

## B.TECH

### Program Outcomes (POs)

1. **PO 1:** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **PO 2:** Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **PO 3:** 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.
4. **PO 4:** 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.
5. **PO 5:** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **PO 6:** 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.
7. **PO 7:** 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.
8. **PO 8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **PO 9:** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **PO 10:** 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.
11. **PO 11:** 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.
12. **PO 12:** 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.



## **B.TECH (CSE)**

### **The Program Educational Objectives (PEOs)**

- 1) To prepare students for higher studies as well as for industrial jobs.
- 2) Students will demonstrate technical competency in software and system development for successful carrier
- 3) To develop a sufficient level of knowledge among students for successful transition into other professional areas e.g. software marketing.
- 4) To demonstrate ethics, communication skills, leadership and team work in their professional practice.
- 5) Capable of adapting to new technologies and constantly upgrade their skills with an attitude towards lifelong learning

### **Program Specific Outcomes (PSOs)**

- **PSO1:** Develop ability to learn and obtain hands on experience in various programming language and basic knowledge of Artificial Intelligence.
- **PSO2:** Ability to apply Engineering knowledge among students so that they can work in diverse areas of computer science and engineering

## **B.TECH(Civil Engineering)**

### **The Program Educational Objectives (PEOs)**

- **PEO-1:** To make graduates of the Civil Engineering program capable of contributing towards Nation's development by providing sustainable solutions to a wide range of diverse and complicated Civil Engineering problems in different application sectors including physical infrastructure.
- **PEO-2:** To transform graduates of the Civil Engineering program into successful professionals in designing and executing national standard products and services in the field of Civil Engineering, becoming entrepreneurs, and pursuing further education and research.
- **PEO-3:** To enable graduates of the Civil Engineering Program for adapting to dynamic changes in the technological scenarios and handle broader social challenges with a rational and flexible decision-making style.

### **Program Specific Outcomes (PSOs)**



- **PSO-1:** Capability to manage large infrastructure projects ensuring safe and cost-effective execution of projects having knowledge of fast track construction and project management.
- **PSO-2:** Ability to use building software packages to calculate safe loads and stresses for designing structural members to ensure safety and serviceability.

## **Master of Business Administration**

### **The Program Educational Objectives (PEOs)**

PEO 1: To establish themselves as effective professionals by solving real problems through the use of management science knowledge.

PEO 2: To develop professional skills that promotes them for a life-long learning in advanced areas of management and related fields.

PEO 3: To demonstrate their ability to adapt to a rapidly changing environment through learning and application of new skills and added competencies.

### **Program Specific Outcomes (PSOs)**

PSO 1: Develop skills in Financial Accounting, Investment analysis, Management of Liquidity, Risk assessment, Global Finance and Dividend decisions.

PSO 2: Establish skills in understanding customer, marketing research, product promotion, product life cycle and pricing strategies in business.

### **Program Outcomes (POs)**

**PO1:** Demonstrate an understanding of management concepts, principles and theories, and apply them in the context of organizational work practices.

**PO2:** Apply analytical and critical thinking skills to analyze the dynamic business environment and identify entrepreneurial and business opportunities and risks.

**PO3:** Prepare business strategies, develop concomitant functional and operational strategies and implement them in an integrated manner to efficiently and effectively achieve the functional goals and the business objectives.

**PO4:** Demonstrate an understanding of decision making processes at various levels of the organization with respect to resources mobilization and their efficient deployment and use to achieve the set goals.

**PO5:** Demonstrate the ability to analyse management problems, to identify and collect



relevant data and to apply a creative problem-solving approach.

**PO6:** Identify and recommend the information technology based interventions to achieve organizational goals

**PO7:** Benchmark organizational and managerial practices against the principles of good governance, ethical conduct, corporate social responsibility and the imperatives of long-term societal welfare.

**PO8:** Demonstrate effective communication and interpersonal skills as well as the ability to work with and lead teams.

**PO9:** Develop a lifelong learning approach manifested in their attitude to learn, unlearn and relearn and in their pursuit of excellence in professional, personal and social life.

## **Bachelor of Business Administration (BBA)**

### **Program Outcomes (POs)**

PO1: Demonstrate ability to perform effectively as a team leader or team member for the achievement of defined organizational goals.

PO2: Develop the diverse potential skills and competencies for managing businesses and entrepreneurial ventures.

PO3: Acquire pre-requisite knowledge and skills to effectively accomplish visionary companies through creativity and strategic innovation.

### **PSO:**

PSO1: Develop a global approach towards the contemporary areas of Finance, HR, Marketing, Information Technology and Law.

PSO2: Develop corporate, social and environmental responsiveness towards changing business environment.

PSO3: Discuss intellectual integrity, stress management and awareness of business ethics.

PSO4: Develop research oriented thinking and nurture entrepreneurial spirit in students by developing a broad thinking about productivity and risk management.

## **POs for Bachelor of Computer Applications**



PO1: Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies.

PO2: Familiarized with Business environment and Information Technology and its Applications in different domains.

PO3: Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.

PO4 Analyze, design, implements and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.

PO5: Understand the front end and backend of software applications

PO6: Gain expertise in at least one emerging technology.

PO7: Acquire knowledge about computer architecture and organization, networks, network devices and their configuration, protocols, security concepts at various level etc.

PO8: Apply techniques of software validation and reliability analysis to the development of computer programs.

PO9: Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.

PO10: Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.

PO11: Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.



## **DATABASE MANAGEMENT SYSTEM**

### **DATA STRUCTURE & ALGORITHMS**

**CO1: Define** various types of data structure and operations that can be performed on them. **(Level 1 : Remember)**

**CO2: Demonstrate** the concept of Algorithmic complexity & their related usage in various algorithms. **(Level 2: Understand)**

**CO3: Implement** data structures like Arrays , stacks , Queue , Linked List , Tree , Graph to get solutions to computational problems. **(Level 3 : Apply)**

**CO4: Compare** performance of Selection sort, Bubble Sort , Insertion sort , Quick Sort , Merge sort , Heap sort in terms of space and time complexity. **(Level 4 : Analyze)**

### **DIGITAL ELECTRONICS**

**CO1:** Examine all logic gates using truth-table.

**CO2:** Apply the K-MAP method to solve the Boolean Expression.

**CO3:** Analyze the various Flip-Flops, Registers and Counters by their truth-table.

**CO4:** Designing of various combinational and sequential circuits.

### **PYTHON PROGRAMMING**

**CO1:** For a given conceptual problem students will be able to analyze the problem and write a program in python with basic concepts

**CO2:** For a given problem of Strings and texts, students will be able to analyze the problem and write a program in python with basic concepts involving strings and texts.

**CO3:** The knowledge of list and dictionary will enable students to implement in python language and analyze the same.

**CO4:** Student will able to write a program using functions to implement the basic concepts of object oriented programming language

### **MATHEMATICS-III (MULTIVARIABLE CALCULUS AND DIFFERENTIAL EQUATIONS)**

**CO1:** Define various mathematical formulas for Multivariable

Differential Calculus and Multivariable Integral Calculus

**.(Level 1: Remember)**

**CO2:** Demonstrate the mathematical tools needed in evaluating multiple integrals and their usage. (Level 2 : Understand)

**CO3:** Implement the computational and conceptual principles of calculus to the solutions of various scientific applications .(Level 3: Apply)

**CO4:** Compare the mathematical tools for the solutions of first order ODE and second and higher order ODE ( Level 4: Analyze)

#### **ECONOMICS FOR ENGINEERS**

**CO1:** The students will be able to understand the basic concept of economics.

**CO2:** The student will be able to understand the concept of production and cost.

**CO3:** Implement the computational and conceptual principles of calculus to the solutions of various scientific applications .(Level 3: Apply)

**CO4:** Compare the mathematical tools for the solutions of first order ODE and second and higher order ODE ( Level 4: Analyze)

#### **DATABASE MANAGEMENT SYSTEM LAB**

**CO1:** Practice various DDL DML and DCL in SQL queries

**CO2:** Implement various operations in database.

**CO3:** Examine transactions and concurrency control techniques using various locking scheme

**CO4:** Design database management system for industries

#### **DIGITAL ELECTRONICS LAB**

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#### **DATA STRUCTURES AND ALGORITHMS LAB USING C**

#### **PYTHON PROGRAMMING LAB**

#### **DISCRETE MATHEMATICS**

**CO1:** Define the basic concepts of set theory and logics(Remember)

**CO2:** Understand sets,relations,functions and algebraic structures.(**Understand**).

**CO3:** Able to formulate problems and solve recurrence relations. (**Evaluate**)

**CO4:** Able to model and solve real world problems using graphs and trees .(**Analyze**)

#### **COMPUTER ORGANIZATION & ARCHITECTURE**

**CO1:** Define the basic concepts of computer architecture and organization. (**Level 1 : Remember**)

**CO2:** Describe various trends in computer design, classification

processor, and various operations of instruction sets. (**Level 2: Understand**)

**CO3:** Interpret the enhancing performance of CPU architecture and expansion of memory organization. (**Level 3 : Apply**)

**CO4:** Analyze multiprocessor system to achieve goal of

parallelism . (**Level 4 : Analyze**)

#### **OPERATING SYSTEM**

**CO1:** Understand the structure and architectural components of OS to analyze and design the applications to run in parallel. Moreover, students would be able to develop scheduling algorithms to optimize various parameters like CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time for research purpose. (**Level 1 : Remember**)

