DEPARTMENT OF ECE

POs and PSOs Of Electronics and Communication Engineering

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

PO1:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO1: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.

PO1: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.

PO1: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.

PO2: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.

PO3: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.

PO4: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.

PO5:Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO6:Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO7: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.

PO8: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.

PO9: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.

. **PROGRAMME SPECIFIC OUTCOMES:**

PSO1: An ability to design an Electronics and Communication Engineering system, component, or process and conduct experiments, analyze, interpret data and prepare a report with conclusions to meet desired needs within the realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

PSO2:An ability to use modern Electronic Design Automation (EDA) tools, software and electronic equipment to analyze, synthesize and evaluate Electronics and Communication Engineering systems for multidisciplinary tasks

COURSE OUTCOMES OF ECE

S. No	Course Title	BRANCH
1	Electronic Circuits & Devices	ECE
2	Switching Theory & Logic Design	ECE
3	Electrical Circuits	ECE
4	Electronic Circuit Analysis	ECE
5	Signals and Systems	ECE
6	Electronic Circuit Analysis Lab	ECE
7	Signals and Systems Lab	ECE
8	Digital Electronics Lab	ECE
9	Electromagnetic Theory and Transmission Lines	ECE
10	Microcontrollers	ECE
11	Analog Communications	ECE
12	Analog Electronics	ECE
13	Microcontrollers Lab	ECE
14	Analog Communications Lab	ECE
15	Analog Electronics Lab	ECE
16	Digital Communication	ECE
17	Antennas and Wave Propagation	ECE
18	VLSI Design	ECE
19	VLSI Design Lab	ECE
20	Digital Communication Lab	ECE
21	Digital Signal Processing	ECE
22	Electronic Measurements and Instrumentation	ECE
23	Digital Signal Processing Lab	ECE
24	Embedded Systems	ECE
25	Linear Control Systems	ECE
26	Microwave Engineering	ECE
27	Cellular and Mobile Communications	ECE
28	Optical Communications	ECE
29	Multimedia and Signal Coding	ECE

30	Wireless Communication and Networks	ECE
31	Digital Design through Verilog HDL	ECE
32	Microwave Engineering Lab	ECE
33	Communication Protocols Lab	ECE
34	Embedded Systems Lab	ECE
35	Digital Image Processing	ECE
36	Radar Systems	ECE
37	Electronic Navigation Systems	ECE
38	Digital Signal Processors and Architectures	ECE
39	Satellite Communications	ECE
40	Digital Image Processing Lab	ECE

1. COURSE OUTCOMES OF ELECTRONIC DEVICES AND CIRCUITS

At the end of the course student will be able to

CO1: Comprehend the fundamentals of construction of the semiconducting material, fabrication of elements, working principles and operation of semiconductors.

CO2: Analyze the concept with the working principles of forward and reverse bias characteristics.

CO3: Demonstrate the basic skills in design and analysis of filter circuits, biasing circuits.

CO4: Discriminate the principle, construction and operation of BJTs, FETs and MOSFETs.

CO5: Interpret the different techniques for FET and MOSFET circuit designs.

CO6: Interpret the performance and analysis-volt amp characteristics of BJT and FET amplifiers.

CO7: Analyze the small signal low frequency Transistor amplifiers using h-parameters

2.Switching Theory & Logic Design

Course Outcomes:

CO1: Aware of theory of Boolean Algebra & the underlying features of various number systems.

CO2: Use the concepts of Boolean Algebra for the analysis & design of various combinational & sequential logic circuits.

CO3: Design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.

CO4: Explain the concepts of VHD Language

CO5: Analyze the various coding schemes are the part of the digital circuit design

CO6: Analyze the sequential logic circuits design both in synchronous and asynchronous modes for various complex logic and switching devices.

CO7: Design of various circuits with the help of VHDL Coding techniques

3.Electrical Circuits

Course Outcomes:

CO1: Comprehend the mathematical expression for voltages and currents in RL, RC and RLC circuits to find the transient response of inductor and capacitor in dc circuits.

CO2: Analyze the concept with working principles of linear constant coefficient differential equations with the help of Laplace transforms.

CO3: Know the basic skills of an ac circuits with independent/dependent voltage current sources by drawing impedance/admittance diagrams or using various laws/ techniques like source conversion

CO4: Acquaint with AC circuits in the frequency domain and compute transient response for first and second order circuits.

CO5: Discriminate the concepts like cut-set, tie-set, pole zero parameters and stability analysis

CO6: Interpret the pole zero network functions, transfer and driving point functions

CO7: Create the two-port network parameters, conversion between parameters,

CO8: Interconnection of two port networks.

4. Electronic Circuit Analysis

Course Outcomes:

CO1: Comprehend the fundamental concepts in feedback amplifier circuits.

CO2: Analyze the oscillators design, frequency responses calculations with the help of mathematical expressions.

CO3: Describe the various cascade amplifier circuits using BJT and FET models

CO4: Apply the h-parameter model to power amplifiers circuit design

CO5: Discriminate the concepts quality factor, form-factor in small signal tuned amplifier analysis and design.

CO6: Interpret the tuned amplifiers and tuned cascaded networks functionality

CO7: Create the circuit design analysis, testing and utilization of the circuits in various levels.

5. Signals and Systems

Course Outcomes:

CO1: Defines the fundamentals of mathematical models and analyze deterministic CT signals and systems

CO2: Analyze the concepts in assess the effect of LTI systems on signals passing through them in frequency and time domains

CO3: Demonstrates an appreciate effect of sampling in continuous-time signals and explain the application of sampling theorem in signal processing

CO4: Acquaint with mathematically represent of discrete-time (DT) signals

CO5: Discriminate the Fourier, Laplace and Z-transforms as appropriate for various signals and systems

CO6: Interpret to analyze the importance of various transformation techniques in signal processing.

CO7: Create the terms mean, variance, mean squared error, random process and orthogonality functions

6. Electronic Circuit Analysis Lab

Course Outcomes:

CO1: Comprehend the fundaments of multistage amplifiers, feedback, power amplifiers and oscillator circuits

CO2; Analyze the circuit design process and simulate the common base, common emitter and common collector amplifier circuits

CO3: Know the origin of failure of a circuit when it is in an application

CO4: Acquaint with the design and simulate the RC coupled and Cascade amplifier circuits

CO5: Discriminate the design and simulate various oscillator circuits

CO6: Interpret to design and simulate Darlington pair,

CO7: Create the design and simulate the cascade, class A power amplifier circuits, and single tuned voltage amplifier circuits

7. Signals and Systems Lab

Course Outcomes:

CO1: Comprehend the fundamentals to explain the classification of signals and systems

CO2: Analyze the concepts to simulate the Fourier series, Fourier transform in singles and systems

CO3:Know the behavior of LTI system with matlab simulation environment

CO4: Acquaint with sampling of signals with matlab

CO5: Discriminate in writing the code for convolution response

CO6: Interpret to write code and analyze the graphical representation of gibbs phenomenon in signals and systems

CO7: Create in writing the code for simulation and synthesis of Laplace transforms.

8. Digital Electronics Lab

Course Outcomes:

CO1: Study the theory of Boolean algebra and to study representation of switching functions through various experiments.
CO2: Perform the combinational logic design of various logic and switching devices and validate the outputs

CO3: Perform the sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices and validate the outputs

CO4: Design and validate the counters and registers for synchronous and asynchronous circuits
CO5: Design the combinational logic circuits using VHDL programming syntaxes.
CO6: Design the sequential circuits using VHDL programming syntaxes.
CO7: Describe the various VHDL programming concepts

9. Electromagnetic Theory and Transmission Lines

Course Outcomes:

CO1: Define and describe Electromagnetic field quantities mathematically/graphically in words.
CO2: Solve simple problems involving EM fields.
CO3: Explain important deductions maid from Maxwell's equations.
CO4: Analyze and solve problems of EM wave propagation in unbounded media

CO5: Analyze and solve problems of EM wave propagation along transmission lines.
CO6: Solve transmission line problems using Smith chart.
CO7: Derive propagation characteristics of EM waves in parallel plates wave guides

10. Microcontrollers & Micro Processors

Course Outcomes:

CO1: Compare the functionally and architectures of microprocessors and microcontrollers
CO2: Analyze assembly language programming techniques
CO3: Explain the implementation of 8051 instruction set
CO4: Analyze assembly language programming concepts
CO5: Acquainted with design of microcontrollers
CO6: Interface various devices with microcontrollers
CO7: Design various programs to run several applications

11. Analog Communications

Course Outcomes:

CO1: Analysis and design of various modulation and demodulation techniques.

CO2: Analyze and demonstrate a good background in analyzing the block diagram of communication system.

CO3: Illustrates how the mathematical concepts bend the analog communication process

CO4: Acquaint with formulate the frequency modulation and angle modulation signals

CO5: Discriminate the design skills to illustrate the electronic component and method to implement different communication systems.

CO6: Interpret with differentiate types of transmitters and receivers used for particular application.

CO7: Create the spectrum and noise performance of particular communication system.

12. Analog Electronics

Course Outcomes:

CO1: Explain the basic concepts of linear and non linear wave shaping circuits

CO2: Analyze the working principles of clippers and clappers

CO3: Describe and compare the Bi-stable, Mono-stable and Astable circuits and its applications

CO4: Design various multivibrators from the given constraints

CO4: Explain the ideal and practical Op-Amp characteristics

CO5: Perform the various Op-Amp circuits in different applications

CO6: Compare the negative and positive feedback amplifiers

13. Microcontrollers Lab

Course Outcomes:

CO1: Comprehend the fundamentals in programming for microcontrollers

CO2: Analyze the code and build simple real time applications using microcontrollers

CO3: Know the skill to write, upload the programs on LED patterns, Switches and LEDs

CO4: Compile and compose the programs on LED patterns, Switches and LEDs

CO5: Describe the LCD and UART based programs

CO6: Interpret with various applications using TRIAC, ADC and DAC

CO7: Discriminate the Control based programs

14. Analog Communications

Course Outcomes:

CO1: Comprehend the fundamentals in explain the functionality of modulation and demodulation environment

CO2: Analyze the concepts, write and simulate the concepts of AM and AM-Demodulation process in Communication.

CO3: Know the origin and simulation of FM and FM-Demodulation process in communication

CO4: Acquaint with AM and FM basic functionalities
CO5: Discriminate the AM and FM functionalities
CO6: Interpret with various angle modulation and demodulation systems
CO7: Create the writing and simulation environments in PWM, PPM, Mixer and ring modulation

15. Analog Electronics Lab

Course Outcomes:

CO1: Analyze and select analog devices using circuit specifications based on circuit requirements.
CO2: Conduct experiments on different types of multivibrators.
CO3: Design Digital to Analog Converters (DAC).
CO4: Design pulse stretcher and square wave generating circuits.
CO5: Design oscillators and function generator circuits.
CO6: Identify the positive and negative feedback circuits.
CO7: Discriminate the design of simple circuits like summers, subtractors and multivibrators using op-amp.

16. Digital Communication

Course Outcomes:

CO1: Classification of digital modulation techniques.
CO2: Communications with a focus on modern digital communications theory and systems.
CO3: Explains the spread spectrum techniques.
CO4: Apply the underlying methods for up-to-date examples of real world systems.
CO5: Demonstrate the error detection and error correction in linear convolution codes.
CO6: Emphasize on modern digital data transmission concepts and optimization of receivers.
CO7: Build a basis for subsequent related courses such as wireless, cellular and mobile communications.

17. Antennas and Wave Propagation

Course Outcomes:

CO1: Know the fundamentals of Antennas.
CO2: Illustrate the different types of arrays and their radiation patterns.
CO3: Analyze a complete radio system, from the Transmitter to the Receiver end with reference to antenna.
CO4: Quantify the fields radiated by various types of antennas
CO5: Design wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and micro strip antennas
CO6: Analyze antenna measurements to assess antenna's performance
CO7: Know the concept of radio wave propagation.

