and Pushdown Automaton for evaluating the CFG.	3	3			2			1	1	2		2
CO4	Apply the knowledge of Turing Machine he/she can analyze the Type-0 grammar and can design and evaluate the Turing Machine	3	3			2			1	1	2		2
CO5	Apply the knowledge of Pumping Lemma Theorem students can check whether the given grammar Regular grammar/Context Free Grammar or not	3	2			1					2		2

Subject/Code No: Data Communication and Computer Networks/4CS3-07
LTP: 3L+0T+0P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Able to identify the principles of layered protocol architecture; be able to recognize and generalize the system functions in the correct protocol layer and further illustrate how the layers interact.	3	3	1			2	1		3			1
CO2	State and cite mathematical problems for data-link and network protocols.	1	2		2		2				1		2
CO3	Use network layer protocols and calculate number of subnets required for a network.	3	2	2	1	2	1	2	1				1
CO4	Compute the reliability of data transfer over transport layer by glossy channel bit errors problem.	2		1			2	1					1
CO5	Select and plan for common services, system services, such as name and address lookups, and communications applications.	2					1		1			1	1

Subject/Code No: Microprocessor & Interfaces Lab/4CS3-21
LTP: 0L+0T+2P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze the fundamentals of assembly level programming	2	1	1		1							1
CO2	Apply interfacing concept between input and output devices.	2	1	1									
CO3	Elaborate the interfacing of various other devices with microprocessor.	2	2										
CO4	Compose the various programs on different problems using Assembly Language Programming.	2	2	2									2
CO5	Implement standard microprocessor real time interfaces including digital-to-analog converters and analog-to-digital converters	1	1										

Subject/Code No: Database Management System Lab/4CS3-22
LTP: 0L+0T+3P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Create and execute a database schema for a specified problem domain	2	1	1									
CO2	Manage integrity constraints within a database using a relational database management system (RDBMS),	2	1	1									
CO3	Construct and Devise a graphical user interface (GUI) application using a fourth-generation programming language (3GL).	3	1	1						1			
CO4	Composing PL/SQL code encompassing stored procedures, stored functions, cursors, and packages.												
CO5	Produce SQL and Procedural interfaces to SQL comprehensively.	2	1							1			

Subject/Code No: Network Programming Lab/4CS3-23
LTP: 0L+0T+3P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Identify the functioning of various networking equipment's	1					1					1	1
CO2	Illustrate the LAN Installation techniques and Configurations techniques	1	1			1						1	
CO3	Solving various Error correcting techniques and framing methods	1	1	1	1						1	1	
CO4	Practice the programs for client and server involving UDP/TCP sockets using socket programming.	1	1	1									1
CO5	Estimate the communication between client and server using Network Simulator.	1	1										

Subject/Code No: Linux Shell Programming Lab/4CS3-23
LTP: 0L+0T+2PSemester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Summarize the concepts and commands in UNIX.	1	1	1						1			
CO2	Construct the directory layout of a typical UNIX system, maintain, and secure UNIX directories and files.	1	1	1	1								
CO3	Illustrate the knowledge to use the several shell quoting mechanism correctly.	1	1	3	1								
CO4	Construct regular expression using filters and various commands to express the patterns.	1	1	2	1	1							
CO5	Write simple scripts to develop basic command output	1	1	1	1								

Subject/Code No: Java Lab/4CS3-23
LTP: 0L+0T+2P Semester: 4th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Express and restate fundamentals of java, and tools for program designing environments.	1		2		1							
CO2	Construct classes and implement the principles of method overloading, inheritance, and access controls within those classes.	1	2	1	1	1							
CO3	Develop Java packages and incorporate the concept of interfaces, along with importing these packages in Java.	1	2	2		1							
CO4	Formulate the application by managing file operations, handling exceptions, and implementing threads.		1	2		1							
CO5	Create applications utilizing Java applets and design various polygons. This task involves the application of knowledge and the synthesis of design skills		1	2		1							

Subject/Code No:COMPUTER ARCHITECTURE/5CS1
LTP: 2L+0T+0P Semester:5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Implement register transfer with the help of micro operations.	3	2	3	2	-	-	-	-	-			-
CO2	Analyze basic of computer organization, instructions, RISC & CISC characteristics.	1	3	3	2	-	-	-	-	-			-
CO3	Apply integer and floating type computer arithmetic techniques.	2	2	2	-	-	3	-	-	-			-
CO4	Analyze basics of memory organization, allocation and management schemes.	3	3	-	-	-	-	-	-	-			-
CO5	To assess modes of transfer and input output interface, interrupts and DMA Processing	2	2	2	-	-	-	-	-	-			-

Subject/Code No: DIGITAL LOGIC DESIGN/5CS2
LTP: 3L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	To demonstrate Hardware Description Languages and their use in digital logic design.	2	2	-	2	-	-	-	-	-			-
CO2	To design a digital system, components or process to meet desired needs within realistic constraints.	2	2	-	2	-	-	-	-	-			-
CO3	To design different controllers using JK and D flip flop.	2	2	-	-	-	3	-	-	-			-
CO4	To Analyze the asynchronous circuits, concepts of different hazards.	3	3	-	-	-	-	2	-	-			-
CO5	To understand the concept of FPGA, Technology mapping of FPGA.	2	2	-	-	-	3	-	-	-			-

Subject/Code No: TELECOMMUNICATION FUNDAMENTALS/5CS3
LTP: 3L+0T+0PSemester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze data transmission method over with wire and wireless communication.	2	1	2	-	-	-	-	-	-			-
CO2	Analyze the errors and its occurrence in data communication data link control.	2	2	2	-	-	-	-	-	-			-
CO3	Demonstrate the concept of wireless LAN and Their different types.	2	2	3	-	-	-	-	-	-			-
CO4	Apply the TDMA and space time division multiplexing	-	3	3	2	-	-	-	-	-			-
CO5	Apply the concept of spread spectrum techniques in wireless communication	2	2	-	-	2	-	-	-	-			-

Subject/Code No: DATABASE MANAGEMENT SYSTEM/5CS4
LTP: 3L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Design Database System with the help of Entity relationship Diagram for Real World Application	2	3	-	2	-	-	-	-	-			-
CO2	Deduct data using query language from any Database	2	3	-	2	-	-	-	-	-			-
CO3	Apply normal forms for database schema refinement	-	2	3	2	-	-	-	-	-			-
CO4	Design transaction with different types of schedule	-	2	3	2	-	-	-	-	-			-
CO5	Evaluate concurrency control mechanism and Recovery system	1	2	-	3	-	-	-	-	-			-

Subject/Code No: OPERATING SYSTEM/5CS5
LTP: 3L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Explore the concept of Operating Systems with its need and basic functions	3	-	-	-	-	-	-	-	-			-
CO2	Analyze Process scheduling techniques and Inter Process Communication so that Real World Classical Problems can be solved.	-	3	-	2	-	-	-	-	-			-
CO3	Design the techniques for deadlock prevention, avoidance and detection with better memory management.	-	2	3	-	-	-	-	-	-			-
CO4	Analysis of Memory Management Techniques and Page Replacement Algorithms to formulate Free Space Management with concept of virual memory	1	3	-	-	-	-	-	-	-			-
CO5	Demonstrate the knowledge File system, Input/ Output Systems and various disk scheduling algorithms by having case studies	2	3	-	2	-	-	-	-	-			-

Subject/Code No: ADAVNCEDDATA STRUCTURE/5CS6
LTP: 2L+0T+0P Semester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze various operations on Weight Balanced Trees such as Red-Black tree, Huffman tree and 2-3 tree and their augmentation.	2	3	-	2	-	-	-	-	-			-
CO2	Design amortized analysis on data structures, including Mergable heaps, 2-3-4 Trees, and Fibonacci Heap.	3	2	3	-	-	-	-	-	-			-
CO3	Apply Graph theory and related algorithms on Flow Networks and Spanning trees.	-	2	2	3	-	-	-	-	-			-
CO4	Implement various sorting networks algorithms and perform operations on disjoint sets.	2	3	-	1	-	-	-	-	-			-
CO5	Evaluate the numerical algorithms such as CRT, RSA, and Primality testing and integerfactorization.	1	2	-	3	-	-	-	-	-			-

Subject/Code No: DATABASE MANAGEMENT SYSTEM LAB/5CS7
LTP: _0L+0T+2P Semester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Transform an information model into a relational database schema and to use a DDL and utilities.	3	-	2	-	-	-	2	-	-			-
CO2	Create SQL interface of a multi-user relational DBMS for preparing ER Diagram.	-	3	2	-	2	-	-	-	-			-
CO3	Explore desktop database package to populate, maintain, and query a database.	-	3	-	-	2	2	-	-	-			-
CO4	Design database and writing applications for manipulation of data.	-	-	-	3	-	-	3	-	-			-
CO5	Formulate query, using SQL, solutions to a broad range of query and data update problems.	-	-	3	-	2	-	-	-	2			-

Subject/Code No: SYSTEM DESIGN IN UML LAB/5CS8
LTP: 0L+0T+2P Semester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Develop a business model & Analyze the boundary and interaction between system and user	-	2	-	-	-	3	2	-	-			-
CO2	Create Communication model with help of Modern tool usage .	-	-	-	-	3	-	-	-	3			-
CO3	Analyze communication model and make dynamic model using state charts and activity graph	-	3	-	-	-	-	3	-	-			-
CO4	Assess class model and create physical component model which includes both software and hardware components	-	1	2	-	-	-	-	-	-			-
CO5	Create the physical architecture and deploy the various components on that hardware architecture.	-	-	3	-	-	-	-	-	-			3

Subject/Code No: OPERATING SYSTEM SIMULATION LAB/5CS9
LTP: 0L+0T+2P Semester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze of algorithms that can schedule processes in various manners	-	-	-	-	2	-	3	-	-			-
CO2	Implementation of Inter Process Communication for real world problems.	-	-	-	-	2	-	-	-	-			-
CO3	Evaluate of various memory management techniques so that free space management.	-	-		-	2	-	-	-	-			-
CO4	Apply of various Page Replacement techniques for effective utilization of memory	-	3	-	-	2	-	-	-	-			-
CO5	Analyze of various disk scheduling algorithms	-	-	-	2	2	-	-	-	-			2

Subject/Code No: DIGITAL HARDWARE DESIGN LAB/5CS10
LTP: L+0T+2P Semester: 5th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Implement digital/computer circuits with modern design tools.	-	-	-	-	-	3	-	3	-			-
CO2	Analysis the behavior of a digital logic circuit (analysis).	-	-	-	-	3	-	2	-	2			-
CO3	Synthesis descriptions of logical problems to efficient digital logic circuits.	-	-	-	-	1	-	-	2	-			1
CO4	Integrate previously designed components into a large-scale system to meet specified requirements	-	-	-	-	2	-	-	2	2			-
CO5	Apply practical knowledge on the application of digital hardware	-	-	-	-	-	3	1	-	1			-

Subject/Code No: COMPUTER NETWORKS /6CS1
LTP: 3L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Evaluate the reliability of data transfer over transport layer by lossy channel bit errors problem.	3	-	2	-	-	-	-	-	-			-
CO2	Apply network layer protocols and calculate number of subnets required for a network.	3	2	-	-	-	-	-	-	-			-
CO3	Analyze flow control and to apply protocols for communication over transport layer.	3	2	-	-	1	-	-	-	-			-
CO4	Design the handshaking process for connection establishment and connection release.	3	-	2	-	1	-	-	-	-			-
CO5	Demonstrate for common services, system services, such as name and address lookups, and communications applications.	2	3	-	-	`1	-	-	-	-			-

Subject/Code No: DESIGN AND ANALYSIS OF ALGORITHMS /6CS2
LTP: 2L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Evaluate the algorithm correctness and efficiency.	3	2	1	-	-	-	-	-	-			-
CO2	Apply Dynamic Programming to solve real time problems.	3	2	2	-	-	-	-	-	-			-
CO3	Formulation design and analysis of various pattern matching algorithms and of assignment problem.	2	2	2	-	-	-	-	-	-			-
CO4	Evaluate the randomized algorithm using Min-Cut, 2-SAT etc.	2	2	-	3	-	-	-	-	-			-
CO5	Identify behaviors of algorithms and the notion of various classes of algorithms.	2	-	-	-	3	-	-	-	-			-

Subject/Code No: THEORY OF COMPUTATION /6CS3
LTP: 3L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Apply the knowledge of different types of grammar, along with the relationship among them.	2	3	1	-	-	-	-	-	-			-
CO2	Analyze the concept of regular expression and finite automaton	2	2	-	2	-	-	-	-	-			-
CO3	Generate the Context free grammar and Pushdown Automaton for evaluating the CFG.	-	2	3	1	-	-	-	-	-			-
CO4	Design Turing Machine in reference of Type-0 grammar	1	3	2	-	-	-	-	-	-			-
CO5	Apply the knowledge of Pumping Lemma Theorem	-	2	2	2	-	-	-	-	-			-

Subject/Code No: COMPUTER GRAPHICS AND MULTIMEDIA TECHNIQUES /6CS4
LTP: 2L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze basic of principles computer graphics, the geometrical and mathematical	2	1	2	1	-	-	-	-	1	-	-	-
CO2	Problems with reference to computers and evaluate various algorithmic solutions.	2	-	2	-	-	-	-	-	2	-	-	-
CO3	Implement transformation methods and clipping algorithms.	2	3	1	-	-	-	-	-	-	-	-	-
CO4	Analyze algorithms of Hidden Lines and Surfaces to create curves.	2	2	2	-	-	-	-	-	-	-	-	-
CO5	Implementation various illumination models and color models.	2	2	2	-	-	-	-	-		-	-	-

Subject/Code No: EMBEDDED SYSTEM DESIGN /6CS5
LTP: 3L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Explore of working principle of embedded system, tool and components required to design an embedded system	3	-	3	-	-	-	-	-	-	-	-	-
CO2	Analyze Interrupt latency, scheduling architecture for embedded system design.	2	3	-	-	-	-	-	-	-	-	-	-
CO3	Analyze RTOS and Semaphore for embedded system design.	3	-	3	-	-	-	-	-	-	-	-	-
CO4	Apply knowledge about Hard real-time and soft real time system principles..	2	-	3	-	-	-	-	-	-	-	-	-
CO5	Apply knowledge of Embedded Software development tools for Host and target systems Like cross compilers, linkers, and locators for embedded systems and analyze In-circuit emulators and monitors.	2	3	1	-	-	-	-	-	-	-	-	-

Subject/Code No: ARTIFICIAL INTELLIGENCE /6CS6.2
LTP: 2L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze different approaches of AI important AI techniques, including in particular search, knowledge representation, planning and constraint management	2	3	-	-	-	-	-	-	-	-	-	-
CO2	Interpret the modern view of AI as the study of agents that receive percepts from the environment and perform actions.	3	2	-	1	-	-	-	-	-	-	-	-
CO3	Explore awareness of AI facing major challenges and the complexity of typical problems within the field.	-	3	2	-	-	-	-	-	-	-	-	-
CO4	Assess critically the techniques presented and apply them to real world problems.	-	3	-	2	-	-	-	-	-	-	-	-
CO5	Apply advance approach of AI such as intelligence system and expert system.	2	3	-	-	-	-	-	-	-	-	-	-

Subject/Code No: JAVA PROGRAMMING LAB /6CS7
LTP: 2L+0T+0P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Understand fundamentals of java, and tools for program designing environments.	3	-	-	-	2	-	-	-	-	-	-	-
CO2	Apply concept of overloading, inheritance and access controls to class.	2	-	2	-	-	2	-	-	-	-	-	-
CO3	Apply the concept of interfaces and importing the packages in java.	2	2	-	-	2	-	-	-	-	-	-	-
CO4	Design the application by handling files, Exceptions and threads.	-	-	3	3	-	-	-	-	-	-	-	-
CO5	Develop the applications using applets and design some polygons.	3	-	-	-	-	-	-	-	-	-	-	2

Subject/Code No: COMPUTER GRAPHICS AND MULTIMEDIA TECHNIQUES LAB /6CS8
LTP: 0L+0T+3P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Describe the Ecommerce and ERP, delving into their respective requisites and the infrastructure needed to support them.	2	1					2	2				3
CO2	Examine the necessary infrastructure and software prerequisites to ensure the operational functionality of Ecommerce portals.	2					1	2	2				3
CO3	Elaborate on the operational mechanisms of the Internet, web portals, and Ecommerce portals, while highlighting the essential infrastructure requirements.	2	2					2				1	3
CO4	Apply the effectiveness of tools and techniques in the realm of digital marketing, considering their resultant impact.	3	2					2					3
CO5	Construct an XML-based database and formulate an XML application tailored for storing data.	2	2					1					3

Subject/Code No: DESIGN AND ANALYSIS OF ALGORITHMS LAB /6CS9
LTP: 0L+0T+3P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Apply image enhancement operation and image Arithmetic Operations on a given image	1	1	1		1				1			1
CO2	Demonstrate image restoration and histogram processing on images	1	1	1	1	1				1		1	1
CO3	Distinguish and compare various Noise and filtering algorithms on images	2	1	1	1	1				1			1
CO4	Illustrate image restoration and segmentation techniques on an image	1	1	1	1	1				1		1	1
CO5	Apply pattern recognition techniques on images using features extraction	1	1	1		1				1			1

Subject/Code No: EMBEDDED SYSTEM DESIGN LAB /6CS10
LTP: 0L+0T+3P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Demonstrate the selection procedure of Processors in the Embedded domain.	1	2	-	3	-	-	-	-	-	-	-	-
CO2	Develop existing embedded systems by formulating the system design problem including the design constraints.	3	1	-	-	1	-	-	-	-	-	-	-
CO3	Develop the embedded systems platform for future applications.	3	-	-	2	1	-	-	-	-	-	-	-
CO4	Implementing several embedded systems with particular focus on the interaction between multiple devices.	3	-	-	2	1	-	-	-	-	-	-	-
CO5	Visualize the role of Real time Operating Systems in Embedded System.	3	-	-	3	-	-	-	-	-	-	-	-

Subject/Code No: HUMANITIES AND SOCIAL SCIENCE/6CS11
LTP: 0L+0T+3P Semester: 6th
Course Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Able to understand Indian constitution, fundamental rights, duties and principles.	-	-	-	3	3	-	-	-	-	-	-	-
CO2	Able to understand Indian constitution, fundamental rights, duties and directive principles.	3	-	-	-	2	-	-	-	-	-	-	-
CO3	Able to apply the utility approach and find out the implication of economic laws related to demand and supply.	2	-	2	-	-	2	-	-	-	-	-	-
CO4	Able to understand that how national income of a country is determined.	2	2	-	-	2	-	-	-	-	-	-	-
CO5	Able to understand the concepts of exchange rate and BOP.	-	-	3	3	-	-	-	-	-	-	-	-

Subject/Code No: Cloud Computing/7CS1A
LTP: 3L+0T+0P Semester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Recognize the progression of cloud computing and its practical uses over time	3	3	3			2					2	1
CO2	Evaluate the structure, framework, and various models of cloud computing's design and architecture.	3	3	3		1	1					2	2
CO3	Measure an appraisal of virtualization technology and data centers, including their applications within the context of cloud computing.	3	3	3		1	2					2	1
CO4	Write the understanding of security concerning data, data centers, and cloud services.	3	2	2		1	2					1	1
CO5	Explain cloud services such as AWS and Google App Engine in terms of their integration capabilities with cloud applications.	3	2	1		3	1						1

Subject/Code No: Information Security System/7CS2A
LTP: 3L+0T+0P Semester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Identify services that enhance the security and its mechanism.	3	1	1		1		1		1			1
CO2	Classify security attacks on information over network. Describe and apply classical encryption techniques.	2	2	1	2	1	1						2
CO3	Compare conventional encryption algorithms & public key cryptography, and design Encryption algorithm to provide the Integration and confidentiality of a message.	3	1	3	1	1			1				2
CO4	Understand the concept of hash function with application and message authentication code in security system	3	2		2	2							2
CO5	Classify key management schemes and discuss web security and transport level security protocols.	3	2	2			2						2

Subject/Code No: Data Mining & ware Housing/7CS3A
LTP: 3L+0T+0P Semester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Apply preprocessing techniques over raw data and provide suitable input for range of data mining algorithms.	3	3	1		1							
CO2	Apply appropriate association rule mining algorithms & statistical measures on data.	3	3	1		1							
CO3	Create solutions to real life problems using different data mining techniques likeclassification, prediction & clustering.	3	3	2		1							
CO4	Design data warehouse with dimensional modeling	3	2	3		1							
CO5	Apply OLAP operations & Discover the knowledge imbibed in the high dimensional system.	3	2	1		1							

Subject/Code No: Computer Aided Design for VLSI/7CS3A
LTP: 3L+0T+0P Semester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze digital circuits, incorporating into a VLSI chip also expected to understand various design methodologies such as custom, semi-custom, standard cell, arrayed logic, sea-of-gates.	3	3	1									
CO2	Explore various contemporary techniques for the design, Simulation.	3	3				1						
CO3	Apply simulation, synthesis and optimization on digital circuit.	3	2	2		1							
CO4	Design the Layout, routing, placement of a VLSI Chip.	2	3	3		1							
CO5	Optimize performance of h/w through CAD tools with floor planning, placement and routing.	2	3	3		1							

Subject/Code No: Compiler Construction/7CS5A
LTP: 3L+0T+0P Semester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analysis the working of compiler by understanding its different phases.	3	3		2								
CO2	Apply and implement different types of Parsing algorithms.	3	3		2								
CO3	Evaluate between different types of Intermediate code generations.	3	2		1								1
CO4	Classify the different storage organization techniques	3	3		1								
CO5	Analyze the different issues in the design of the code generator and basic block control flow graph.	3	3		1								

Subject/Code No: Advance Database Management Systems/7CS6.1A
LTP: 3L+0T+0PSemester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze the processes involved in query optimization which impact on database operation and design	3	2	2		1							
CO2	Analyze the database functions and packages suitable for enterprise database application development and management	3	2	2		1							
CO3	Evaluate alternative designs and architectures for databases.	3	2	2		1							
CO4	Apply the database solutions for data access and its Security measures.	3	2	2		1							
CO5	Create the design of database systems for the solution of an applications.	3	2	2		1							