**CO2:** Understand the design issues associated with Operating systems (e.g. Mutual exclusion, Deadlock detection etc.) to gain insight towards developing algorithms/techniques for efficient deadlock handling. (**Level 2: Understand**)processor, and various operations of instruction sets. (**Level 2: Understand**)

**CO3:** For a given specification of memory organization, develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time. (**Level 3 : Apply**)

**CO4:** Design and implement a file management system for a given specification. Identify, use and evaluate the disk management policies with respect to various performance evaluation parameters. (**Level 4 : Analyze**)

#### **OBJECT ORIENTED PROGRAMMING**

**CO1:** Define the procedural and object oriented paradigm

with concepts of streams, classes, functions, data and objects (**Level 1 : Remember**)

**CO2:** Demonstrate the dynamic memory management techniques using pointers, constructors, destructors, etc. (**Level 2: Understand**)

**CO3:** Implement the use of various OOPs concepts with the help of programs. **(Level 3 : Apply)**

**CO4:** Compare inheritance with the understanding of early and late binding, usage of exception handling, generic programming. **(Level 4 : Analyze)**

#### **ORGANIZATIONAL BEHAVIOR**

**CO1: Define** the concepts of Management, Organization, organizational culture and process .  
**(Level 1 : Remember)**

**CO2: Understand** the concept of personality, learning process, leadership quality. **(Level 2: Understand)**

**CO3: Demonstrate** various types of organizational culture, organizational change, motivational techniques. **(Level 3 : Apply)**

**CO4: Analyze** group and team concept, managerial skill, functions of Management, organizational structure.

**(Level 4 : Analyze)**

#### **ENVIRONMENTAL SCIENCES**

**CO1: Define** The natural resources , renewable and non- renewable ecosystem and biodiversity conservation .**(Level 1 : Remember)**

**CO2:** Understand the components of environmental issues and sustainable development along with its legal framework . **(Level 2: Understand)**

**CO3:** Interpret the social issues related to the environment and their impact on human activities.

**(Level 3 : Apply)**

**CO4:** Apply the role of information technology in human health and sustainable development .

**(Level 4 : Analyze)**

#### **WEB TECHNOLOGIES**

**CO1:** For a given conceptual problem students will be able to understand the basic process of Web Technologies and their application domains.

**CO2:** For a given problem the student will be able to analyze the problem and select which technique is most suitable for developing a website.

**CO3:** The knowledge of various techniques will enable students to implement these dynamic techniques using various tools to make interactive web pages.

**CO4:** Student will able to write a program using these technologies to implement the basic concepts of web

## **OPERATING SYSTEM LAB**

## **OBJECT ORIENTED PROGRAMMING LAB USING C++**

## **WEB TECHNOLOGIES LAB**

## **ENVIRONMENT SCIENCE**

## **MICROPROCESSOR**

## **COMPUTER NETWORKS**

**CO1:** Recognize the technological trends of Computer Networking and have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layer

and explain the functions of the different layers of the OSI Protocol.

**CO2:** Classify the functions of data link layer and apply it on networking paradigms and draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) and describe the function of each.

**CO3:** Explain the routing protocols and analyze the concept of addressing and identifying and connecting various connecting components of a computer network.

**(Level 3 : Apply)**

**CO4:** Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

## **FORMAL LANGUAGES AND AUTOMATA**

**CO1:** To use basic concepts of formal languages of finite automata techniques.

**CO2:** To Design Finite Automata for different Regular Expressions and Languages.

**CO3:** To construct context free grammar for various languages.

**CO4:** To solve various problems of applying normal form techniques, push down automata and Turing Machines.

## **DESIGN AND ANALYSIS OF ALGORITHMS**

### **PROGRAMMING IN JAVA**

#### **MICROPROCESSOR LAB**

**CO1:** Apply the operation of Intel 8085 microprocessor in assembly language programming techniques.

**CO2:** Execute the operation of Intel 8086 microprocessor in assembly language programming

**CO3:** Analyze and compare the logic used in programs output carried out by 8086 microprocessor theoretically and practically.

**CO4:** Create programs related to interfacing and implementation of various peripheral chips using 8086 microprocessor.

#### **COMPUTER NETWORKS LAB**

**CO1:** Configure and implement various networking protocols such as TCP, IP, DHCP, DNS, and HTTP.

**CO2:** Analyze network traffic using tools such as Wireshark and tcpdump.

**CO3:** Configure and troubleshoot various network topologies including LAN, WAN, and VPN.

**CO4:** Design and implement secure network configurations, including firewalls, VPNs, and encryption.

#### **DESIGN & ANALYSIS OF ALGORITHMS USING C++**

**CO1:** Implementation of various algorithms and to analyze the performance of algorithms.

**CO2:** Demonstrate a familiarity with major algorithms and data structures.

**CO3:** Apply important algorithmic design paradigms and methods of analysis.

**CO4:** Synthesize efficient algorithms in common engineering design situations.

#### **PROGRAMMING IN JAVA LAB**

### **SOFTWARE ENGINEERING**

**CO1:** Recall and recognize software project management concepts, software life cycle models, characteristics, and the software crisis.

**CO2** Apply software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployments

**CO3:** Examine architectural designs, conduct comprehensive software testing, and perform effective maintenance and re-engineering of software systems.

**CO4:** Analyze software reliability and quality assurance practices and Work as an individual and as part of a multidisciplinary team to develop and deliver quality software

### **COMPILER DESIGN**

**CO1:** Defining knowledge of different phases and passes of the compiler and develop the lexical analyser for a given grammar specification.

**CO2** Summarize the parser and its types. Summarize the working of all phases of compiler. and construction of LL, SLR, CLR, and LALR parsing table

**CO3:** Apply parser specification articulate top-down and bottom-up techniques

**CO4:** Analyze syntax directed translation schemes, Symbol Table and Parsing Strategies

### **ARTIFICIAL INTELLIGENCE**

**CO1:** understand various type of AI problem and use of various type of search to solve them..

**CO2** understand the way of knowledge representation in AI and various type of Logics for them

**CO3:** understand how AI machines take decisions in case of uncertainty.

**CO4:** understand how AI machine learn from past experience and basics of AI , Neural Network

### **ADVANCED JAVA**

### **MOBILE AND WIRELESS COMMUNICATION**

**CO1:** Recall the fundamental concepts of various mobile and wireless communication systems like mobile, wireless & internet communication system.

#### **(Level 1 : Remember)**

**CO2** Understanding the various multiple access techniques such as FDMA, TDMA, CDMA and SDMA used in mobile & wireless communication .

#### **(Level 2: Understand)**

**CO3:** Demonstrate different cellular concepts and wireless technologies to suit different application for mobile &

wireless communication techniques

**(Level 3 : Apply)**

**CO4:** Differentiate between different parameters like interference, architecture, layers, protocol, handover etc. for mobile & wireless communication techniques.

**(Level 4 : Analyze)**

**ADVANCED DATABASE MANAGEMENT SYSTEM**

**CO1: Define** the physical concepts of antenna theory.

**CO2 Understand** various parameters of the antenna like gain, directivity, radiation resistance and beam - width.

**CO3: Demonstrate** various types of antenna used in wave propagation.

**CO4: Analyze** uniformly spaced arrays with uniform and non-uniform excitation amplitude.

**VHDL AND DIGITAL DESIGN**

**CO1:** Understand the need & application of hardware description language.

**CO2** Modelling & simulations of various basic & advanced digital systems using VHDL.

**CO3:** Implementation of various basic & advanced digital systems using FPGAs.

**CO4:** Apply knowledge to design & implement combinational circuits & sequential circuits related to research & industry applications.

**VHDL AND DIGITAL DESIGN**

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**CO4:** Apply knowledge to design & implement combinational circuits & sequential circuits related to research & industry applications

**Compiler Design Lab**

**CO1:** Examining the implementation of different parsers

**CO2** Analyze the knowledge of different phases of the compiler.

**CO3:** Explain the usage of compiler tools like LEX, YACC, etc

**CO4:** Discussing different types of grammar.

### **Artificial Intelligence Lab using python**

#### **Advanced Java Lab**

#### **Constitution of India**

**CO1:** Define the concepts of Indian constitution, its historical background and relevancy in Indian political scenario.

**CO2** Analysis the nature of Indian constitution and the approach of constitutional makers regarding creating a healthy political- social society in India.

**CO3** Discuss the organization, composition, powers and importance of Indian parliament.

**CO4:** Understand the role of President in Indian parliament and impact in India.

#### **NEURAL NETWORK**

**CO1:** Recognize for a given conceptual problem student will able to analyze the problem and able to visualize in NN.

**CO2** Classify the functions that is familiar with different NN models.

**CO3** Explain to understand the concept of learning in NN

**CO4:** Explain the memory and their architecture to understand it in NN.

#### **NEURAL NETWORK LAB**

**CO1:** For a given conceptual problem students will be able to analyze the problem and be able to visualize using NN.

**CO2** Students will be familiar with different NN models and its implementation.

**CO3** Students will be able to understand the concept of learning in NN and its implementation.

#### **SOFTWARE PROJECT MANAGEMENT**

**CO1:** Define software projects, distinguish them from other projects, and list activities and principles of software project management.

**CO2** Understand cost-benefit analysis, project evaluation techniques, and the principles of risk management in software project management.

**CO3** Apply resource allocation, control monitoring, contract management, and people management principles in software project management contexts.

**CO4:** Evaluate the significance of software quality, apply ISO 9126 standards, and utilize techniques to enhance software quality within project planning.

## **FUNDAMENTALS OF MANAGEMENT**

**CO1:** Recognize the Evolution of Management and contribution of Management thinkers and have a good understanding of the management evolution in particular have knowledge of managing and explain the different styles of the different author's.