18. VLSI Design

Course Outcomes:

CO1: Differentiate between IC families and their manufacturing processes.

CO2: Analyze and model the MOS transistor circuit, down to physical level considering parasitic components.

CO3: Analyze and implement various CMOS subsystems at gate level and transistor level.

CO4: Compare the various parameters used in fabrication process

CO5: Describe the various operations like stick and layout diagrams of VLSI

CO6: Implement designs using various programmable devices.

CO7: Know the testing of ICs and design IC s with testability features.

19. VLSI Design Lab

Course Outcomes:

CO1: Apply switching theory to the solution of logic design problems.

CO2: Know the logical properties of flip-flops and how to design counters, adders, sequence detectors and similar circuits.

CO3: Program various digital circuits in different models using Verilog.

CO4: Learn the work flow of mentor graphic tools for digital design.

CO5: Draw layouts using Cadence/Mentor Graphics/Synopsys CAD tools.

CO6: Have the knowledge and experience to design using HDL languages like Verilog and able to transfer and interpret the design results on FPGA kits

CO7: Do transistor level design and layout

20. Digital Communication Lab

Course Outcomes:

CO1: Develop any real application using digital modulation techniques.

CO2: Develop time division multiplexing concepts in real applications.

CO3: Measures the bandwidth of various modulation techniques and observes the output waveforms.

CO1: Demonstrate a good background in analyzing the block diagram of communication systems.

CO1: Use appropriate design skills to illustrate design skills to illustrate electronic components & method to implement different communication circuits &systems

CO1: Emphasize on sampling modeling, techniques, signal constellations.

CO1: Study the spectral characteristics of PAM and QAM

21. Digital Signal Processing

Course Outcomes:

CO1: Analyze and process signals in the discrete domain

CO2: Design filters to suit specific requirements for specific applications

CO3: Perform statistical analysis and inferences on various types of signals

CO4: Design multi rate signal processing of signals through systems.

CO4: Analyze binary fixed point and floating-point representation of numbers and arithmetic operations

CO5: Design and apply digital signal processing techniques to design discrete time systems and digital filters

CO6: Compile and solve the digital signal processing problems using MAT lab.

22. Electronic Measurements and Instrumentation

Course Outcomes:

CO1: Describe the fundamental concepts and principles of instrumentation.

CO2: Learn principle of operation, working of different electronic instruments like digital multi meter, vector voltmeter.

CO3: Learn the functioning, specification, and applications of signal analyzing instruments.

CO4: Know the purpose of various electronic circuits, ,systems and how to design them, and how those are useful in real time

CO5: An ability to work in industry with good skill.

CO6: Measure various parameters using proper instruments without errors

CO7: Define importance of electronic instrumentation and measurements in the real world

23. Digital Signal Processing Lab

Course Outcomes:

CO1: Apply knowledge of digital filter design for various applications.

CO2: Analyze various signals in transform domain

CO3: Apply MultiMate concepts in different areas

CO4: Perform real time experiments on processors such as audio and speech processing.

CO4: Work with MATLAB functions

CO5: Enable students to analyze and design different signals & filters using MATLAB

CO6: Provide the basic knowledge of trainer kit TMS320C6713 DSP Processors.

24. Embedded Systems

Course Outcomes:

CO1: Learn assembly language programming & embedded C.

CO2: Learn and design embedded systems and real-time systems

CO3: Define the unique design problems and challenges of real-**time systems** • Program an embedded system

CO4: Identify the unique characteristics of real-time operating systems and evaluate the need for real-time operating system.

CO5: Explain the general structure of a real-time system

CO6: Know and use RTOS to build an embedded real-time system.

CO7: Gain knowledge and skills necessary to design and develop embedded applications based on real-time operating systems.

25. Linear Control Systems

Course Outcomes:

CO1: Analyze and improve the system performance by selecting a suitable controller and a compensator for a specific application

CO2: Represent the mathematical model of a system.

CO3: Analyze the stability of the system.

CO4: Design a system, component, or process to meet desired needs.

CO5: Identify, formulate, and solve engineering problems

CO6: Analyze various time domain and frequency domain techniques to assess the system performance

CO7: Apply various control strategies to different applications (example: Power **systems, electrical drives etc…)**

26. Microwave Engineering

Course Outcomes:

CO1: Integrating a wide range of Microwave components into one design oriented frame work

CO2: Design and solve real world problems

CO3: Characterize microwave devices in terms of the directionality of communication.

CO4: Use a microwave test bench in analyzing various types of microwave measurements.

CO5: Measure the various parameters in microwave engineering.

CO6: An in-depth knowledge of applying the concepts on real time applications

CO7: Design & analyze the micro wave integrated circuits.

27. Cellular and Mobile Communications

Course Outcomes:

CO1: Design and analyze Basic Cellular System

CO2: Know of frequency reuse and Co-channel Interference and different methods of cell splitting and sectoring.

CO3: Measure the real time Co-Channel Interference.

CO4: Apply the different methods of Handoff mechanisms

CO5: Research work with good engineering breadth so as to analyze the accessing techniques for cellular and mobile communications.

CO6: Explore the implementing of these wireless technologies in cellular and mobile communications.

CO7: An in-depth knowledge of applying the concepts on real time applications

28. Optical Communications

Course Outcomes:

CO1: Know the propagation of light in optical fiber and an in-depth knowledge of applying the concepts on real time applications.

CO2: Learn the principles governing optical sources and amplifiers used in optical communications.

CO3: Design optical communication systems to serve a defined purpose.

CO4: Analyze optical systems for performance and utility.

CO5: Critically review and summarize modern topics in optical communications.

Design the optical fiber link.

CO6: Explain operation of different fiber techniques.

29. Multimedia and Signal Coding

Course Outcomes:

CO1: Know the Multimedia concepts.

CO2: Learn about image/graphics data types and file formats

CO3: Illustrates the video concepts like analog and digital video

CO4: Learn about the different types of compression algorithms KLT, DCT and Wavelet based codings.

CO4: Know the different types of compression techniques.

CO5: Identify the different types of audio compression techniques and algorithms like MPEG1, MPEG2, MPEG-2 AAC and MPEG-4.

CO6: Identify the image compression standards like JPEG, JPEG2000.

30. Wireless Communication and Networks

Course Outcomes:

CO1: Become familiar with security risks threatening computer networks.

CO2: Code the binary into a digital signals pattern which has less baseline wandering and less DC components, and can also decide which type of network is suitable based on the application requirement.

CO3: Design backbone networks, virtual LANs and wireless WANs.

CO4: Design the Multiple access techniques for wireless communication

CO5: Know the Different Mobile Data Networks, Blue Tooth and Mobile ip and wireless access protocol

CO6: Learn the Wireless LAN Technology and Wireless data services

CO7: An in-depth knowledge of applying the concepts on real time applications

31. Digital Design through Verilog HDL

Course Outcomes:

CO1: Describe Verilog hardware description, languages (HDL).

CO2: Write Behavioral models of digital circuits.

CO3: Write Register Transfer Level (RTL) models of Digital Circuits.

CO4: Verify Behavioral and RTL models.

CO5: Describe standard cell libraries and FPGAs

CO6: Synthesize RTL models to standard cell libraries and FPGAs

CO7: Implement RTL models on FPGAs and Testing and Verification

32. Microwave Engineering Lab

Course Outcomes:

CO1: Design test bench for measurement of various microwave parameters.

CO2: Analyze various characteristics of microwave junctions and design of microwave communication links.

CO3: Integrating a wide range of Microwave components into one design oriented frame work

CO4: Design and solve real world problems

CO5: Use a microwave test bench in analyzing various types of microwave measurements.

CO6: Measure the various parameters in microwave engineering.

CO7: Design & analyze the micro wave integrated circuits.

33. Communication Protocols Lab

Course Outcomes:

CO1: Identify and describe the functions of basic components required to build data communication networks, both local area and wide area;

CO2: Describe the process of converting information from its original form, to a form that can be transmitted through data networks;

CO3: Discuss how different types of transmission media are affected by their physical characteristics and the role that multiplexing plays in data networks;

CO4: Describe specific processes and functions that apply to a layered network model, with specific reference to the OSI reference model and TCP/IP;

CO5: Subnet a network using multi-level sub netting and provide a sub netted IP design based on a given topology or business profile;

CO6: Describe the process by which distance vector and link state routing protocols update information within a network;

CO7: Know the importance of DNS within the Internet; and understand the emerging issues for IT as it relates to networks and IT Infrastructure such as cloud and grid computing, and securing networks.

34. Embedded Systems Lab

Course Outcomes:

CO1: Develop programs to add numbers in various number system representation

CO2: Examine the I/O port operation using a simulator.

CO3: Develop a program to transfer and receive data from/to a PC serially.

CO4: Learn assembly language programming & embedded C.

CO5: Familiarize with programming and interfacing microcontrollers to various devices.

CO6: Build various applications using microcontrollers.

CO7: Develop a program to use a software delay to toggle an LED on the evaluation board and ADC & sample sequencer

35. Digital Image Processing

Course Outcomes:

CO1: Apply to current technologies and issues that are specific to image processing systems.

CO2: Know how images are formed, sampled, quantized and represented digitally.

CO3: Leverage the student's knowledge of image processing to a practical system.

CO4: Compress the Digital image which is required for storage and transmission of digital images.

CO5: Identify transform-domain representation of images (Fourier, DCT, Haar, WHT)

CO6: Learn the morphological processing and wavelet transforms

CO7: Know the principles of image compression, enhancement and restoration and segmentation

36. Radar Systems

Course Outcomes:

CO1: Demonstrate an understanding of the factors affecting the radar performance using Radar Range Equation.

CO2: Analyze the principle of FM-CW radar and apply it in FM- CW Altimeter.

CO3: Differentiate between a MTI Radar and a Pulse Doppler Radar based on their working principle.

CO4: Demonstrate an understanding of the importance of Matched Filter Receivers in Radars.

CO5: Familiarize with the different types of Radar Displays and their application in real time scenario

CO6: Know the suitable measurement methodologies to characterize and verify the performance of radar systems

CO7: Design radar systems and to undertake measurements to characterize and verify the performance of radar systems

37. Electronic Navigation Systems

Course Outcomes:

CO1: Learn and analyze radar Systems

CO2: Analyse radar signal processing

CO3: Appreciate the wide range of applications of radar Systems

CO4: Know Target detection and tracking using radar systems

CO5: Identify various electronic counter measures(ECM)

CO6: Learn various electronic navigation systems

CO7: Design simulation experiments related to radar systems and radar signal processing

38. Digital Signal Processors and Architectures

Course Outcomes:

CO1: Learn to represent real world signals in digital format and understand transform-domain (Fourier and z-transforms) representation of the signals;

CO2: Know to apply the linear systems approach to signal processing problems using high-level programming language;

CO3: Learn the basic architecture of microprocessors and digital signal processors;

CO4: Learn to implement linear filters in real-time DSP chips;

CO5: Introduce applications of linear filters and their real-time implementation challenges.

CO6: Provide the basic knowledge of different DSP Processors.

CO7: Interfacing Memory and I/O Peripherals to different Programmable DSP Devices

39. Satellite Communications

Course Outcomes:

CO1: Learn the communication satellite mechanics

CO2: Know about the satellite internal sub systems for communication applications

CO3: Design the power budget for satellite links

CO4: Know about the principles of GPS

CO5: Identify the various constellations of satellite and their applications

CO6: Learn the Low earth orbit and geo-stationary satellite systems

CO7: Know the Earth station technology and Satellite navigation & the global positioning system

40. Digital Image Processing Lab

Course Outcomes:

CO1: Process images using techniques of smoothing, sharpening, histogram processing, and filtering,

CO2: Explain sampling and quantization processes in obtaining digital images from continuously sensed data,

CO3: Enhance digital images using filtering techniques in the spatial domain,

CO4: Enhance digital images using filtering techniques in the frequency domain,

CO5: Restore images in the presence of only noise through filtering techniques,

CO6: Explain most commonly applied color models and their use in basic color image processing,

CO7: Familiarize with Mat lab and image processing toolbox.