Subject/Code No: Web Development Lab/7CS7A
LTP: 0L+0T+2P Semester:7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Apply the basic knowledge of web development using knowledge of HTML andCSS elements.	1		1		1				1			
CO2	Create student registration form entry using validation through JavaScript.	1		1		1				1			
CO3	Identify basic configuration of Web Servers. Design a dynamic web page usingJSP, PHP and ASP	1		1		1				1			
CO4	Analysis and Interpretation for Dynamic Web Page using JSP and JDBC.	1		1		1							
CO5	Apply the concept of Session in Web Page and demonstrate the knowledge of Ajax development.	1		1		1							

Subject/Code No: VLSI Physical Design Lab/7CS8A
LTP: 0L+0T+3PSemester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Design digital circuits, incorporating into a VLSI chip.			2		2							
CO2	Explore various contemporary techniques for the design, Simulation.		3			1							
CO3	Apply simulation, synthesis and optimization of digital circuit.			3			1						
CO4	Implementation and Design the Layout, routing, placement of a VLSI Chip.			3				1					
CO5	Optimize performance of h/w through CAD tools with floor planning, placement and routing.			3		2							

Subject/Code No: Compiler Design Lab/7CS9A
LTP: 0L+0T+3PSemester: 7th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Identify different kinds of tokens and lexemes.	2	2										
CO2	Analyze scanning by using the concept of finite state automation, parse tree.	2	2										
CO3	Deploy intermediate code for various statements in a programming language concept	2	1				1						1
CO4	Deploy heap structure for storage		1						2				1
CO5	Deploy various language patterns using lex tools they are also able to parse.		1				1						1

Subject/Code No: Mobile Computing/8CS1A
LTP: 3L+0T+0PSemester:8th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze the principles of mobile computing technologies and Evaluate Mobility management Techniques.	3	3	2									
CO	Interpret Data dissemination and management and evaluate mobile middleware.	3	2	2									
CO3	Assess Service Discovery and Evaluate standardization Methods.	3	2	2									
CO4	Apply Mobile IP, Mobile TCP, Database systems in mobile environments, and assess World Wide Web.	3	2	2	1								
CO5	Analyze Ad Hoc networks, evaluate and practice Routing protocols.	3	2	2	1								

Subject/Code No: Digital Image Processing/8CS2A
LTP: 3L+0T+0P Semester: 8th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Illustrate the fundamental concepts of Digital Image Processing System	2	2	2		1							1
CO2	Demonstrate various transformations and filtering techniques on Images in different domains.	3	3	2	2	1							1
CO3	Distinguish the causes for image degradation and compare the image restoration techniques.	3	2	2	1	1							1
CO4	Distinguish various image compression and segmentation techniques.	3	2	2	1	1							1
CO5	Categorize different image segmentation and representation algorithms and techniques	2	2	1	1	1							1

Subject/Code No: Distributed System/8CS3A
LTP: 3L+0T+0PSemester: 8th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Illustration of various architectures used to design distributed systems along with different types of operating systems.	3	3	1	1								1
CO2	Analysis of concurrent programming with inter process communication techniques, such as remote method invocation, remote events.	3	2	2	1								1
CO3	Evaluation of various distributed file system through case studies.	2	2	1	1	1							1
CO4	Analysis of distributed shared memory models and their failures in distributed computation.	2	2	2	1								1
CO5	Analyze various faults and their consequences and replicated data management through exploration different types of Distributed Systems.	2	2		2	1							1

Subject/Code No: Real Time System/8CS3.2A
LTP: 3L+0T+0PSemester: 8th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze the concepts of Real-Time systems and modeling	3	2		3								
CO2	Explore the functionality in real-time systems, their architecture and inner behavior.	3	2		3								
CO3	Evaluate the multi-task scheduling algorithms for periodic tasks performance of scheduling.	3	2		1	1							
CO4	Apply scheduling algorithms for aperiodic, and sporadic tasks as well as examine the impact of scheduling	3	3		2	1							
CO5	Design of protocols related to real-time communication	2		3	2	1							

Subject/Code No: UNIX NETWORK PROGRAMMING & SIMULATION LAB/8CS5A
LTP: 0L+0T+3PSemester: 8th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Analyze the functionality of various distributions of Unix via. BSD, POSIX.	1	1	3	1								
CO2	Develop the programs for client and server involving UDP/TCP sockets using socket programming.		1	3									
CO3	Evaluate interoperability between IPV3& IPV6.	1		3									
CO4	Implement the functionality of FORK function for system call	1		3	1								
CO5	Evaluate the communication between client and server using Network Simulator.	1		2	1								

Subject/Code No:FPGA LAB /8CS6A
LTP: 0L+0T+3P Semester: 8th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Design the various continuous, discrete analog and digital signals with the use of sampling and quantization	1	1	3	1								
CO2	Evaluate the various parameters of the different signals		1	3									
CO3	Design the various filters and calculate the parameter for their characteristics.	1		3									
CO4	Apply digital design flows for system design and recognize the trade-offs involved Design state machines to control complex systems	1		3	1								
CO5	Simulate the transmission and reception of signal of different digital modulation techniques	1		2	1								

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Subject/Code No: Digital Image Processing Lab/8CS7A
LTP: 0L+0T+2PSemester: 8th
Course Outcome Mapping with Program Outcome

CO Number	CO Definition	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Apply image enhancement operation and image Arithmetic Operations on a given image	1	1	1		1				1			1
CO2	Demonstrate image restoration and histogram processing on images	2	2	2									
CO3	Distinguish and compare various Noise and filtering algorithms on images	2				1							
CO4	Illustrate image restoration and segmentation techniques on an image	1				1							
CO5	Apply pattern recognition techniques on images using features extraction	1				1				1			1

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Bachelor of Technology in Civil Engineering

Program Name: Civil Engineering
Session: 2018-19

S. No.	Course Code	Course Name	CO No.	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3CE2-01	Advance Engineering Mathematics-I	CO 1	Conduct investigations on interpolation and numerical integration based real world problems.	2	2	-	-	-	-	-	-	-	1	-	1
			CO 2	Analyze the various numerical methods and evaluate solution of problems based on differential equations, polynomial equations and Transcendental equations.	2	1	1	1	-	-	-	-	-	-	-	1
			CO 3	Evaluate Laplace transform and inverse Laplace transforms to solve Initial Value Problem (IVP).	2	2	1	1	-	-	-	-	-	-	-	1
			CO 4	Apply Fourier transforms and inverse Fourier transforms to solve Initial Value Problem (IVP) and Boundary Value Problem (BVP).	2	2	1	1	-	-	-	-	-	-	-	1
			CO 5	Apply Z-transform in discrete system and evaluate solution of problems based on recurrence relations.	2	2	1	1	-	-	-	-	-	-	-	1
2	3CE1-02	Technical Communication	CO 1	Apply basics of grammar, common error in writing and speaking, study of advanced grammar, editing strategies to achieve appropriate technical style of official documents such as Project Reports, Manuals, and Minutes of Meetings.	-	-	-	-	-	-	-	-	1	2	-	1
			CO 2	Investigate, judge and assess their linguistic ability which will get enhanced by Identifying key principles and delivery techniques of effective public speaking (listening, speaking, writing, reading)	-	-	-	-	-	-	-	-	1	2	-	2
			CO 3	Outline Notes and create different kinds of technical documents, plan information collection along with analyzing factors and strategies for Information design and document design in an organization.	-	-	-	-	-	-	-	-	1	1	-	2
			CO 4	Create emails and memos intended for an audience within the same company or team as well as to design Resume, Job Application, and Technical Reports.	-	-	-	-	-	-	-	-	1	2	-	2
			CO 5	Apply and analyze the relation between load, shear force, bending moment and slope deflection.	-	-	-	-	-	-	-	-	1	2	-	3

3	3CE3-03	Engineering Mechanics	CO 1	Analyze and evaluate Fundamental laws of mechanics.	3	2	-	-	-	-	-	-	-	-	-	-
			CO 2	Evaluate structure by methods of joints and method of section.	2	3	-	-	-	-	-	-	-	-	-	-
			CO 3	Differentiate the concept of Moment of Inertia of any section.	2	2	-	-	-	-	-	-	-	-	-	-
			CO 4	Analyze the principal of virtual works, different types of friction, Spring and their arrangement	3	2	-	-	-	-	-	-	-	-	-	-
			CO 5	Relate stresses and strain for a structure.	2	2	-	-	-	-	-	-	-	-	-	-
4	3CE3-05	Surveying	CO 1	Analyze the importance of surveying and apply the methods for measuring angles and directions using various instruments.	2	1	-	-	-	-	-	-	-	-	-	-
			CO 2	Evaluate RL using levelling instruments of a given area.	1	2	2	-	-	-	-	-	-	-	-	-
			CO 3	Analyze the different type of curve in field.	2	-	2	2	-	-	-	-	-	-	-	-
			CO 4	Apply the concept of tachometry and photogrammetric in field.	1	-	1	2	-	-	-	-	-	-	-	-
			CO 5	Create the setting out of work using different instruments (Total station and EDM).	1	2	1	1	-	-	-	-	-	-	-	-
5	3CE3-06	Fluid Mechanics	CO 1	Understand various types of fluid and its properties.	3	3	-	-	-	-	-	-	-	-	-	-
			CO 2	Apply &analyze various pressures at a point in a static fluid, equilibrium condition and stability concept for floating bodies.	2	2	2	-	-	-	-	-	-	-	-	-
			CO 3	Explain types, behaviour and various phenomenon to estimate the fluid discharge.	2	-	2	3	-	-	-	-	-	-	-	-
			CO 4	Apply the concept of Euler, Bernoulli's and momentum equation.	2	-	2	2	-	-	-	-	-	-	-	-
			CO 5	Evaluate the concept of laminar flow through pipes, its characteristics and losses.	2	2	2	1	-	-	-	-	-	-	-	-
6	3CE3-07	Building Materials and Construction	CO 1	Understand various types of fluid and its properties.	3	2	-	-	-	-	-	-	-	-	-	-
			CO 2	Apply &analyze various pressures at a point in a static fluid, equilibrium condition and stability concept for floating bodies.	2	3	-	2	-	-	-	-	-	-	-	-
			CO 3	Explain types, behaviour and various phenomenon to estimate the fluid discharge.	3	2	2	-	-	-	-	-	-	-	-	-
			CO 4	Apply the concept of Euler, Bernoulli's and momentum equation.	2	-	2	2	-	-	-	-	-	-	-	-
			CO 5	Evaluate the concept of laminar flow through pipes, its characteristics and losses.	2	2	1	2	-	-	-	-	-	-	-	-
7	3CE3-08	Engineering Geology	CO 1	Understand and evaluate the geology: Branches and Scope of Geology and the concepts of various geological materials and weathering processes.	3	2	2	1	-	-	-	-	-	-	-	-
			CO 2	Analyze and evaluate the properties, behaviour and engineering significance of different type of rocks and minerals.	3	2	2	1	-	-	-	-	-	-	-	-
			CO 3	Interpret and analyze different type of geological features: Fold, Fault, Joints and Unconformities.	3	2	2	1	-	-	-	-	-	-	-	-
			CO 4	Relate and evaluate Geophysical methods for Subsurface Analysis and understand the site selection parameters for Dam& Tunnel.	2	2	1	-	-	1	-	-	-	-	-	-

			CO 5	Create and evaluate the basic concept of remote sensing & GIS in various fields of Civil Engineering.	1	1	1	-	1	-	-	-	-	-	-	1
8	3CE3-21	Surveying Lab	**CO1**	Use different conventional instruments of measurements in surveying in length, angle, levelling measurements.	2	2	-	-	-	-	1	-	2	2	-	2
			CO2	Apply the procedures involved in field work and to work as a surveying team.	2	2	-	-	-	-	1	-	2	2	-	2
			CO3	Determine the Height of an object by trigonometric levelling	2	2	1	-	-	-	1	-	2	2	-	2
			CO4	Discuss and determine the modern tool of measurement in surveying like EDM, Total station etc.	2	2	1	-	2	-	1	-	1	2	-	2
			CO5	Conduct a survey, collect field data and plot them on a paper	2	3	2	-	2	-	1	-	1	2	-	2
9	3CE3-22	Fluid Mechanics Lab	**CO1**	Able to demonstrate the basic properties and characteristics of incompressible fluid in laboratory.	2	1	-	-	-	1	-	-	2	2	2	3
			CO2	Able to demonstrate fundamental theorems governing fluid flows i.e., continuity, energy and momentum in laboratory.	2	1	-	-	-	2	-	-	2	2	2	3
			CO3	Able to measure different fluid properties using various type of equipments like measurement of flow, pressure velocity and head loss.	2	1	-	-	-	1	-	-	2	2	2	3
			CO4	Classify the various pressure measuring devices.	1	1	-	-	-	1	-	-	2	2	2	2
10	3CE3-23	Computer Aided Civil Engineering Drawing	**CO1**	Draw Orthographic projections of Lines, Planes, and Solids	1	-	2	-	3	-	-	-	-	-	-	2
			CO2	Construct Isometric Scale, Isometric Projections and Views	1	-	2	-	3	-	-	-	-	-	-	2
			CO3	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids	1	-	2	-	3	-	-	-	-	-	-	2
			CO4	Draw projections of lines, planes, solids, isometric projections and sections of solids including Cylinders, cones, prisms and pyramids using AutoCAD	1	2	2	-	3	1	1	-	-	-	-	2
11	3CE3-24	Civil Engineering Materials Lab	**CO1**	To study about selection criteria and uses of common building stones and dressing of stones.	1	1	-	-	1	1		-	2	2	3	2
			CO2	To understand the types and properties of bricks and their determination as per IS code such as water absorption, compressive strength, effloresces, dimension and tolerance test.	1	1	-	-	-	-	-	1	2	2	3	2
			CO3	To know raw material of cements.	1	1	-	-				1	2	2	3	2
			CO4	To study the various properties of material i.e glass, kotastone etc.	1	1	-	-				-	2	2	2	2
12	3CE3-25	Geology Lab	**CO1**	Students should be able to learn the significance of earth and its minerals.	2	1	-	-	-	1	-	-	2	2	2	3
			CO2	Students should be able to learn the significance of rocks and its engineering properties.	1	1	-	-	-	1	-	-	2	2	3	2
			CO3	Students should be able to understand the application of geology knowledge to civil engineering construction.	1	-	-	-	-	2	1	-	2	2	3	2
			CO4	To know about various applications of remote sensing techniques.	1	1	-	-	3	2	1	-	2	2	2	3

13	4CE2-01	Advance Engineering Mathematics-II	**CO 1**	Apply concept of probability and evaluate solutions of real world problems.	2	2	-	-	-	-	-	-	-	1	-	2
			CO 2	Analyze standard probability distributions and evaluate solutions of real world problems.	1	2	1	-	-	-	-	-	-	-	-	1
			CO 3	Estimate the relationship between variables of databases of the problems in quantify and qualitative forms and solve problems by methods of correlation, regression and Rank correlation.	3	1	-	1	-	-	-	-	-	-	-	1
			CO 4	Explore the relationship between variables of databases of the problems and evaluate standard form of the problem by the method of least squares (Method of curve fitting).	2	2	-	-	-	-	-	-	-	-	-	2
			CO 5	Conduct investigation on hypothesis testing in statistical problems and evaluate solution of problem in appropriate form.	2	3	-	-	-	-	-	-	-	-	-	2
14	4CE1-03	Managerial Economics & Financial	**CO 1**	Determine the objectives, nature, scope, role &responsibilities of a manager of a business undertaking.	2	2	2	-	-	-	-	-	-	-	-	-
			CO 2	Predict the demand for a product or product mix of a company & to analyze various factors influencing demand elasticity. Forecast & compute the future sales level of a product by using various quantitative & qualitative techniques and with the help of past sales data.	3	2	-	-	-	-	-	-	2	-	-	-
			CO 3	Differentiate the meaning, importance, sources, & uses of capital in an enterprise and to estimate the working capital requirements.	2	2	2	-	3	-	-	-	-	-	-	-
			CO 4	Know the meaning, importance, steps, methods, uses & limitations of Capital Budgeting & Market Structure.	3	-	-	-	3	-	-	-	-	-	-	3
			CO 5	Interpret, analyze, discuss & comment on the financial performance of a business unit through liquidity leverage, coverage, turn over & profitability ratios.	3	-	-	3	-	-	-	-	-	-	-	3
15	4CE3-03	Basic Electronics for Civil Engineering Applications	**CO 1**	Understand the concepts of Digital Electronics.	3	1	-	-	-	-	-	-	-	-	-	-
			CO2	Interpret the Basic Electronics in measurements in Civil Engineering applications.	3	2	-	-	-	-	-	-	-	-	-	-
			CO 3	Analyze and equip with Errors in measurements systems and to expose to Data Acquisition and Processing.	3	2	-	-	-	-	-	-	-	-	-	-
			CO 4	Apply skills of Sensors and to explain Various Sensor Characteristics.	3	-	-	-	-	-	-	-	-	-	-	-
			CO 5	To share them Image processing Tools and Mat lab codes on Images.	3	-	-	-	1	-	-	-	-	-	-	-
16	4CE3-05	Strength of Materials	**CO 1**	Understand and apply the concept of stress and strains and to evaluate stress and strains in different members.	3	2	1	-	-	-	-	-	-	-	-	-
			CO 2	Apply and analyze the Bending moment, Shear force and Axial thrust diagrams for statically determinate beams and the distribution of bending and shear stresses for simple and composite sections.	2	3	1	-	-	-	-	-	-	-	-	-
			CO 3	Interpret and compare the elementary concepts of torsion, shear stress in solid and hollow circular	2	2	-	-	-	-	-	-	-	-	-	-

				shafts.													
			CO 4	Evaluate the short and long columns subjected to various loading conditions.	3	2	-	-	-	-	-	-	-	-	-	-	-
			CO 5	Apply and analyze the relation between load, shear force, bending moment and slope deflection.	2	2	1	-	-	-	-	-	-	-	-	-	-
17	4CE3-06	Hydraulics Engineering	**CO 1**	Understand dimensional analysis and analyze the various models, concepts and characteristics of boundary layer and turbulent flow.	3	3	-	-	-	-	-	-	-	1	-	1	
			CO 2	Classify steady, unsteady, uniform and non-uniform flow, to apply and evaluate gradually and rapidly varied flow in open channel flow	2	3	-	-	-	-	-	-	-	-	-	1	
			CO 3	Identify about the working of hydraulic machines like pumps, turbines: To apply and relate the performance of hydraulic machines	3	3	-	-	-	-	-	-	-	-	-	3	
			CO 4	Describe about hydrological phenomenon, unit hydrograph, analyze the rainfall, and properties of aquifer: to analyze and estimate the runoff and peak runoff rate.	3	2	2	-	-	-	-	-	-	1	-	1	
			CO 5	Apply and estimate water requirement, delta, duty and base and various aspects of Design of Canal: To understand various approaches of cross section of channels and silt control in canals and analyze Kennedy's theory and Lacey's theory.	3	3	2	-	-	-	-	-	-	-	-	2	
18	4CE3-07	Building Planning	**CO 1**	Understand and analyze the different types of buildings, criteria for location and site selection and the different methods of drawing sun chart and sun shading devices.	3	-	-	-	-	-	2	-	-	-	-	-	
			CO 2	Apply and analyze the Climatic and comfort Consideration using climate modulating devices and evaluate the orientation criteria for tropical climate with the consideration of Building Bye Laws and NBC Regulations.	2	2	-	-	-	-	-	-	-	-	-	1	
			CO 3	Evaluate the principles of Planning and different factors affecting planning including VastuShastra in Modern Building planning.	2	3	-	-	-	-	-	-	-	-	-	1	
			CO 4	Interpret and compare the functional design and Accommodation requirements of different Buildings.	2	2	-	-	-	-	-	-	-	-	-	2	
			CO 5	Relate the Services in Buildings.	2	2	-	-	-	-	-	-	-	-	-	2	
19	4CE3-08	Concrete Technology	**CO 1**	Apply the knowledge of properties and role of various ingredients like cement, aggregate, admixtures etc. to produce good quality concrete.	3	3	-	-	-	-	-	-	-	-	-	1	
			CO 2	Analyze properties of fresh and harden concrete by examining in lab and perform destructive, semi-destructive and non-destructive tests for concrete.	3	2	-	-	2	-	-	-	-	-	-	1	
			CO 3	Categorize the concrete manufacturing process and selecting right step by step process to achieve workable, durable of fresh and harden concrete.	2	3	-	-	-	-	-	-	-	-	3	2	
			CO 4	Design the concrete mix with suitable chemical admixture; this fulfils the required properties for fresh and hardened concrete.	2	2	2	-	-	-	-	-	-	-	-	1	

			CO 5	Create the advance concrete and develop such concrete by adding and manipulating composition.	3	-	2	3	-	-	-	-	-	-	-	1
20	4CE3-21	Material Testing Lab	**CO1**	Explain basic properties of materials.	2	1	-	-	-	-	2	-	-	2	-	2
			CO2	Identify the test to be conducted for different properties of building materials.	2	2	1	-	-	-	2	-	-	2	-	2
			CO3	Test for different properties of building materials.	2	2	1	-	-	-	1	-	-	2	-	2
			CO4	Analyze the test results for different properties.	2	2	2	-	-	-	-	-	-	2	-	2
21	4CE3-22	Hydraulics Engineering Lab	**CO1**	Describe the equipments used for behaviour and measurement of fluid in hydraulic structure	2	1	-	-	-	-	1	-	1	2	-	2
			CO2	Apply characteristics of Pelton Wheel ,hydraulic jump and Centrifugal Pump in civil engineering	2	3	-	-	-	-	1	-	1	2	-	2
			CO3	Analyze the discharge by using various instruments like venturimeter Broad crested weir.	2	3	-	2	-	-	1	-	1	2	-	2
			CO4	Evaluate momentum equation, Manning'& Chezy's coefficient of roughness for the bed of a given flume.	-	-	-	-	-	-	-	-	-	-	-	-
22	4CE3-23	Building Drawing	**CO1**	Create drawing of basic Components of buildings.	1	2	-	-	-	-	-	-	-	-	-	2
			CO2	Identify the components of different buildings required asper their functional need.	1	2	2	-	-	-	-	-	-	-	-	2
			CO3	Conduct the survey experiment using appropriate instruments and procedure.	1	2	2	2	2	1	-	-	-	-	-	2
			CO4	Analyze the data obtained and get the results after necessary computations.	1	2	2	2	2	1	-	-	-	-	-	2
23	4CE3-24	Advanced Surveying Lab	**CO1**	Identify the instruments required for a particular survey problem	1	2	-	-	-	-	-	-	-	-	-	2
			CO2	Device a method to fulfill the desired objective.	1	2	2	-	-	-	-	-	-	-	-	2
			CO3	Conduct the survey experiment using appropriate instruments and procedure.	1	2	2	2	2	1	-	-	-	-	-	2
			CO4	Analyze the data obtained and get the results after necessary computations.	1	2	2	2	2	1	-	-	-	-	-	2
24	4CE3-25	Concrete Lab	**CO1**	Explain the Quality control test on ingredients of concrete.	2	1	-	-	-	-	1	-	-	2	-	2
			CO2	Conduct Quality Control test on ingredients of fresh and hardened concrete.	2	2	-	-	-	-	1	-	2	2	-	2