**CO2** Classify the functions and importance of staffing and training enhances knowledge, abilities, and skills that match with the job, people are changed to better fit the job.

**CO3** Explain the concept of material management and inventory control and analyze the concept of addressing and identify and connect various connecting components of inventories.

**CO4:** Explain the components of marketing and advertising, various sources of finance and capital structure.

## **Cyber Security & Threats**

**CO1:** Students will be able to recall and identify various sources of security threats, such as email threats, web threats, intruders, hackers, and insider threats. **(Remember)**

**CO2** Students will demonstrate an understanding of security threat management principles by explaining the motives behind different types of cyber threats, identifying target assets and vulnerabilities, and describing the consequences of security breaches. **(Understand)**

**CO3** Students will apply security elements, such as authorization, authentication, firewalls, intrusion detection systems (IDS), and log files, to design and implement security measures for different types of networks and systems. **(Apply)**

**CO4:** Through forensic analysis and threat modeling exercises, students will analyze and evaluate security vulnerabilities, assess risks, and develop strategies for threat identification, analysis, and mitigation. **(Analyze)**

## **BASICS OF MACHINE LEARNING**

**CO1:** Understand fundamental issues and challenges of supervised and unsupervised learning techniques.

**CO2** Extract features that can be used for a particular machine learning approach.

**CO3** To compare and contrast pros and cons of various machine learning techniques and to get an insight of when to apply a particular machine learning approach.

**CO4:** To mathematically analyze various machine learning approaches and paradigms.

## **BIG DATA ANALYTICS**

**CO1: Define** the physical concepts of antenna theory.

**CO2 Understand** various parameters of the antenna like gain, directivity, radiation resistance and beam - width.

**CO3 Demonstrate** various types of antenna used in wave propagation.

**CO4: Analyze** uniformly spaced arrays with uniform and non uniform excitation amplitude.

## **Intelligent Instrumentation for Engineers**

**CO1:** Demonstrate various network like Star, ring ,Bus Network.

**CO2** Analyze advanced signal processing techniques for filtering and intelligent instrumentation system

**CO3** Analyze advanced signal processing techniques for filtering and intelligent instrumentation system

## **MACHINE LEARNING WITH PYTHON LAB**

### **BIG DATA ANALYTICS LAB**

**CO1:** Develop skills to work with big data using tools and technologies.

**CO2** Gain practical experience in handling and processing large datasets

**CO3** Learn how to extract insights and patterns from big data.

**CO4:** Acquire proficiency in using data visualization techniques to present and communicate findings.

**Department of Civil Engineering**

**MERI-CET**

**B-TECH CIVIL ENGG SEMESTER-3<sup>rd</sup>****COURSE:- INTRODUCTION TO CIVIL ENGINEERING****COURSE CODE:- PCC-201-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomys
CO1	To Remember various terms used in building construction.	L1 (Remember)
CO2	To Understand the importance of Civil Engineering in the infrastructural development of the society.	L2 (Understand)
CO3	To Apply the knowledge about sound acoustic system and various traditional building material.	L3 (Apply)
CO4	To Evaluate the types and properties of various building material and basic requirement of a building construction.	L4 (Evaluate)
CO5	To Analysis the suitable types of flooring , plastering , varnishes with their uses.	L4 (Analysis)

**COURSE:- SURVEYING****COURSE CODE:- PCC-CE-207-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomys
CO1	To Recall the various terminology & equipment used in Surveying	L1 (Remember)
CO2	To Understand the working of various Surveying instrument i.e. Compass, Theodolite, Levelling equipment etc & process of setting of different curves for road & railway	L2 (Understand)
CO3	To Apply the Principles of surveying in field.	L3 (Apply)
CO4	To Apply different tape correction on linear measurement & suitable correction on angular measurement.	L3 (Apply)
CO5	To Prepare plan/map & contour map of an area	L4 (Analyse)

**COURSE:- ENGINEERING MECHANICS**

**COURSE CODE:- PCC-203-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomys
CO1	To Identify the relationship between stress and strain on deformable solids	L1 (Identify)
CO2	To Distinguish various civil engineering structures members through SFD AND BMD under different loading conditions	L2 (Distinguish)
CO3	To Apply the torsion in shaft and Column stability.	L3 (Apply)
CO4	To Analyse the concepts of failure theories for design of structures	L4 (Analyse)
CO5	To Summarize different materials and their behaviour	L5 (Summarize)

CO/PO	PO 1	PO 2	PO 3	PO 4	PO5	PO6	PO 7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	1	2	1	2								1		1
CO2	2	2	2	2		1						1	1	
CO3	1		1	1								1		1
CO4	2	2	2	2		1							1	
CO5	2			2		1	2					1		1

**COURSE:- SURVEIVING LAB**

**COURSE CODE:- LC-CE-215-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomys
CO1	To Recall the various terminology & equipment used in Surveying	L1 (Remember)
CO2	To Understand the working of various Surveying instrument i.e. Compass, Theodolite, Levelling equipment etc & process of setting of different curves for road & railway	L2 (Understand)
CO3	To Apply the Principles of surveying in field.	L3 (Apply)
CO4	To Prepare plan/map & contour map of an area	L4 (Analyse)
CO5	To Estimate quantity of Earthwork by determining RL of ground points With the help of levelling instrument.	L6 (Evaluation)

**COURSE:- MATHEMATICS III**

**COURSE CODE:- MC-106-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomys
CO1	Pupil will be able to recall the essential tool of partial differential equation, the essential tool of partial differential equation, numerical methods, integration, laplace transform and discrete mathematics. in a comprehensive manner.	L1 (Remember)
CO2	Students will be able to understand different type polynomial and transcendental equations, interpolation, linear and non linear PDE and basic concept of Laplace transformation.	L2 (Understand)
CO3	Pupil will be able to apply the tools of differentiation and integration and numerical method to solve polynomial and transcendental equations, interpolation, linear and non linear PDE and Laplace transform that are used in various techniques dealing engineering problems.	L3 (Apply)
CO4	Students will be able to analyse how to deal with Laplace, numerical, problems, PDE and Discrete maths problem that are essential in most branches of engineering.	L4 (Analyse)
CO5	Pupil will also be able to evaluate/solve the mathematical problems related to PDE, Numerical Method, Laplace Transform, Discrete Math's	L6 (Evaluation)

**COURSE:- ECONOMICS FOR ENGINEERS**

**COURSE CODE:- MC-106-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomys
CO1	To Describe the Basic of Economics Theories terminology, Cost concepts and Pricing Policies Used in Engineering Economics.	L1 (Remember)
CO2	To Summarize the measures of national income, the function of banks and concepts of globalization.	L2 (Understand)
CO3	To Discuss how supply and demand change when a product price changes.	L3 (Apply)
CO4	To Use the concept of Demand to explain the Outcomes of markets for individuals firms and society.	L4 (Analyse)
CO5	To Analyze how a change in price and income affects the behavior of buyers and sellers	L4 (Analyse)

**B-TECH CIVIL ENGG SEMESTER-4<sup>th</sup>****COURSE:- HYDRAULIC ENGINEERING****COURSE CODE:- MC-106-G**

Course Outcome

CO (Course outcome)		RBT*-Revised Bloom Taxonomy
CO1	To describe various types of flow in pipes and open channels.	L1 (Remember)
CO2	To understand the hydraulic jump and its application.	L2 (Understand)
CO3	To Identify the different losses in flow through pipes.	L3 (Apply)
CO4	To design the most economical section in open channel flow.	L4 (Analyse)
CO5	To relate the theory and practice of problems in hydraulic engineering.	L5 (Evaluate)

**COURSE:- DESIGN OF CONCRETE STRUCTURE****COURSE CODE:- PCC-CE-204-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
CO1	To Recall the terms used in RC Structural elements like Beam ,Column and Slabs	L1 (Remember)
CO2	To Illustrate use of various components to understand structure stability .	L2 (Understand)
CO3	To Explain the application of LSM and WSM concept for application In practical life	L2 (Understand)
CO4	To Analysis the cause of failure of RC structure like Beam, Column ,Strut, footing ,Retaining wall .	L4 (Analyse)
CO5	To Evaluate and find and fix the causes of failure of RC structure by suitable methods .	L6 (Evaluate)

**COURSE:- STRUCTURAL ANALYSIS**COURSE CODE:- **PCC-CE-206-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
CO1	To Remember various terminology used in Determinate and indeterminate structure subjected to static or moving loading	L1 (Remember)
CO2	To Understand the concept of deflection, Rotation & ILD	L2 (Understand)
CO3	To Select Suitable method of Analyses and Applying them practically on structure	L3 (Apply)
CO4	Apply concept of ILD and moving Load on Structure	L3 (Apply)
CO5	Analyses Determinate and indeterminate structure ( Beam , Arch and Truss ) using different Displacement method	L4 (Analyse)

**COURSE:- GEOMATICS AND AERIAL SURVEYING**COURSE CODE:- **PCC-CE-208-G**

Course Outcome

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
CO1	To IDENTIFY the principle of surveying on very large scale by locating precise horizontal controls	L1 (Remember)
CO2	To SUMMARIZE about surveying applications in setting out works.	L2 (Understand)
CO3	To DISCOVER absolute positions of a point using celestial measurements.	L3 (Apply)
CO4	To CALCULATE different types of errors in measurements and their adjustment	L4 (Analyse)
CO5	To PREPARE basic concept of photogrammetry, Remote sensing, and GIS.	L5 (Evaluate)