Department of Computer Science and Engineering

Course Outcomes & objective

B. Tech (CSE) – PROGRAM EDUCATIONAL OBJECTIVES (PEO's)

The Program Educational Objectives (PEOs) of the department of CSE are given below:

PEO-1: Students will establish themselves as effective professionals by solving real problems through the use of computer science knowledge and with attention to team work, effective communication, critical thinking and problem solving skills.

PEO-2: Students will develop professional skills that prepare them for immediate employment and for life-long learning in advanced areas of computer science and related fields.

PEO-3: Students will demonstrate their ability to adapt to a rapidly changing environment by having learned and applied new skills and new technologies.

PEO-4: Students will be provided with an educational foundation that prepares them for excellence, leadership roles along diverse career paths with encouragement to professional ethics and active participation needed for a successful career

B. Tech (CSE) - PROGRAM OUTCOMES (PO's)

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: 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.

PO3: 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.

PO4: 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.

PO5: 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.

PO6: **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.

PO7: 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.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: 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.

PO11: 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.

PO12: 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) - PROGRAM SPECIFIC OUTCOMES (PSO's)

A graduate of the Computer Science and Engineering Program will demonstrate:

PSO1: Professional Skills: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2: Problem-Solving Skills: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3: Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

Department of Computer Science and Engineering

Course Outcomes:

Sl. No.	Name of the Subject/Course Title	Branch
1	Computer Programming	CSE
2	Mathematical Foundations of Computer Science	CSE
3	Data Structures	CSE
4	Computer Organization	CSE
5	Database Management Systems	CSE
6	Java Programming	CSE
7	Formal Languages and Automata Theory	CSE
8	Design and Analysis of Algorithms	CSE
9	Principles of Programming Languages	CSE
10	Software Engineering	CSE
11	Compiler Design	CSE
12	Operating Systems	CSE
13	Computer Networks	CSE
14	Distributed Systems	CSE
15	Information Security	CSE
16	Object Oriented Analysis and Design	CSE
17	Software Testing Methodologies	CSE
18	Web Technologies	CSE
19	Linux Programming	CSE
20	Design Patterns	CSE
21	Data Warehousing and Data Mining	CSE
22	Cloud Computing	CSE
23	Mobile Computing	CSE
24	Software Project Management	CSE
25	Computer Graphics	CSE
26	Information Retrieval Systems	CSE
27	Computer Forensics	CSE
28	Ad hoc and Sensor Networks,	CSE
29	Scripting Languages	CSE
30	Cryptography and Network Security	CSE
31	Data Communication and Computer Networks	CSE
32	Programming for Problem Solving	CSE

COMPUTER PROGRAMMING

Course Outcomes:

CO1: Demonstrate the basic knowledge of computer hardware and software.

CO2: Ability to apply solving and logical skills to programming in C language and also in other languages.

DATA STRUCTURES

Course Outcomes

CO1: Learn how to use data structure concepts for realistic problems.

CO2: Ability to identify appropriate data structure for solving computing problems in respective language.

CO3: Ability to solve problems independently and think critically.

COMPUTER ORGANIZATION

Course Outcomes:

CO1: After this course students understand in a better way the I/O and memory organization in depth.

CO2: They should be in a position to write assembly language programs for various applications.

DATABASE MANAGEMENT SYSTEMS

Course Outcomes:

CO1: Demonstrate the basic elements of a relational database management system.

CO2: Ability to identify the data models for relevant problems.

CO3: Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.

CO4: Apply normalization for the development of application software's.

JAVA PROGRAMMING

Course Outcomes:

CO1: Understanding of OOP concepts and basics of java programming (Console and GUI based).

CO2: The skills to apply OOP and Java programming in problem solving.

CO3: Should have the ability to extend his/her knowledge of Java programming further on his/her own.

FORMAL LANGUAGES AND AUTOMATA THEORY

Course Outcomes:

CO1: Graduate should be able to understand the concept of abstract machines and their power to recognize the languages.

CO2: Attains the knowledge of language classes & grammars relationship among them with the help of Chomsky hierarchy.

CO3: Graduate will be able to understanding the pre-requisites to the course compiler or advanced compiler design.

DESIGN AND ANALYSIS OF ALGORITHMS

Course Outcomes:

CO1: Be able to analyze algorithms and improve the efficiency of algorithms.

CO2: Apply different designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc.

CO3: Ability to understand and estimate the performance of algorithm

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course Outcomes:

CO1: Ability to illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.

CO2: Ability to demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.

CO3: Ability to represent and Apply Graph theory in solving computer science problems

PRINCIPLES OF PROGRAMMING LANGUAGES

Course Outcomes:

CO1: Ability to express syntax and semantics in formal notation.

CO2: Ability to apply suitable programming paradigm for the application.

CO3: Gain Knowledge and comparison of the features programming languages.

SOFTWARE ENGINEERING

Course Outcomes:

CO1: Ability to identify the minimum requirements for the development of application.

CO2: Ability to develop, maintain, efficient, reliable and cost effective software solutions

CO3: Ability to critically thinking and evaluate assumptions and arguments

COMPILER DESIGN

Course Outcomes:

CO1: Ability to understand the design of a compiler given features of the languages.

CO2: Ability to implement practical aspects of automata theory.

CO3: Gain Knowledge of powerful compiler generation tools.

OPERATING SYSTEMS

Course Outcomes:

CO1: Apply optimization techniques for the improvement of system performance.

CO2: Ability to understand the synchronous and asynchronous communication mechanisms in their respective OS.

CO3: Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput with keeping CPU as busy as possible.

CO4: Ability to compare the different OS

COMPUTER NETWORKS

Course Outcomes:

CO1: Students should be understand and explore the basics of Computer Networks and Various Protocols.

CO2: He/She will be in a position to understand the World Wide Web concepts.

CO3: Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

DISTRIBUTED SYSTEMS

Course Outcomes:

CO1: Able to comprehend and design a new distributed system with the desired features.

CO2: Able to start literature survey leading to further research in any subarea.

CO3: Able to develop new distributed applications.

INFORMATION SECURITY

Course Outcomes:

CO1: Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.

CO2: Ability to identify information system requirements for both of them such as client and server.

CO3: Ability to understand the current legal issues towards information security.

OBJECT ORIENTED ANALYSIS AND DESIGN

Course Outcomes:

CO1: Graduate can able to take up the case studies and model it in different views with respect user requirement such as use case, logical, component and deployment and etc, and preparation of document of the project for the unified Library application.

SOFTWARE TESTING METHODOLOGIES

Course Outcome:

CO1: Ability to apply the process of testing and various methodologies in testing for developed software.

WEB TECHNOLOGIES

Course Outcomes:

CO1: Gain knowledge of client side scripting, validation of forms and AJAX programming

CO2: have understanding of server side scripting with PHP language

CO3: have understanding of what is XML and how to parse and use XML Data with Java

CO2: To introduce Server side programming with Java Servlets and JSP

LINUX PROGRAMMING

Course Outcomes:

CO1: Work confidently in Linux environment.

CO2: Work with shell script to automate different tasks as Linux administration

DESIGN PATTERNS

Course Outcomes:

CO1: Ability to understand and apply common design patterns to incremental / iterative development.

CO2: Ability to identify appropriate patterns for design of given problem.

DATA WAREHOUSING AND DATA MINING

Course Outcomes:

CO1: Student should be able to understand why the data warehouse in addition to database systems.

CO2: Ability to perform the preprocessing of data and apply mining techniques on it.

CO3: Ability to identify the association rules, classification and clusters in large data sets.

CO4: Ability to solve real world problems in business and scientific information using data mining

CLOUD COMPUTING

Course Outcomes: CO1: Ability to understand the virtualization and cloud computing concepts

MOBILE COMPUTING

Course Outcomes:

CO1: Able to think and develop new mobile application.

CO2: Able to take any new technical issue related to this new paradigm and come up with a solution(s).

CO3: Able to develop new ad hoc network applications and/or algorithms/ protocols.

CO4: Able to understand & develop any existing or new protocol related to mobile environment

SOFTWARE PROJECT MANAGEMENT

Course Outcomes:

CO1: Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.

CO2: Compare and differentiate organization structures and project structures.

CO3: Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

COMPUTER GRAPHICS

Course Outcomes:

CO1: Students can animate scenes entertainment.

CO2: Will be able work in computer aided design for content presentation..

CO3: Better analogy data with pictorial representation.

.INFORMATION RETRIEVAL SYSTEMS

Course Outcomes:

CO1: Possess the ability to store and retrieve textual documents using appropriate models.

CO2: Possess the ability to use the various retrieval utilities for improving search.

CO3: Possess an understanding of indexing and compressing documents to improve space and time efficiency.

CO4: Possess the skill to formulate SQL like queries for unstructured data.

CO5: Understand issues in web search.

COMPUTER FORENSICS

Course Outcomes:

CO1: Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.

CO2: It gives an opportunity to students to continue their zeal in research in computer forensics

AD HOC AND SENSOR NETWORKS

Course Outcomes:

CO1: Ability to understand the concept of ad-hoc and sensor networks.

CO2: Ability to design and implement sensor network protocols.

CO3: Ability to set up and evaluate measurements of protocol performance in sensor networks..

SCRIPTING LANGUAGES

Course Outcomes:

CO1: Ability to understand the differences between scripting languages.

CO2: Ability to apply your knowledge of the weaknesses of scripting languages to select implementation..

CO3: Master an understanding of python especially the object oriented concepts.

DATA COMMUNICATION AND COMPUTER NETWORKS

Course Outcomes:

CO1: Students should be understand and explore the basics of Computer Networks and Various Protocols.

CO2: He/She will be in a position to understand the World Wide Web concepts.

CO3: Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

CRYPTOGRAPHY AND NETWORK SECURITY

Course Outcomes:

CO1: Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.

CO2: Ability to identify information system requirements for both of them such as client and server.

CO3: Ability to understand the current legal issues towards information security.

PROGRAMMING FOR PROBLEM SOLVING

Course Outcomes: The student will learn

CO1: To write algorithms and to draw flowcharts for solving problems.

CO2: To convert the algorithms/flowcharts to C programs.

CO3: To code and test a given logic in C programming language.

CO4: To decompose a problem into functions and to develop modular reusable code.

CO5: To use arrays, pointers, strings and structures to write C programs.

CO6: Searching and sorting problems.

TALLA PADMAVATHI COLLEGE OF ENGINEERING
SOMIDI, KAZIPET, WARANGAL.
Department of Civil Engineering

Programme Educational Objectives (PEO's)

B.Tech Programme in Civil Engineering

PEO1: Provide a strong foundation in Mathematics, Basic Sciences and Engineering fundamentals to the students, enabling them to excel in the various careers in Civil Engineering.

PEO2: Impart necessary theoretical and practical background in Civil Engineering to the students, so that they can effectively compete with their contemporaries in the National / International level.

PEO3: Motivate and prepare the Graduates to pursue higher studies, Research and Development, thus contributing to the ever-increasing academic demands of the country.

PEO4: Enrich the students with strong communication and interpersonal skills, broad knowledge and an understanding of multicultural and global perspectives, to work effectively in multidisciplinary teams, both as leaders and team members.

Programme Outcomes(PO's)

Graduates of the Civil Engineering Programme will be able to:

PO1: Apply the knowledge of mathematics, science, engineering fundamentals, and Civil Engineering principles to the solution of complex problems in Civil Engineering.

PO2: Identify, formulate, research literature, and analyse complex Civil Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

PO3: Design solutions for complex Civil 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.

PO4: 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 related to Civil Engineering problems.

PO5: Create, select, and apply appropriate techniques, resources, and modern engineering tools such as CAD, FEM and GIS including prediction and modelling to complex Civil Engineering activities with an understanding of the limitations.

PO6: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Civil Engineering practice.