			CO3	Analyze the test on fresh and hardened concrete and Non-destructive test on concrete.	3	2	-	-	2	-	1	-	2	2	-	2
			CO4	Design the concrete mix.	2	3	2	2	-	1	1	-	2	2	-	2
25	5CE1A	Theory of Structures-I	**CO 1**	Apply the basic concept of Static and Kinematic determinacy and to, analyze & differentiate the beam and frame among various classical methods.	3	-	2	-	-	-	1	-	-	-	-	-
			CO 2	Apply, Analyze & Interpret the data for simply supported Continuous beam by Moment Distribution method.	3	2	2	-	-	-	-	-	-	-	-	-
			CO 3	Differentiate among various types of structures and Examine & Produce the Structure by Strain Energy method and Unit Load Method.	3	1	-	-	-	-	2	-	-	-	-	-
			CO 4	Implement and categorized the structure by Column Analogy and Kani's Method for beam and Frame Structures.	2	3	1	-	-	-	3	-	-	-	-	-
			CO 5	Analyze and Evaluate the Frame by using three different methods and Build & differentiate among these methods.	3	3	2	-	-	-	-	-	-	-	-	-
26	5CE2A	Environmental Engineering -I	**CO 1**	Apply the basic concept of Static and Kinematic determinacy and to, analyze & differentiate the beam and frame among various classical methods.	2	-	-	-	-	2	2	-	-	-	-	2
			CO 2	Apply, Analyze & Interpret the data for simply supported Continuous beam by Moment Distribution method.	-	2	2	2	-	-	-	-	-	-	-	2
			CO 3	Differentiate among various types of structures and Examine & Produce the Structure by Strain Energy method and Unit Load Method.	-	2	2	-	-	-	-	-	-	-	-	2
			CO 4	Implement and categorized the structure by Column Analogy and Kani's Method for beam and Frame Structures.	-	-	2	-	2	-	-	-	-	-	-	2
			CO 5	Analyze and Evaluate the Frame by using three different methods and Build & differentiate among these methods.	1	1	-	-	-	2	-	-	2	-	-	-
27	5CE3A	Geotechnical Engineering -I	**CO 1**	Apply the properties of soil like water content, specific gravity, void ratio etc.	2		2	2	-	-	-	-	-	-	-	-
			CO 2	Analyze the different types of structures of soil, concept of Capillary and Permeability.	1	2	2		-	-	-	-	-	-	-	-
			CO 3	Apply and analyze the different types of stresses in soil.	2.	2	-	2	-	-	-	-	-	-	-	1
			CO 4	Identify the Shear strength of soil and different tests of soil on Shear strength.	3.	2.	-	-	-	-	-	-	-	-	-	-
			CO 5	Apply and analyze the Principles of soil compaction and soil stabilization	2	1	-	-	-	-	-	-	-	-	-	1
28	5CE4A	Surveying II	**CO 1**	Evaluate trigonometric formulas for leveling: RL for various field and instrument conditions.	2	3	-	-	1.	-	-	-	1.	-	-	1
			CO 2	Analyze the different types of curves.	2	2	-	-	1	-	-	-	1	-	-	1

			CO 3	Analyze the triangulation with proper station requirements for surveying.	2	3	-	2	-	-	-	-	1.		-	1
			CO 4	Analyze various errors in measurement of angles, distances and reduce levels	2	3	-	1	-	-	-	-	1	-	-	-
			CO 5	Apply field astronomy using modern instruments	3	-	-	-	-	-	-	-	-	-	-	-
29	5CE5A	Building Design	**CO 1**	Apply the concept of design loads & structural Systems.	2	1	3	1	-	-	-	-	-	-	-	-
			CO 2	Analyze the concept of lateral loads in respect of wind load	2	2	2	-	-	-	-	-	-	-	-	-
			CO 3	Implement and analyze the concept of lateral loads in respect of Earthquake loads	2	2	-	-	-	-	-	-	-	-	-	-
			CO 4	Analyze & evaluate of masonry and framed buildings	1.	-	2	-	-	-	1	-	-	-	-	-
			CO 5	Analyze & evaluate of mass housing and special roofs with different types	2	-	-	-	2.	2	-	-	-	-	-	-
30	5CE6.3A	Solid Waste Management	**CO 1**	Apply the concept of design loads & structural Systems.	3	-	-	-	-	2.	2.	-	-	-	-	1
			CO 2	Analyze the concept of lateral loads in respect of wind load	2.	-	-	-	-	2.	2	-	-	-	-	-
			CO 3	Implement and analyze the concept of lateral loads in respect of Earthquake loads	2	-	-	-	-	2	2.	-	-	-	-	-
			CO 4	Analyze & evaluate of masonry and framed buildings	2	-	-	-	-	2	2	-	-	-	-	1
			CO 5	Analyze & evaluate of mass housing and special roofs with different types	2	-	-	-	-	2	2	-	-	-	-	1
31	5CE7A	Environmental Engineering Lab-I	**LO1**	Explain the quality parameters of water and unit processes for the treatment of water.	1	2	-	-	-	-	-	-	-	-	-	1
			LO2	Analyse the characteristics and quality parameters of water with the help of tests.	2	2	-	-	-	-	-	-	-	-	-	1
			LO3	Design different water and waste water treatment unit processes.	2	2	2	2	-	-	-	-	-	-	-	2
32	5CE8A	Geotechnical Engineering Lab-I	**LO1**	Understand the procedure to classify the coarse grained and fine grained soil.	2	-	-	-	-	-	-	-	-	-	-	-
			LO2	Evaluate the index properties of soil.	3	3	3	-	-	-	-	-	-	-	-	-
			LO3	Determine the engineering properties of soil.	3		3	-	-	-	-	-	-	-	-	-
33	5CE9A	Surveying Lab-II	**LO1**	Conduct survey and collect field data	3		3	-	-	-	-	-	-	-	-	-
			LO2	Prepare field notes from survey data		3	3	-	-	-	-	-	-	-	-	-
			LO3	Interpret survey data and compute areas and volumes	2.	2	3	-	-	-	-	-	-	-	-	-

34	5CE10A	Computer Aided Building Design	LO1	Draw Orthographic projections of Lines, Planes, and Solids	3	2	3	-	-	-	-	-	-	-	-	-
			LO2	Construct Isometric Scale, Isometric Projections and Views		2	3.	-	-	-	-	-	-	-	-	-
			LO3	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids		3	3	-	-	-	-	-	-	-	-	-
			LO4	Draw projections of lines, planes, solids, isometric projections and sections of solids including Cylinders, cones, prisms and pyramids using AutoCAD	3	2	3	-	-	--	-	-	-	-	-	-
35	5CE11A	Structural Engineering Lab	LO1	Verify theoretical formulas by conducting experiments.	3	2	3	-	-	-	-	-	-	-	-	-
			LO2	Analyze statically determinate beams, trusses.			2	-	-	-	-	-	-	-	-	-
			LO3	Students will be able to analyze arch structures.		3		-	-	-	-	-	-	-	-	-
			LO4	Obtain the influence lines for statically determinate and indeterminate structures. 5. Determine deflections of beams and frames using classical methods		2	3	-	-	-	-	-	-	-	-	-
36	6CE1A	TOS-II	CO 1	Apply the basic principles of SFD & BMD for the rolling loads and mathematical problems with reference to rolling loads and ILD.	3	3	-	1	-	--	-	-	-	-	-	-
			CO 2	Distinguish between types of arches and evaluate the stability of arches.	2	1	3	1	-	-	-	-	-	-	-	-
			CO 3	Classify the concept of cables and suspension bridges.	3	3	-	-	-	-	-	-	-	-	-	-
			CO 4	Analyze the concept of unsymmetrical bending and shear centre.	3	3	3	-	-	-	-	-	-	-	-	-
			CO 5	Apply the matrix method for displacement calculations in structures.	2	2	-	-	-	-	-	-	-	-	-	-
37	6CE2A	Geotechnical Engineering-II	CO 1	Apply and evaluate stresses in soil under surface loadings by different methods of analysis.	2	2	2	2.	-	-	-	-	-	-	-	-
			CO 2	Apply and evaluate the concept of compressibility & consolidation under different conditions.	1.	2	2	2	-	-	-	-	-	-	-	-
			CO 3	Classify the different types of slopes and their stability.	2	2	-	2	-	-	-	-	-	-	-	1
			CO 4	Apply and analyze the earth pressure theory.	1	2	2	-	-	-	-	-	-	-	-	-
			CO 5	Identify and apply the various methods of estimation of bearing capacity of shallow foundation at different loadings and water level conditions using different methods.	1	1	0	1	-	-	-	-	-	-	-	1
38	6CE3A	Environmental Engineering-II	CO 1	Evaluate the various wastewater parameters and sewage quality parameters with creation of the quality assessment equipment.	1	-	-	2	2	2	-	-	-	-	-	-
			CO 2	Analyze the various types of sewerage system with application of the hydraulic design of sewer lines in various terrain.	-	2	1	-	-	2	2	-	-	-	-	-
			CO 3	Apply and analyze the various treatment processes for wastewater with consideration of sustainable or economical uses.	-	-	2	2	-	3	-	-	-	-	-	-

			CO 4	Classify the various methods for disposal of sewage by dilution, self purification and sewage farming and evaluating the various types of plumbing systems in buildings.	-	-	2	-	-	2	3	-	-	-	-	-
			CO 5	Identify the practical solutions of the air and noise pollution with the effective solution for reduction of pollution and also differentiate the pollution of greenhouse effect and acid rain.	-	-	-	-	2	2	2	-	-	-	-	-
39	6CE4A	Design of Concrete Structure-I	**CO 1**	Use the stress strain behaviour of steel and concrete & concept of working stress and limit state methods.	2	1	3	-	-	-	-	-	-	-	-	1
			CO 2	Analyzing the singly and doubly reinforced beam.	1	2	3	-	-	-	-	-	-	-	-	1
			CO 3	Apply limit state design for flexure, shear, torsion, bond and anchorage and development length.	1	2	3	-	-	-	-	-	-	-	-	1
			CO 4	Classify one way and two way concrete slab according IS 456 -2000.	1	2	3	-	-	-	-	-	-	-	-	1
			CO 5	Analyze the behaviour of columns subjected to eccentric load and use of interaction diagrams and study the design of various foundations.	1	2	3	-	-	-	-	-	-	-	-	1
40	6CE5A	Transportation engineering-I	**CO 1**	Discuss the planning, characteristics and development of the transportation system.	3	1	1	-	-	-	-	-	-	-	-	1
			CO 2	Analyze the various properties, procedures of road construction material and equipment.	2	3	2	-	-	-	-	-	-	-	-	2
			CO 3	Classify the various road cross section elements and curves.	3	3	-	-	-	-	-	-	-	-	-	-
			CO 4	Analyse the several road traffic engineering studies and awareness regarding design of informatory and warning indications.	2	3	-		-	-	-	-	-	-	-	-
			CO 5	Design the plain and hilly pavement by various methods considering different factors.	2	3	1	-	-	-	-	-	-	-	-	-
41	6CE6.1A	Remote Sensing & GIS	**CO 1**	Evaluate Photogrammetric and apply principles of Photogrammetric to create maps and their substitutes	3	1	1	-	1.	-	-	-	1	-	-	-
			CO 2	Analyze the basic concept of remote sensing.	2	1	1	-	-	1	-	-	-	-	-	-
			CO 3	Evaluate and analyse different types of platforms, sensors and their characteristics in Remote Sensing.	2	1	1	-	-	-	-	-	-	-	-	-
			CO 4	Analyze and create the different type of information from different remote sensing data products using various image processing techniques.	2	1	1	1	-	-	-	-	-	-	-	-
			CO 5	Create the basic concept of GIS and analyze the use of GIS tools for civil engineering purposes.	1	1	1	1	1	1	-	-	-	-	-	-
42	6CE7A	Geotechnical Engineering Lab-II	**LO1**	Implement and analyze the properties of soil such as Grain size distribution, specific Gravity, liquid limit, plastic limit and density etc.	1	-	-	-	-	-	-	-	-	-	-	2
			LO2	Classify C-Ø values by unconfined compression Test Apparatus, Direct Shear Test Apparatus and Triaxial Test.	1	-	-	2		-	-	-	-	-	-	2

			LO3	Evaluate the differential free swell index, swelling pressure, CBR of soil.	1	2	2	2	1	-	-	-	-	-	-	2
			LO4	Interpret the compressibility parameters of soil by consolidation test,permeability of soil by constant and falling head methods.	1.	2	2	2	1.	-	-	-	-	-	-	2
			LO5	Apply and analyze the Design concepts.	-	-	-	-		-	-	-	-	-	-	
43	6CE8A	Environmental Engineering Lab-II	**LO1**	LO1: Define water and waste water treatment plant process and design	1.	2	-	-	-	-	-	-	-	-	-	1
			LO2	LO2: Discuss various methods to measure air, noise, water and waste water pollution	2.	2	2	-	-	-	-	-	-	-	-	1
			LO3	LO3: Apply various equipment, technology to demonstrate air , noise pollution, water and waste water treatment process	2.	2	2	-	-	-	-	-	-	-	-	2
			LO4	LO4: Examine and analyze the quantification of air and noise pollutants, water and waste water pollution	2	2	2	-	-	-	-	-	-	-	-	2
44	6CE9A	Concrete Structures Design-I	**LO1**	Assess the bending moment and shear force for beams, columns, slabs and footings.	2	-	-	-	-	-	-	-	-	-	-	1
			LO2	Analyze the design parameters of the flexural members to fulfill the requirements of WSM and Limit state of Collapse for Flexure, shear and torsion.	2	-	2	-	-	-	-	-	-	-	-	2
			LO3	Design of flexural members for flexure, shear, bond, development length & curtailment of bar to fulfill the criteria of Limit State of Collapse for Flexure, shear and Torsion.	2.	2	2	-	-	-	-	-	-	-	-	2
			LO4	Analyze and design of column and column footings economically and suitably recommend the appropriate type according to site conditions	2	2	2	-	-	-	-	-	-	-	-	2
			LO5	Analyze and design of RCC components and Building with using Software tools	-	-	-	-	-	-	-	-	-	-	-	
45	6CE10A	Road Material Testing Lab	**LO1**	Characterization of the pavement materials	1	2	-	-	-	-	-	-	-	-	-	1
			LO2	Perform quality control tests on pavements and pavement materials	2	2	2	-	-	-	-	-	-	-	-	1
			LO3	Estimate earth work from longitudinal and cross-section details of design grade intersections	2	2	2	-	-	-	-	-	-	-	-	2
46	7CE1A	Water Resources Engineering-I	**CO 1**	Apply and analyze the functions, advantages of present status of irrigation in India and water harvesting and conservation.	3	-	-	-	-	-	-	-	-	-	-	-
			CO 2	Discuss the role of command area development authority and Canal Irrigation. To Analyze and Evaluate the design of channels, regime and semi theoretical approaches.	1	2	1	-	-	-	-	-	-	-	-	1
			CO 3	Apply and Distribution of Canal Water. To apply and evaluate different stages of rivers, and river training & bank protection works.	1	3	1	-	-	-	-	-	-	-	-	1
			CO 4	Analyze and Apply Water Logging Causes and types of channels lining and design of lined channels.	1	2	1	-	-	-	-	-	-	-	-	1

			CO 5	Use the Hydrology and Hydrologic cycle and evaluate Application to Engineering problems, measurement of rainfall, rain gauge, peak flow, flood frequency method	1	1	1	-		-	-	-	-	-	-	1
47	7CE2A	Design of Steel Structures-I	**CO 1**	Apply and analyze the types of steel, their broad specifications and Plastic analysis of steel structures.	2	1	3	--	-	-	-	-	-	-	-	1
			CO 2	Design the bolted and welded connections under axial and eccentric loadings.	1	2	3	-	-	-	-	-	-	-	-	1
			CO 3	Implement and analyze the Compression Member.	1	2	3	-	-	-	-	-	-	-	-	1
			CO 4	Classify and design the beams and their connections.	1	2	3	-	-	-	-	-	-	-	-	1
			CO 5	Analyze the column bases, Slab base, gusseted base for axial and eccentric compressive load.	1	2	3	-	-	-	-	-	-	-	-	1
48	7CE3A	Design of Concrete Structures-II	**CO 1**	Compare the concept of Pre-Tension & Post-Tension concrete and students are able to Analyze and Apply the concept of Pre-Tension & Post- Tension on rectangular Prestressed concrete Section.	1	3	2	-	-	-	-	-	-	-	-	-
			CO 2	Classify Torsion and different types of beam and Analyse & Evaluate the three types of Beams by using Indian Standard Code:456-2000.	1	3	2	-	-	-	-	-	-	-	-	-
			CO 3	Differentiate and apply the types of Tank and Dome using Indian Standard code: 3370-Part2-2009.	1	3	2	-	-	-	-	-	-	-	-	-
			CO 4	Describe the basic concept of Yield Line Theory & its applications & students are able to differentiate, Evaluate and analyse the different types of Retaining walls.	1	3	2	-	-	-	-	-	-	-	-	-
			CO 5	Classify the bridge and Culvert and students are able to apply and analyse the slab culvert and T-Bridge for IRC Loading by using Indian Stand Code: IRC 6-1966 and IRC 21-2000.	1	3	1	-	-	-	-	-	-	-	-	-
49	7CE4A	Transportation engineering-II	**CO 1**	Classify the various permanent way components, features, maintenance, and signal systems.	-	-	-	-	-	3	2	-	1	-	-	-
			CO 2	Apply and design the points and crossings, at surface, elevated and underground railway system conditions.	-	-	3	-	-	-	2	-	-	-	2	-
			CO 3	Design the various geometric attributes and gauge widening in the railway system.	-	-	3	-	-	1	1	-	-	-	-	-
			CO 4	Analyze the several components of airport engineering.	-	-	-	-	-	2	2	-	1	-	-	-
			CO 5	Design airport pavement by using various methods.	-	-	3	3	-	-	-	-	-	-	-	-
50	7CE5A	Numerical Methods in Civil	**CO 1**	Discuss the decimal and binary number system and understand the concept of Accuracy, Errors and approximations for solution of problems.	2	2	-	-	-	-	-	-	-	2	-	1
			CO 2	Explain basic concepts of iterative methods and apply appropriate iterative methods for numerical solutions of nonlinear equations.	2	2	-	-	-	-	-	-	-	-	-	2

			CO 3	Execute the basic concept of matrices and understand consistency of the system of equations for solving linear systems of equations by direct methods.	2	2	-	2	-	-	-	-	-	-	-	1
			CO 4	Apply the concept of iterative methods and create the approximate solution of the linear system of equations by use of appropriate iterative methods.	1	2	-	2	-	-	-	-	-	-	-	1
			CO 5	Discuss the concept of finite differences, analyze the various methods and apply knowledge of interpolation for solution of engineering problems.	1	1	1	1	-	-	-	-	-	-	-	1
51	7CE6.1A	Advanced Transportation Engineering	**CO 1**	Classify the different traffic studies and also to apply & analyze the traffic data by various methods.	2	3	-	-	-	-	-	-	-	2	-	1
			CO 2	Apply the various methods for traffic engineering and also to solve out the problems based on distribution.	1	2	2	-	-	-	-	-	-	-	-	2
			CO 3	Analyze the principles of roads & signals and also design the various roads and signals in traffic engineering.	1	1	2	2	-	-	-	-	-	-	-	1
			CO 4	Analyze the various traffic laws and regulations & also to evaluate the various types of markings and signs.	2	1	2	2	-	-	-	-	-	-	-	1
			CO 5	Evaluate the effect of traffic on the environment and to understand & remember the various road safety measures.	1	2	2	1	-	-	-	-	-	-	-	1
52	7CEPR	Project-I	**LO1**	Team work to select an engineering problem and its solution	2	2	-	-	-	3	-	3	-	-	-	-
			LO2	Formulate the problem and design using modern technologies and new software learning	1	-	-	-	-	-	-	3	3	3	-	-
			LO3	Develop the engineering solutions by considering society and environment	2	-	-	-	-	-	-	2	3	3	-	-
			LO4	Applying solution considering societal, health, safety, legal and cultural issues	2	1	-	-	-	-	-	-	2	2	-	-
			LO5	Analysis and explanation of data to provide the valid conclusions.	2	-	-	-	-	1	-	-	2	2	-	-
			LO6	Use of management principles in project functioning and consider the multidisciplinary environments.	-	-	-	-	-	-	-	-	-	-	3	2
			LO7	To work effectively in Project as an individual member and team by following the ethical principles	-	-	-	-	-	-	-	3	3	-	-	-
			LO8	Communicate effectively for various activities with help of reports, presentations and verbal communication that can help in life-long learning.	-	-	-	-	-	-	-	-	-	3	-	-
53	7CE7A	Design of Water Resource Structures-I	**LO1**	LO1) Explain the basic concept of water resource engineering, canals, dams, well irrigation, cross drainage structure and hydrology.	1	2			-	-	-	-	-	-	-	1
			LO2	LO2) Apply the water resource concept in irrigation system, canals, diversion head works, dams, well irrigation, cross-drainage structure and hydrology.	2	2	2		-	-	-	-	-	-	-	1
			LO3	LO3) Analyze the water requirement of crop, seepage losses in dam, forces acting on dam, run off and rain fall.	2	2	2	2	-	-	-	-	-	-	-	2