**COURSE:- MATERIAL TESTING AND EVALUATION**COURSE CODE:- **PCC-CE-210-G****Course outcome**

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
CO1	To Remembering the various terminology used in material testing and concrete technology.	L1 (Remember)
CO2	To Understand the behaviour of construction material.	L2 (Understand)
CO3	To Apply the mix design concept and explain what will effect on strength of concrete..	L3 (Apply)
CO4	To Analysis the properties of fresh and hardened of concrete.	L4 (Analyse)
CO5	To Evaluate the design of concrete mix using ACI and IS code method..	L6 (Evaluate)

**COURSE:- HYDRAULIC ENGINEERING LAB.**COURSE CODE:- **LC-CE-212-G****Course Outcome**

CO (Course outcome)		RBT*-Revised Bloom Taxonomy
CO1	To list various type of pipe flow.	L1 (Remember)
CO2	To understand the Reynold No. and discharge in pipe flow.	L2 (Understand)
CO3	To compute energy loss in pipe flow.	L3 (Apply)
CO4	To calculate the loss due to pipe fittings.	L4 (Analyse)
CO5	To set up the discharge in open channel flow.	L5 (Evaluate)

COURSE:- **STRUCTURAL ANALYSIS LAB**

COURSE CODE:- **LC-CE-214-G**

Course Outcome

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy</b>
<b>CO1</b>	To <b>Remember</b> different things related to Beam , Arches and frames	L1 (Remember)
<b>CO2</b>	To <b>Understand</b> the effect of load on Arch, Beam and Frames	L2 (Understand)
<b>CO3</b>	To <b>Compare</b> different result Experimental and Theoretical concept	L3 (Apply)
<b>CO4</b>	To Understand the concept of Sway in Portal Frame with the help of <b>Demonstration</b>	L3 ( Apply )
<b>CO5</b>	To <b>Calculate</b> Slope and Deflection of various members subjected to Loading	L4 (Analysis)

COURSE:- **GEOMATICS AND ARIAL SURVEYING LAB.**

COURSE CODE:- **LC-CE-216-G**

Course Outcome

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy</b>
<b>CO1</b>	To <b>IDENTIFY</b> the use of theodolite for angle measurements.	L1 (Remember)
<b>CO2</b>	To <b>DESCRIBE</b> tacheometer for horizontal and vertical distances.	L2 (Understand)
<b>CO3</b>	To <b>SKETCH</b> simple circular curves.	L3 (Apply)
<b>CO4</b>	To <b>CALCULATE</b> base line measurement.	L4 (Analyse)
<b>CO5</b>	To <b>PREPARE</b> total station and its use for measuring distance, elevation and coordinates.	L5 (Evaluate)

**COURSE:- MATERIAL TESTING & EVALUATION LAB**

**COURSE CODE:- LC-CE-216-G**

Course Outcome

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy</b>
<b>C O 1</b>	To <b>Remembering</b> the various properties of cement, aggregate and concrete for any project work.	L1 (Remember)
<b>C O 2</b>	To <b>Understand</b> the importance of testing of cement,sand,aggregate.	L2 (Understand)
<b>C O 3</b>	To <b>Apply</b> the load on concrete sample and find compressive strength and tensile strength.	L3 (Apply)
<b>C O 4</b>	To <b>Analysis</b> the strength of concrete after using mix design.	L4 (Analyse)
<b>C O 5</b>	To <b>Evaluate</b> the suitability of material for practical application.	L6 (Evaluate)

**B-TECH CIVIL ENGG SEMESTER-5<sup>TH</sup> COURSE:-  
HYDROLOGY AND WATER RESOURCE ENGINEERING COURSE  
CODE:- PCC-CE-301-G  
Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy s</b>
<b>CO1</b>	To <b>Describe</b> the basic knowledge of Hydrologic Cycle to find out Precipitation Intensity with the Rain Gauge, also for evaporation.	L1
<b>CO2</b>	To <b>Identify</b> the hydrological parameters like the Evaporation process to measure with the equation.	L2
<b>CO3</b>	To <b>Solve</b> out statistical and probability analysis of runoff relationship with hydrologic data	L3
<b>CO4</b>	To <b>Distinguish</b> the concepts of water resource planning,	L4
<b>CO5</b>	To <b>Categorize</b> the concepts of hydrograph, unit hydrograph and flood estimation	L5

**COURSE:- HIGHWAY ENGINEERING-I  
COURSE CODE:- PCC-CE-303-G  
Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy s</b>
<b>CO1</b>	To Remember various cross section elements of highway.	L1 (Remember)
<b>CO2</b>	To Understand the importance of transportation and characteristics of road transport.	L2 (Understand)
<b>CO3</b>	To apply the knowledge about history of highway development , survey and classification.	L3 (Apply)
<b>CO4</b>	To Evaluate the traffic characteristics and design of intersections.	L4 (Evaluate)
<b>CO5</b>	To analysis the geometric design of highways and pavement material.	L4 (Analysis)

COURSE:- **DESIGN OF STEEL STRUCTURE**

COURSE CODE:- **PCC-CE-309-G**

**Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy</b>
<b>CO1</b>	To <b>Recall</b> the properties of steel & basic terminology used in steel structure	L1 (Remember)
<b>CO2</b>	To <b>Understand</b> basic of steel structure with practical application for different loads.	L2 (Understand)
<b>CO3</b>	To <b>Apply</b> the IS Code of practice for design of steel structural element and use of stress strain curve of steel.	L3 (Apply)
<b>CO4</b>	To <b>Evaluate</b> load carrying capacity (strength) of different structural member & connections	L5 (Evaluate)
<b>CO5</b>	To <b>Design</b> different structural member i.e. Tension member, Compression member, Flexural member etc.	L6 (Create)

COURSE:- **DESIGN OF STEEL STRUCTURES DRAWINGS**

COURSE CODE:- **LC-CE-317-G**

**Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy</b>
<b>CO1</b>	To <b>Remember</b> the types of member used & types of connection used in	L1 (Remember)

	steel structure	
<b>CO2</b>	To <b>Understand</b> the study of drawing for various components like connection, trusses, girders, joints etc.	L2 (Understand)
<b>CO3</b>	To <b>Apply</b> the IS Code of practice for design of steel structural element drawing.	L3 (Apply)
<b>CO4</b>	To <b>Implementation</b> of design in drawing forms with by laws.	L3 (Apply)
<b>CO5</b>	To <b>Evaluate</b> the force in members of truss.	L4 ( Evaluate )

**B-TECH CIVIL ENGG SEMESTER-6<sup>TH</sup>**COURSE: - **IRRIGATION ENGINEERING**COURSE CODE:- **PCC-CE-302-G****Course Outcome**

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
<b>CO1</b>	To <b>Remember</b> different terms used in Irrigation and various method of Irrigation	L1 (Remember)
<b>CO2</b>	To <b>Learn</b> crop water requirements, effect of water logging and method of land Reclamation	L1 ( Remember )
<b>CO3</b>	To <b>Understand</b> the concept of water distribution and river training works	L2 (Understand)
<b>CO4</b>	To <b>Apply</b> different theory to design Canal, Canal regulatory work, Outlet and Cross drainage works	L3 (Apply)
<b>CO5</b>	To <b>Create</b> new method of irrigation and add new concept of energy dissipater	L6 (Create)

COURSE: - **FOUNDATION ENGINEERING**COURSE CODE:- **PCC-CE-304-G****Course Outcome**

CO (Course outcome)		RBT*-Revised Bloom Taxonomy
CO1	To state the investigation of soil by various determination methods.	L1 (Remember)
CO2	To explain soil behavior controlling factors and dewatering method.	L2 (Understand)
CO3	To predict when a deep foundation is needed.	L3 (Apply)
CO4	To point out different parameters which determine the bearing capacity of the soil.	L4 (Analyse)
CO5	To design the layout of caissons and well foundation by dynamic loading on soil foundation.	L5 (Evaluate)

COURSE:- **HIGHWAYENGINEERING-II**

COURSE CODE:- **PCC-CE-306-G**

**Course Outcome**

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
<b>CO1</b>	To <b>Remembering</b> the various terminology used in highway engineering.	L1 (Remember)
<b>CO2</b>	To <b>Understand</b> the various types of failures and their causes.	L2 (Understand)
<b>CO3</b>	To <b>Apply</b> the construction technique, make investigation and develop a solution to a problem related to highway pavement.	L3 (Apply)
<b>CO4</b>	To <b>Analysis</b> the bituminous and non bituminous pavement and rate analysis of MoRTH.	L4 (Analyse)
<b>CO5</b>	To <b>Avaluate</b> the design of flexible and rigid pavement.	L6 (Evaluate)

COURSE: - **AIR AND NOISE POLLUTION CONTROL**

COURSE CODE:- **PEC-CEEL-304-G**

**Course Outcome**

CO (Course outcome)		RBT*- Revised Bloom Taxonomy
<b>(CO1)</b>	Pupil will be <b>able to recall</b> the basic concepts of environment pollution.	L1 (Remember)
<b>(CO2)</b>	Students will be <b>able to understand</b> various air pollutants, various methods of control of air pollution and various methods of control of noise pollution	L2 (Understand)
<b>(CO3)</b>	Pupil will be <b>able to apply</b> various methods of control of noise pollution.	L3 (Apply)
<b>(CO4)</b>	Students will be <b>able to analyse</b> various types of noises.	L4 (Analyse)
<b>(CO5)</b>	Pupil will be <b>able to evaluate</b> adverse impacts of air and noise pollution.	L5 (Evaluate)