PO7: Understand the impact of the professional Civil Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the Civil Engineering practice.

PO9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communicate effectively on complex Civil 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.

PO11: 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 Civil Engineering projects and in multidisciplinary environments.

PO12: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSES OF CIVIL DEPARTMENT

Sl no	Subject Name	Department
1	Strength of material	CE
2	Surveying	CE
3	Fluid mechanics	CE
4	Hydraulics and hydraulic machinery	CE
5	Environmental studies	CE
6	Structural analysis	CE
7	Building materials and construction planning	CE
8	Computer aided drawing of buildings	CE
9	Concrete technology	CE
10	Reinforced concrete structure design and drawing	CE

11	Engineering geology	CE
12	Geotechnical engineering	CE
13	Water resource engineering	CE
14	Disaster management	CE
15	Human values and professional ethics	CE
16	Steel structures design and drawing	CE
17	Environmental engineering	CE
18	Transportation engineering	CE
19	Foundation engineering	CE
20	Remote sensing and GIS	CE
21	Estimation and costing	CE
22	Pre stressed concrete structures	CE
23	Design and drawing of irrigation structures	CE
24	Construction management	CE
25	Solid waste management	CE
26	Fluid mechanics lab	CE
27	Air pollution and control	CE
28	Railway and airport engineering	CE
29	Pavement design	CE
30	Disaster management	CE
31	Ground improvement techniques	CE
32	Retrofitting and rehabilitation of structures	CE
33	Water resource system analysis	CE
34	Concrete and highway material testing lab	CE
35	Soil mechanics	CE
36	Irrigation engineering	CE
37	Hydraulics and hydraulic machinery	CE

COURSE OUTCOMES(CO's)

1. STRENGTH OF MATERIAL (1&2)

CO1: Analyze the statically determinate and indeterminate problems.

CO2: Determine the stresses and strains in the members subjected to axial, bending.

CO3: Evaluate the slope and deflection of beams subjected to loads.

CO4: Determine the principal stresses and strains in structural members.

C05: Determine stresses in the member subjected to Torsion
CO6: Analyze columns and struts
CO7: Understand the concept of direct and bending stresses
CO8: Analyze and design springs, thin and thick cylinders
CO9: Understand the concept of unsymmetrical bending

2. CONCRETE TECHNOLOGY

CO1: Identify Quality Control tests on concrete making materials Understand the behavior of fresh and hardened concrete
CO2: Design concrete mixes as per IS and ACI codes
CO3: Understand the durability requirements of concrete
CO4: Understand the need for special concretes

3. DESIGN OF REINFORCED CONCRETE STRUCTURES

CO1: Design RC Structural elements
CO2: Design the Reinforced Concrete beams using limit state Design
CO3: Design Reinforced Concrete slabs
CO4: Design the Reinforced Concrete Columns and footings
CO5: Design structures for serviceability
CO6: Design staircases, canopy

4. WATER RESOURCE ENGINEERING (1&2)

CO1: Analyze hydro-meteorological data
CO2: Estimate abstractions from precipitation
CO3: Compute yield from surface and subsurface basin
CO4: Develop rainfall-runoff models
CO5: Formulate and solve hydrologic flood routing models Estimate runoff,
CO6: design discharge from catchment

5. FLUID MECHANICS (1&2)

CO1: Apply conservation laws to derive governing equations of fluid flows. Compute hydrostatic and hydrodynamic forces.
CO2: Analyze and design simple pipe systems.
CO3: Apply principles of dimensional analysis to design experiments. Compute drag and lift coefficients
CO4: Understand the concepts o channel flows.
CO5: Compute flow profiles in channel transitions and analyze hydraulic transients
CO6: Design the working proportions of hydraulic machines

6. ENGINEERING GEOLOGY

CO1: Understand weathering process and mass movement Distinguish geological formations
CO2: Identify geological structures and processes for rock mass quality
CO3: Identify subsurface information and groundwater potential sites through geophysical investigations
CO4: Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels

7. SURVEYING

CO1: Calculate angles, distances and levels
CO2: Identify data collection methods and prepare field notes
CO3: Understand the working principles of survey instruments Estimate measurement errors and apply corrections
CO4: Interpret survey data and compute areas and volumes

8. STRUCTURAL ANALYSIS (1&2)

CO1: Analyze Perfect, Imperfect And Redundant Frames
CO2: Formulate Equilibrium and compatibility equations for structural members
CO3: Analyze one dimensional and two dimensional problems using classical methods Analyze indeterminate structures
CO4: Analyse structures for gravity loads, moving loads and lateral loads

9. BUILDING MATERIALS AND CONSTRUCTION PLANNING

CO1: The student will be able to identify various building materials required for

CO2: Able to identify types of windows, timber and defects of timber

10. ENGINEERING HYDROLOGY

CO1: Analyse hydro-meteorological data
CO2: Estimate abstractions from precipitation
CO3: Compute yield from surface and subsurface basin
CO4: Develop rainfall-runoff models
CO5: Formulate and solve hydrologic flood routing models

11. GEOTECHNICAL ENGINEERING (SOIL MECHANICS)

CO1: Characterise and classify soils
CO2: Identify shear strength parameters for field conditions
CO3: Compute and analyze the consolidation settlements
CO4: Understand the principles of compaction and its control
CO5: Determine the earth pressures on foundations and retaining structures
CO6: Analyze shallow and deep foundations
CO7: Calculate the bearing capacity of soils and foundation settlements
CO8: Understand soil exploration methods

12. IRRIGATION ENGINEERING

CO1: Plan an Irrigation System
CO2: Plan and design diversion head works
CO3: Design irrigation canal structures

CO4: Analyze gravity and earth dams
CO5: Design spillways and energy dissipations works

13. ENVIRONMENTAL ENGINEERING

CO1: Analyze characteristics of water and wastewater
CO2: Estimate the quantity of drinking water and domestic wastewater generated
CO3: Design components of water supply systems
CO4: Design sewerage system

14. TRANSPORTATION ENGINEERING

CO1: Plan highway networks
CO2: Design highway geometrics
CO3: Design Intersections and prepare traffic management plans
CO4: Design flexible and rigid pavements
CO5: Understand the principles of construction and maintenance of highways

15. CONSTRUCTION MANAGEMENT

CO1: Understand the roles and responsibilities of a project manager
CO2: Prepare schedule of activities in a construction project
CO3: Prepare tender and contract document for a construction project
CO4: Understand safety practices in construction industry
CO5: Identify the equipment used in construction

16. PRE STRESSED CONCRETE STRUCTURES

CO1: Understand the concepts of pre-stressing in concrete structures and identify the
CO2: materials for pre-stressing
CO3: Analyse a Pre-stressed Concrete section
CO4: Estimate losses of pre-stressing
CO5: Design pre-tensioned and post tensioned girders for flexure and shear
CO6: Design continuous pre-tensioned and post tensioned beams

17. INDUSTRIAL WASTE WATER TREATMENT

CO1: Identify the characteristics of industrial wastewaters
CO2: Describe pollution effects of disposal of industrial effluent
CO3: Identify and design treatment options for industrial wastewater
CO4: Formulate environmental management plan

18. AIR POLLUTION AND CONTROL

CO1: Identify sampling and analysis techniques for air quality assessment
CO2: Describe the plume behaviour for atmospheric stability conditions

CO3: Apply plume dispersion modelling and assess the concentrations
CO4: Design air pollution controlling devices

19.GROUND IMPROVEMENT TECHNIQUES

CO1: Identify ground conditions and suggest method of improvement
CO2: Design and assess the degree of improvement
CO3: Understand the principles of soil reinforcement and confinement in engineering constructions
CO4: Design reinforced soil structures

20. PAVEMENT ENGINEERING

CO1: Characterize the response characteristics of soil, aggregate, asphalt, and asphalt mixes
CO2: Analyze flexible pavements
CO3: Analyze rigid pavements
CO4: Design a flexible pavement using IRC, Asphalt Institute, and AASHTO methods
CO5: Design a rigid pavement using IRC, and AASHTO methods

Department of Electrical and Electronics Engineering

Course Outcomes & objectives

Educational Objectives & Outcomes

Program Educational Objectives (PEO's):

A graduate of the Electrical and Electronics Engineering Program should:

PEO1: Success in Electrical Engineering : To provide students with the knowledge of Basic Sciences in general and Electrical and electronics Engineering in particular so as to acquire the necessary skills for analysis and synthesis of problems in generation, transmission and distribution.

PEO2: Industrial awareness and research: To provide technical knowledge and skills to identify, comprehend and solve complex tasks in industry and research and inspire the students to become future researchers / scientists with innovative ideas.

PEO3: Successful employment and professional ethics: To prepare the students for successful employment in various Industrial and Government organizations, both at the National and International level, with professional competence and ethical administrative acumen so as to handle critical situations and meet deadlines.

PEO4: Being a leader professional and societal environment: To train the students in basic human and technical communication skills so that they may be good team-members, leaders and responsible citizen.

Program Outcomes:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: 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.

PO3: 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.

PO4: 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.

PO5: 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.

PO6: 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.

PO7: 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.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: 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.

PO11: 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.

PO12: 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.

Program Specific Outcomes (PSO'S):

A graduate of the Electrical and Electronics Engineering Program will demonstrate:

PSO1: Problem Solving: Exploit the knowledge of high voltage engineering in collaboration with power systems in innovative, dynamic and challenging environment, for the research based team work.

PSO2: Professional Skills: Identify the scientific theories, ideas, methodologies and the new cutting edge technologies in renewable energy engineering, and use this erudition in their

professional development and gain sufficient competence to solve the current and future energy problems universally.

PSO3: Modern Tools in Electrical Engineering: Comprehend the technologies like PLC, PMC, process controllers, transducers and HMI and design, install, test, maintain power systems and industrial applications.

Department of Electrical and Electronics Engineering

Course Outcomes:

Sl. No.	Name of the Subject/Course Title	Branch
1.	Basic Electrical Engineering	EEE
2.	Basic Electrical Engineering Lab	EEE
3.	Electrical Machines-I	EEE
4.	Electrical Circuits	EEE
5.	Electrical Circuits and Simulation Lab	EEE
6.	Electrical Machines Lab-I	EEE
7.	Electrical Machines Lab-II	EEE
8.	Network Theory	EEE
9.	Power Systems-I	EEE
10.	Electrical Machines –II	EEE
11.	Electrical Machines –III	
12.	Power Electronics	EEE
13.	Power Electronics and Simulation Lab	EEE
14.	Power Systems-II	EEE
15.	Control Systems	EEE
16.	Control Systems & Simulation Lab	EEE
17.	Computer Methods In Power Systems	EEE
18.	Power System Analysis	EEE
19.	Electrical Measurements	EEE
20.	Electrical & Electronics And Instrumentation	EEE
21.	Electrical Measurements Lab	EEE
22.	Renewable Energy Sources	EEE
23.	Power Semi Conductor Drives	EEE
24.	Static Drives	EEE
25.	Utilization Of Electrical Energy	EEE
26.	Power System Operation Control	EEE
27.	High Voltage Engineering	EEE
28.	Switch Gear And Protection	EEE
29.	Electrical Distribution Systems	EEE
30.	Reliability Engineering Applications To Power Systems	EEE
31.	HVDC Transmission	EEE
32.	Fundamentals Of HVDC & FACTS	EEE
33.	EHVAC Transmission	EEE
34.	Basic Simulation Lab	EEE
35.	Network Analysis	EEE

BASIC ELECTRICAL ENGINEERING

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Analyze and solve electric and magnetic circuits

CO2: Identify the type of electrical machines for a given application

CO3: Recognize the ratings of different electrical apparatus

CO4: Identify meters for measuring electrical quantities

BASIC ELECTRICAL ENGINEERING LAB

Course Outcomes:

CO1: Study different meters and instruments for measurement of electrical quantities

CO2: Study the linear and nonlinear characteristics of different types of loads experimentally

CO3: Design and experiment potential divider circuit

CO4: Experimentally verify the basic circuit theorems

CO5: Measure power and power factor in ac circuits

CO6: Understand 3 phase balanced and unbalanced, star and delta connected supply and load and to measure power in 3 phase circuits

CO7: Measure inductance in coupled circuits

CO8: Measure earth resistance and insulation resistance

CO9: Learn the characteristics of fuse experimentally

ELECTRICAL MACHINES – I

Course Outcomes**:**

After this course, the student will be able to

CO1: Identify different parts of a DC machine & understand its operation.