			LO4	LO4) Design of canal, surface and subsurface flows, dams like embankment and gravity dam, tube well.	2	2	2	2	-	-	-	-	-	-	-	2
54	7CE8A	Steel Structures Design-I	**LO1**	Analyze steel sections used in steel structures and the suitable sections for design.	2	2	2	-	-	-	-	-	-	-	-	-
			LO2	Analyzing the different kinds of connection used in steel structures and being able to create the compression and tension member.	2	3	3	-	-	-	-	-	-	-	-	-
			LO3	Create the laterally supported and unsupported steel beams and analyze the gantry girder, plate girder and laterally loaded steel members.	2	2	3	1	-	-	-	-	-	-	-	-
			LO4	Analyze and apply the different type's column bases.	2	2	2	-	-	-	-	-	-	-	-	-
			LO5	Analyze and create the truss girder and foot over bridge.	2	2	2	-	-	-	-	-	-	-	-	-
55	7CE9A	Concrete Structures Design-II	**LO1**	To understanding basic philosophy of Working Stress and Limit State Design of RCC structures.	3	2	-	-	-	-	-	-	-	-	-	-
			LO2	To design different structural components like beams, columns, slabs etc.	2	-	-	-	-	-	-	-	-	-	-	-
			LO3	To design different structural frames.	2	3	3	-	-	-	-	-	-	-	-	-
56	7CE10A	Numerical Methods in Civil	**LO1**	To know about how to make engineering easy and more interesting.	3	-	-	-	-	-	-	-	-	-	-	-
			LO2	To understand application of numerical methods.	2	3	2	-	-	-	-	-	-	-	-	-
			LO3	To application of numerical methods to make program in language C.	3	-	-	-	-	-	-	-	-	-	-	-
57	7CETR	Practical Training & Industrial Visit	**LO1**	Participate in the projects in industries during his or her industrial training.	2	-	-	-	2	-	3	3	3	2	-	2
			LO2	Describe use of advanced tools and techniques encountered during industrial training and visit.	2	-	-	-	2	-	3	3	3	2	-	2
			LO3	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.	2	-	-	-	2	-	3	3	3	2	-	2
			LO4	Develop awareness about general workplace behavior and build interpersonal and team skills.	2	-	-	-	2	-	3	3	3	2	-	2
			LO5	Prepare professional work reports and presentations.	2	-	-	-	2	-	3	3	3	2	-	2
58	7CEPR	Project-I	**CO 1**	Team work to select an engineering problem and its solution	2	2	-	-	-	3	-	-	-	-	-	-
			CO 2	Formulate the problem and design using modern technologies and new software learning	1	-	-	-	-	-	-	-	3	3	-	-
			CO 3	Develop the engineering solutions by considering society and environment	2	-	-	-	-	-	-	2	3	3	-	-
			CO 4	Applying solution considering societal, health, safety, legal and cultural issues	2	1	-	-	-	-	-	-	2	2	-	-
			CO 5	Analysis and explanation of data to provide the valid conclusions.	2	-	-	-	-	1	-	-	2	2	-	-

			CO 6	Use of management principles in project functioning and consider the multidisciplinary environments.	-	-	-	-	-	-	-	-	-	-	3	2
			CO 7	To work effectively in Project as an individual member and team by following the ethical principles	-	-	-	-	-	-	-	3	3	-	-	-
			CO 8	Communicate effectively for various activities with help of reports, presentations and verbal communication that can help in life-long learning.	-	-	-	-	-	-	-	-	-	3	-	-
59	8CE1A	Water Resources Engineering-II	**CO 1**	Classify and design the Regulation of works and Drainage Structure.	2	2	1	2	-	-	-	-	1	-	-	-
			CO 2	Apply and analyze the surface and subsurface flows, using Bligh's and Khosla's theory, also describe the weirs and barrages.	2	-	3	2	-	-	-	-	-	-	-	-
			CO 3	Implement and analyze the Embankment Dams and Gravity Dams with the stability and seepage analysis.	2	-	-	-	-	-	-	-	2	-	-	2
			CO 4	Select and evaluate spillways and gates, general features of hydroelectric schemes, elements of power house structure, selection of turbines and cavitations.	-	1	-	2	-	2	-	-	-	-	-	2
			CO 5	Evaluate the impact of water projects on river regimes and environment. To analyze the Reservoir sedimentation and water shed management using optimization techniques and system approach and G.I.S. and Computer aided irrigation design.	-	-	-	-	2	2	2	-	-	-	-	-
60	8CE2A	Design of Steel Structures-II	**CO 1**	Differentiate the Gantry girder and Roof Truss and also Apply & analyse the Gantry girder and Roof Truss with help of Indian Standard Code: 800-2007, IS: 875-Part-III and understand the application of Tubular Sections.	2	2	2	1	-	-	-	-	-	-	-	-
			CO 2	Classify and evaluate the welded section & bolted Section using Design Specification IS: 800-2007.	2	3	2	1	-	-	-	-	-	-	-	-
			CO 3	Design the bridge, Categorization & Produced the Deck Type Bridge with help of Indian Standard Bridge Rule Code.	1	2	2	1	-	-	-	-	-	-	-	-
			CO 4	Design of bridge and differentiate the Foot over Bridge & Truss Girder Bridge with help of Indian Bridge Rule Code.	2	3	2	-	-	-	-	-	-	-	-	-
			CO 5	Differentiate explanation of the types of tank and analyse among these tank with the help of Indian Standard Code: IS 804-1967, IS 805-1968.	2	2	2	1	-	-	-	-	-	-	-	-

61	8CE3A	PPCM	**CO 1**	Discuss the financial evaluation of the project and also to differentiate the various construction project techniques.	3	3	-	-	-	-	-	-	-	-	-	-
			CO 2	Evaluate the different project management techniques and also analyze the methods of network for various projects.	2	3	-	-	-	-	-	-	-	-	-	1
			CO 3	Solve the problems related to project cost and time control and also to understand the cost and time for various projects.	2	2	-	-	-	-	-	-	-	-	-	1
			CO 4	Discuss the skills of contract management and also to evaluate the various contracts and tenders	2	2	-	-	-	-	-	-	-	-	-	1
			CO 5	Discover about the safety measures at construction sites and also to remember and understand the various environment and social aspects of construction projects.	2	3	-	-	-	-	-	-	-	-	-	1
6	8CE4.2A	Advance Foundation Engineering	**CO 1**	Discuss the various methods of estimation of bearing capacity of shallow foundation at different loading and water level conditions.	2	-	1	-	1	1	-	-	-	-	-	1
			CO 2	Evaluate the settlement under shallow foundation by various methods available with reference to Indian Standards.	1	3	2	-	1	1	-	-	-	-	-	1
			CO 3	Classify different types of pile with their use, modes of failure and to estimate bearing capacity and settlement of pile foundation at various conditions.	1	3	2	-	1	1	-	-	-	-	-	1
			CO 4	Analyze the behavior of collapsible and expansive soils also design practices of foundation for these soils.	1	3	1	-	1	1	-	-	-	-	-	1
			CO 5	Classify common types of raft, modes of failure and to measure bearing capacity, settlement of raft and well foundation at various conditions.	1	2	1	-	1	1	-	-	-	-	-	1
63	8CEPR	Project	**CO 1**	Team work to select an engineering problem and its solution	2	2				3	—	3	-	-	-	-
			CO 2	Formulate the problem and design using modern technologies and new software learning	1	-	-	-	-	-	-	3	3	3	-	-
			CO 3	Develop the engineering solutions by considering society and environment	2	-	-	-	-	-	-	2	3	3	-	-
			CO 4	Applying solution considering societal, health, safety, legal and cultural issues	2	1	-	-	-	-	-	-	2	2	-	-
			CO 5	Analysis and explanation of data to provide the valid conclusions.	2	-	-	-	-	1	-	-	2	2	-	-
			CO 6	Use of management principles in project functioning and consider the multidisciplinary environments.	-	-	-	-	-	-	-	-	-	-	3	2
			CO 7	To work effectively in Project as an individual member and team by following the ethical principles	-	-	-	-	-	-	-	3	3	-	-	-
			CO 8	Communicate effectively for various activities with help of reports, presentations and verbal communication that can help in life-long learning.	-	-	-	-	-	-	-	-	-	3	-	2

64	8CE5A	Design of Water Resource Structures-II	**LO 1**	Classify and design the Regulation of works and Drainage Structure.	2	2	1	2	-	-	-	-	1	-	-	-
			LO 2	Apply and analyze the surface and subsurface flows, using Bligh's and Khosla's theory, also describe the weirs and barrages.	2	-	3	2	-	-	-	-	-	-	-	-
			LO 3	Implement and analyze the Embankment Dams and Gravity Dams with the stability and seepage analysis.	2	-	-	-	-	-	-	-	2	-	-	2
			LO 4	Select and evaluate spillways and gates, general features of hydroelectric schemes, elements of power house structure, selection of turbines and cavitations.	-	1	-	2	-	2	-	-	-	-	-	2
			LO 5	Evaluate the impact of water projects on river regimes and environment. To analyze the Reservoir sedimentation and water shed management using optimization techniques and system approach and G.I.S. and Computer aided irrigation design.	-	-	-	-	2	2	2	-	-	-	-	-
65	8CE6A	Professional Practice & Estimating	**LO1**	Understand the basic concepts of Different types of Knots, Different types of plan layout in field and type of scaffolding and ladders.	3	3	1	-	-	1	-	-	-	-	-	-
			LO2	Identify the preparation Specification and bar bending schedule for reinforcement works.	2	1	-	-	2	1	-	3	-	2	3	1
			LO3	Analysis of Estimation and Valuation methods of buildings and properties.	2	2	3	-	-	-	1	-	-	-	-	1
66	8CE7A	Steel Structures Design-II	**LO1**	LO1: Explain the fundamental concept of structural steel, plastic analysis, basic steel structure elements, plate girder, gantry girder, roof trusses & truss girder bridges.	2	2	2	-	-	-	-	-	-	-	-	
			LO2	LO2: Apply the concept of mechanism method, shape factor, connection types, basic steel structure elements, plate girder, gantry girder & roof trusses in steel structures.	2	3	3	-	-	-	-	-	-	-	-	1
			LO3	LO3: Analyze the basic steel structural members, plate girder, gantry girder, roof trusses and case studies on steel structures as per the concept of Indian Standard.	2	2	3	1	-	-	-	-	-	-	-	1
67	8CE8A	Design of Foundations	**LO1**	To understand the significance and determine the load bearing capacity for shallow foundation.	3			-	-	-	-	-	-	-	-	-
			LO2	To analyse the settlement behaviour of different type of soil.		2	3	-	-	-	-	-	-	-	-	-
			LO3	To calculate the load bearing capacity for deep foundation		2	3	-	-	-	-	-	-	-	-	-
			LO4	To apply the behaviour of different type of soil under different conditions.	3	2	3	-	-	-	-	-	-	-	-	-
			LO5	To design the various parameters of raft and well foundations		2	3	3	-	-	-	-	-	-	-	-
68	8CE9A	Analysis by Matrix	**LO1**	To distinguish statically determinate and redundant structural systems.	3		3	-	-	-	-	-	-	-	-	-
			LO2	To analyses a suitable method for the structural system.	2	3	2	-	-	-	-	-	-	-	-	-

			LO3	To calculate the forces in axially loaded member.	2		2	-	-	-	-	-	-	-	-	-
			LO4	To know the deflection in axially loaded member.	2		2	-	-	-	-	-	-	-	-	-
			LO5	To know the behavior of the frame and truss structure by flexibility and stiffness method	3	3	3	-	-	-	-	-	-	-	-	-
69	8CESM	Seminar	**LO1**	LO1: Discover potential research areas and conduct a survey of several available literatures in the preferred field of study.	2	2	-	-	-	-	-	-	-	-	3	-
			LO2	LO2: Compare and contrast the several existing solutions for research challenge.	1	3	-	-	-	-	-	-	-	-	2	-
			LO3	LO3: Report and present the findings of the study conducted in the preferred domain.	1	3	-	-	-	-	-	-	-	-	2	-
70	8CEPR	Project	**CO 1**	Team work to select an engineering problem and its solution	2	2	-	-	-	3	-	3	-	-	-	-
			CO 2	Formulate the problem and design using modern technologies and new software learning	1	-	-	-	-	-	-	3	3	3	-	-
			CO 3	Develop the engineering solutions by considering society and environment	2	-	-	-	-	-	-	2	3	3	-	-
			CO 4	Applying solution considering societal, health, safety, legal and cultural issues	2	1	-	-	-	-	-	-	2	2	-	-
			CO 5	Analysis and explanation of data to provide the valid conclusions.	2	-	-	-	-	1	-	-	2	2	-	-
			CO 6	Use of management principles in project functioning and consider the multidisciplinary environments.	-	-	-	-	-	-	-	-	-	-	3	2
			CO 7	To work effectively in Project as an individual member and team by following the ethical principles	-	-	-	-	-	-	-	3	3	-	-	-
			CO 8	Communicate effectively for various activities with help of reports, presentations and verbal communication that can help in life-long learning.	-	-	-	-	-	-	-	-	-	3	-	-

Department of Electronics and Communication Engineering

Program Name: B.Tech.Electronics and Communication Engineering

Course Name: 3EC2-01: Advanced Engineering Mathematics
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	3	-	-	-	-	-	-	3
CO-2	3	3	2	2	3	-	-	-	-	-	-	3
CO-3	3	3	2	2	2	-	-	-	-	-	-	3
CO-4	3	3	2	2	2	-	-	-	-	-	-	3
CO-5	3	3	2	3	2	-	-	-	-	-	-	3

Course Name: 3EC1-03: MEFA
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	1	-	-	-	1	2	3	2	3	1	1
CO-2	-	1	-	-	-	1	2	3	2	3	1	1
CO-3	-	1	-	-	-	1	2	3	2	3	1	1
CO-4	-	1	-	-	-	1	2	3	2	3	1	1
CO-5	-	1	-	-	-	1	2	3	2	3	1	1

Course Name: 3EC3-03: Digital System Design
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	2	-	1	-	-	-	-	-	2
CO-2	2	3	2	3	-	-	-	-	-	-	-	-
CO-3	3	2	2	1	1	-	-	-	-	-	-	-
CO-4	2	2	3	2	1	-	-	-	-	-	-	1
CO-5	2	2	1	2	1	-	-	-	-	-	--	-

Course Name: 3EC4-05: Signal & System
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	-	-	-	-	-	-	-	-	-	-
CO-2	3	2	-	-	-	-	-	-	-	-	-	-
CO-3	3	3	3	--	2	-	-	-	-	-	-	-
CO-4	3	3	3	2	2	-	-	-	-	-	-	-
CO-5	3	3	3	2	2	-	-	-	-	-	2	-

Course Name: 3EC4-06: Network Theory
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	3	2	-	3	-	-	-		-	2
CO-2	2	3	2	3	-	3	-	-	-	-	-	-
CO-3	3	2	2	1	1	-	-	-	-	-	-	-
CO-4	2	2	3	2	1	-	-	-	-	-	-	1
CO-5	3	2	1	2	1	-	-	-	-	-	--	-

Course Name: 3EC4-07: Electronics Device
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	2	2	-	-	-	-	-	-	-	-	2
CO-2	2	1	1	-	-	-	-	-	-	-	-	2
CO-3	2	1	2	-	2	-	-	-	-	-	-	2
CO-4	3	3	2	2	2	1	-	-	-	-	-	2
CO-5	2	1	1	1	2	-	-		-	-	-	2

Course Name: 3EC4-21: Electronics Device Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	1	-	-	-	-	-	1	-	-	2
CO-2	2	1	1	-	-	-	-	-	1	-	-	2
CO-3	2	1	1	-	1	-	-	-	2	-	-	2
CO-4	3	2	3	2	2	-	-	-	2	-	-	2
CO-5	3	2	1	2	-	-	-	-	2	-	-	2

Course Name: 3EC4-22: Digital System Design Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	-	-	-	-	2	-	-	-
CO-2	2	2	3	1	-	-	-	-	2	-	-	-
CO-3	2	2	3	2	2	-	-	-	2	-	-	-
CO-4	3	3	2	2	2	-	-	-	3	-	-	-

Course Name: 3EC4-23: Signal Processing Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	2	-	-	1	2	2	-	2
CO-2	3	3	2	1	2	-	-	1	2	2	-	2
CO-3	3	3	2	2	2	-	-	1	2	2	-	2
CO-4	3	3	2	2	2	-	-	1	2	2	-	2
CO-5	3	3	2	1	2	-	-	1	2	2	-	2

Course Name: 3EC3-24: Computer Programming Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	2	-	-	1	2	2	-	2
CO-2	3	3	2	1	2	-	-	1	2	2	-	2
CO-3	3	3	2	2	2	-	-	1	2	2	-	2
CO-4	3	3	2	2	2	-	-	1	2	2	-	2
CO-5	3	3	2	1	2	-	-	1	2	2	-	2

Course Name: 4EC2-01: Advanced Engineering Mathematics-II
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	1	1	—	—	—	1	—	—	—
CO-2	3	2	1	1	1	—	—	—	1	—	—	—
CO-3	3	2	1	—	1	—	—	—	1	—	—	—
CO-4	3	2	1	2	—	—	—	—	1	—	—	—
CO-5	3	2	1	2	—	—	—	—	1	—	—	—

Course Name: 4EC2-02: Technical Communication
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	-	-	-	-	2	-	-	-
CO-2	2	2	3	1	-	-	-	-	2	-	-	-
CO-3	2	2	3	2	2	-	-	-	2	-	-	-
CO-4	3	3	2	2	2	-	-	-	3	-	-	-
CO-5	3	3	2	2	-	-	-	-	2	-	-	-

Course Name: 4EC4-04: Analog Circuits
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	2	2	2	-	2	-	-	2	-	-	2
CO-2	3	3	2	2	2	2	-	-	2	-	-	2
CO-3	2	3	3	3	2	2	-	-	2	-	-	2
CO-4	2	2	2	3	2	2	-	-	2	-	-	2
CO-5	3	3	3	2	2	2	-	-	2	-	-	2

Course Name: 4EC4-05: Microcontrollers
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	1	2	-	-	-	-	-	2	-
CO-2	2	2	2	3	-	-	-	-	-	-	-	-
CO-3	3	2	2	2	-	-	-	-	-	-	-	-
CO-4	2	2	1	2	-	-	-	-	-	-	-	-
CO-5	2	2	2	1	-	-	-	-	-	-	-	-

Course Name: 4EC3-06: Electronics Measurement & Instrumentation
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	2	-	1	-	-	-	-	-	2
CO-2	2	3	2	3	-	-	-	-	-	-	-	-
CO-3	3	2	2	1	1	-	-	-	-	-	-	-
CO-4	2	2	3	2	1	-	-	-	-	-	-	1
CO-5	2	2	1	2	1	-	-	-	-	-	--	-

Course Name: 4EC4-07: Analog & Digital Communication
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	-	-	-	-	1	-	-	-	1
CO-2	3	2	1	-	-	-	-	1	-	-	-	1
CO-3	3	2	1	-	-	-	-	1	-	-	-	1
CO-4	3	2	1	-	-	-	-	1	-	-	-	1
CO-5	3	2	1	-	-	-	-	1	-	-	-	1

Course Name: 4EC4-21: Analog & Digital Communication Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	1	1	1	-	-	1	2	2	-	2
CO-2	3	3	1	1	1	-	-	1	2	2	-	2
CO-3	3	3	1	1	1	-	-	1	2	2	-	2
CO-4	3	3	1	1	1	-	-	1	2	2	-	2
CO-5	3	3	1	1	1	-	-	1	2	2	-	2

Course Name: 4EC4-22: Analog Circuits Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	1	-	-	-	-	-	2	-	-	1
CO-2	2	2	2	1	-	1	-	-	2	-	-	1
CO-3	2	1	1	2	-	-	-	-	2	-	-	1
CO-4	3	2	2	1	-	1	-	-	2	-	-	1
CO-5	3	2	2	1	-	-	-	-	2	-	-	1

Course Name: 4EC4-23: Microcontroller Lab
LO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	2	2	-	3	-	-	-	2	-	-	3
CO-2	3	2	2	-	-	2	-	-	2	-	-	2
CO-3	-	3	2	2	-	-	-	-	2	-	-	2
CO-4	-	-	3	-	3	2	-	-	-	-	-	2
CO-5	-	-	3	3	3	2	-	-	2	-	-	2

Course Name: 4EC4-24: Electronics Measurement & Instrumentation Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	1	1	1	-	-	1	2	2	-	1
CO-2	3	3	1	1	1	-	-	1	2	2	-	1
CO-3	3	3	1	1	1	-	-	1	2	2	-	1
CO-4	3	3	1	1	1	-	-	1	2	2	-	2
CO-5	3	3	1	1	1	-	-	1	2	2	-	2

Course Name: 5EC01A: Signal & System
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	-	-	-	-	-	-	-	-	-	-
CO-2	3	2	-	-	-	-	-	-	-	-	-	-
CO-3	3	3	3	--	2	-	-	-	-	-	-	-
CO-4	3	3	3	2	2	-	-	-	-	-	-	-
CO-5	3	3	3	2	2	-	-	-	-	-	2	-

Course Name: 5EC02A: Linear Integrated Circuits
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	-	-	-	-	-	-	-	1	-	-
CO-2		3	2	2	3	-	-	-	-	1	-	-
CO-3		3	2	2	3	-	-	-	-	3	2	-
CO-4	2	-	-	-	-	-	-	-	-	2	2	-
CO-5	2	2	2	2	-	-	-	-	-	2	2	-

Course Name: 5EC03A: Telecommunication Engineering
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	2	-	2	-	-	-	-	-	2	-	1
CO-2	-	-	3	2	-	-	-	-	-	1	-	-
CO-3	2	-	-	-	-	2	-	-	-	-	3	-
CO-4	1	-	-	-	-	2	-	-	1	2	-	-
CO-5	-	-	3	2	-	-	-	-	-	-	-	-