**COURSE:- REPAIR & REHABILITATION OF STRUCTURE**  
**COURSE CODE:- PEC-CEEL-312G**

**Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy</b>
<b>CO1</b>	To <b>IDENTIFY</b> all the terms and concepts associated with the deterioration of concrete structures.	L1 (Remember)
<b>CO2</b>	To <b>INDICATE</b> the damage assessment and Rapid Visual inspection of a building showing signs of deterioration and thus should be able to detect the possible cause /source of deterioration.	L2 (Understand)
<b>CO3</b>	To <b>DISCOVER</b> knowhow of the Concrete repair industry equipped with a variety of repair materials and techniques.	L3 (Apply)
<b>CO4</b>	To <b>ILLUSTRATE</b> the importance of quality control in concrete construction and the significance of protection and maintenance of structures.	L4 (Analyse)
<b>CO5</b>	To <b>CATEGORIZE</b> an insight into the subject of concrete repair, its protection, and strengthening.	L5 (Evaluate)

**COURSE:- ENVIRONMENTAL ENGINEERING LAB**  
**COURSE CODE:- LC-CE-308-G**

**Course Outcome**

<b>CO (Course outcome)</b>	<b>RBT*- Revised Bloom's</b>

		<b>Taxonomys</b>
<b>(CO1)</b>	Pupil will be <b>able to recall</b> the concepts of environment.	L1 (Remember)
<b>(CO2)</b>	Students will be <b>able to understand</b> about living organisms, and various issues related to environment.	L2 (Understand)
<b>(CO3)</b>	Pupil will be <b>able to apply</b> environment friendly techniques for healthy environment	L3 (Apply)
<b>(CO4)</b>	Students will be <b>able to analyse</b> problems associated with environmental degradation including pollution related issues.	L4 (Analyse)
<b>(CO5)</b>	Pupil will be <b>able to evaluate</b> contribution of human behavior in environmental degradation.	L5 (Evaluate)

**COURSE:- FOUNDATION ENGINEERING LAB**

**COURSE CODE:- LC-CE-310-G**

**Course Outcome**

CO (Course outcome)		RBT*-Revised Bloom Taxonomy
CO1	To recall basic properties of soil.	L1 (Remember)
CO2	To estimate the density of soil and shear strength parameter of soil.	L2 (Understand)
CO3	To operate triaxial test for selection of foundation.	L3 (Apply)
CO4	To examine soil behavior under plate load test.	L4 (Analyse)
CO5	To collect the consolidation parameter of clayey soil.	L5 (Evaluate)

**COURSE:- HIGHWAYENGINEERING-II LAB**

**COURSE CODE:- LC-CE-312-G**

**Course Outcome**

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
<b>CO1</b>	To <b>Remembering</b> the use of modern equipment for traffic studies and pavement evaluation.	L1 (Remember)
<b>CO2</b>	To <b>Understand</b> the characterization of highway material..	L2 (Understand)
<b>CO3</b>	To <b>Apply</b> the mixdesign of granular, bituminious and composite material.	L3 (Apply)
<b>CO4</b>	To <b>Analysis</b> the standard specification for IS/IRC/MoRT for judging suitability of these material.	L4 (Analyse)
<b>CO5</b>	To <b>Evaluate</b> the use of modern test tool and developsolution to use highway material for sustainable development..	L6 (Evaluate)

**B-TECH CIVIL ENGG SEMESTER-7<sup>TH</sup>**COURSE:- **Disaster Management and Mitigation**COURSE CODE:- **PEC-CEEL- 407G****Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy's</b>
<b>CO1</b>	To <b>provide</b> basic conceptual understanding of disasters and its relationships with Development	L1 (Remember)
<b>CO2</b>	<b>Provide</b> an understanding of the social nature of natural hazards and disasters	L2 (Understand)
<b>CO3</b>	Increase awareness of hazards and disasters around the world and the unequal social Consequences stemming from disaster events	L3 (Apply)

COURSE:- **Ground Water Engineering**COURSE CODE:- **PEC-CEEL- 413G****Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy's</b>
<b>CO1</b>	To <b>Remember</b> various terminology used in Ground water Engineering	L1 (Remember)
<b>CO2</b>	To <b>Understand</b> the concept of water Distribution ( Water cycle ) & Aquifer properties	L2 (Understand)
<b>CO3</b>	To <b>Apply</b> various technique for conservation of Ground water	L3 (Apply)
<b>CO4</b>	To conduct recovery test-pumping test and <b>Calculate</b> well losses	L4 (Analysis)
<b>CO5</b>	To <b>Design</b> of Tube well in different Aquifers	L6 (Create)

COURSE:- **Construction Planning and Management**

COURSE CODE:- **PCC-CE- 401G**

**Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy's</b>
<b>CO1</b>	To <b>Identify</b> the concepts of the construction project management with time and cost estimates.	L1
<b>CO2</b>	To <b>Summarize</b> Cost of the Projects with total cost of the Project and selection of construction equipment's	L2
<b>CO3</b>	To <b>Practice</b> the Basic knowledge of construction management, bar/milestone chart	L3
<b>CO4</b>	To <b>Distinguish</b> knowledge of PERT and CPM, CPM (Cost Model)	L4
<b>CO5</b>	To <b>Categorize</b> construction equipment's and selection of construction equipment's.	L5

COURSE:- **Project Work –I**

COURSE CODE:- **PROJ- CE-427G**

**Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy's</b>
<b>CO1</b>	To <b>Remember</b> the study of published literature of topics.	L1 (Remember)
<b>CO2</b>	To <b>Understand</b> the solving behaviour of assigned topic and Design process.	L3 (Understand)
<b>CO3</b>	To <b>Apply</b> the study of presentation on the topic to present a Report for projector.	L4 (Apply)
<b>CO4</b>	To <b>Prepare</b> a well defined lecture for departmental seminar representation.	L5 (Prepare)
<b>CO5</b>	To <b>Summarize</b> the paper to present in the national conference/ Journals.	L6 (Summarize)

**COURSE:- DESIGN OF HYDRAULIC STRUCTURES**

**COURSE CODE:- PCC-CE- 405 G**

**Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomys</b>
<b>CO1</b>	To <b>Identify</b> the design lines of hydraulic structures	L1
<b>CO2</b>	To <b>Indicate</b> for read charts for various designing purposes	L2
<b>CO3</b>	To <b>Discover</b> develop understanding on cross drainage works and ondesign considerations of Dams	L3
<b>CO4</b>	To <b>Differentiate</b> design processes of Spillways.	L4
<b>CO5</b>	To <b>Create</b> an understanding on seepage conditions	L5

**B-TECH CIVIL ENGG SEMESTER-8<sup>TH</sup>**

COURSE:- ESTIMATION, COASTING AND VALUATION

COURSE CODE:- PCC-CE-402 G

**Course Outcome**

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
CO1	To <b>Remembering</b> the various terms used in Estimating & Costing.	L1 (Remember)
CO2	To <b>Understand</b> the preparation of an approximate estimate for a residential building.	L2 (Understand)
CO3	<b>Demonstrate</b> the calculation of earth quantity of roads.	L3 (Apply)
CO4	To <b>Analysis</b> the cost and carryout make economic in the design making of project.	L4 (Analyse)
CO5	To <b>Evaluate</b> the rates of various types of work.	L6 (Evaluate)

COURSE:- Advanced Structure Analysis

COURSE CODE:- PEC-CEEL- 410G

**Course Outcome**

CO (Course outcome)		RBT*- Revised Bloom's Taxonomy
CO1	To <b>Recall</b> of basic concepts in structural analysis like (structural elements, joints ,support ,stability rigidity and static indeterminacy, kinematic indeterminacy )	L1 (Remember)
CO2	To <b>understand</b> the development of flexibility matrices , stiffness matrices for beam,2D structure ,truss etc	L2 (Understand)
CO3	<b>Apply</b> the knowledge to the design of various civil engineering structures using software .	L3 (Apply)
CO4	<b>Analysis</b> structures using advanced methods of analysis .	L4 (Analyse)
CO5	To <b>Evaluate</b> computer programming for matrices structural analysis	L6 (Evaluate)

COURSE:- **QUALITYENGINEERING**

COURSE CODE:- OEC-ME-410G

**Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy</b>
<b>CO1</b>	To <b>IDENTIFY</b> the basic techniques of quality improvement, fundamental knowledge of statistics and probability	L1 (Remember)
<b>CO2</b>	To <b>INDICATE</b> charts to analyze for improving the process quality.	L2 (Understand)
<b>CO3</b>	To <b>DISCOVER</b> different sampling plans	L3 (Apply)
<b>CO4</b>	To <b>ILLUSTRATE</b> basic knowledge of total quality management	L4 (Analyse)
<b>CO5</b>	To <b>PREPARE</b> the modern quality management techniques	L5 (Evaluate)

COURSE:- **SEMINAR**

COURSE CODE:- S-CE-418 G

**Course Outcome**

<b>CO (Course outcome)</b>		<b>RBT*- Revised Bloom's Taxonomy</b>
<b>CO1</b>	To <b>IDENTIFY</b> important concepts from the readings and provide depth in coverage of the topic.	L1 (Remember)
<b>CO2</b>	To <b>DESCRIBE</b> organizational issues including teams, and attitudes, and define work-life balance and its impact on organizations and employees.	L2 (Understand)
<b>CO3</b>	To <b>DISCOVER</b> current technologies in the field of civil engineering.	L3 (Apply)
<b>CO4</b>	To <b>ILLUSTRATE</b> industrial problems and suggest possible solutions.	L4 (Analyse)
<b>CO5</b>	To <b>PREPARE</b> effective group communication, presentation, self- management and report writing skills.	L5 (Evaluate)

## **COMPUTER NETWORKING & INTERNET**

BBAN504.1 Define the basic concepts of computer networking .