CO2: Carry out different testing methods to predetermine the efficiency of DC machines.

CO3: Understand different excitation and starting methods of DC machines.

CO4: Control the voltage and speed of a DC machines.

ELECTRICAL CIRCUITS:

Course Outcomes:

CO1: Comprehend the mathematical expression for voltages and currents in RL, RC and RLC circuits to find the transient response of inductor and capacitor in dc circuits.

CO2: Analyze the concept with working principles of linear constant coefficient differential equations with the help of Laplace transforms.

CO3: Know the basic skills of an ac circuits with independent/dependent voltage current sources by drawing impedance/admittance diagrams or using various laws/ techniques like source conversion

CO4: Acquaint with AC circuits in the frequency domain and compute transient response for first and second order circuits.

CO5: Discriminate the concepts like cut-set, tie-set, pole zero parameters and stability analysis

CO6: Interpret the pole zero network functions, transfer and driving point functions

CO7: Create the two-port network parameters, conversion between parameters,

CO8: Interconnection of two port networks

ELECTRICAL CIRCUITS AND SIMULATION LAB

Course Outcomes:

CO1: Use basic laboratory equipment and techniques to measure electrical quantities using laboratory test equipment such as multi-meters, power supplies, signal generators, and oscilloscopes.

C02: Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.

C03: Become proficient with computer skills (eg., OrCAD Pspice and Capture) for the analysis and design of circuits.

C04: Develop technical writing skills important for effective communication.

C05: Acquire teamwork skills for working effectively in groups.

ELECTRICAL MACHINES LABORATORY-I (DC MACHINES)

Course Outcomes (COs):

Upon the completion of DC Machines laboratory course, the student will be able to attain

CO1: Familiarity with the types of DC machines and their basic characteristics.

CO2: Study the methods to predetermine the efficiency of DC machines.

CO3: Knowledge of methods and measuring devices for determination of various characteristics and parameters of electrical machines.

CO4: Understand the operation of DC machines in load sharing.

CO5: Demonstrate the ability to work effectively in groups to troubleshoot and analyze electrical machines.

ELECTRICAL MACHINES LABORATORY-II (AC MACHINES)

Course Outcomes (COs):

CO1: Familiarity with the types of synchronous, asynchronous, transformers and their basic characteristics.

CO2: Ability to make a right decision related to a choice of the motor for a particular system in the industrial environment.

CO3: Understanding of the concepts of power and efficiency.

CO4: Understand the concept of efficiency and the short circuit impedance of a single-phase transformer from no - load test, winding resistance, short circuit test, and load test.

CO5: Understand the starting and connecting procedures of synchronous generators, and to obtain the „V" and inverted „V" curves of synchronous motors.

CO6: Experimentally obtain the load characteristics, starting current and starting torque of a three phases and single phase induction motor and to derive circuit parameters from no - load and blocked-rotor tests.

NETWORK THEORY

Course Outcomes**:** After this course, the student will be able to

C01: Analyze the Electrical Circuits with the concept of Network topology

C02: Apply the concepts of Magnetic circuit & Analyze Magnetic circuits

C03: Determine self and mutually induced EMF's for magnetically coupled coils

C04: Understand the importance of three phase circuits and Analyze the three phase circuits with Star & Delta connected balanced and unbalanced loads

C05: Analyze the transient behavior of electrical networks for various excitations

C06: Obtain the various network parameters for the given two port networks

C07: Represent the transfer function for the given network

C08: Determine the parameters for the design of various filters

POWER SYSTEMS-I

Course Outcomes**:** After this course, the student will be able to

CO1: Awareness of general structure of power systems

CO2: Impart the knowledge of generation of electricity based on conventional and nonconventional energy sources

CO3: Awareness of the concept of micro grid and distributed generation

CO4: To make students capable of analysis of mechanical and electrical design aspects of transmission system

CO5: Enable the students to do analysis of different types of distribution systems and its design

CO6: Impart the knowledge of protective relays and circuit breakers.

ELECTRICAL MACHINES II

CO1: Acquire knowledge about the constructional details and principle of operation of alternators.

CO2: Acquire knowledge about the working of synchronous machines as generators and motors.

CO3: Acquire knowledge about testing and applications of synchronous machines.

CO4: Acquire knowledge about the constructional details and principle of operation of three phase and single phase induction motors.

CO5: Acquire knowledge about the starting and speed control of induction motors.

CO6: Acquire knowledge about testing and applications of induction motors.

ELECTRICAL MACHINES-III

Course Outcomes (COs):

CO1: Discuss the construction, working and characteristics of three phase induction motor and synchronous motor.

CO2: Illustrate the equivalent circuit and speed control methods of three phase induction motors.

CO3: Outline the working and parallel operation of alternators.

CO4: Evaluate synchronous impedance and voltage regulation of synchronous machines.

POWER ELECTRONICS

Course Outcomes (COs):

CO1: Integrate the revolutionary development in power transmission, distribution and utilization with the advent of semiconductor devices.

CO2: Demonstrate rectifiers, choppers and various schemes of pulse width modulated inverters.

C03: Explain AC voltage converters and cyclo-converters.

CO4: Outline complete range of power supplies, including switched mode regulators and applications

POWER ELECTRONICS AND SIMULATION LABORATORY

Course Outcomes:

After completion of this course, the student is able to

C01: Understand the operating principles of various power electronic converters.

C02: Use power electronic simulation packages& hardware to develop the power converters.

C03: Analyze and choose the appropriate converters for various applications

POWER SYSTEMS-II

Course Outcomes**:** After this course, the student will be able to

CO1: Exposure to the modeling of individual power system components like transmission lines and generators

CO2: Enable the students to do load flow and short circuit calculations

CO3: Enable the students to do analysis of economic dispatch of thermal generators, load sharing and governor control

CO4: To impart the knowledge of automatic generation control and voltage regulation

CO5: To make students capable of analysis of power system stability, security and reliability

CO6: Awareness of deregulated power system

CONTROL SYSTEMS

Course Objectives (COs):

The course should enable the students to:

CO1: Organize modeling and analysis of electrical and mechanical systems.

CO2: Analyze control systems by block diagrams and signal flow graph technique.

CO3: Demonstrate the analytical and graphical techniques to study the stability.

CO4: Illustrate the frequency domain and state space analysis

CONTROL SYSTEMS AND SIMULATION LABORATORY

Course Outcomes (COs):

Upon the completion of Control Systems practical course, the student will be able to attain the following:

CO1: Recognize the symbols for the different parts of a block diagram: functional blocks, summing blocks and branch points. Simplify a block diagram using block diagram algebra to obtain a transfer function between any two points in the diagram.

CO2: Model a mechanical (masses, dampers and springs) and electrical system (inductors, resistors, capacitors) in the form of a transfer function.

CO3: Determine the impulse, step, and ramp response of a system, given a transfer function model.

CO4: Perform Routh‘s stability criterion and root locus of a system to determine stability. For systems with unknown values, determine the range of values for which the system will be stable and explain how adding a pole or a zero affects the stability.

CO5: Analyze feedback control systems in the time and frequency domain to use state space concepts to describe systems.

CO6: Recognize the ―type‖ of a system (based on the number of free integrators) and discuss the expected error characteristics as related to step, ramp, and acceleration inputs.

CO7: Interpret design criteria as related to the closed loop pole location on the complex plane.

CO8: Draw the Frequency response plots like Bode, Nyquist and Polar plots (magnitude and phase) for a given transfer function.

CO9: Design feedback compensators to achieve a set of desired closed loop system characteristics and design a compensator in the frequency domain to meet specific design requirements using a lead compensator, lag compensator, or lead-lag compensator.

CO10: Develop a PLC program for an automatic control system of a medium degree of complexity and select the right hardware for a given application.

CO11: Consider such aspects of the automation system as network communication, human machine interface, safety and protection against interference.

COMPUTER METHODS IN POWER SYSTEMS:

Course Outcomes: At the end of the course, the student will be able to:

CO1: Formulate the incidence, network matrices and model the power system components.

CO2: Perform steady state power flow analysis of power system networks using Gauss-Seidel, Newton-Raphson and fast decoupled iterative methods.

CO3: Analyze short circuit faults in power system networks using ZBus method.

CO4: Perform contingency analysis for power system networks using ZBus method.

POWER SYSTEM ANALYSIS:

Course Outcomes (COs):

CO1: Determine the bus impedance and admittance matrices for power system network.

CO2: Calculate various parameters at different buses using load flow studies and numerical methods.

CO3: Discuss the symmetrical component theory, sequence networks, short circuit calculations and per unit representation power system.

CO4: Understand the steady state stability of power system and suggest improvements.

CO5: Analyze the transient stability of power system and check methods to improve the stability.

ELECTRICAL MEASUREMENTS

Course Objectives (COs):

The course should enable the students to:

CO1: Demonstrate the construction, working and characteristics of electrical measurement instruments.

CO2: Illustrate the principles of energy measurement in electrical loads.

CO3: Outline the use of cathode ray oscilloscope.

CO4: Evaluate various transducers for electrical measurement.

ELECTRICAL AND ELECTRONICS INSTRUMENTATION

Course Objectives (COs):

The course should enable the students to:

CO1: to impart them the knowledge required for them, in understanding the working of various instruments and equipments used for the measurement of various electrical engineering parameters like voltage, current, power, phase etc in industry as well as in power generation, transmission and distribution sectors.

CO2: to make students capable of analyzing and solving the varieties of problems and issues coming up in the vast field of electrical measurements.

CO3: To enable the students to think in terms of innovative ideas to improve the existing technology in the field of measurements in terms of accuracy, cost, durability and user friendliness.

ELECTRICAL MEASUREMENTS LABORATORY

Course Outcomes (COs):

CO1: Upon completion of study of the course should be able to calibrate and test single phase energy meter, calibrate PMMC voltmeter and calibrate LPF wattmeter.

CO2: Student should be able to measure resistance, inductance and capacitance.

CO3: Students should be able to measure 3-Φ active power and reactive power.

CO4: Students should be able to test current transformer and dielectric strength of oil.

CO5: Students should be able to calibrate LVDT and resistance strain gauge.

RENEWABLE ENERGY SOURCES

Course Outcomes:

At the end of the course the student will be able to:

CO1: Understand the principles of wind power and solar photovoltaic power generation, fuel cells.

CO2: Assess the cost of generation for conventional and renewable energy plants

CO3: Design suitable power controller for wind and solar applications

CO4: Analyze the issues involved in the integration of renewable energy sources to the grid

POWER SEMICONDUCTOR DRIVES

Course Outcomes:

C01: Upon completing this course students must be able to choose their electric drive system base on this application.

C02: Also the operation of single and multi-quadrant operation of drive, they will be able to analyze any type of 1Φ & 3Φ rectifiers fed to DC motors as well as chopper fed to DC motors.

C03: Upon completing this course students must be able to control the speed of an AC-AC & DC-AC converter fed to induction motor and synchronous motor.

C04: Also the closed loop operation of an electric drive and their controllers. Student will be able to model any type of machines using linear transformation.

STATIC DRIVES

Course Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

CO1: Understand the speed control of DC motor with single phase controlled rectifiers.

CO2: Understand the speed control of DC motor with three phase controlled rectifiers.

CO3: Analyze the speed torque characteristics of DC motors for various firing angles.

CO4: Analyze the four quadrant operation of DC drives.

CO5: Understand the braking methods of DC drives.

CO6: Apply the knowledge of dual converters for four quadrant operation of DC motors.