Course Name: 5EC04A: Analog Communication
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	1	-	1	-	1	-	1	-	2	-	2
CO-2	3	1	-	-	--	1	-	1	-	2	-	2
CO-3	3	1	-	2	-	1	-	1	-	2	-	2
CO-4	3	1	-	-	-	1	-	1	-	2	-	2
CO-5	3	1	-	-	-	1	-	1	-	2	-	2

Course Name: 5EC05A: Microwave Engineering-I
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	2	-	3	2	-	1	-	-	2
CO-2	3	3	-	-	--	-	-	-	1	-	-	2
CO-3	3	-	-	2	-	-	-	-	1	-	-	2
CO-4	-	-	-	-	-	-	-	-	1	-	2	2
CO-5	3	3	-	-	-	-	2	-	1	-	-	2

Course Name: 5EC06A: Biomedical Instrumentation
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	2	-	1	-	-	-	-	-	2
CO-2	2	3	2	3	-	-	-	-	-	-	-	-
CO-3	3	2	2	1	1	-	-	-	-	-	-	-
CO-4	2	2	3	2	1	-	-	-	-	-	-	1
CO-5	2	2	1	2	1	-	-	-	-	-	--	-

Course Name: 5EC07A: Electronics Engineering Design Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	2	-	-	-	-	-	1	-	-
CO-2	3	2	2	2	-	-	-	-	1	-	-	-
CO-3	3	2	2	2	-	-	-	-	1	-	-	-
CO-4	3	2	2	2	-	-	-	-	1	-	-	-
CO-5	3	2	3	-	3	-	-	-	1	-	-	2

Course Name: 5EC08A: Microwave Engineering Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	2	-	3	-	-	3	-	-	2
CO-2	3	3	-	-	--	-	-	-	3	-	-	2
CO-3	3	2	-	2	-	-	-	-	3	-	-	2
CO-4	3	2	-	-	-	-	-	-	3	-	2	2
CO-5	3	3	-	2	-	-	-	-	3	-	-	2

Course Name: 5EC09A: Communication Lab-I
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	1	-	1	-	-	1	3	2	1	2
CO-2	2	1	1	-	1	-	-	1	3	2	1	2
CO-3	2	1	1	-	1	-	-	1	3	2	1	2
CO-4	2	1	1	-	1	-	-	1	3	2	1	2
CO-5	2	1	1	-	1	-	-	1	3	2	1	2

Course Name: 5EC10A: Signal Processing Lab-I
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	2	2	-	-	1	2	2	-	2
CO-2	3	3	2	1	2	-	-	1	2	2	-	2
CO-3	3	3	2	2	2	-	-	1	2	2	-	2
CO-4	3	3	2	2	2	-	-	1	2	2	-	2
CO-5	3	3	2	1	2	-	-	1	2	2	-	2

Course Name: 5EC11A: Profession Ethics & Disaster Management
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	1	-	-	-	1	2	3	2	3	1	1
CO-2	-	1	-	-	-	1	2	3	2	3	1	1
CO-3	-	1	-	-	-	1	2	3	2	3	1	1
CO-4	-	1	-	-	-	1	2	3	2	3	1	1
CO-5	-	1	-	-	-	1	2	3	2	3	1	1

Course Name: 6EC01A: Microwave Engineering-II
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	2	-	-	2	-	1	-	-	2
CO-2	3	3	-	2	--	-	-	-	1	-	-	2
CO-3	3	-	-	2	-	-	-	-	1	-	-	2
CO-4	3	3	-	2	-	-	-	-	1	-	2	2
CO-5	3	3	-	2	-	-	2	-	1	-	-	2

Course Name: 6EC02A: Microprocessors
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	2	2	-	1	-	-	-	-	2	1	-
CO-2	-	2	2	-	1	-	-	-	-	2	3	-
CO-3	3	-	-	-	-	-	-	-	-	2	-	-
CO-4	-	2	2	-	2	-	-	-	-	2	-	-
CO-5	-	3	3	3	2	-	-	-	-	2	3	-

Course Name: 6EC03A: Industrial Electronics
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	2	1							1
CO-2	2	1	3	2	-	-	1	-	-	1	2	2
CO-3	3	1	2	2	1	-	-	-	-	2	1	2
CO-4	2	2	3	1	2	-	2	-	-	1	1	1
CO-5	1	1	2	1	1	-	1	-	-	2	1	3

Course Name: 6EC04A: Digital Communication
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	3	2							3
CO-2	2			3	2	2						3
CO-3	3	3		3	3		2			3	3	3
CO-4	2			3	3					3		3
CO-5	2	3	2	3	3		3			3	3	3

Course Name: 6EC05A: Control System
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	1	-	-	-	1	2	3	2	3	1	1
CO-2	-	1	-	-	-	1	2	3	2	3	1	1
CO-3	-	1	-	-	-	1	2	3	2	3	1	1
CO-4	-	1	-	-	-	1	2	3	2	3	1	1
CO-5	-	1	-	-	-	1	2	3	2	3	1	1

Course Name: 6EC06.3A: Optical Fiber Communication
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	1	-	-	-	-	-	1	1	1	-	2
CO-2	3	1	-	-	-	-	-	1	1	1	-	2
CO-3	3	1	-	-	-	-	-	1	1	1	-	2
CO-4	3	1	1	1	-	-	-	1	1	1	-	2
CO-5	3	1	1	1	-	-	-	1	1	1	-	2

Course Name: 6EC07A: Communication Lab-II
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	-	3	-	-	-	-	-	2
CO-2	3	2	2	-	-	2	-	-	-	-	-	2
CO-3	3	3	2	1	-	3	-	-	-	-	-	2
CO-4	3	2	3	-	-	2	-	-	-	-	-	2
CO-5	3	2	3	2	3	-	-	-	-	-	-	3

Course Name: 6EC08A: Microprocessor Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	-	-	-	-	-	-	1	-	-
CO-2	-	-	2	-	2	-	-	-	-	1	2	-
CO-3	-	-	2	-	2	-	-	-	-	1	2	-
CO-4	3	-	-	-	-	-	-	-	-	1	-	-
CO-5	1	3	3	3	3	-	-	-	-	2	3	-

Course Name: 6EC09A: RF Simulation Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	1	2	-	-	-	-	-	-	-	-	-
CO-2	2	-	-	-	-	3	2	-	-	-	2	-
CO-3	-	-	3	2	1	-	-	-	-	-	-	-
CO-4	3	-	-	-	2	-	-	-	-	-	-	2
CO-5	-	-	2	-	-	-	-	-	-	-	2	-

Course Name: 6EC10A: Industrial Electronics Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	-	-	-	-	-	-	-	-	-	-
CO-2	1	-	2	3	3	-	-	-	-	-	-	-
CO-3	2	3	3	3	3	-	-	-	-	2	-	-
CO-4	2	-	-	-	-	-	2	-	-	-	-	-
CO-5	2	-	-	-	-	-	2	-	-	-	-	-

Course Name: 6EC11A: Personality Development and General Aptitude
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	1	-	-	-	1	2	3	2	3	1	1
CO-2	-	1	-	-	-	1	2	3	2	3	1	1
CO-3	-	1	-	-	-	1	2	3	2	3	1	1
CO-4	-	1	-	-	-	1	2	3	2	3	1	1
CO-5	-	1	-	-	-	1	2	3	2	3	1	1

Course Name: 7EC01A: Antenna & Wave Propagation
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	-	-	-	-	-	-	-	-	-	-
CO-2	1	-	2	3	3	-	-	-	-	-	-	-
CO-3	2	3	3	3	3	-	-	-	-	2	-	-
CO-4	2	-	-	-	-	-	2	-	-	-	-	-
CO-5	2	-	-	-	-	-	2	-	-	-	-	-

Course Name: 7EC02A: Digital Signal Processing
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	-	-	-	-	-	-	-	-	-	1
CO-2	2	-	2	2	3	-	-	-	-	-	-	1
CO-3	2	2	2	2	3	-	-	-	-	2	-	1
CO-4	2	1	-	-	-	-	2	-	-	-	-	1
CO-5	2	-	-	-	-	-	2	-	-	-	-	1

Course Name: 7EC03A: Digital Image Processing
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	-	-	-	2	-	-	-	1	-	-
CO-2	3	2	-	2	-	-	-	-	-	-	1	-
CO-3	-	-	2	-	2	-	-	-	-	1	-	-
CO-4	-	-	-	-	-	2	-	-	-	-	-	2
CO-5	2	-	-	-	-	3	2	-	-	-	-	-

Course Name: 7EC04A: Wireless Communication
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	3	-	1	-	-	-	-	-	2
CO-2	2	3	2	3	-	-	-	-	-	-	-	-
CO-3	3	1	2	2	1	-	-	-	-	-	-	-
CO-4	3	1	3	1	1	-	-	-	-	-	-	1
CO-5	2	2	1	2	1	-	-	-	-	-	--	-

Course Name: 7EC05A: VLSI Design
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	-	3	-	-	-	-	-	2
CO-2	3	2	2	-	-	2	-	-	-	-	-	2
CO-3	3	3	2	1	-	3	-	-	-	-	-	2
CO-4	3	2	3	-	-	2	-	-	-	-	-	2
CO-5	3	2	3	2	3	-	-	-	-	-	-	3

Course Name: 7EC06A: VHDL
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	2	3	1	-	-	-	-	-	-
CO-2	2	2	3	2	2	2	1	-	-	-	-	2
CO-3	2	2	2	3	2	-	-	-	-	-	-	-
CO-4	3	2	1	2	1	-	-	-	-	-	-	-
CO-5	2	2	2	3	1	-	-	-	-	-	-	1

Course Name: 7EC07A: Signal and Image Processing Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	3	2	3	-	-	-	-	-	-	-
CO-2	3	3	3	2	3	-	-	-	-	-	-	-
CO-3	3	3	3	2	3	-	-	-	-	-	-	-
CO-4	3	3	3	3	3	-	-	-	-	-	-	-
CO-5	3	3	3	2	3	-	-	-	-	-	-	-

Course Name: 7EC08A: Wireless Communication Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	2	3	1	-	-	-	-	-	1
CO-2	3	2	3	2	2	2	1	-	-	-	-	1
CO-3	3	2	2	2	2	-	-	-	-	-	-	1
CO-4	3	2	2	2	1	-	-	-	-	-	-	1
CO-5	2	2	2	2	1	-	-	-	-	-	-	1

Course Name: 7EC09A: Practical Training Seminar
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	-	-	-	-	-	-	-	-	-	-	1
CO-2	-	-	-	-	-	-	-	-	-	-	-	2
CO-3	2	-	-	-	2	-	-	-	-	-	-	-
CO-4	-	-	2	-	3	-	-	-	-	-	-	2
CO-5	2	2	-	-	-	3	-	-	-	3	1	2

Course Name: 7EC10A: Project Stage-I
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	3	-	-	3	-	-	-	-	3	2
CO-2	3	3	-	3	-	3	-	-	-	-	-	-
CO-3	3	-	3	-	2	3	-	-	3	3	3	3
CO-4	3	-	3	-	2	3	-	-	3	3	3	3
CO-5	3	-	2	-	2	3	-	-	3	3	3	3

Course Name: 8EC01A: IC Technology
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	2	1	-	3	-	-	-	-	-	2
CO-2	3	2	2	-	-	2	-	-	-	-	-	2
CO-3	3	3	2	1	-	3	-	-	-	-	-	2
CO-4	3	2	3	-	-	2	-	-	-	-	-	2
CO-5	3	2	3	2	3	-	-	-	-	-	-	3

Course Name: 8EC02A: Radar & TV Engineering
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	1	2	-	-	2	-	-	-	1	3	1
CO-2	3	1	-	3	-	2	-	-	-	1	-	1
CO-3	3	-	2	-	2	2	-	-	3	2	3	1
CO-4	3	-	2	-	2	2	-	-	3	3	3	1
CO-5	3	-	2	-	2	3	-	-	2	3	2	1

Course Name: 8EC03A: MEMS & Nanotechnology
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	-	-	-	-	-	-	2	-	-
CO-2	3	-	-	-	-	-	-	-	-	1	-	-
CO-3	3	-	-	-	-	-	-	-	-	1	-	-
CO-4	3	2	-	-	2	-	-	-	-	1	-	-
CO-5	3	-	-	-	-	-	-	-	-	1	-	-

Course Name: 8EC04A: Microcontroller & Embedded System
.CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	-	2	2	2	-	-	-	-	2
CO-2	2	2	3	2	2	2	-	-	-	2	2	3
CO-3	2	2	2	2	3	2	2	-	2	2	-	3
CO-4	3	3	2	2	2	2	2	2	2	-	2	3
CO-5	3	3	2	2	2	-	-	-	2	3	-	2

Course Name: 8EC05A: RF Fabrication Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	2	-	2	2	-	-	-	-	2	2
CO-2	-	-	3	-	2	-	-	-	-	-	-	-
CO-3	-	2	2	-	-	-	-	-	-	2	-	2
CO-4	2	-	1	-	-	-	-	-	-	-	1	-
CO-5	-	2	3	-	3	2	-	-	-	-	-	-

Course Name: 8EC06A: Industrial Electronics & Management
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	-	1	-	-	-	1	2	3	2	3	1	1
CO-2	-	1	-	-	-	1	2	3	2	3	1	1
CO-3	-	1	-	-	-	1	2	3	2	3	1	1
CO-4	-	1	-	-	-	1	2	3	2	3	1	1
CO-5	-	1	-	-	-	1	2	3	2	3	1	1

Course Name: 8EC07A: VLSI & Optical Fiber Lab
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	3	1	1	2	1	-	-	-	-	-	2
CO-2	2	1	1	2	2	2	-	-	-	-	-	1
CO-3	2	2	3	2	2	1	-	-	-	-	-	2
CO-4	2	2	2	3	1	2	-	-	-	-	-	-
CO-5	2	1	3	2	1	1	-	-	-	-	-	-

Course Name: 8EC08A: Project Stage-II
CO-PO Mapping Matrix of Course

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	3	-	-	3	-	-	-	-	3	2
CO-2	3	3	-	3	-	3	-	-	-	-	-	-
CO-3	3	-	3	-	2	3	-	-	3	3	3	3
CO-4	3	-	3	-	2	3	-	-	3	3	3	3
CO-5	3	-	2	-	2	3	-	-	3	3	3	3

Course Name: 8EC09A: Seminar
CO-PO Mapping Matrix of Course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	-	-	-	-	-	-	-	-	-
CO-2	3	3	2	2	-	-	-	-	-	-	-	-
CO-3	3	-	-	2	-	-	-	-	-	2	-	-
CO-4	-	-	-	-	-	-	-	-	-	3	-	-
CO-5	3	-	-	-	-	-	-	-	-	3	-	-

Bachelor of Technology in Electrical Engineering

POWER GENERATION PROCESS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	1	0	-	2	-	-	-	-	-	2
CO-2	2	1	2	2	-	1	-	-	-	-	-	-
CO-3	2	2	2	1	-	-	-	-	-	-	-	1
CO-4	1	1	-	1	-	-	-	-	-	-	-	1
CO-5	2	1	3	-	-	-	-	-	-	-	-	-

ELECTRICAL CIRCUIT ANALYSIS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	1	0	-	2	-	2	-	-	-	2
CO-2	2	1	2	2	-	1	-	-	-	-	-	-
CO-3	2	2	2	1	-	1	-	-	-	-	-	1
CO-4	1	1	-	1	-	-	-	-	-	-	-	1
CO-5	2	1	3	-	-	-	-	-	1	-	-	-

ANALOG ELECTRONICS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	1	0	-	2	-	2	-	-	-	2
CO-2	1	1	2	2	-	1	-	-	-	-	-	-
CO-3	2	2	2	1	-	1	-	-	-	1-	-	1
CO-4	1	1	-	1	-	-	1	-	2	-	-	1
CO-5	2	1	3	-	-	-	-	-	1	-	-	-

ELECTRICAL MACHINE-I
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	1	1	-	2	-	2	-	-	-	2
CO-2	1	2	2	2	-	1	-	-	-	-	-	-
CO-3	2	2	2	1	-	1	-	-	-	2	-	1
CO-4	1	1	-	1	-	-	1	-	2	-	-	1
CO-5	2	1	3	-	-	-	-	-	1	-	-	-

ELECTROMAGNETIC FIELD
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	1	1	-	1	-	2	-	-	-	1
CO-2	1	2	2	2	-	1	-	-	-	-	2	-
CO-3	2	2	2	1	-	1	-	-	-	1	-	1
CO-4	1	1	-	1	-	-	1	-	2	-	1	1
CO-5	1	1	3	-	-	-	-	-	1	-	-	-

ELECTRONIC MEASUREMENT AND INSTRUMENTAION
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	1	1	-	1	-	2	-	-	-	1
CO-2	1	2	2	2	-	1	2	-	-	-	2	-
CO-3	2	2	2	1	-	1	-	-	-	1	-	1
CO-4	2	1	-	1	-	-	1	-	2	-	1	1
CO-5	1	1	3	-	-	-	-	-	1	2	-	-

ELECTRICAL MACHINE-II
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	1	1	-	1	-	2	-	-	-	2
CO-2	1	2	1	2	-	1	2	-	-	-	2	-
CO-3	2	2	2	1	-	1	-	-	-	1	-	1
CO-4	2	1	-	1	-	-	1	-	2	-	1	2
CO-5	3	1	3	-	-	-	-	-	1	2	-	-

POWER ELECTRONICS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	1	1	-	1	-	2	-	-	-	2
CO-2	1	2	1	2	-	1	2	-	-	1	2	-
CO-3	2	2	2	1	-	1	-	-	-	1	-	1
CO-4	2	1	-	1	-	-	1	-	2	-	1	2
CO-5	3	1	-	-	-	-	-	-	1	2	-	-

SIGNAL & SYSTEMS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	1	1	-	1	-	2	-	-	-	2
CO-2	1	2	1	2	-	1	2	-	-	1	2	-
CO-3	2	2	1	1	-	2	-	-	-	1	-	1
CO-4	2	1	-	1	-	-	2	-	1	-	1	2
CO-5	3	1	-	-	-	-	-	-	1	2	-	-

DIGITAL ELECTRONICS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	1	1	-	1	-	2	-	-	-	1
CO-2	1	2	1	2	-	2	2	-	-	1	2	-
CO-3	2	2	1	1	-	2	-	-	-	1	-	1
CO-4	2	1	-	2	-	-	2	-	1	-	1	2
CO-5	3	2	-	-	-	-	-	-	1	2	-	-

POWER ELECTRONICS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2				1	1	3			1	2	
CO-2	2	1	3	2	2	1	1			1	2	
CO-3	2	2	3	2	3	1	2				2	
CO-4	2	2	3		3	1	2				2	
CO-5	2	1	3		1	1	2				2	

MICROPROCESSOR & COMPUTER ARCHITECTURE
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	1	3	1	2	1	1	1	3	2
CO-2	3	3	3	3	3	2	1	1	3	1	3	2
CO-3	3	3	3	3	2	1	1	1	1	1	3	2
CO-4	2	2	3	1	2	1	1	1	3	1	3	2
CO-5	1	1	1	1	3	1	2	1	1	3	3	2

CONTROL SYSTEM
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	1			3			1		1	1
CO-2	1	1	3	1	3	3	1	-	1	-	1	1
CO-3	1	1	3	1	3	-	1	-	1	-	1	1
CO-4	1	2	3	2	3	-	-	-	-	-	-	-
CO-5	1	1	3	-	3	-	-	-	2	-	-	-

DATABASE MANAGEMENT SYSTEM
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	-	-	2	-	-	-	-	-	-	-
CO-2	1	1	-	-	1	1	-	-	-	-	-	-
CO-3	1	1	-	-	-	-	1	-	-	1	-	-
CO-4	1	1	-	-	3	-	-	-	1	-	-	-
CO-5	1	-	-	2	3	-	-	2	-	-	-	-

TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	2	-	-	3	-	-	-	-	-	-
CO-2	1	2	-	-	2	2	1	-	-	-	-	-
CO-3	-	2	1	3	-	-	-	-	-	-	-	-
CO-4	-	2	1	-	-	-	-	-	-	-	-	
CO-5	-	2	1	-	1	-	1	1	-	-	-	-

RINCIPLE OF COMMUNICAITON SYSTEM
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	1	2	1	2	3	1	3	1	2	2
CO-2	3	2	1	2	1	2	3	2	2	1	3	3
CO-3	3	3	2	3	2	3	2	3	2	2	2	3
CO-4	2	2	2	3	1	3	2	1	3	3	2	3
CO-5	1	2	1	2	-	-	-	-	-	-	-	-

MODERN CONTROL THEORY
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	1	2	1	2	3	1	3	1	2	2
CO-2	3	2	1	2	1	2	3	2	2	1	3	3
CO-3	3	3	2	3	2	3	2	3	2	2	2	3
CO-4	3	3	2	3	2	3	2	3	2	2	2	3
CO-5	2	2	2	3	1	3	2	1	3	3	2	3

HIGH VOLTAGE ENGINEERING
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	1	2	-	3	1	2	-	-	1	1	-
CO-2	1	2	2	-	2	1	-	-	-	1	2	-
CO-3	2	1	3	3	2	3	-	-	-	1	-	-
CO-4	1	1	3	1	2	-	3	-	-	1	1	-
CO-5	1	1	2	-	1	1	-	-	-	-	2	-

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SWITCHGEAR AND PROTECTION
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	1	2	-	3	1	2	-	-	1	1	-
CO-2	1	2	2	-	1	-	-	-	1	2	-	-
CO-3	2	1	1	2	2	3	-	-	-	-	1	-
CO-4	3	3	2	1	2	-	3	-	-	1	1	-
CO-5	2	1	2	-	1	1	-	-	-	-	2	-

ADVANCED POWER ELECTRONICS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	-	-	3	1	1	-	-	-	-	-
CO-2	2	1	3	-	2	1	-	-	-	1	1	-
CO-3	2	2	3	-	1	1	2	-	-	1	-	-
CO-4	2	1	3	2	1	1	1	-	-	-	2	-
CO-5	2	1	3	-	1	1	2	-	-	-	2	-

SMART GRID TECHNOLOGY
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	-	2	2	-	2	-	-	-	-	2
CO-2	3	2	2	3	3	2	3	-	-	-	-	3
CO-3	1	2	3	3	1	2	3	-	-	-	3	3
CO-4	1	2	-	2	1	2	2	-	2	2	-	2
CO-5	1	2	-	3	2	-	1	-	-	3	-	2