BBAN 504.2 Understand different types of topologies and taxonomy of computer network .

BBAN 504.3 Apply the types of network understanding in hierarchy through various network modes .

BBAN 504.4 Evaluate the basics of HTML and Internet and apply them in real time applications.

## **BBAN-301 Cost and Management Accounting**

C01: To get in depth knowledge of Cost Accounting, material control and fixation of inventory level.

C02: To understand about the labour cost control, system of wage payment and overheads.

C03: To get the insights of various factors of management accounting, techniques, responsibility accounting and budgets.

C04: To be familiar with financial statements and MIS.

## **Introduction to Information Technology**

CO1 Understand various aspects, features and applications of computer software like Microsoft Office, Excel, Power Point &Tally.L1-Remember

CO2 Leverage the features, formulae of MS Excel functions, MS Word shortcuts, Power Point and Tally in regular use.L2-Understand

CO3 Learn Real Life applications of Computer Software and apply them in daily life.L3-Apply

CO4 Understand various aspects Tally Software.

## **PRODUCTION & MATERIAL MANAGEMENT**

1. Evaluate and Apply: Evaluate production decisions and apply production system knowledge to real-world scenarios.
2. Implement and Optimize: Implement effective PPC strategies and optimize inventory management
3. Ensure and Manage: Ensure quality control in production and manage materials efficiently.
4. Design and Strategize: Design effective store layouts, handle logistics, and strategically manage material disposal to reduce waste.

## **Disaster Management**

1. Define the basic concepts of Disasters and Hazards.
2. Understand types of Disasters, causes, prevention, cure and hazard mapping.
3. Apply the concepts of different Disasters and compare them in terms of their scale, destruction, prone areas and measures to deal with them.
4. Analyse the importance of Disaster Management for different groups of people and how to apply it in real time applications.

### **Human Rights and Values**

1. Define the basic concepts of Human Rights.
2. Understand different types of Human Rights, their origin and how they differ from Indian Constitution.
3. Apply the concept of International Rights in Indian context through Fundamental Rights.
4. Evaluate the basics of Human Values and Human Rights and apply them in real time applications.

### **Indian Business Environment**

1. Provide an in-depth view of Environment on profitability of the firm.
2. Develop knowledge on the Foreign Trade Policy of India.
3. Improving students' understanding of Industrial policies of India.
4. Enhancing student's ability in understanding Indian Economic Policies, social responsibilities and Licensing policies of India to get an overview of Indian Economy.

### **Foundation of International Business**

1. Define the basic concept of business in International Market.
2. Understand different types of barriers in International Business and how to overcome them.
3. Apply the types of international Business through modes of entry in Country Selection and Evaluation.
4. Evaluate the basic role of different International Organisations in free trade and apply them in real time applications.

## **B.TECH. MECHANICAL ENGINEERING**

### **Course Outcomes**

#### **Semester: 3**

#### **COs    Physics II (Optics & Waves) (BSC-ME- 201G)**

- BSC-ME- 201G.1      Recall the concepts of harmonic and mechanical oscillators in details.
- BSC-ME- 201G.2      Explain the phenomena of interference and diffraction in details.
- BSC-ME- 201G.3      Demonstrate the construction of lasers and discuss its applications.
- BSC-ME- 201G.4      Analyze wave optics and waves.

#### **COs    Mathematics-III (BSC-ME- 203G)**

- BSC-ME- 203G.1      Recall the basics of differential equations, probability & statistics.
- BSC-ME- 203G.2      Describe the basic concept of probability & partial differential equations.
- BSC-ME- 203G.3      Apply the various methods of probability, statistics & partial differential.
- BSC-ME- 203G.4      Determine the practical understanding of statistics, probability & partial differential equation.

#### **COs    Biology (BSC-BIO- 205G)**

- BSC-BIO- 205G.1      Recall the concepts of biology as an important scientific discipline.
- BSC-BIO- 205G.2      Explain the laws and concepts of genetics.
- BSC-BIO- 205G.3      Understand various aspects of bio-molecules as the basis of life.
- BSC-BIO- 205G.4      Apply the knowledge of genetic engineering and biotechnology in various fields.

#### **COs    Basics of Electronics Engineering (ESC-ECE- 207G)**

- ESC-ECE- 207G.1      Recall the fundamental concepts of semiconductor components and devices.
- ESC-ECE- 207G.2      Understand the various aspects of oscillator, amplifier and electronic communication system.
- ESC-ECE- 207G.3      Demonstrate the Boolean algebra for simplify logic expression.
- ESC-ECE- 207G.4      Illustrate various OP-amp applications such as amplifiers, integrators & differentiators.

**COs    Engineering Mechanics (ESC-ME- 209G)**

- ESC-ME- 209G.1      Define the basic terminologies and fundamentals of engineering mechanics.
- ESC-ME- 209G.2      Understand the vector algebra, kinematics, dynamics and geometrical properties.
- ESC-ME- 209G.3      Apply the theorems and principles to solve the problems of engineering mechanics.
- ESC-ME- 209G.4      Analyze the structural members subjected to external loading.

**COs    Basics of Mechanical Engineering (ESC-ME- 211G)**

- ESC-ME- 211G.1      Recall basic concepts of mechanical engineering.
- ESC-ME- 211G.2      Describe the machine tools, metal cutting operations and hydraulic machines.
- ESC-ME- 211G.3      Understand the fundamentals of solid mechanics, thermal engineering & RAC.
- ESC-ME- 211G.4      Apply the concepts & knowledge to solve the engineering problem.

**COs    Thermodynamics (PCC-ME- 213G)**

- PCC-ME- 213G.1      Define the technical terms related to Thermal Engineering.
- PCC-ME- 213G.2      Understand the Thermodynamics laws, cycles and applications.
- PCC-ME- 213G.3      Apply the knowledge of Thermodynamics to solve the real life problem.
- PCC-ME- 213G.4      Analyze various parameters associated to Thermal Engineering and its applications.

**COs    Basics of Mechanical Engineering Lab (LC-ME- 215G)**

- LC-ME- 215G.1      Describe various boilers with its mountings, accessories and IC engines.
- LC-ME- 215G.2      Determine various mechanical parameters such as MA, VR, MOI and efficiency of different mechanical devices.
- LC-ME- 215G.3      Examine the elastic properties of different members such as beams & curved bars.
- LC-ME- 215G.4      Analyse the structural behaviour of different members such as truss, hinged arc etc.

## Semester: 4

### **COs Applied Thermodynamics (PCC-ME- 202G)**

- PCC-ME- 202G.1 Describe basic terminologies related to steam generation and its applications.
- PCC-ME- 202G.2 Understand the properties of fuels, dry and wet air & energy conversion.
- PCC-ME- 202G.3 Demonstrate psychrometric charts, steam turbines and reciprocating compressors.
- PCC-ME- 202G.4 Analyze exhaust gases, power & gas cycles and nozzle.

### **COs Fluid Mechanics (PCC- ME- 204G)**

- PCC- ME- 204G.1 Describe the fundamentals of fluid mechanics.
- PCC- ME- 204G.2 Understand the laws, equations and theorems of fluid static, kinematics and dynamics.
- PCC- ME- 204G.3 Apply the principles of fluid mechanics to solve practical engineering problems.
- PCC- ME- 204G.4 Analyze the various types of flow and its properties.

### **COs Strength of Materials (PCC- ME- 206G)**

- PCC- ME- 206G.1 Recall the basic fundamentals of strength of materials.
- PCC- ME- 206G.2 Derive the expression for stress, strain, deflection and moment of inertia for different structural members.
- PCC- ME- 206G.3 Apply the appropriate methods to solve different engineering problems.
- PCC- ME- 206G.4 Analyze the behavior of the various structural members subjected to different loading conditions.

### **COs Materials Engineering (PCC- ME- 208G)**

- PCC- ME- 208G.1 Describe crystal structure and mechanical properties of materials.
- PCC- ME- 208G.2 Understand the concept of crystal structure, failure theory, phase diagram and heat treatment processes in material.
- PCC- ME- 208G.3 Demonstrate various mechanical tests and processes for checking properties of materials.
- PCC- ME- 208G.4 Analyze crystal structure, failure theory, phase diagram and heat treatment processes in material engineering.

**COs Instrumentation & Control (PCC- ME- 210G)**

- PCC- ME- 210G.1 Define the basics of measurement and instrumentation.
- PCC- ME- 210G.2 Explain the principle and components of transducers.
- PCC- ME- 210G.3 Describe various measuring devices and instruments (motion, force, torque, Temperature, flow).
- PCC- ME- 210G.4 Illustrate the working of measuring and control systems.

**COs Applied Thermodynamics Lab (LC- ME- 212G)**

- LC- ME- 212G.1 Understand the various types of boilers, mountings & accessories and various turbines.
- LC- ME- 212G.2 Calculate the efficiency and power output of steam turbine and steam condenser.
- LC- ME- 212G.3 Demonstrate the working of cooling tower & air compressor and find their efficiency.
- LC- ME- 212G.4 Determine calorific value of fuel and dryness fraction of steam.

**COs Strength of Materials Lab (LC- ME- 214G)**

- LC- ME- 214G.1 Demonstrate the hardness testing machine and perform various tests.
- LC- ME- 214G.2 Demonstrate the impact testing machine and perform impact tests.
- LC- ME- 214G.3 Demonstrate UTM and perform various tests on UTM.
- LC- ME- 214G.4 Demonstrate the torsion testing machine performs a torsion test.