CO7: Understand the control techniques for the operation of choppers.

CO8: Apply the knowledge of Choppers for speed control of DC Motors.

CO9: Analyze the four quadrant operation of DC motors with choppers.

CO10: Understand the speed control of induction motors with variable voltage control.

CO11: Understand the speed control of induction motors with variable frequency control.

CO12: Analyze the speed control of induction motor with rotor resistance control.

CO13: Apply the knowledge of cyclo converters for speed control of synchronous Motors.

CO14: Analyze the speed control of synchronous Motors with VSI.

CO15: Apply the knowledge of CSI for speed control of synchronous Motors.

CO16: Apply the knowledge of DC, AC motors and power electronics.

CO17: Process the knowledge and skills for employability and to succeed national and international level competitive examinations.

UTILIZATION OF ELECTRICAL ENERGY:

Course Outcomes:

CO1: To impart the knowledge of Electric Traction, Electric heating, Electric welding and Illumination

CO2: To make students capable of analyzing and solving the varieties of problems and issues in electric power utilization

CO3: Enable the students to design of interior and exterior lighting systems- illumination levels for various purposes light fittings- factory lighting- flood lighting-street lighting

CO4: Create awareness of energy conservation.

CO5: To impart the knowledge of air conditioning and refrigeration

CO6: Awareness of technology of electric and hybrid electric vehicles

POWER SYSTEM OPERATION AND CONTROL:

Course Objectives (COs):

CO1: Dispatch the load economically among thermal plants

CO2: Model LFC, AGC and AVR for single and two area power systems

CO3: Understand SCADA system for power system operation and control

CO4: Explain power system security and voltage stability

CO5: Estimate state of the system using weighted least squares method.

HIGH VOLTAGE ENGINEERING

CO1: Understand breakdown phenomena in gases and to elucidate the concepts used for the generation of high voltages and currents.

CO2: Elucidate the concepts used for the measurement of high voltages and currents and design corresponding circuits.

CO3: Understand high voltage testing techniques of Power apparatus and causes of over voltage in Power systems.

CO4: Design the layout of Gas Insulated substations and to know the concepts of insulation coordination.

SWITCH GEAR AND PROTECTION

Course Outcomes:

After Completion of this course student will be able to

CO1: Understand the types of Circuit breakers and choice of Relays for appropriate protection of power system equipment.

CO2: Understand various types of Protective devices in Electrical Power Systems.

C03: Interpret the existing transmission voltage levels and various means to protect the system against over voltages.

CO4: Understand the importance of Neutral Grounding, Effects of Ungrounded Neutral grounding on system performance, Methods and Practices.

ELECTRICAL DISTRIBUTION SYSTEMS:

Course Objectives (COs):

CO1: Understand the distribution system planning and automation

CO2: Explain the design considerations of sub transmission lines

CO3: Explain the design considerations of primary and secondary systems

CO4: Apply various protective devices and its coordination techniques to distribution system

CO5: Evaluate voltage drop and line loss calculations and design the capacitors and voltage regulating equipment to improve the power factor and voltage profile

RELIABILITY ENGINEERING APPLICATIONS TO POWER SYSTEMS

Course Objectives (COs):

CO1: To list the objectives of load forecasting and to apply the AI technique for load forecasting.

CO2: To determine the reliability of ISO and interconnected generation systems.

CO3: To analyze the transmission system reliability.

CO4: To explain the expansion planning and capacitor placement problem in transmission system and radial distributions system.

CO5: To design the primary and secondary distribution system and to explain distribution system protective scheme and its coordination.

HVDC TRANSMISSION

Course Objectives (COs):

CO1**:** Identify significance of DC over AC transmission system, types and application of HVDC links in practical power systems.

CO2: Analyze different converters viz.3, 6 and 12 pulse converters.

CO3**:** Analyze AC/DC system interactions and know the operation and control of various MTDC systems.

CO4: Model AC/DC system and apply protection for HVDC system against transient overvoltage and over currents.

FUNDAMENTALS OF HVDC AND FACTS DEVICES

Course Objectives (COs):

The course should enable the students to:

CO1: Summarize the different types of HVDC Transmission systems.

CO2: Distinguish AC and DC transmission system.

CO3: Examine the control schemes for HVDC transmission systems.

CO4: Illustrate the power flow analysis of AC and DC systems.

CO5: Classify different types of FACTS devices which are used in compensation of reactive power.

CO6: Analyze the Static series and combined compensators.

EHVAC TRANSMISSION

Course Objectives (COs):

CO1: Know the necessity, merits and demerits of EHVAC transmission and mechanical aspects

CO2: Evaluate the Inductance and capacitance of two conductor and multi conductor lines

CO3: Analyze the effect of corona, electrostatic field of EHVAC lines

CO4: Analyze the surface gradient on two conductor and bundle with more than 3 sub conductors

CO5: Design SVC schemes and voltage controlling devices

BASIC ELECTRICAL SIMULATION LAB

Course Outcomes:

After going through this lab the student will be able to

CO1: Apply signal generation in different systems.

CO2: Analyze networks by various techniques

CO3: Analyze circuit responses

CO4: Analyze bridge rectifiers

NETWORK ANALYSIS

CO1: Analyze three phase star and delta connected circuits to calculate the active and reactive power.

CO2: Understand the transient response of series and parallel RL, RC and RLC circuits for DC and AC excitations.

CO3: Discuss the concepts of locus diagram, network functions and to calculate the two port network parameters.

CO4: Design different types of filters and perform the digital simulation of electric circuits.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

The Programme Educational Objectives of B.Tech. Programmes are:

1. To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
2. To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
3. To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, design and implementation skills
4. To prepare graduates who will thrive to pursue life-long learning to fulfill their goals

PROGRAMME OUTCOMES (POs):

Undergraduate engineering programmes are designed to prepare graduates to attain the following program outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
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. **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. **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. **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. **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. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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. **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. **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.

COURSE OUTCOMES OF HUMANITIES AND SCIENCES

MATHEMATICS – I:

CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations

CO2: Find the Eigen values and Eigen vectors. Reduce the quadratic form to canonical form using orthogonal transformations.

CO3: Analyze the nature of sequence and series. Solve the applications on the mean value theorems.

CO4: Evaluate the improper integrals using Beta and Gamma functions. Find the extreme values of functions of two variables with/ without constraints

APPLIED PHYSICS:

CO1: The student would be able to learn the fundamental concepts on Quantum behaviour of matter in its micro state.

CO2: The knowledge of fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.

CO3: Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.

CO4: The course also helps the students to be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.

PROGRAMMING FOR PROBLEM SOLVING:

CO1: To write algorithms and to draw flowcharts for solving problems.

CO2: To convert the algorithms/flowcharts to C programs.

CO3: To code and test a given logic in C programming language.

CO4: To decompose a problem into functions and to develop modular reusable code.

CO5: To use arrays, pointers, strings and structures to write C programs.

CO6: Searching and sorting problems.

ENGINEERING GRAPHICS

CO1: Preparing working drawings to communicate the ideas and information.

CO2: Read, understand and interpret engineering drawings.

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PROGRAMMING FOR PROBLEM SOLVING LAB:

CO1: Formulate the algorithms for simple problems

CO2: Translate given algorithms to a working and correct program

CO3: Correct syntax errors as reported by the compilers

CO4: Identify and correct logical errors encountered during execution

CO5: Represent and manipulate data with arrays, strings and structures

CO6: Use pointers of different types

CO7: Create, read and write to and from simple text and binary files

CO8: Modularize the code with functions so that they can be reused

ENVIRONMENTAL SCIENCE:

CO1: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

MA201BS: MATHEMATICS – II:

CO1: Identify whether the given differential equation of first order is exact or not

CO2: Solve higher differential equation and apply the concept of differential equation to real world problems.

CO3: Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped

CO4: Evaluate the line, surface and volume integrals and converting them from one to another

CHEMISTRY:

CO1: The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.

CO2: The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.

CO3: The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.

CO4: The knowledge of configurational and conformational analysis of molecules and reaction mechanisms

BASIC ELECTRICAL ENGINEERING:

CO1: To analyze and solve electrical circuits using network laws and theorems.

CO2: To understand and analyze basic Electric and Magnetic circuits

CO3: To study the working principles of Electrical Machines

CO4: To introduce components of Low Voltage Electrical Installations.

ENGINEERING WORKSHOP:

CO1: Study and practice on machine tools and their operations

CO2: Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, and foundry, house wiring and welding.

CO3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.

CO4: Apply basic electrical engineering knowledge for house wiring practice

ENGLISH:

CO1: Use English Language effectively in spoken and written forms.

CO2: Comprehend the given texts and respond appropriately.

CO3: Communicate confidently in various contexts and different cultures.

CO4: Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

ENGINEERING CHEMISTRY LAB:

CO1: Determination of parameters like hardness and chloride content in water.

CO2: Estimation of rate constant of a reaction from concentration – time relationships.

CO3: Determination of physical properties like adsorption and viscosity.

CO4: Calculation of Rf values of some organic molecules by TLC technique

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB:

CO1: To facilitate computer-assisted multi-media instruction enabling Individualized and independent language learning

CO2: To sensitize students to the nuances of English speech sounds, word accent, Intonation and rhythm

CO3: To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking

CO4: To improve the fluency of students in spoken English and neutralize their Mother tongue influence

CO5: To train students to use language appropriately for public speaking and Interviews

BASIC ELECTRICAL ENGINEERING LAB:

CO1: Get an exposure to basic electrical laws.

CO2: Understand the response of different types of electrical circuits to different excitations.

CO3: Understand the measurement, calculation and relation between the basic electrical parameters CO4: Understand the basic characteristics of transformers and electrical machines

ENGINEERING PHYSICS LAB:

CO1: The student is expected to learn from this laboratory course the concept of error and its analysis.

CO2: It also allows the student to develop experimental skills to design new experiments in Engineering.

CO3: With the exposure to these experiments the student can compare the theory and correlate with experiment.

IT WORKSHOP / ENGINEERING WORKSHOP:

CO1: PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

CO2: Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

CO3: Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. (Recommended to use Microsoft office 2007 in place of MS Office 2003).

APPLIED PHYSICS LAB:

CO1: To determine the energy gap of a semiconductor diode

CO2: To study the V-I Characteristics of solar cell

CO3: Plot V-I and P-I characteristics of light emitting diode

CO4: Determination of magnetic field along the axis of a current carrying coil

CO5: To determine Hall co-efficient of a given semi-conductor.

CO6: To determine work function of a given material

CO7: To study the characteristics of LASER sources.

CO8: To determine the bending losses of Optical fibres.

CO9: To determine the Quality factor of LCR Circuit

CO10: To determine the time constant of R-C circuit.

MATHEMATICAL METHODS:

CO1: Explain at high levels concepts from advanced linear algebra and multi-variable differentiation.

CO2: Compute eigenvalues and eigenvectors of matrices, and solve first and higher order ordinary differential equations.

CO3: Evaluate partial derivatives of multivariate functions.

CO4: Implement basic operations in Fourier series and Laplace transforms.

CO5: Apply mathematical and computational methods to a range of problems in science and engineering.

ENGINEERING MECHANICS:

CO1: At the end of this course, students should meet the learning objectives through following observable and measurable outcomes by undergoing various tests planned by the course teacher as a part of course assessment.

CO2: Summarize and sketch different force systems. .

CO3: Calculate the resultant, reaction of system of forces.

CO4: Calculate geometric properties of planar elements.

CO5: Solve problems related to kinetics.

CO6: Solve problems on forces in space using vector approach.

COMPUTER PROGRAMMIMING IN C:

CO1: Demonstrate the basic knowledge of computer hardware and software.

CO2: Ability to write algorithms for solving problems.

CO3: Ability to draw flowcharts for solving problems.

CO4: Ability to code a given logic in C programming language

CO5: Gain knowledge in using C language for solving problems.