POWER SYSTEM PLANNING
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	3	-	3	1	2	-	-	-	-	-
CO-2	-	3	2	-	2	1	2	-	-	-	1	-
CO-3	1	3	1	-	2	-	-	-	1	-	-	-
CO-4	2	-	2	-	3	-	2	-	-	-	1	-
CO-5	1	-	2	-	2	-	2	-	-	-	1	-

POWER SYSTEM ANALYSIS
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	0	-	2	2	1	-	-	-	-	2
CO-2	2	1	1	2	-	1	-	-	2	2	1	-
CO-3	2	2	1	1	-	-	2	-	-	-	-	1
CO-4	1	3	1	-	-	1	2	-	-	-	-	1
CO-5	2	1	3	-	-	-	2	-	-	-	-	1

ARTIFICIAL INTELLIGENCE TECHNIQUES
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	3	-	-	1	-	-	-	-	-	-	-
CO-2	2	-	3	-	1	-	-	-	-	-	-	
CO-3	-	-	3	-	1	-	-	-	-	-	-	-
CO-4	1	-	2	-	3	-	-		-	-	-	-
CO-5	-	3	2	-	1	-	-	-	-	-	-	-

NON CONVENTIONAL ENERGY SOURCES
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	2	1	-	-	3	2	-	1	1	1	1
CO-2	1	-	-	-	1	3	2	-	1	-	1	1
CO-3	1	-	-	-	1	-	2	-	1	-	1	1
CO-4	1	-*	-	-	1	-	2	-	-	-	1	-
CO-5	1	-	-	-	1	-	2	-	2	-	-	-

OWER SYSTEM ENGINEERING
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	1	2	3	2	1	-	-	1	1	-	-
CO-2	1	2	2	-	2	1	-	-	-	1	2	-
CO-3	2	1	1	2	2	3	-	-	-	-	1	-
CO-4	3	3	2	1	2	-	3	-	-	1	1	-
CO-5	2	1	2	-	1	1	-	-	-	-	2	-

COMPUTER AIDED DESIGN OF ELECTRICAL MACHINES
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	-	2	2	-	-	-	-	-	-	1
CO-2	2	1	3	1	2	1	2	-	-	-	3	2
CO-3	2	2	3	1	1	3	1	-	-	-	-	2
CO-4	1	2	-	2	2	2	2	-	3	3	-	1
CO-5	1	2	-	3	2	-	1	1	1	3	1	2

EHV AC/DC TRANSMISSION
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	3	-	-	2	2	-	-	-	-	-	-
CO-2	2	3	2	-	-	1	-	-	-	-	-	-
CO-3	3	3	2	-	2	1	-	-	-		-	-
CO-4	2	1	1	-	3	1	-	-	-	-	-	-
CO-5	2	3	-	-	2	2	1	-	-	-	-	-

ELECTRICAL DRIVES AND THEIR CONTROL
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	1	2	-	1	1	1	-	-	1	1	-
CO-2	3	2	1	-	2	1	1	-	-	1	2	-
CO-3	2	2	3	1	3	1	2	-	-	-	1	2
CO-4	3	2	3	1	2	-	1	1	-	-	1	1
CO-5	3	2	2	-	1	1	1	-	-	-	2	-

PROTECTION OF POWER SYSTEM
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	2	-	-	2	2	-	-	-	2	2
CO-2	2	2	2	-	-	1	-	-	-		--	1
CO-3	3	2	2	1	1	1	1	2	-	-	-	-
CO-4	2	1	-	2	-	-	2	-	-	-	-	1
CO-5	2	1	3	-	-	-	3	-	-	-	1	2

FACTS DEVICES AND THEIR CONTROL
COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	3	3	-	-	-	-	-	-	-	-	-
CO-2	1	2	-	-	2	-	-	-	-	-	-	-
CO-3	1	-	2	-	2	2	-	-	-	-	-	-
CO-4	2	1	-	1	-	-	-	-	-	-	-	-
CO-5	1	-	-	-	2	-	-	-	-	-	-	-

ANALOG ELECTRONICS LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	-	2	2	-	2	-	-	-	-	1
CO-2	2	1	3	1	2	2	1	-	-	-	3	2
CO-3	2	2	3	1	1	3	1	-	-	-	-	2
CO-4	1	2	-	2	2	2	2	-	3	3	-	1
CO-5	1	2	-	3	2	-	1	-	-	3	-	2

ELECTRICAL MACHINE-I LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	-	2	2	-	2	-	-	-	-	2
CO-2	2	1	3	1	2	2	1	-	-	-	3	2
CO-3	2	2	2	1	1	3	1	-	-	-	-	2
CO-4	1	2	-	2	2	2	2	-	3	3	-	1
CO-5	2	1	-	3	1	-	1	-	-	3	-	1

ELECTRICAL CIRCUIT DESIGN LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	3	-	2	2	-	2	-	-	-	-	1
CO-2	2	1	3	2	2	2	1	-	1	-	3	2
CO-3	2	1	3	1	1	2	1	-	-	-	-	2
CO-4	1	2	-	2	2	2	2	-	3	3	-	1
CO-5	1	2	-	3	2	-	1	-	-	3	-	2

ELECTRICAL MACHINE-II LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	3	-	2	2	-	2	-	-	-	-	1
CO-2	2	1	3	1	2	2	1	2	-	-	3	2
CO-3	2	2	3	1	1	3	1	-	2	-	-	2
CO-4	1	2	-	2	2	2	2	-	3	3	-	1
CO-5	1	2	-	3	3	-	2	-	-	3	-	1

POWER ELECTRONICS LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	-	2	2	-	2	-	-	-	-	1
CO-2	2	1	3	1	2	2	1	-	-	2	3	2
CO-3	1	2	3	2	1	3	1	2	-	-	-	2
CO-4	1	2	-	2	2	2	2	-	3	3	-	1
CO-5	1	2	-	3	2	-	1	1	-	3	-	2

DIGITAL ELECTRONICS LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	-	-	2	2	-	2	-	-	3	-	2
CO-2	1	2	-	-	-	-	1	-	2	-	-	-
CO-3	1	1	-	2	1	-	-	-	-	3	2	-
CO-4	1	-	-	2	1	2	2	-	1	-	1	2
CO-5	-	-	-	1	2	-	1	-	-	3	-	3

POWER ELECTRONICS LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	3	3	-	3	2	-	-	-	2	3
CO-2	2	2	2	2	-	3	-	-	-	-	2	2
CO-3	3	2	3	1	-	-	2	-	-	-	1	1
CO-4	3	3	3	2	-	2	2	-	-	-	2	3
CO-5	2	1	2	-	-	-	3	-	-	-	1	1

MICROPORCESSOR LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	1	1	3	1	2	1	1	1	3	2
CO-2	3	3	3	3	3	2	1	1	3	1	3	2
CO-3	3	3	3	3	2	1	1	1	1	1	3	2
CO-4	2	2	3	1	2	1	1	1	3	1	3	2
CO-5	1	1	1	1	3	1	2	1	1	3	2	2

SYSTEM PROGRAMMING LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	1	-	-	3	-	-	1	1	1	1
CO-2	1	1	3	1	3	3	1	-	1	-	1	1
CO-3	1	1	3	1	3	-	1	-	1	-	1	1
CO-4	1	2	3	2	3	-	-	-	-	-	-	-
CO-5	2	2	-	3	2	-	1	-	-	3	-	2

DATABASE MANAGEMENT SYSTEM LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	-	-	-	2	-	-	-	-	-	-	-
CO-2	1	1	-	-	1	1	-	-	-	-	-	-
CO-3	1	1	-	-	-	-	1	-	-	1	-	-
CO-4	1	1	-	-	3	-	-	1	-	-	-	-
CO-5	1	-	-	-	2	3	-	-	2	-	-	-

CONTROL SYSTEM LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	1	-	-	3	-	-	1	1	1	1
CO-2	1	1	3	1	3	3	1	-	1	-	1	1
CO-3	1	1	3	1	3	-	1	-	1	-	1	1
CO-4	1	2	3	2	3	-	-	-	-	-	-	-
CO-5	1	1	3	-	3	-	-	-	2	-	-	-

POWER SYSTEM LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	2	3	-	2	-	-	-	-	-	1
CO-2	2	2	1	2	-	2	-	-	-	-	-	2
CO-3	3	2	3	1	1	-	2	-	-	-	1	3
CO-4	2	1	1	-	2	-	-	-	-	-	2	1
CO-5	2	1	2	2	-	-	-	-	-	-	-	1

ADVANCED POWER ELECTRONICS LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2		2	2	-	2	-	-	-	-	2
CO-2	3	1	3	1	3	2	1	-	-	-	-	2
CO-3	3	1	3	1	1	3	1	-	-	-	3	2
CO-4	1	2		2	1	2	2	-	3	3	3	2
CO-5	1	3		3	2	-	1	-	-	3	3	2

SMART GRID LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3		2	2		2	-	-	-	-	2
CO-2	3	2	2	3	3	2	3	-	-	-	-	3
CO-3	1	2	3	3	1	2	3	-	-	-	3	3
CO-4	1	2	-	2	1	2	2	-	2	2	-	2
CO-5	1	2	-	3	1	-	1	-	-	3	-	2

POWER SYSTEM PLANNINGLAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	-	-	2	2	-	-	-	-	-	1
CO-2	2	1	3	1	2	2	1	-	-	-	3	2
CO-3	2	2	3	1	1	3	1	-	-	-	-	2
CO-4	1	2	-	2	2	2	2	-	3	3	-	1
CO-5	1	2	-	3	2	-	1	-	-	3	-	2

POWER SYSTEM MODELLING AND SIMULATION LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	-	-	-	-	-	-	-	-	-	-
CO-2	2	2	-	-	1	3	-	--	-	-	-	-
CO-3	1	3	-	2		2	-	-	-	-	-	-
CO-4	1	2	-	2	2	2	2	-	3	3	-	1
CO-5	1	2	-	3	2	-	1	-	-	3	-	2

ELECTRICAL DRIVES AND THEIR CONTROL LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3		2	2		2	-	-	-	-	2
CO-2	3	2	2	3	3	2	3	-	-	-	-	3
CO-3	1	2	3	3	1	2	3	-	-	-	3	3
CO-4	1	2	-	2	1	2	2	-	2	2	-	2
CO-5	1	2	-	3	2	-	1	-	-	3	-	2

HIGH VOLTAGE ENGINEERING LAB
LAB ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	3	-	-	-	-	-	-	-	-	1
CO-2	2	2	1	2	-	-	-	-	-	-	-	2
CO-3	3	2	3	1		-	3	-	-	-	3	3
CO-4	2	1	1	-	-	-	-	-	-	-	-	1
CO-5	2	1	2	-	-	-	-	-	-	-	-	1

POORNIMA
INSTITUTE OF ENGINEERING & TECHNOLOGY

CHAPTER IX

Program wise CO-PSO Mapping
Session: 2018-19

Department of Computer Engineering
Program Name: Computer Engineering
Subject/Code No:Advanced Engineering Mathematics/3CS2-01
LTP:3L+0T+0PSemester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Recall and understand the fundamental concepts of probability and standard distributions which can describe real life phenomenon.		3	2
CO2	Analyze the various method of numerical solutions of Normal, Poisson and Binomial probability distribution.		3	2
CO3	Formulate the optimization problems in mathematical form with classification.		3	2
CO4	Interpret non-linear optimization problems and solve by appropriate methods.		3	2
CO5	Demonstrate linear optimization problems and solve by standard methods.		3	2

Subject/Code No:Technical Communication/3CS1-02
LTP:2L+0T+0P Semester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Understand the process of technical communication in terms of LSRW.		1	2
CO2	Apply the concept of Technical Materials/Texts in various technical documents.		1	2
CO3	Enhance the skills in the process of technical communication in terms of LSRW.		1	2
CO4	Implement the basic concepts of technical communication in Technical Reports, articles and their formats.		1	2

Subject/Code No:Digital Electronics/3CS3-03
LTP:3L+0T+0PSemester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Demonstrate basic principles of digital circuits and different number systems	2	3	2
CO2	Distinguish logic expressions and circuits using Boolean laws and K-map	2	3	2
CO3	Differentiate types of digital electronic circuits and also the different logic families involved in the digital system to prepare the most simplified circuits using various mapping and mathematical methods.	2	3	2
CO4	Design various types of memoryless element digital electronic circuits for particular operation within the realm of economic, performance, efficiency, user friendly and environmental constraints.	2	3	2
CO5	Design various types of memory element digital electronic circuits for particular operation within the realm of economic, performance, efficiency, user friendly and environmental constraints.	2	3	2

Subject/Code No:Data Structures and Algorithms/3CS3-05
LTP: 3L+0T+0P Semester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Recognize fundamental Stack operations to address a range of engineering problems.	3	2	3
CO2	Relate the principles of Queues and Linked Lists to offer solutions for computer-based issues.	3	3	2
CO3	Discover different Search and Sorting methods to rationalize their application in diverse scenarios.	3	3	3
CO4	Practice the concept of Trees and their operations to furnish valid solutions.	2	3	2
CO5	Compare a variety of techniques that can be employed with Graphs and Hashing.	3	1	3

Subject/Code No: Object Oriented Programming/3CS3-06
LTP:3L+0T+0PSemester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Describe the Object Oriented Programming paradigm with the concept of objects and classes.	3	2	2
CO2	Explain the memory management techniques using constructors, destructors and pointers	3	2	2
CO3	Classify and demonstrate the various Inheritance techniques.	3	2	2
CO4	Understand how to apply polymorphism techniques on the object oriented problem.	3	2	2
CO5	Summarize the exception handling mechanism, file handling techniques and Use of generic programming in Object oriented programming	3	2	2

Subject/Code No:Software Engineering/3CS3-07
LTP:3L+0T+0PSemester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Recognize different software life cycle models and testing techniques to develop real time projects.	1	2	2
CO2	Identify cost estimation and risk analysis in project management.	2	3	2
CO3	Interpret and deduce the engineering process of software requirement analysis.	2	1	3
CO4	Apply procedural design methods to architect software systems.	2	1	3
CO5	Collaborate the concept of object-oriented analysis and design in software development process.	3	2	2

Subject/Code No: Data Structures and Algorithms Lab/3CS3-21
LTP:0L+0T+3PSemester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Recognize fundamental Stack and Queue operations to address a range of engineering problems.	3	3	2
CO2	Relate the principles of Linked Lists to offer solutions for computer-based issues.	3	3	1
CO3	Discover different Search and Sorting methods to rationalize their application in diverse scenarios.	3	3	2
CO4	Devise diverse operations on non-linear data structures such as trees and graphs.	2	3	2
CO5	Propose a solution for a provided engineering problem utilizing Stack, Queue, Linked List, Tree and Sorting	3	3	

Subject/Code No: Object Oriented Programming Lab/3CS3-22
LTP: 0L+0T+3PSemester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Create and explain Basic C++ Program using i/o variables and structures.	3	2	3
CO2	Apply object oriented programming concepts using class and objects	3	2	3
CO3	Design and assess the classes for code reuse	3	2	3
CO4	Analysis and Apply the generic classes concepts in programming problem	3	2	3
CO5	Illustrate and evaluate the file Input Output mechanisms	3	2	3

Subject/Code No:Software Engineering Lab/3CS3-23
LTP:0L+0T+3P Semester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Observe the requirements specification, function oriented design using Software Analysis and Software Design of given project and relate the use of appropriate CASE tools and other tools in the software life cycle.	3	2	2
CO2	Translate Software Requirements Specification (SRS) for a given problem in IEEE template.	2	1	3
CO3	Select DFD model (level-0, level-1 DFD and Data dictionary) of the project.	2	1	3
CO4	Prepare all Structure and Behaviour UML diagram of the given project.	2	2	2
CO5	Test/Evaluate “Project Libre” a project management software tool to manage files.	1	1	3

Subject/Code No:Digital Electronics Lab/3CS3-24
LTP:0L+0T+3P Semester: 3rd
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Demonstrate the basics of logic gates	1	3	2
CO2	Demonstrate basic combinational circuits and verify their functionalities	1	3	2
CO3	Apply the working mechanism and design guidelines of different sequential circuits in the digital system design	2	3	2
CO4	Construct different types of counter for real time digital systems	2	3	2
CO5	Distinguish the different types of shift registers	2	3	2

Subject/Code No:Discrete Mathematics Structure/4CS2-01
LTP:3L+0T+0P Semester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Describe basic concept of Sets, Relations, Functions and Discrete Structure and apply appropriate methods to solve the problems.	1	3	2
CO2	Describe the concept of mathematical logic to create the problem in appropriate form and test for validity of the problem.	1	3	2
CO3	Apply fundamental mathematical concepts such as sets, relations, Combinatorics technique to formulate the problems and solve by appropriate method.	1	3	2
CO4	Interpret the concept of groups, ring and field to analyze the complex problems.	1	3	2
CO5	Demonstrate the model of real world problems using concept of Graph and solve the problems by standard result and graph algorithms.	1	3	2

Subject/Code No:Managerial Economics and Financial Accounting/4CS1-03 LTP: 2L+0T+0P Semester: 3thCourse
Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Recognize and describe the fundamental concepts of Economics and Financial Management and define the meaning of national income, demand, supply, cost, market structure, and balance sheet.		3	1
CO2	Calculate and Classify the domestic product, national product and elasticity of price on demand and supply.		3	1
CO3	Draw the cost graphs, revenue graphs and forecast the impact of change in price in various perfect as well as imperfect market structures.		3	2
CO4	Compare the financial statements to interpret the financial position of the firm and evaluate the project investment decisions.		2	2

Subject/Code No:Microprocessor & Interfaces/4CS3-03
LTP:3L+0T+0P Semester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Classify the basic operations of Microprocessor and microcontroller using their pin and architectural diagram, and also about area of manufacturing and performance.	2	3	3
CO2	Practice of Knowledge about programing proficiency, using various addressing modes and data transfer instructions of microprocessor and microcontroller.	3	2	3
CO3	Evaluate the measures of Assembly Language Programming.	2	3	3
CO4	Discriminate the interfacing of various circuits with microprocessor.	2	3	3
CO5	Compare the different programming logic applications with 8085 microprocessor.	3	2	3

Subject/Code No:Database Management System/4CS3-0
5:LTP: 3L+0T+0P Semester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Tabulate Database System with the help of Entity Relationship Diagram that visualizes a database system implemented in a real-world scenario.	3		1
CO2	Apply data deduction and manipulation techniques using query languages on a variety of databases.	3	2	1
CO3	Use normal forms in the process of enhancing the database schema through refinement techniques	3	1	
CO4	Create transaction plans incorporating diverse scheduling types.	3		
CO5	Generalize and assess the effectiveness of concurrency control mechanisms and recovery systems	2	1	1

Subject/Code No: Theory of Computation/4CS3-06:
LTP: 3L+0T+0P Semester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Apply the knowledge of different types of grammar; he/she can analyze the all types of grammar and evaluate the relationship among them.	2	3	2
CO2	Differentiate the concept of regular expression and finite automaton and apply the knowledge to compare the procedure for writing regular expression for an automaton or vice versa	2	2	2
CO3	Apply the knowledge of Context Free grammar; he/she can generate the Context free grammar and Pushdown Automaton for evaluating the CFG	1	1	2
CO4	Apply the knowledge of Turing Machine he/she can analyze the Type-0 grammar and can design and evaluate the Turing Machine	1	2	2
CO5	Apply the knowledge of Pumping Lemma Theorem students can check whether the given grammar Regular grammar/Context Free Grammar or not	2	1	3

Subject/Code No: Data Communication and Computer Networks/4CS3-07
LTP: 3L+0T+0P Semester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Able to identify the principles of layered protocol architecture; be able to recognize and generalize the system functions in the correct protocol layer and further illustrate how the layers interact.	2	2	3
CO2	State and cite mathematical problems for data-link and network protocols.	1	1	2
CO3	Use network layer protocols and calculate number of subnets required for a network.	1	3	1
CO4	Compute the reliability of data transfer over transport layer by glossy channel bit errors problem.	2	2	1
CO5	Select and plan for common services, system services, such as name and address lookups, and communications applications.	1	1	3

Subject/Code No:Microprocessor & Interfaces Lab/4CS3-21
LTP:0L+0T+2P Semester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze the fundamentals of assembly level programming	2	2	3
CO2	Apply interfacing concept between input and output devices.	2	2	3
CO3	Elaborate the interfacing of various other devices with microprocessor.	1	1	3
CO4	Compose the various programs on different problems using Assembly Language Programming.	2	2	3
CO5	Implement standard microprocessor real time interfaces including digital-to-analog converters and analog-to-digital converters	1	1	3

Subject/Code No:Database Management System Lab/4CS3-22
LTP:0L+0T+3PSemester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Create and execute a database schema for a specified problem domain	3		1
CO2	Manage integrity constraints within a database using a relational database management system (RDBMS),	3		1
CO3	Construct and Devise a graphical user interface (GUI) application using a fourth-generation programming language (3GL).	3		
CO4	Composing PL/SQL code encompassing stored procedures, stored functions, cursors, and packages.	3		1
CO5	Produce SQL and Procedural interfaces to SQL comprehensively.	3		1

Subject/Code No:Network Programming Lab/4CS3-23
LTP:0L+0T+3P Semester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	the functioning of various networking equipment's	1	3	2
CO2	Illustrate the LAN Installation techniques and Configurations techniques	2	1	1
CO3	Solving various Error correcting techniques and framing methods	2	3	1
CO4	Practice the programs for client and server involving UDP/TCP sockets using socket programming.	1	1	3
CO5	Estimate the communication between client and server using Network Simulator.	2	1	

Subject/Code No:Linux Shell Programming Lab/4CS3-24
LTP:0L+0T+2PSemester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Summarize the concepts and commands in UNIX.	2	2	2
CO2	Construct the directory layout of a typical UNIX system, maintain, and secure UNIX directories and files.	3	2	2
CO3	Illustrate the knowledge to use the several shell quoting mechanism correctly.	3	2	2
CO4	Construct regular expression using filters and various commands to express the patterns.	3	2	2
CO5	Write simple scripts to develop basic command output	2	2	2

Subject/Code No:Java Lab/4CS3-25
LTP:0L+0T+2P Semester: 3th
Course Outcome Mapping with Program Specific outcome