**COs Fluid Mechanics Lab (LC- ME- 216G)**

- LC- ME- 216G.1 Determine the coefficient of discharge for different flow meters.
- LC- ME- 216G.2 Calculate friction factor, Reynolds no and losses of flow through pipes.
- LC- ME- 216G.3 Analysis of stability of floating bodies.
- LC- ME- 216G.4 Verify the Bernoulli's Theorem.

**COs Materials Lab (LC- ME- 218G)**

- LC- ME- 218G.1 Understand the properties of various type of plastics.
- LC- ME- 218G.2 Describe crystal structure & imperfection by using ball models.
- LC- ME- 218G.3 Examine the crystal structure & their defects in different specimen.
- LC- ME- 218G.4 Show creep behaviour & heat treatment process for a given specimen.

**COs Instrumentation Lab (LC- ME- 220G)**

- LC- ME- 220G.1 Understand the working of various measuring instruments.
- LC- ME- 220G.2 Use various transducer for measurement of physical quantities like temperature, pressure, displacement, speed & torque.
- LC- ME- 220G.3 Calculate the errors present in measuring instruments and calibrate them.
- LC- ME- 220G.4 Analyze static and dynamic characteristics of measurement system.

**COs Environment Science (MC-106G)**

- MC-106G.1 Remember the environmental related problems and their effects on web of life.
- MC-106G.2 Understand the current environmental problems and prevent future ones.
- MC-106G.3 Apply critical thinking for conservation of biodiversity, social quality and sustainable development.
- MC-106G.4 Analyze the complex environmental social challenges and participate actively in solving environmental problems.

## Semester: 5

### COs    **Computer Aided Design & Manufacturing (PCC-ME-301G)**

- PCC-ME-301G.1        Define the fundamental concepts of CAD/CAM/CAE.
- PCC-ME-301G.2        Explain the fundamentals of additive manufacturing & flexible manufacturing systems.
- PCC-ME-301G.3        Understand basics of geometric and solid modeling, surfaces and solids.
- PCC-ME-301G.4        Apply the appropriate method to solve the modeling problems.

### COs    **Solid Mechanics (PCC- ME-303G)**

- PCC- ME-303G.1        Define fundamental concepts and properties of materials.
- PCC- ME-303G.2        Derive the theorems and equations related to force, stress, and displacement.
- PCC- ME-303G.3        Apply appropriate methods to solve numerical problems related to structural elements.
- PCC- ME-303G.4        Analyzing the behavior and response of a body under different loading conditions.

### COs    **Manufacturing Technology-I (PCC- ME-305G)**

- PCC- ME-305G.1        Recall the basic fundamentals of manufacturing technology.
- PCC- ME-305G.2        Acquire knowledge of various tools and techniques and processes related to manufacturing technology.
- PCC- ME-305G.3        Demonstrate proficiency in the application of industrial technologies to address the practical challenges.
- PCC- ME-305G.4        Analyze the various parameters, features economics and defects associated with manufacturing technology.

### COs    **Kinematics of Machine (PCC- ME-307G)**

- PCC- ME-307G.1        Define basic terminologies related to kinematics of machines.
- PCC- ME-307G.2        Understand the kinematic mechanisms and working principles of power elements.
- PCC- ME-307G.3        Apply appropriate laws & methods to solve the problems of kinematics of machines.
- PCC- ME-307G.4        Analyze the behavior and motion of different mechanisms and elements.

**COs Fluid Machines (PCC- ME-309G)**

- PCC- ME-309G.1 Define & list various components of fluid machines.
- PCC- ME-309G.2 Describe construction and working principles of hydraulic machines & systems.
- PCC- ME-309G.3 Calculate the work done and impact of jets on different surfaces.
- PCC- ME-309G.4 Analyze the performance characteristics of various hydraulic machines.

**COs Economics for Engineers (HSMC-01G)**

- HSMC-01G.1 Describe Economics in context of Engineering.
- HSMC-01G.2 Explain fundamental concepts of production, marketing, economy and banking sector.
- HSMC-01G.3 Apply strategies for different market structures.
- HSMC-01G.4 Analyze characteristics of the Indian economy in context of Liberalization, Privatization and Globalization.

**COs Computer Aided Design & Manufacturing Lab (LC-ME-311G)**

- LC-ME-311G.1 Understand the basic commands of CAD software.
- LC-ME-311G.2 Used of advanced tool to print coupling, crankshaft, pulley, piston, connecting rod, nut, bolts.
- LC-ME-311G.3 Apply CAD tools for making 2D drawings and 3D models of engineering components and assemblies.
- LC-ME-311G.4 Apply the knowledge of part programming, G&M codes development for machining operations.

**COs Fluid Machines Lab (LC-ME-313G)**

- LC-ME-313G.1 Explain the construction, working principle and fluid flow circuit of various fluid turbines.
- LC-ME-313G.2 Demonstrate centrifugal and reciprocating pump and draw their characteristics curves.
- LC-ME-313G.3 Determine the various efficiencies of a hydraulic ram.
- LC-ME-313G.4 Analyze the performance characteristics of various fluid turbines.

**COs Kinematics of Machine Lab (LC-ME-315G)**

LC-ME-315G.1 Understand various types of kinematics mechanisms & its inversions.

LC-ME-315G.2 Describe various motion mechanisms like cam & followers, belt & pulley, gears and gear trains.

LC-ME-315G.3 Calculate coefficient of friction between belt & pulley and efficiency of screw jack.

LC-ME-315G.4 Create various linkage, mechanisms, joints and cam profile and simulate on CAD.

**COs Practical Training-I (PT-ME-317G)**

PT-ME-317G.1 Identify various technologies and fields for practical training to enhance employability skills.

PT-ME-317G.2 Understand the ability to adapt with the latest changes in the technological world.

PT-ME-317G.3 Applying engineering knowledge and ethical practices to solve industrial problems and demonstrate presentation skills.

PT-ME-317G.4 Analyze the ability of learning skills to be job ready with real corporate exposure.

**COs Essence of Indian Traditional knowledge (MC-315G)**

MC-315G.1 Define the concepts of traditional knowledge.

MC-315G.2 Explain the need and importance of protecting traditions.

MC-315G.3 Apply various enactments related to the protection of traditional knowledge.

MC-315G.4 Outline the relationship between modern science and the Indian knowledge system.

## Semester: 6

### COs Manufacturing Technology-II (PCC-ME-302G)

- PCC-ME-302G.1 Recall the basic terminologies of various machining processes.
- PCC-ME-302G.2 Explain the mechanism of machining processes and cutting tool material selection.
- PCC-ME-302G.3 Understand the advanced manufacturing technologies, processes and machines.
- PCC-ME-302G.4 Apply the fundamental knowledge to solve the problems related to metal cutting.

### COs Design of Machine Element-I (PCC- ME-304G)

- PCC- ME-304G.1 Describe concepts, philosophy & considerations of machine design.
- PCC- ME-304G.2 Calculate steady and variable stresses induced in machine elements.
- PCC- ME-304G.3 Analyze the behavior of various members subjected to different types of loading.
- PCC- ME-304G.4 Design various machine components as per given specifications.

### COs Heat Transfer (PCC- ME-306G)

- PCC- ME-306G.1 Define fundamental concepts and terminologies of Heat Transfer.
- PCC- ME-306G.2 Understand the principles and modes of Heat Transfer.
- PCC- ME-306G.3 Apply laws & mathematical equations to solve the associated engineering problems.
- PCC- ME-306G.4 Analyze the heat exchange between two bodies and their performance variables.

### COs Dynamics of Machines (PCC- ME-308G)

- PCC- ME-308G.1 Describe the concepts and basics terminologies of dynamics of Machines.
- PCC- ME-308G.2 Understand static and dynamic force analysis of mechanism and components.
- PCC- ME-308G.3 Demonstrate the working & control mechanisms of governor, gyroscope and dynamometer
- PCC- ME-308G.4 Analyze the the problems of dynamics of machines.

**COs Workshop Lab-I (LC-ME-310G)**

LC-ME-310G.1 To understand tool life, speed and miscellaneous functions of CNC, drilling, milling and lathe machines.

LC-ME-310G.2 To understand the various preparatory and miscellaneous functions for CNC part programming.

LC-ME-310G.3 Apply the part programming for CNC Milling and CNC Lathe.

LC-ME-310G.4 Compare theoretical machining time with actual machining time.

**COs Workshop Lab-II (LC-ME-312G)**

LC-ME-312G.1 Describe various types of I.C. engines, cycles of operation and its related terms.

LC-ME-312G.2 Calculate various performance factor and show heat balance sheet of a multicylinder petrol/diesel engine.

LC-ME-312G.3 Draw various performance parameter curve of a multicylinder petrol/diesel engine.

LC-ME-312G.4 Analyze the effect of gases on various parameter from multicylinder engine.

**COs Heat Transfer Lab (LC-ME-314G)**

LC-ME-314G.1 Determine the thermal conductivity of metallic rod and insulating powder.

LC-ME-314G.2 Calculate the effectiveness of fin under natural and forced convection.

LC-ME-314G.3 Analyze the surface heat transfer coefficient, average heat transfer coefficient and emissivity.

LC-ME-314G.4 Verify stefen boltzmann constant for thermal radiation.

**COs Dynamics of Machines Lab (LC-ME-316G)**

LC-ME-316G.1 Understand the gyroscopic effects through models.

LC-ME-316G.2 Demonstrate the experiment for static balancing, dynamics balancing on balancing machine.