MATHEMATICS-III: COURSE OUT COME:

CO1: Ordinary differential equations of first order.

CO2: Applications and numerical methods.

CO3: Ordinary differential equations of higher order.

CO4: Applications and numerical methods.

CO5: Systems of ordinary differential equations and their numerical methods.

CO6: Laplace transforms.

CO7: Partial differential equations and their applications.

PROFESSIONAL COMMUNICATION IN ENGLISH:

CO1: Use English Language effectively in spoken and written forms.

CO2: Comprehend the given texts and respond appropriately.

CO3: Communicate confidently in formal and informal contexts

Department of Mechanical Engineering

Course Outcomes & objectives

PO1 - Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 - Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, naturals ciences, and engineering sciences.

PO3 - 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.

PO4 - 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.

PO5 - 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.

PO6 - 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.

PO7 - 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.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - 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.

PO11 - 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.

PO12 - 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.

Department of Mechanical Engineering

Course Outcomes:

Sl. No.	Name of the Subject/Course Title	Branch
1	ENGINEERING GRAPHICS	MECH
2	ENGINEERING WORKSHOP	MECH
3	THERMODYNAMICS	MECH
4	KINEMATICS OF MACHINERY	MECH
5	MECHANICS OF SOLIDS	MECH
6	METALLURGY AND MATERIAL SCIENCE LAB	MECH
7	DYNAMICS OF MACHINERY	MECH
8	FLUID MECHANICS AND HYDRAULIC MACHINES	MECH
9	MACHINE DRAWING	MECH
10	MANUFACTURING PROCESS	MECH
11	KINEMATICS AND DYNAMICS LAB	MECH
12	FLUID MECHANICS AND HYDRAULIC MACHINES LAB	MECH
13	MANUFACTURING PROCESS LAB	MECH
14	DESIGN OF MACHINE MEMBERS - I	MECH
15	THERMAL ENGINEERING – I	MECH
16	METROLOGY AND MACHINE TOOLS	MECH
17	THERMAL ENGINEERING - II	MECH
18	DESIGN OF MACHINE MEMBERS - II	MECH
19	HEAT TRANSFER	MECH
20	FINITE ELEMENT METHODS	MECH

21	REFRIGERATION AND AIR CONDITIONING	MECH
22	MACHINE TOOL DESIGN	MECH
23	IC ENGINES AND GAS TURBINES	MECH
24	HEAT TRANSFER LAB	MECH
25	CADD and MAT LAB	MECH
26	MACHINE LEARNING	MECH
27	RELIABILITY ENGINEERING	MECH
28	ENGINEERING MECHANICS	MECH

ENGINEERING GRAPHICS:

Course Outcomes:

CO1: Preparing working drawings to communicate the ideas and information.

CO2: Read, understand and interpret engineering drawings.

ENGINEERING WORKSHOP:

Course Outcomes: At the end of the course, the student will be able to:

CO1: Study and practice on machine tools and their operations

CO2: Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding

CO3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.

CO4: Apply basic electrical engineering knowledge for house wiring practice

THERMODYNAMICS:

Course Outcomes: At the end of the course, the student should be able to

CO1: Understand and differentiate between different thermodynamic systems and processes.

CO2: Understand and apply the laws of Thermodynamics to different types of systems undergoing various processes and to perform thermodynamic analysis.

CO3: Understandand analyze the Thermodynamic cycles and evaluate performance parameters.

KINEMATICS OF MACHINERY:

Course Outcomes:

CO1: The main purpose is to give an idea about the relative motions obtained in all the above type of components used in mechanical Engineering.

MECHANICS OF SOLIDS:

Course Outcomes:

CO1: Analyze the behavior of the solid bodies subjected to various types of loading;

CO2: Apply knowledge of materials and structural elements to the analysis of simple structures;

CO3: Undertake problem identification, formulation and solution using a range of analytical methods;

CO4: Analyze and interpret laboratory data relating to behavior of structures and the materials they are made of, and undertake associated laboratory work individually and in teams.

CO5: Expectation and capacity to undertake lifelong learning

METALLURGY AND MATERIAL SCIENCE LAB:

Course Outcomes:

CO1: The Primary focus of the Metallurgy and Material science program is to provide undergraduates with a fundamental knowledge based associated materials properties, and their selection and application.

CO2: Upon graduation, students would have acquired and developed the necessary background and skills for successful careers in the materials-related industries.

CO3: Furthermore, after completing the program, the student should be well prepared for management positions in industry or continued education toward a graduate degree

DYNAMICS OF MACHINERY:

Course Outcomes:

CO1: The study of KOM& DOM are necessary to have an idea while designing

CO2: The various machine members like shafts, bearings, gears, belts & chains and various I.C.

CO3: Engine Components & Machine tool parts.

FLUID MECHANICS AND HYDRAULIC MACHINES:

Course Outcomes:

CO1: Able to explain the effect of fluid properties on a flow system.

CO2: Able to identify type of fluid flow patterns and describe continuity equation.

CO3: To analyze a variety of practical fluid flow and measuring devices and utilize fluid Mechanics principles in design.

CO4: To select and analyze an appropriate turbine with reference to given situation in power plants.

CO5: To estimate performance parameters of a given Centrifugal and Reciprocating pump

CO6: Able to demonstrate boundary layer concepts.

MACHINE DRAWING:

Course Outcomes:

CO1: Preparation of engineering and working drawings with dimensions and bill of material during design and development. Developing assembly drawings using part drawings of machine components.

CO2: Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.

CO3: Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.

CO4: Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features

CO5: Title boxes, their size, location and details - common abbreviations and their liberal usage

CO6: Types of Drawings – working drawings for machine parts.

MANUFACTURING PROCESS:

Course Outcomes:

CO1: Understand the idea for selecting materials for patterns.

CO2: Types and allowances of patterns used in casting and analyze the components of moulds.

CO3: Design core,core print and gating system in metal casting processes Understand arc, gas, solid state and resistance welding processes**.**

CO4: Develop process-maps for metal forming processes using plasticity principles.

CO5: Identify the effect of process variables to manufacture defect free products.

KINEMATICS AND DYNAMICS LAB:

Course Outcomes: Upon successful completion of this lab, students should be able to:

CO1: Understand types of motion

CO2: Analyze forces and torques of components in linkages

CO3: Understand static and dynamic balance

CO4: Understand forward and inverse kinematics of open-loop mechanisms

FLUID MECHANICS AND HYDRAULIC MACHINES LAB:

Course Outcomes:

CO1: Able to explain the effect of fluid properties on a flow system

CO2: Able to identify type of fluid flow patterns and describe continuity equation

CO3: To analyze a variety of practical fluid flow and measuring devices and utilize fluid mechanics principles in design.

CO4: To select and analyze an appropriate turbine with reference to given situation in power plants

CO5: To estimate performance parameters of a given Centrifugal and Reciprocating pump.

CO6: Able to demonstrate boundary layer concepts

MANUFACTURING PROCESS LAB:

CO1: Understanding the properties of moulding sands and pattern making

CO2: Fabricate joints using gas welding and arc welding.

CO3: Evaluate the quality of welded joints.

CO4: Basic idea of press working tools and performs moulding studies on plastics

DESIGN OF MACHINE MEMBERS – I:

Course Outcomes:

CO1: The student acquires the knowledge about the principles of design, material selection, component behavior subjected to loads, and criteria of failure

CO2: Understands the concepts of principal stresses, stress concentration in machine members and fatigue loading.

CO3: Design on the basis of strength and rigidity and analyze the stresses and strains induced in a machine element.

THERMAL ENGINEERING – I:

Course Outcomes:

CO1: At the end of the course, the student should be able to evaluate the performance of IC engines and compressors under the given operating conditions.

CO2: Apply the laws of Thermodynamics to evaluate the performance of Refrigeration and air conditioning cycles.

CO3: Understand the functionality of the major components of the IC Engines and effects of operating conditions on their performance

METROLOGY AND MACHINE TOOLS:

Course Outcomes: At the end of the course, the student would be able to

CO1: Identify techniques to minimize the errors in measurement.

CO2: Identify methods and devices for measurement of length, angle, gear & thread
parameters, surface roughness and geometric features of parts.

CO3: Understand working of lathe, shaper, planer, drilling, milling and grinding machines.

CO4: Comprehend speed and feed mechanisms of machine tools

CO5: Estimate machining times for machining operations on machine tools

THERMAL ENGINEERING – II:

Course Outcomes: At the end of the course, the student should be able to

CO1: Develop state – space diagrams based on the schematic diagrams of process flow of
steam and gas turbine plants

CO2: Apply the laws of Thermodynamics to analyze thermodynamic cycles

CO3: Differentiate between vapour power cycles and gas power cycles

CO4: Infer from property charts and tables and to apply the data for the evaluation of
performance parameters of the steam and gas turbine plants

CO5: Understand the functionality of major components of steam and gas turbine plants and
to do the analysis of these components

DESIGN OF MACHINE MEMBERS – II:

Course Outcomes:

CO1: Knowledge about journal bearing design using different empirical relations

CO2: Estimation of life of rolling element bearings and their selection for given service
conditions.

CO3: Acquaintance with design of the components as per the standard, recommended
procedures which is essential in design and development of machinery in industry

HEAT TRANSFER:

Course Outcomes: At the end of this course, student will be able to

CO1: Understand the basic modes of heat transfer

CO2: Compute one dimensional steady state heat transfer with and without heat generation

CO3: Understand and analyze heat transfer through extended surfaces

CO4: Understand one dimensional transient conduction heat transfer

CO5: Understand concepts of continuity, momentum and energy equations

CO6: Interpret and analyze forced and free convective heat transfer

CO7: Understand the principles of boiling, condensation and radiation heat transfer

CO8: Design of heat exchangers using LMTD and NTU methods

FINITE ELEMENT METHODS:

Course Outcomes: At the end of the course, the student will be able to

CO1: Apply finite element method to solve problems in solid mechanics, fluid mechanics and heat transfer.

CO2: Formulate and solve problems in one dimensional structures including trusses, beams and frames.

CO3: Formulate FE characteristic equations for two dimensional elements and analyze plain stress,plain strain, axi-symmetric and plate bending problems

CO4: Implement and solve the finite element formulations using MATLAB

REFRIGERATION AND AIR CONDITIONING:

Course Outcomes: At the end of the course, the student should be able to

CO1: Differentiatebetween different types of refrigeration systems with respect to application aswell as conventional and unconventional refrigeration systems.

CO2: Thermo dynamically analyse refrigeration and air conditioning systems and evaluate performance parameters**.**

CO3: Apply the principles of Psychometrics to design the air conditioning loads for the industrial applications

MACHINE TOOL DESIGN:

Course Outcomes: **:** At the end of the course, the student will be able to

CO1: Understand basic motions involved in a machine tool.

CO2: Design machine tool structures

CO3: Design and analyze systems for specified speeds and feeds

CO4: Select subsystems for achieving high accuracy inmachining.

CO5: Understand control strategies for machine tool operations

CO6: Apply appropriate quality tests for quality assurance.

IC ENGINES AND GAS TURBINES:

Course Outcomes:

CO1: Explain basic concepts of actual cycles with analysis and to describe the fundamental concepts of IC engines along with its working principles.

CO2: Describe the combustion phenomenon in SI and CI engines

CO3: Evaluate the performance of IC engines and the importance of alternate fuels

CO4: Classify the essential components of gas turbine along with its performance Improving methods.

CO5: Illustrate the working principle of different types of Jet propulsive engines and Rockets.

HEAT TRANSFER LAB:

Course Outcomes: At the end of the lab sessions, the student will be able to

CO1: Perform steady state conduction experiments to estimate thermal conductivity of different materials

CO2: Perform transient heat conduction experiment

CO3: Estimate heat transfer coefficients in forced convection, free convection , condensation and correlate with theoretical values

CO4: Obtain variation of temperature along the length of the pin fin under forced and free convection

CO5: Perform radiation experiments: Determine surface emissivity of a test plate and Stefan- Boltzmann's constant and compare with theoretical value

CADD and MAT LAB:

Course Outcomes:

CO1: Students should be able to apply computer methods for solving a wide range of engineering problems.