Subject Name/Code	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Express and restate fundamentals of java, and tools for program designing environments.	2	2	1
CO2	Construct classes and implement the principles of method overloading, inheritance, and access controls within those classes.	2	2	1
CO3	Develop Java packages and incorporate the concept of interfaces, along with importing these packages in Java.	2	2	1
CO4	Formulate the application by managing file operations, handling exceptions, and implementing threads.	2	2	1
CO5	Create applications utilizing Java applets and design various polygons. This task involves the application of knowledge and the synthesis of design skills	2	2	1

Subject/Code No: COMPUTER ARCHITECTURE/ 5CS1
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Implement register transfer with the help of micro operations.		3	
CO2	Analyze basic of computer organization, instructions, RISC & CISC characteristics.		3	
CO3	Apply integer and floating type computer arithmetic techniques.		3	
CO4	Analyze basics of memory organization, allocation and management schemes.		3	
CO5	To assess modes of transfer and input output interface, interrupts and DMA Processing		3	

Subject/Code No: DIGITAL LOGIC DESIGN/ 5CS2
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	To demonstrate Hardware Description Languages and their use in digital logic design.		3	
CO2	To design a digital system, components or process to meet desired needs within realistic constraints.		3	
CO3	To design different controllers using JK and D flip flop.		3	
CO4	To Analyze the asynchronous circuits, concepts of different hazards.		3	
CO5	To understand the concept of FPGA, Technology mapping of FPGA.		3	

Subject/Code No: TELECOMMUNICATION FUNDAMENTALS/ 5CS3
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze data transmission method over with wire and wireless communication.		3	
CO2	Analyze the errors and its occurrence in data communication data link control.		3	
CO3	Demonstrate the concept of wireless LAN and Their different types.		3	
CO4	Apply the TDMA and space time division multiplexing		3	
CO5	Apply the concept of spread spectrum techniques in wireless communication		3	

Subject/Code No: DATABASE MANAGEMENT SYSTEM/ 5CS4
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Design Database System with the help of Entity relationship Diagram for Real World Application	3		
CO2	Deduct data using query language from any Database	3		
CO3	Apply normal forms for database schema refinement	3		
CO4	Design transaction with different types of schedule	3		
CO5	Evaluate concurrency control mechanism and Recovery system	3		

Subject/Code No: OPERATING SYSTEM/ 5CS5
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Explore the concept of Operating Systems with its need and basic functions	2		
CO2	Analyze Process scheduling techniques and Inter Process Communication so that Real World Classical Problems can be solved.	2		
CO3	Design the techniques for deadlock prevention, avoidance and detection with better memory management.	3		
CO4	Analysis of Memory Management Techniques and Page Replacement Algorithms to formulate Free Space Management with concept of virual memory	2		
CO5	Demonstrate the knowledge File system, Input/ Output Systems and various disk scheduling algorithms by having case studies	2		

Subject/Code No: ADAVNCED DATA STRUCTURE/ 5CS6.1
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze various operations on Weight Balanced Trees such as Red-Black tree, Huffman tree and 2-3 tree and their augmentation.	2		
CO2	Design amortized analysis on data structures, including Mergable heaps, 2-3-4 Trees, and Fibonacci Heap.	3		
CO3	Apply Graph theory and related algorithms on Flow Networks and Spanning trees.	3		
CO4	Implement various sorting networks algorithms and perform operations on disjoint sets.	3		
CO5	Evaluate the numerical algorithms such as CRT, RSA, Primality testing and integer factorization.	2		

Subject/Code No: DATABASE LAB/ 5CS7
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Transform an information model into a relational database schema and to use a DDL and utilities.	2		
CO2	Create SQL interface of a multi-user relational DBMS for preparing ER Diagram.			3
CO3	Explore desktop database package to populate, maintain, and query a database.	2		
CO4	Design database and writing applications for manipulation of data.	3		
CO5	Formulate query, using SQL, solutions to a broad range of query and data update problems.	2		3

Subject/Code No: SYSTEM DESIGN IN UML LAB/ 5CS8
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Develop a business model & Analyze the boundary and interaction between system and user			3
CO2	Create Communication model with help of Modern tool usage .			3
CO3	Analyze communication model and make dynamic model using state charts and activity graph	3		
CO4	Assess class model and create physical component model which includes both software and hardware components		2	
CO5	Create the physical architecture and deploy the various components on that hardware architecture.	2		2

Subject/Code No: OPERATING SYSTEM SIMULATION LAB/ 5CS9
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze of algorithms that can schedule processes in various manners	3		
CO2	Implementation of Inter Process Communication for real world problems.			3
CO3	Evaluate of various memory management techniques so that free space management.	3		
CO4	Apply of various Page Replacement techniques for effective utilization of memory			3
CO5	Analyze of various disk scheduling algorithms	3		

Subject/Code No: DIGITAL HARDWARE DESIGN LAB/ 5CS10
Semester: 5th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Implement digital/computer circuits with modern design tools.		3	
CO2	Analysis the behavior of a digital logic circuit (analysis).		3	
CO3	Synthesis descriptions of logical problems to efficient digital logic circuits.		3	
CO4	Integrate previously designed components into a large-scale system to meet specified requirements		3	
CO5	Apply practical knowledge on the application of digital hardware		3	

Subject/Code No: COMPUTER NETWORKS/ 6CS1
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Evaluate the reliability of data transfer over transport layer by lossy channel bit errors problem.	3		
CO2	Apply network layer protocols and calculate number of subnets required for a network.	3		
CO3	Analyze flow control and to apply protocols for communication over transport layer.	3		
CO4	Design the handshaking process for connection establishment and connection release.	3		
CO5	Demonstrate for common services, system services, such as name and address lookups, and communications applications.	3		

Subject/Code No: DESIGN AND ANALYSIS OF ALGORITHMS/ 6CS2
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Evaluate the algorithm correctness and efficiency.	3		
CO2	Apply Dynamic Programming to solve real time problems.	3		
CO3	Formulation design and analysis of various pattern matching algorithms and of assignment problem.	3		
CO4	Evaluate the randomized algorithm using Min-Cut, 2-SAT etc.	3		
CO5	Identify behaviors of algorithms and the notion of various classes of algorithms.	3		

Subject/Code No: THEORY OF COMPUTATION/ 6CS3
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Apply the knowledge of different types of grammar, along with the relationship among them.	3		
CO2	Analyze the concept of regular expression and finite automaton		3	
CO3	Generate the Context free grammar and Pushdown Automaton for evaluating the CFG.	3		
CO4	Design Turing Machine in reference of Type-0 grammar			3
CO5	Apply the knowledge of Pumping Lemma Theorem		3	

Subject/Code No: COMPUTER GRAPHICS AND MULTIMEDIA TECHNIQUES/ 6CS4
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze basic of principles computer graphics, the geometrical and mathematical		3	
CO2	problems with reference to computers and evaluate various algorithmic solutions.		3	
CO3	Implement transformation methods and clipping algorithms.		3	
CO4	Analyze algorithms of Hidden Lines and Surfaces to create curves.		3	
CO5	Implementation various illumination models and color models.		3	

Subject/Code No: EMBEDDED SYSTEM DESIGN/ 6CS5
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Explore of working principle of embedded system, tool and components required to design an embedded system	3		
CO2	Analyze Interrupt latency, scheduling architecture for embedded system design.	3		
CO3	Analyze RTOS and Semaphore for embedded system design.	3		
CO4	Apply knowledge about Hard real-time and soft real time system principles..	3		
CO5	Apply knowledge of Embedded Software development tools for Host and target systems Like cross compilers, linkers, and locators for embedded systems and analyze In-circuit emulators and monitors.	3		

Subject/Code No: ARTIFICIAL INTELLIGENCE/ 6CS6.2
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze different approaches of AI important AI techniques, including in particular search, knowledge representation, planning and constraint management	3		
CO2	Interpret the modern view of AI as the study of agents that receive percepts from the environment and perform actions.	3		
CO3	Explore awareness of AI facing major challenges and the complexity of typical problems within the field.	3		
CO4	Assess critically the techniques presented and apply them to real world problems.	3		
CO5	Apply advance approach of AI such as intelligence system and expert system.	3		

Subject/Code No: JAVA PROGRAMMING LAB/ 6CS7
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Understand fundamentals of java, and tools for program designing environments.			3
CO2	Apply concept of overloading, inheritance and access controls to class.			3
CO3	Apply the concept of interfaces and importing the packages in java.			3
CO4	Design the application by handling files, Exceptions and threads.			3
CO5	Develop the applications using applets and design some polygons.			3

Subject/Code No: COMPUTER GRAPHICS AND MULTIMEDIA TECHNIQUES LAB/ 6CS8
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	To Implement of program functions to draw different graphics primitives.	3		
CO2	To analysis of various graphics drawing algorithms to draw basic objects of graphics.	3		
CO3	To apply various transformations techniques on graphical objects.	3		
CO4	To apply various clipping algorithms and then filling methods on various graphical objects.	3		
CO5	To design and create a small applications in programming language.	3		

Subject/Code No: DESIGN AND ANALYSIS OF ALGORITHMS LAB/ 6CS9
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze the complexity of the basic algorithms.	3		
CO2	Apply sorting algorithms on real time problem.			3
CO3	Create binary search tree using various algorithms.	3		
CO4	Implement minimum spanning tree algorithms			3

Subject/Code No: EMBEDDED SYSTEM DESIGN LAB/ 6CS10
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Demonstrate the selection procedure of Processors in the Embedded domain.			3
CO2	Develop existing embedded systems by formulating the system design problem including the design constraints.			3
CO3	Develop the embedded systems platform for future applications.			3
CO4	Implementing several embedded systems with particular focus on the interaction between multiple devices.			3
CO5	Visualize the role of Real time Operating Systems in Embedded System.	3		

Subject/Code No: HUMANITIES AND SOCIAL SCIENCE/ 6CS11
Semester: 6th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Able to understand Indian constitution, fundamental rights, duties and principles.		3	
CO2	Able to understand Indian constitution, fundamental rights, duties and directive principles.		3	
CO3	Able to apply the utility approach and find out the implication of economic laws related to demand and supply.		3	
CO4	Able to understand that how national income of a country is determined.		3	
CO5	Able to understand the concepts of exchange rate and BOP.		3	

Subject/Code No: CLOUD COMPUTING/ 7CS1
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Exhibit the evolution of Cloud computing and its applications.	3		
CO2	Analyze the Design and Architecture of cloud and its models	3		
CO3	Evaluation of Virtualization Technology, Data Centers and their applications incloud computing	3		
CO4	Develop the awareness of security on Data, Data Centre and Cloud services.			3
CO5	Assess an cloud services on AWS, GoogleApp Engine etc. , Integrating with cloudapplications.	3		

Subject/Code No: INFORMATION SYSTEM SECURITY/ 7CS2
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze different cryptography techniques transposition and substitution methods.	3		
CO2	Apply AES, RC6, and random number generation. S-box theory		3	
CO3	Analyze Public key Cryptosystem using RSA and also learn various techniques used for the distribution of key in public key cryptosystem		3	
CO4	Analyze Message authentication and hash function using MD5 and SHA and also learn the concept of digital signature.		3	
CO5	Apply the IP security and password message protocols.			3

Subject/Code No: DATA MINING AND WAREHOUSING/ 7CS3
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Apply preprocessing techniques over raw data and provide suitable input for range of data mining algorithms.			3
CO2	Apply appropriate association rule mining algorithms & statistical measures on data.			3
CO3	Create solutions to real life problems using different data mining techniques like classification, prediction & clustering.	3		
CO4	Design data warehouse with dimensional modeling.			3
CO5	Apply OLAP operations & Discover the knowledge imbibed in the high dimensional system.	3		

Subject/Code No: COMPUTER AIDED DESIGN FOR VLSI/ 7CS4
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze digital circuits, incorporating into a VLSI chip. also expected to understand various design methodologies such as custom, semi-custom, standard cell, arrayed logic, sea-of-gates.	3		
CO2	Explore various contemporary techniques for the design, Simulation.	3		
CO3	Apply simulation, synthesis and optimization on digital circuit.			3
CO4	Design the Layout, routing, placement of a VLSI Chip.	3		
CO5	Optimize performance of h/w through CAD tools with floor planning, placement and routing.	3		

Subject/Code No: COMPILER CONSTRUCTION/ 7CS5
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyse the working of compiler by understanding its different phases.	3		
CO2	Apply and implement different types of Parsing algorithms.			3
CO3	Evaluate between different types of Intermediate code generations.	3		
CO4	Analyze different storage organization techniques.	3		
CO5	Analyze different issues in the design of the code generator and basic block control flow graph.	3		

Subject/Code No: ADVANCED DATABASE MANAGEMENT SYSTEM/ 7CS6.1
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze the processes involved in query optimization which impact on database operation and design	3		
CO2	Analyze the database functions and packages suitable for enterprise database application development and management	3		
CO3	Evaluate alternative designs and architectures for databases.			3
CO4	Apply the database solutions for data access and its Security measures.	3		
CO5	Create the design of database systems for the solution of an applications.	3		

Subject/Code No: WEB DEVELOPMENT LAB/ 7CS7
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Apply the basic knowledge of web development using knowledge of HTML and CSS elements.	3		
CO2	Create student registration form entry using validation through JavaScript.			3
CO3	Identify basic configuration of Web Servers. Design a dynamic web page using JSP, PHP and ASP	3		
CO4	Analysis and Interpretation for Dynamic Web Page using JSP and JDBC.	3		
CO5	Apply the concept of Session in Web Page and demonstrate the knowledge of Ajax development.			3

Subject/Code No: VLSI PHYSICAL DESIGN LAB/ 7CS8
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Design digital circuits, incorporating into a VLSI chip.	3		
CO2	Explore various contemporary techniques for the design, Simulation.		3	
CO3	Apply simulation, synthesis and optimization of digital circuit.	3		
CO4	Implementation and Design the Layout, routing, placement of a VLSI Chip.			3
CO5	Optimize performance of h/w through CAD tools with floor planning, placement and routing.	3		

Subject/Code No: COMPILER DESIGN LAB/ 7CS9
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Identify different kinds of tokens and lexemes.	3		
CO2	Analyze scanning by using the concept of finite state automation, parse tree.		3	
CO3	Deploy intermediate code for various statements in a programming language concept	3		
CO4	Deploy heap structure for storage	3		
CO5	Deploy various language patterns using lex tools they are also able to parse.	3		

Subject/Code No: PROJECT – I/ 7CSPR
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Demonstrate a sound technical knowledge of their selected project topic that can be applied to fulfill the needs of society	3		
CO2	Analyze the problem to formulate it	3		
CO3	Develop engineering solutions to complex problems by utilizing a systematic approach.			3
CO4	Create an engineering project that can demonstrate functioning			3
CO5	Communicate effectively for various activities with the help of reports, presentations and verbal communication that can help in life-long learning.			3

Subject/Code No: PRACTICAL TRAINING/ 7CSTR
Semester: 7th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Demonstrate work done training duration.			3
CO2	Apply work done in the form of presentations and paper publication.			3
CO3	Apply verbal communication that can help in life-long.			3
CO4	Explore multiskilled engineer along with good technical knowledge, management and leadership skills.			3
CO5	Analyze the importance of sustainability and cost effectiveness in design and development of engineering solution.			3

Subject/Code No: MOBILE COMPUTING/ 8CS1
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze the principles of mobile computing technologies and Evaluate Mobility management Techniques.	3		
CO2	Interpret Data dissemination and management and evaluate mobile middleware.	3		
CO3	Assess Service Discovery and Evaluate standardization Methods.	3		
CO4	Apply Mobile IP, Mobile TCP, Database systems in mobile environments, and assess World Wide Web.			3
CO5	Analyze Ad Hoc networks, evaluate and practice Routing protocols.	3		

Subject/Code No: DIGITAL IMAGE PROCESSING/ 8CS2
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze various steps of Digital Image processing.	3		
CO2	Apply Image Transformation & Filtering techniques	3		
CO3	Evaluate various methods of Image Restoration.	3		
CO4	Evaluate concepts of Image Compression and segmentation	3		
CO5	Analyze image segmentation and representation algorithms and techniques.	3		

Subject/Code No: Distributed System/ 8CS3
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Exploration and understanding various architectures used to design distributed systems along with different types of operating systems.	3		
CO2	Analysis of concurrent programming with interprocess communication techniques, such as remote method invocation, remote events.	3		
CO3	Analysis of various distributed file systems through case studies.	3		
CO4	Analysis of distributed shared memory models and their failures in distributed computation.	3		
CO5	Analyze various faults and their consequences and replicated data management through exploration different types of Distributed Systems.	3		

Subject/Code No: REAL TIME SYSTEM/ 8CS4.2
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze the concepts of Real-Time systems and modeling	3		
CO2	Explore the functionality in real-time systems, their architecture and inner behavior.	3		
CO3	Evaluate the multi-task scheduling algorithms for periodic tasks performance of scheduling.	3		
CO4	Apply scheduling algorithms for aperiodic, and sporadic tasks as well as examine the impact of scheduling			3
CO5	Design of protocols related to real-time communication			3

Subject/Code No: UNIX NETWORK PROGRAMMING & SIMULATION LAB/ 8CS5
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Analyze the functionality of various distributions of Unix via. BSD, POSIX.	3		
CO2	Develop the programs for client and server involving UDP/TCP sockets using socket programming.	3		
CO3	Evaluate interoperability between IPV4 & IPV6.	3		
CO4	Implement the functionality of FORK function for system call			3
CO5	Evaluate the communication between client and server using Network Simulator.	3		

Subject/Code No: FPGA LAB/ 8CS6
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Design the various continuous, discrete analog and digital signals with the use of sampling and quantization			3
CO2	Evaluate the various parameters of the different signals			3
CO3	Design the various filters and calculate the parameter for their characteristics.			3
CO4	Apply digital design flows for system design and recognize the trade-offs involved Design state machines to control complex systems	3		
CO5	Simulate the transmission and reception of signal of different digital modulation techniques	3		

Subject/Code No: DIGITAL IMAGE PROCESSING LAB/ 8CS7
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Apply image enhancement operation and image Arithmetic Operations on a given image	3		
CO2	Evaluate image restoration and Histogram Processing on various images	3		
CO3	Analyze various Noise and filtering algorithms on images	3		
CO4	Implement image restoration and segmentation techniques on an image	3		
CO5	Extract features of an image and apply pattern recognition techniques	3		

Subject/Code No: PROJECT – II/ 8CSPR
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Present the impact of engineering solution to society by working in a team	3		
CO2	Undertake problem formulation and need for sustainable development	3		
CO3	Design engineering solutions to complex problems by following ethical principles.			3
CO4	Demonstrate functioning and management of engineering project			3
CO5	Communicate effectively for various activities with the help of reports, presentations and verbal communication that can help in life-long learning.			3

Subject/Code No: SEMINAR/ 8CSSM
Semester: 8th
Course Outcome Mapping with Program Specific outcome

CO	CO Definition	PSO 1	PSO 2	PSO 3
CO1	Demonstrate effectively work done by student.			3
CO2	Apply work done in the form of presentations and paper publication.	3		
CO3	Apply verbal communication that can help in life-long.			3
CO4	Explore multi skilled engineer along with good technical knowledge, management and leadership skills.			3
CO5	Analyze the importance of sustainability and cost effectiveness in design and development of engineering solution.			3

Bachelor of Technology in Civil Engineering

Program Name: Civil Engineering
Session: 2018-19

S. No.	Course Code	Course Name	CO No.	PSO1	PSO2	PSO3
1	3CE2-01	Advance Engineering Mathematics-I	CO 1	1	2	-
			CO 2	-	-	3
			CO 3	3	-	-
			CO 4	-	-	3
			CO 5	1	-	2
2	3CE1-02	Technical Communication	CO 1	1	-	2
			CO 2	2	-	2
			CO 3	2	-	2
			CO 4	2	-	3
			CO 5	1	-	3
3	3CE3-03	Engineering Mechanics	CO 1	1	-	2
			CO 2	2	-	1
			CO 3	2	-	1
			CO 4	2	1	-
			CO 5	1	-	2
4	3CE3-05	Surveying	CO 1	2	-	1
			CO 2	2	3	3
			CO 3	2	2	3
			CO 4	2	0	2
			CO 5	2	2	3
5	3CE3-06	Fluid Mechanics	CO 1	2	-	1
			CO 2	3	2	-
			CO 3	-	2	2
			CO 4	2	3	-
			CO 5	-	2	2
6	3CE3-07	Building Materials and Construction	CO 1	2	-	2
			CO 2	2	-	2
			CO 3	3	-	2
			CO 4	3	-	3
			CO 5	3	-	2
7	3CE3-08	Engineering Geology	CO 1	2	3	-
			CO 2	1	-	3
			CO 3	1	1	2

			CO 4	-	2	2
			CO 5	-	2	2
8	3CE3-21	Surveying Lab	**CO1**	2	1	1
			CO2	2	-	1
			CO3	2	2	2
			CO 4	1	2	2
			CO5	2	2	-
9	3CE3-22	Fluid Mechanics Lab	**CO1**	2	2	1
			CO2	2	2	1
			CO3	2	2	1
			CO 4	2	1	1
10	3CE3-23	Computer Aided Civil Engineering Drawing	**CO1**	1	1	1
			CO2	1	2	-
			CO3	1	2	-
			CO 4	1	2	1
11	3CE3-23	Civil Engineering Materials Lab	**CO1**	2	2	1
			CO2	3	2	2
			CO3	2	2	1
			CO 4	2	2	1
12	3CE3-25	Geolgy Lab	**CO1**	2	2	2
			CO2	2	2	1
			CO3	2	2	2
			CO 4	1	2	2
13	4CE2-01	Advance Engineering Mathematics-II	**CO 1**	-	2	2
			CO 2	-	-	3
			CO 3	3	-	2
			CO 4	-	-	3
			CO 5	-	2	2
13	4CE1-03	Managerial Economics & Financial	**CO 1**	2	2	-
			CO 2	2	2	-
			CO 3	2	2	-
			CO 4	2	-	1
			CO 5	-	2	1
15	4CE3-03	Basic Electronics for Civil Engineering Applications	**CO 1**	-	-	3
			CO 2	-	1	2
			CO 3	-	-	3
			CO 4	-	1	2
			CO 5	-	1	2
16	4CE3-05	Strength of Materials	**CO 1**	3	3	-