LC-ME-316G.3 Determine the gyroscopic couple, moment of inertia of connecting rod by different methods.

LC-ME-316G.4 Examine the performance characteristics curves, its stability and sensitivity of a governor.

**COs Seminar (PCC-ME-318G)**

- PCC-ME-318G.1 Identify various technologies and recent trends in engineering.
- PCC-ME-318G.2 Understand problem identification, formulation and solution.
- PCC-ME-318G.3 Apply skills in preparing detailed report describing project.
- PCC-ME-318G.4 Demonstrate a sound technical knowledge of their selected seminar topic.

**COs Internal Combustion Engines & Gas Turbines (PEC-ME-320G)**

- PEC-ME-320G.1 Define the parts and terminologies of IC engine.
- PEC-ME-320G.2 Understand the working cycle of IC engine and methods of emission control.
- PEC-ME-320G.3 Demonstrate the working of various systems of IC engines.
- PEC-ME-320G.4 Analyze the effect of operating variables on performance of engines & gas turbines.

**COs Fundamentals of Management (HSMC -08G)**

- HSMC -08G.1 Define and recall the concept and scope of management.
- HSMC -08G.2 Describe the production and controlling mechanism of management.
- HSMC -08G.3 Demonstrate various tools and techniques of production, marketing and financial management.
- HSMC -08G.4 Analyze various functions of the management system.

## Semester: 7

### COs Refrigeration & Air Conditioning (PEC-ME-401G)

- PEC-ME-401-G.1 Describe the concept and applications of refrigeration and air conditioning.
- PEC-ME-401-G.2 Understand various types of refrigeration and air conditioning systems.
- PEC-ME-401-G.3 Apply knowledge of psychrometric charts and cycles to solve the problem of cooling.
- PEC-ME-401-G.4 Analyze the performance of RAC systems.

### COs Noise and Vibrations (PEC-ME-409G)

- PEC-ME-409-G.1 Define the fundamentals of vibrations & Noise.
- PEC-ME-409-G.2 Understand the causes, significance, impacts, and the need for the reduction/isolation of Vibrations and Noise.
- PEC-ME-409-G.3 Apply different methods, principles and techniques to solve related real life problems.
- PEC-ME-409-G.4 Analyze the Vibration and Noise characteristics in diverse systems.

### COs Design of Machine Element-II (PCC-ME-401G)

- PCC-ME-401-G.1 Understand the concept of design for production, stresses and failure mechanisms.
- PCC-ME-401-G.2 Apply the knowledge to solve the design problems.
- PCC-ME-401-G.3 Analyze the feasibility of design of various machine elements.
- PCC-ME-401-G.4 Design various elements of machine as per given specifications.

### COs Entrepreneurship Development (PCC-ME-403G)

- PCC-ME-403-G.1 Describe the basic concept of entrepreneurship development.
- PCC-ME-403-G.2 Understand insights into management, opportunity search, product/project finalization, feasibility and financial studies required for entrepreneurship.
- PCC-ME-403-G.3 Apply the knowledge of entrepreneurship development in real life scenario.
- PCC-ME-403-G.4 Analyze the various factors/schemes/issues related to small enterprises, product feasibility, support institutes and management for entrepreneurial growth.

**COs Workshop Lab-III (LC- ME-403G)**

- LC-ME-403-G.1 Describe the various control used in rac & study the cut- sectional of the refrigerent compressor.
- LC-ME-403-G.2 Understand the various air conditioning process and plot them on Psychrometric chart.
- LC-ME-403-G.3 calculate the cop of various refrigerating system such as vapour compressor refrigeration system, heat pump and ice plant etc.
- LC-ME-403-G.4 Determine the bypass factor and sensible heat factor of heating and cooling coils.

**COs Seminar (PCC-ME-405G)**

- PCC-ME-405-G.1 Identify various technologies and recent trends in engineering.
- PCC-ME-405-G.2 Understand problem identification, formulation and solution.
- PCC-ME-405-G.3 Apply skills in preparing detailed report describing project.
- PCC-ME-405-G.4 Demonstrate a sound technical knowledge of their selected seminar topic.

**COs Project-I (PROJ-ME-407G)**

- PROJ-ME-407-G.1 Identify various tools, techniques and technologies used in mechanical engineering.
- PROJ-ME-407-G.2 Understand the process to make reports and presentations.
- PROJ-ME-407-G.3 Applying ethical practices and engineering knowledge to solve industrial problems.
- PROJ-ME-407-G.4 Analyze complex engineering problems and tools used in different technologies.
- PROJ-ME-407-G.5 Select and justify the suitable tools, techniques and parameters to deal with real life probles.
- PROJ-ME-407-G.6 Design and develop the solution for complex engineering problems.

**COs    Practical Training-II (PT-ME-409G)**

- PT-ME-409-G.1      Identify various technologies and fields for practical training to enhance employability skills.
- PT-ME-409-G.2      Understand the the ability to adapt with the latest changes in the technological world.
- PT-ME-409-G.3      Applying engineering knowledge and ethical practice to solve industrial problems and demonstrate presentation skills.
- PT-ME-409-G.4      Analyze the ability of learning skills to be job ready with real corporate exposure.

**COs    Constitution of India (MC-317G)**

- MC-317-G.1      Recall the salient features and basic structure of constitution of India.
- MC-317-G.2      Describe the types of legislative and financial powers allocated between the Union and the States in India.
- MC-317-G.3      Demonstrate the procedure for amending the Indian Constitution by providing a detailed description.
- MC-317-G.4      Analyze the interplay between Fundamental Rights and Fundamental Duties in the Indian Constitution and its impact on citizens and governance.

## **Semester: 8**

### **COs Industrial Automation (PCC-ME-402G)**

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|-----------------|--|
| PCC-ME- 402-G.1 | Define basic terminologies, and elements of Industrial Automation.               |
| PCC-ME- 402-G.2 | Understand the principles, strategies, components & circuits used in automation. |
| PCC-ME- 402-G.3 | Illustrate the automated material handling and manufacturing systems.            |
| PCC-ME- 402-G.4 | Demonstrate the control technologies, modeling and simulation of automation.     |

### **COs Plant Maintenance Engg. (PEC-ME-404G)**

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|-----------------|--|
| PEC-ME- 404-G.1 | Describe the basics of plant layout, maintenance and strategies.                       |
| PEC-ME- 404-G.2 | Understand the principles and practices of plant maintenance engineering.              |
| PEC-ME- 404-G.3 | Explain the fundamental concepts and objectives of facility planning and plant layout. |
| PEC-ME- 404-G.4 | Demonstrate the various maintenance strategies & spare parts management.               |

### **COs Power Plant Engineering (PEC-ME-412G)**

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|-----------------|--|
| PEC-ME- 412-G.1 | Define fundamentals of different types of power plants.                          |
| PEC-ME- 412-G.2 | Understand the power plant economics and natural resources used in power plants. |
| PEC-ME- 412-G.3 | Explain the combined cycles and non-conventional Power Generation.               |
| PEC-ME- 412-G.4 | Demonstrate the working principles of power plants with their applications.      |

### **COs Automobile Engineering (PEC-ME-420G)**

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|-----------------|---|
| PEC-ME- 420-G.1 | List the various components and systems of Automobiles.   |
| PEC-ME- 420-G.2 | Understand the principles of various systems of Automobiles.  |
| PEC-ME- 420-G.3 | Apply theoretical understanding to practical solutions in Automobile.   |
| PEC-ME- 420-G.4 | Classify Automobile components and system based on functions and interrelationships, including engine parts, vehicle systems, safety features and emission control mechanism. |

### **COs Quality Engineering (OEC-ME- 410G)**

- OEC-ME- 410-G.1 Define fundamental concepts & significance of quality engineering.
- OEC-ME- 410-G.2 Describe quality systems, elements of TQC and different forms of Inspection.
- OEC-ME- 410-G.3 Apply the concepts of statistical quality control and quality management.
- OEC-ME- 410-G.4 Illustrate various approaches for quality management, control and improvement.

### **COs Workshop Lab-IV (LC- ME-404G)**

- LC-ME- 404-G.1 Explain various types of wheels & automotive emission/pollution control system.
- LC-ME- 404-G.2 Demonstrate construction details, working principles and operation of lubricating system, ignition system & starting system.
- LC-ME- 404-G.3 Demonstrate construction details, working principles and operation of automotive transmission , drive lines, differential & suspension system.
- LC-ME- 404-G.4 Demonstrate construction details, working principles and operation of fuel supply, steering, brake and clutch system.

### **COs Seminar (PCC-ME-406G)**

- PCC-ME- 406-G.1 Identify various technologies and recent trends in engineering.
- PCC-ME- 406-G.2 Understand problem identification, formulation and solution.
- PCC-ME- 406-G.3 Apply skills in preparing detailed report describing project.
- PCC-ME- 406-G.4 Demonstrate a sound technical knowledge of their selected seminar topic.

### **COs Project-II (PROJ-ME-408G)**

- PROJ-ME- 408-G.1 Identify various tools, techniques and technologies used in mechanical engineering.
- PROJ-ME- 408-G.2 Understand the process to make reports and presentations.
- PROJ-ME- 408-G.3 Applying ethical practices and engineering knowledge to solve industrial problems.
- PROJ-ME- 408-G.4 Analyze complex engineering problems and tools used in different technologies.
- PROJ-ME- 408-G.5 Select and justify the suitable tools, techniques and parameters to deal with real life problems.
- PROJ-ME- 408-G.6 Design and develop the solution for complex engineering problems.