			CO 2	3	3	-
			CO 3	2	2	-
			CO 4	3	2	1
			CO 5	3	3	1
17	4CE3-06	Hydraulics Engineering	**CO 1**	2	0	2
			CO 2	2	0	2
			CO 3	2	3	3
			CO 4	3	2	2
			CO 5	3	2	1
18	4CE3-07	Building Planning	**CO 1**	2	3	-
			CO 2	3	2	-
			CO 3	3	1	-
			CO 4	3	2	-
			CO 5	3	2	-
19	4CE3-08	Concrete Technology	**CO 1**	2	2	-
			CO 2	3	3	-
			CO 3	3	2	-
			CO 4	3	3	-
			CO 5	2	2	-
20	4CE3-21	Material Testing Lab	**CO1**	2	1	2
			CO2	-	1	2
			CO3	2	2	1
			CO 4	1	1	2
21	4CE3-22	Hydraulics Engineering Lab	**CO1**	1	1	3
			CO2	2	2	1
			CO3	2	1	2
			CO 4	1	1	2
22	4CE3-23	Building Drawing lab	**CO1**	3	2	2
			CO2	3	1	1
			CO3	3	2	1
			CO4	3	2	2
23	4CE3-24	Advanced Surveying Lab	**CO1**	1	2	-
			CO2	1	2	1
			CO3	2	2	1
			CO4	2	2	1
24	4CE3-25	Concrete Lab	**CO1**	1	1	2
			CO2	3	2	2
			CO3	1	2	1
			CO4	2	1	1
25	5CE1A	Theory of Structures-I	**CO 1**	2	3	-

			CO 2	3	2	-
			CO 3	2	3	-
			CO 4	3	2	-
			CO 5	2	3	-
26	5CE2A	Environmental Engineering -I	**CO 1**	-	2	3
			CO 2	1	-	2
			CO 3	1	3	3
			CO 4	1	3	2
			CO 5	2	-	1
27	5CE3A	Geotechnical Engineering -I	**CO 1**	1	2	-
			CO 2	2	3	-
			CO 3	3	3	-
			CO 4	2	3	-
			CO 5	2	2	-
28	5CE4A	Surveying II	**CO 1**	1	-	-
			CO 2	2	3	-
			CO 3	2	2	-
			CO 4	2	2	-
			CO 5	2	-	-
29	5CE5A	Building Design	**CO 1**	2	2	-
			CO 2	3	1	-
			CO 3	3	2	-
			CO 4	3	2	-
			CO 5	3	3	-
30	5CE6.3A	Solid Waste Management	**CO 1**	2	-	2
			CO 2	3	-	2
			CO 3	2	-	2
			CO 4	3	-	3
			CO 5	2	-	2
31	5CE7A	Environmental Engineering Lab-I	**LO1**	2	2	
			LO2	2	2	
			LO3	2	2	1
32	5CE8A	Geotechnical Engineering Lab-I	**LO1**	2		
			LO2		3	
			LO3			3
33	5CE9A	Surveying Lab-II	**LO1**	3		
			LO2		2	
			LO3			3
34	5CE10A	Computer Aided Building Design	**LO1**	3		
			LO2		2	
			LO3			3

			LO4		3	
35	5CE11A	Structural Engineering Lab	**LO1**	3		
			LO2		2	
			LO3			3
			LO4		3	
36	6CE1A	TOS-II	**CO 1**	2	2	-
			CO 2	3	-	-
			CO 3	3	2	-
			CO 4	2	2	-
			CO 5	3	-	2
37	6CE2A	Geotechnical Engineering-II	**CO 1**	2	-	-
			CO 2	3	-	-
			CO 3	3	2	-
			CO 4	-	2	-
			CO 5	3	-	-
38	6CE3A	Environmental Engineering-II	**CO 1**	2	-	-
			CO 2	2	-	-
			CO 3	2	3	2
			CO 4	2	-	-
			CO 5	-	3	-
39	6CE4A	Design of Concrete Structure-I	**CO 1**	2	-	-
			CO 2	3	-	-
			CO 3	2	2	-
			CO 4	2	2	1
			CO 5	3	2	-
40	6CE5A	Transportation engineering-I	**CO 1**	2	3	-
			CO 2	2	3	-
			CO 3	1	3	-
			CO 4		3	1
			CO 5	2	3	-
41	6CE6.1A	Remote Sensing & GIS	**CO 1**	2	2	-
			CO 2	3	-	-
			CO 3	3	2	-
			CO 4	3	2	-
			CO 5	3	-	1
42	6CE7A	Geotechnical Engineering Lab-II	**LO1**	2	1	1
			LO2	2	2	1
			LO3	2	2	1
			LO4	2	2	1
			LO5			
43	6CE8A	Environmental Engineering	**LO1**	2	2	

		Lab-II	**LO2**	2	2	
			LO3	2	2	1
			LO4	2	2	2
44	6CE9A	Concrete Structures Design-I	**LO1**	1	2	
			LO2	1	2	
			LO3	1	2	2
			LO4	1	2	2
			LO5			
45	6CE10A	Road Material Testing Lab	**LO1**	**2**	**2**	
			LO2	**2**	**2**	
			LO3	**2**	**2**	**1**
46	7CE1A	Water Resources Engineering-I	**CO 1**	3	2	2
			CO 2	3	2	2
			CO 3	3	2	-
			CO 4	3	2	2
			CO 5	3	2	-
47	7CE2A	Design of Steel Structures-I	**CO 1**	2	3	-
			CO 2	3	3	-
			CO 3	2	3	2
			CO 4	2	3	2
			CO 5	2	3	-
48	7CE3A	Design of Concrete Structures-II	**CO 1**	2	3	-
			CO 2	2	3	-
			CO 3	2	3	-
			CO 4	2	3	3
			CO 5	2	3	2
49	7CE4A	Transportation engineering-II	**CO 1**	2	3	-
			CO 2	-	3	-
			CO 3	2	3	-
			CO 4	-	3	-
			CO 5	3	3	-
50	7CE5A	Application of Numerical Methods in Civil Engineering	**CO 1**	2	-	2
			CO 2	2	-	2
			CO 3	2	1	2
			CO 4	2	-	3
			CO 5	2	1	2
51	7CE6.1A	Advanced Transportation Engineering	**CO 1**	2	3	1
			CO 2	2	3	-
			CO 3	2	3	-
			CO 4	1	3	2
			CO 5	2	3	-

52	7CEPR	Project-I	**LO1**	1	1	2
			LO2	2	—	1
			LO3	1	—	—
			LO4	1	—	—
			LO5	2	—	—
			LO6	-	1	2
			LO7	-	-	1
			LO8	-	-	2
53	7CE7A	Design of Water Resource Structures-I	**LO1**	2	2	
			LO2	2	2	
			LO3	2	2	1
			LO4	2	2	2
54	7CE8A	Steel Structures Design-I	**LO1**	2	1	1
			LO2	3	2	1
			LO3	3	3	1
			LO4	2	2	1
			LO5	2	2	1
55	7CE9A	Concrete Structures Design-II	**LO1**	3		
			LO2		3	
			LO3			2
56	7CE10A	Application of Numerical Methods in Civil Engineerinng Lab	**LO1**	3		
			LO2		3	
			LO3			2
57	7CETR	Practical Training & Industrial Visit	**LO1**	-	-	
			LO2	-	-	
			LO3	-	-	
			LO4	-	-	
			LO5	-	-	
58	7CEPR	Project-I	**CO 1**	1	1	2
			CO 2	2	—	1
			CO 3	1	—	—
			CO 4	1	—	—
			CO 5	2	—	—
			CO 6	-	1	2
			CO 7	-	-	1
			CO 8	-	-	2
59	8CE1A	Water Resources Engineering-II	**CO 1**	3	2	-
			CO 2	3	1	-
			CO 3	3	2	-
			CO 4	3	1	-
			CO 5	3	2	-

60	8CE2A	Design of Steel Structures-II	**CO 1**	1	3	-
			CO 2	1	3	-
			CO 3	2	3	-
			CO 4	2	3	-
			CO 5	2	3	-
61	8CE3A	PPCM	**CO 1**	3	1	-
			CO 2	3	-	1
			CO 3	3	2	1
			CO 4	3	-	-
			CO 5	3	3	1
62	8CE4.2A	Advance Foundation Engineering	**CO 1**	1	2	-
			CO 2	2	2	-
			CO 3	2	2	-
			CO 4	1	-	-
			CO 5	2	2	-
63	8CEPR	Project	**CO 1**	1	1	2
			CO 2	2	—	1
			CO 3	1	—	—
			CO 4	1	—	—
			CO 5	2	—	—
			CO 6	-	1	2
			CO 7	-	-	1
			CO 8	-	-	2
64	8CE5A	Design of Water Resource Structures-II	**LO 1**	3	2	-
			LO 2	3	1	-
			LO 3	3	2	-
			LO 4	3	1	-
			LO 5	3	2	-
65	8CE6A	Professional Practice & Estimating	**LO1**	2	-	-
			LO2	1	1	2
			LO3	1	1	1
				1.33	**1**	**1.50**
66	8CE7A	Steel Structures Design-II	**LO1**	2	1	1
			LO2	3	2	1
			LO3	3	3	1
67	8CE8A	Design of Foundations	**LO1**	3		
			LO2		3	
			LO3			2
			LO4		3	
			LO5		3	
68	8CE9A	Structural Analysis by Matrix	**LO1**	3		

		Methods	**LO2**		3	
			LO3			3
			LO4		2	
			LO5			3
69	8CESM	Seminar	**LO1**	1	1	3
			LO2	1	1	3
			LO3	2	1	3
70	8CEPR	Project	**CO 1**	1	1	2
			CO 2	2	—	1
			CO 3	1	—	—
			CO 4	1	—	—
			CO 5	2	—	—
			CO 6	-	1	2
			CO 7	-	-	1
			CO 8	-	-	2

Bachelor of Technology in Electronics and Communication Engineering

Program Name: B.Tech.Electronics and Communication Engineering

ADVANCED MATHEMATICS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	2	1
CO 4	1	1	2
CO 5	2	2	1

TECHNICAL COMMUNICATION
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

POWER GENERATION PROCESS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	3	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

ELECTRICAL CIRCUIT ANALYSIS

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	3	2
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	1	2	1

ANALOG ELECTRONICS

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

ELECTRICAL MACHINE-I

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	3
CO 2	2	2	2
CO 3	2	-	1
CO 4	1	1	2
CO 5	2	1	1

ELECTROMAGNETIC FIELD
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	1
CO 2	2	-	2
CO 3	2	-	1
CO 4	1	1	2
CO 5	1	1	1

ANALOG ELECTRONICS LAB
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	1
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	1	2
CO 5	1	1	1

ELECTRICAL MACHINE-I LAB
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	2
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	2	2
CO 5	1	1	1

ELECTRICAL CIRCUIT DESIGN LAB

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	1
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	2	2
CO 5	2	1	-

BIOLOGY

MAPPING OF COs WITH PSOs

Semester 4

COs	PSO 1	PSO2	PSO3
CO 1	1	-	3
CO 2	2	-	3
CO 3	1	-	3
CO 4	2	-	3
CO 5	1	-	3

MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	3	2
CO 2	2	-	2
CO 3	2	2	-
CO 4	2	-	3
CO 5	2	2	-

ELECTRONIC MEASUREMENT AND INSTRUMENTAION

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	1	2
CO 5	-	3	1

ELECTRICAL MACHINE-II

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	-	-
CO 2	2	-	-
CO 3	2	-	-
CO 4	2	-	-
CO 5	-	-	-

POWER ELECTRONICS

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	2
CO 2	1	-	3
CO 3	-	-	3
CO 4	-	1	3
CO 5	1	-	2

SIGNAL & SYSTEMS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	3	3
CO 2	1	3	3
CO 3	1	3	3
CO 4	1	3	3
CO 5	1	3	3

DIGITAL ELECTRONICS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	1	2
CO 5	-	3	1

ELECTRICAL MACHINE-II LAB
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	2
CO 2	1	2	-
CO 3	3	2	3
CO 4	1	3	-
CO 5	3	1	2

POWER ELECTRONICS LAB

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	2
CO 2	2	2	-
CO 3	2	3	-
CO 4	1	1	-
CO 5	3	1	2

DIGITAL ELECTRONICS LAB

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	-	3
CO 2	2	-	3
CO 3	1	-	3
CO 4	1	-	3
CO 5	1	-	3

Signal & System

MAPPING OF COs WITH PSOs

Semester 5

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	3	1
CO 3	2	3	3
CO 4	1	-	-
CO 5	3	2	1

Linear Integrated Circuits
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	-	-	3
CO 2	-	1	3
CO 3	-	-	3
CO 4	1	-	3
CO 5	1	-	3

Telecommunication Engineering
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	2	1
CO 4	1	2	2
CO 5	2	2	1

Analog Communication
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	-	3	3
CO 5	-	2	-

Microwave Engineering-I

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	-	-	1
CO 3	-	-	1
CO 4	-	1	2
CO 5	-	3	1

Biomedical Instrumentation

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	2	1	3
CO 4	1	-	-
CO 5	1	2	1

Electronics Engineering Design Lab

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3-
CO 2	3	2	3
CO 3	2	1	3
CO 4	1	-	-
CO 5	1	2	1

Microwave Engineering Lab

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	2	3
CO 2	1	3	2
CO 3	1	2	3
CO 4	1	2	3
CO 5	1	2	3

Communication Lab-I

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	1	2
CO 2	3	2	-
CO 3	3	2	-
CO 4	3	1	-
CO 5	3	1	2

Signal Processing Lab-I

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	2	1
CO 4	1	1	2
CO 5	2	1	2

Profession Ethics & Disaster Management

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	-	1
CO 2	2	-	2
CO 3	1	2	
CO 4	2		2
CO 5	1		2

Microwave Engineering-II

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	2	1	3
CO 4	1	-	-
CO 5	1	2	1

Microprocessors

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	1	1	3
CO 4	1	1	2
CO 5	1	2	2

Industrial Electronics

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	2	1	2
CO 4	1	-	-
CO 5	1	2	1

Digital Communication

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3
CO 2	1	2	3
CO 3	2	1	1
CO 4	1	2	-
CO 5	1	2	1

Control System

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	1
CO 2	3	2	3
CO 3	2	2	1
CO 4	1	3	-
CO 5	1	2	2

Optical Fiber Communication
MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	-
CO 2	1	2	3
CO 3	1	1	-
CO 4	1	-	2
CO 5	1	2	1

Communication Lab-II
MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	2	1
CO 4	1	1	2
CO 5	2	2	1

Microprocessor Lab
MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	3	2
CO 2	2	-	2
CO 3	2	2	-
CO 4	2	-	3
CO 5	2	2	-

RF Simulation Lab

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	1	2
CO 5	-	3	1

Industrial Electronics Lab

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	-	-
CO 2	2	-	-
CO 3	2	-	-
CO 4	2	-	-
CO 5	-	-	-

Personality Development and General Aptitude

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	1	2
CO 5	-	3	1

Antenna & Wave Propagation

MAPPING OF LOs WITH PSOs

Semester 7

COs	PSO 1	PSO2	PSO3
CO 1	2	2	2
CO 2	2	2	2
CO 3	2	2	2
CO 4	1	1	2
CO 5	1	2	2

Digital Signal Processing

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	3	1
CO 3	2	3	3
CO 4	1	-	-
CO 5	3	2	1

Digital Image Processing

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	2	1	3
CO 4	1	-	-
CO 5	1	2	1

Wireless Communication

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	
CO 3	2		
CO 4	1	-	-
CO 5	1	2	1

VLSI Design

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	3	1
CO 3	2	3	3
CO 4	1	-	-
CO 5	3	2	1

VHDL

MAPPING OF LOs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	2	-
CO 2	2	2	-
CO 3	2	2	-
CO 4	1	1	-
CO 5	1	2	-

Signal and Image Processing Lab

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	2	1
CO 4	1	1	2
CO 5	2	2	1

Wireless Communication Lab

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

Practical Training Seminar

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	3	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

Project Stage-I

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	3	2
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	1	2	1

IC Technology

MAPPING OF COs WITH PSOs

Semester 8

COs	PSO 1	PSO2	PSO3
CO 1	1	1	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

Radar & TV Engineering

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	3
CO 2	2	2	2
CO 3	2	-	1
CO 4	1	1	2
CO 5	2	1	1

MEMS & Nanotechnology

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	1
CO 2	2	-	2
CO 3	2	-	1
CO 4	1	1	2
CO 5	1	1	1

Microcontroller & Embedded System

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	1
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	1	2
CO 5	1	1	1

RF Fabrication Lab

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	2
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	2	2
CO 5	1	1	1

Industrial Electronics & Management

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	1
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	2	2
CO 5	2	1	-

VLSI & Optical Fiber Lab

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	-	3
CO 2	2	-	3
CO 3	1	-	3
CO 4	2	-	3
CO 5	1	-	3

Project Stage-II

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	3	2
CO 2	2	-	2
CO 3	2	2	-
CO 4	2	-	3
CO 5	2	2	-

Seminar

MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	1	2
CO 5	-	3	1

POORNIMA
INSTITUTE OF ENGINEERING & TECHNOLOGY

Bachelor of Technology in Electrical Engineering

Program Name: Electrical Engineering

POWER GENERATION PROCESS
MAPPING OF COs WITH PSOs

Semester 3

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	2	1
CO 4	1	1	2
CO 5	2	2	1

ELECTRICAL CIRCUIT ANALYSIS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

ANALOG ELECTRONICS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	3	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

ELECTRICAL MACHINE-I
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	3	2
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	1	2	1

ELECTROMAGNETIC FIELD
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	1	1	2
CO 5	2	2	1

ELECTRONIC MEASUREMENT AND INSTRUMENTAION
MAPPING OF COs WITH PSOs

Semester 4

COs	PSO 1	PSO2	PSO3
CO 1	1	1	3
CO 2	2	2	2
CO 3	2	-	1
CO 4	1	1	2
CO 5	2	1	1

ELECTRICAL MACHINE-II
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	1
CO 2	2	-	2
CO 3	2	-	1
CO 4	1	1	2
CO 5	1	1	1

POWER ELECTRONICS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	1
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	1	2
CO 5	1	1	1

SIGNAL & SYSTEMS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	1	2
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	2	2
CO 5	1	1	1

DIGITAL ELECTRONICS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	1
CO 2	2	-	1
CO 3	2	1	1
CO 4	1	2	2
CO 5	2	1	-

POWER ELECTRONICS
MAPPING OF COs WITH PSOs

Semester 5

COs	PSO 1	PSO2	PSO3
CO 1	1	-	3
CO 2	2	-	3
CO 3	1	-	3
CO 4	2	-	3
CO 5	1	-	3

MICROPROCESSOR & COMPUTER ARCHITECTURE
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	3	2
CO 2	2	-	2
CO 3	2	2	-
CO 4	2	-	3
CO 5	2	2	-

CONTROL SYSTEM
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	1	2
CO 5	-	3	1

DATABASE MANAGEMENT SYSTEM
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	-	-
CO 2	2	-	-
CO 3	2	-	-
CO 4	2	-	-
CO 5	-	-	-

TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	2
CO 2	1	-	3
CO 3	-	-	3
CO 4	-	1	3
CO 5	1	-	2

PRINCIPLE OF COMMUNICAITON SYSTEM
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	3	3
CO 2	1	3	3
CO 3	1	3	3
CO 4	1	3	3
CO 5	1	3	3

MODERN CONTROL THEORY
MAPPING OF COs WITH PSOs

Semester 6

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	2	1
CO 3	3	2	1
CO 4	3	1	2
CO 5	-	3	1

HIGH VOLTAGE ENGINEERING
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	2
CO 2	1	2	-
CO 3	3	2	3
CO 4	1	3	-
CO 5	3	1	2

SWITCHGEAR AND PROTECTION
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	2
CO 2	2	2	-
CO 3	2	3	-
CO 4	1	1	-
CO 5	3	1	2

ADVANCED POWER ELECTRONICS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	1	-	3
CO 2	2	-	3
CO 3	1	-	3
CO 4	1	-	3
CO 5	1	-	3

SMART GRID TECHNOLOGY
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	3	3	1
CO 3	2	3	3
CO 4	1	-	-
CO 5	3	2	1

Semester 7

POWER SYSTEM PLANNING
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	-	-	3
CO 2	-	1	3
CO 3	-	-	3
CO 4	1	-	3
CO 5	1	-	3

POWER SYSTEM ANALYSIS
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	2	1
CO 4	1	2	2
CO 5	2	2	1

ARTIFICIAL INTELLIGENCE TECHNIQUES
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	-	-
CO 4	-	3	3
CO 5	-	2	-

NON CONVENTIONAL ENERGY SOURCES
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	1	3
CO 2	-	-	1
CO 3	-	-	1
CO 4	-	1	2
CO 5	-	3	1

POWER SYSTEM ENGINEERING
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3
CO 2	3	2	3
CO 3	2	1	3
CO 4	1	-	-
CO 5	1	2	1

COMPUTER AIDED DESIGN OF ELECTRICAL MACHINES
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	2	3-
CO 2	3	2	3
CO 3	2	1	3
CO 4	1	-	-
CO 5	1	2	1

EHV AC/DC TRANSMISSION
MAPPING OF COs WITH PSOs

Semester 8

COs	PSO 1	PSO2	PSO3
CO 1	1	2	3
CO 2	1	3	2
CO 3	1	2	3
CO 4	1	2	3
CO 5	1	2	3

ELECTRICAL DRIVES AND THEIR CONTROL
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	1	2
CO 2	3	2	-
CO 3	3	2	-
CO 4	3	1	-
CO 5	3	1	2

PROTECTION OF POWER SYSTEM
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	3	3	3
CO 2	2	2	2
CO 3	2	2	1
CO 4	1	1	2
CO 5	2	1	2

FACTS DEVICES AND THEIR CONTROL
MAPPING OF COs WITH PSOs

COs	PSO 1	PSO2	PSO3
CO 1	2	-	1
CO 2	2	-	2
CO 3	1	2	
CO 4	2		2
CO 5	1		2