CO2: Students should be able to use computer engineering software to solve and present problem solutions in a technical format.

CO3: Students should be able to utilize computer skills to enhance learning and performance in other engineering and science courses

CO4: And finally, students should be able to demonstrate professionalism in interactions with Colleagues, faculty, and staff

SMACHINE LEARNING:

Course Outcomes:

CO1: Student should be able to understand the basic concepts such as decision trees and neural networks.

CO2: Ability to formulate machine learning techniques to respective problems

CO3: Apply machine learning algorithms to solve problems of moderate complexity

RELIABILITY ENGINEERING:

Course Outcomes: After completion of this course, the student will be able to

CO1: Model various systems applying reliability networks

CO2: Evaluate the reliability of simple and complex systems

CO3: Estimate the limiting state probabilities of repairable systems

CO4: Apply various mathematical models for evaluating reliability of irrepairable systems

ENGINEERING MECHANICS:

Course Outcomes: At the end of the course, students will be able to

CO1: Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces

CO2: Solve problem of bodies subjected to friction

CO3: Find the location of centroid and calculate moment of inertia of a given section

CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion

CO5: Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration

TALLA PADMAVATHI COLLEGE OF ENGINEERING
SOMIDI KAZIPET 03

DEPARTMENT OF MBA

COURSE OUTCOMES

DEPARTMENT VISION AND MISSION

Vision

"Providing excellence in education to build a better tomorrow, through a realistic and research oriented environment."

Mission

To offer high quality Masters in Business Administration and to prepare students for professional career.

To contribute towards societal development through imparting quality education

Program Educational Objectives, Program Outcomes and Program Specific Outcomes

Program Educational Objectives (PEO)

PEO 01: To prepare the students to lead a successful career in industry or pursue higher studies or become an entrepreneur

PEO 02: To train students so as to enable them to offer commercially feasible and socially acceptable, managerial solutions to technical/non technical problems.

PEO 03: To turn out graduates having the capability to demonstrate strong leadership skills, effective communication skills, professional etiquette and a desire to be a lifelong leaner

Program Outcomes(PO)

PO1: Demonstrate managerial competence, comprehensive knowledge and understanding the methodologies and technologies of functional areas of business applications

PO2: Apply the knowledge of statistics, behavioral science, operations and technology. Understand in detail, analyze, formulate and solve the issues pertaining to the business application

PO3: Identify investigate, understand and analyze complex problems pertaining to management applications in industries and identify effective solution strategies for implementation.

PO4: Inculcate the role of research in developing and maintaining knowledge of the state – of – the art in various technologies and application in industries.

Acquire the skill to design, develop and modify systems in hardware and software platforms to meet desired needs within realistic constraints.

PO5: Create, select and apply appropriate techniques, resources, modern management tools to complex activities in the field of business management.

PO6: Analyze and summarize complex information pertaining to various fields of management in industries. Function effectively as an individual, and as a member or leader in a team.

PO7: Develop specifications, implement and critically assess projects and their outcomes. Demonstrate management, leadership and entrepreneurial skills, and apply these to one's own work, as a member and a leader in a team to manage projects in multidisciplinary environments

PO8: Communicate effectively in both oral and written contexts in the form of research papers, project reports, design documents and seminar presentations.

PO9: Engage in self-improvement through continuous professional development and life –long learning to maintain an up-to-date knowledge of contemporary issues in various fields of management.

PO10: Apply and commit to professional ethics and responsibilities of management practice. Understand the importance of sustainability and cost effectiveness in design and development of managerial solutions for industries and their impact in societal and environmental context. Demonstrate awareness of societal, safety, health, legal and cultural issues relevant to professional management practice.

MANAGEMENT FUNDAMENTALS

CO 1 The students should be able to learn the history of management and the contributions of important management researchers.
CO 2 They should be able to understand the relevance of environmental scanning, planning and how to take decisions.
CO 3 The students can learn how to delegate authority and use power to influence people to get the work done through proper communication and control.

BUSINESS LAW AND REGULATION

CO 1 After going through the text and case lets in terms of various court judgements, the students should be able to understand the formalities involved in incorporating a company and the nuances related to the Law of Contract.

CO 2 The student will also be able to know the implications of direct and indirect taxes, negotiable instruments Act and also about the cyber laws.

FINANCIAL ACCOUNTING AND ANALYSIS

CO 1 To prepare, understand, interpret and analyse financial statements with confidence. To appreciate and use financial statements as means of business communication.

CO 2 To use the analytical techniques and arriving at conclusions from financial information for the purpose of decision making.

MANAGERIAL ECONOMICS

CO 1 Students should be able to understand the basic economic principles, forecast demand and supply and should be able to estimate cost and understand market structure and pricing practices.

BUSINESS ENVIRONMENT

CO 1 After reading the text book & cases related to the syllabus and business news**p**apers like Business Standard, Economic Times, and Business Line, students should be able to understand the issues related to the industrial policy and regulation and their amendments from time to time.

CO 2 They will also understand the terminology of the planning commission and Union Budget. The knowledge gained by the students on capital markets, RBI guidelines; trade, EXIM policy and Foreign Exchange Management Act will be useful for them to take decisions to ensure growth and sustainability of the organizations.

RESEARCH METHODOLOGY & STATISTICAL ANALYSIS

CO 1 Students will be able to apply the principles of research methodology for the research design for the various mini and major projects of the MBA programme. They will be able to analyse the data statistically.

STATISTICAL DATA ANALYSIS -PRACTICAL

CO 1 The learning outcome is that the students should be able to:

CO2 Analyse the data to draw inference for decision making.

CO3 Understand application of statistical measures of central tendency

CO4 Understand application of ANOVA

CO 5 Analyse trends, Test hypotheses

BUSINESS COMMUNICATIONS – PRACTICAL

CO 1 At the end of the course, students will be enabled with the following skills.English language skills for effective written business communication ('s). Will be able to understand how to write project report

HUMAN RESOURCE MANAGEMENT

CO 1 Students should be able to understand the basic HR concepts. They will be able to understand the process of recruitment, selection, performance appraisal, training & development, compensation and employee retention approaches and strategies.

QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS

CO 1 The Course covers origin and application of OR, Linear Programming, Decision Theory and queuing theory. These concepts help the student in taking decisions for business.

FINANCIAL MANAGEMENT

CO 1 Provides support for decision making, It enables managers to monitor their decisions for any potential financial implications and for lessons to be learned from experience and to adapt or react as needed.

CO 2 To ensure the availability of timely, relevant and reliable financial and non-financial information

CO 3 FM helps in understanding the use of resources efficiently, effectively and economically. To focus on wealth maximization rather than profit maximization

MANAGEMENT INFORMATION SYSTEM

CO 1 After going through the cases in the text and other references, **b**y the end of this course the students will understand the MIS concepts its applications,

MARKETING MANAGEMENT

CO 1 By reading text and relating the concepts through cases the student would be able to understand the concepts of marketing management.

CO 2 They will be able to analyze markets and design customer driven strategies and will be able to communicate the decisions towards business development with superior customer value.

BUSINESS ETHICS AND CORPORATE GOVERNANCE

CO 1 The learning outcome developing business ethics and professional ethics.

CO 2 They will also be able to understand ethical and psychological dimensions to contain cybercrimes and also will be able grasp the important issues related to corporate governance.

PERSONAL EFFECTIVENESS

CO Students at the end of the course would be able to:

- Loose fear of public speaking and feel confident about them-selves.
- Participate in group discussions.
- Face interviews.
- Gain communication skills and be able to convince their view point to the superiors, peers and subordinates.
- Time management skills to efficiently manage time in meeting deadlines in modern day organizations
- Life style management skills to grow in modern day organization and succeed in their chosen careers
- Help students to confidently face and succeed in the corporate selection processes.

    - Presentations
    - Group Discussions
    - Overcoming fear of facing Interviews
    - Time Management
    - Vocabulary skills for critical corporate communication and to give effective presentations to internal and external customers of an organization.

SUMMER INTERNSHIP

CO 1 Understand the product mix and strategies of the organization, structure of organization, reporting systems and general administration of the organization.

CO 2 Understand the organizational dynamics in terms of organizational behaviour, culture, competition, future strategies and change initiatives of the organization.

CO 3 Understand how to do the routine work related to job they prefer to do after MBA.

PRODUCTION AND OPERATIONS MANAGEMENT

CO 1 The students will be able to understand operations management, product & process design, analysis, plant location, layout, Scheduling and Material Management.

STRATEGIC MANAGEMENT

CO 1 By reading the text and discussing the cases students should be able to understand how to scan internal and external environment of an organization, understand different types of strategies and structures, strategies of the competitors, turnaround strategies, global strategies and strategic control.

CO 2 With that knowledge they would be able to formulate strategies, change strategies if necessary and implement strategies. They will also be able to evaluate strategies and take corrective steps.

ORGANISATIONAL BEHAVIOUR

CO 1 To understand how employees behave in organizations. Students should be able to correct their individual behaviour and group behaviour.

CO 2 They will also be able to motivate and lead employees towards achievement of organizational mission and objectives.

ENTREPRENEURSHIP

CO 1 By the end of this course the students should be able to understand the mindset of the entrepreneurs, identify ventures for launching, develop an idea on the legal framework and also understand strategic perspectives in entrepreneurship.

CONSUMER BEHAVIOR

CO 1 Student should be able to understand the environmental influences on consumer behaviour, perception and attitude of consumers, consumer decision making and marketing ethics towards consumers.

SALES AND DISTRIBUTION

CO 1 After reading the text and discussing the cases the student should be able to understand the importance of Sales Management, Sales Planning and Budgeting and characteristics of distribution channels and managing them.

INTEGRATED MARKETING COMMUCATION

CO 1 After reading the text and discussing the cases the students should be able to understand integrated marketing communication, budgeting, sales promotion, media planning and ethical aspects

RETAILING MANGEMENT

CO 1 The students will learn the Modern Retailing Concepts and will able to link it to cases to understand the present Retailing Trends.

CO 2 The students will be able to understand shopping environment, retail formats, functions, retail operation and promotion.

SERVICES MARKETING

CO 1 The objective of the course is to provide a deeper insight into the Marketing Management of companies offering Services as product.

CO 2 The students will be able to understand the characteristics of services, understand consumer behaviour in services, align service design and standards, delivering service, managing services promises.

INTERNATIONAL MARKETING

CO 1 The objective of the course is to provide a deeper insight into the global marketing management, environment of global markets, assessing global market opportunities, developing and implementing global marketing strategies

COST AND MANAGEMENT ACCOUNTING

CO 1 To distinguish between Management Accounting and Cost Accounting. To understand the detailed cost concepts, cost structure and elements of costs of manufacturing and service organizations which have been facing dramatic changes in their business environment.

CO 2 To identify and describe the elements involved in decision making, planning and control. To identify and describe the future of Management Accounting System

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

CO 1 The objective of this course is to provide the conceptual and Practical understanding of Stock markets Equity & Bond Valuation , Cash market and also Mutual funds.

FINANCIAL INSTITUTIONS, MARKETS AND SERVICES

CO 1 The objective of the course is to provide to students an understanding of Financial Markets, the major institutions involved and the services offered within this framework

STRATEGIC INVESTMENT AND FINANCING DECISIONS

CO 1 To explain the role and nature of investment and financial strategies and its relationship to maximization of wealth/shareholders value and to examine various risk models in capital budgeting.

CO 2 To evaluate the motives for financial implications of mergers and acquisitions and lease financing. To discuss the impact of general and specific inflation on financial and investment strategy decisions.

INTERNATIONAL FINANCIAL MANAGEMENT

CO 1 The objective of the course is to provide students with a broad view of International Monetary Systems and its understanding to enable a global manager to do business in a global setting. The prerequisite for the course is Financial Accounting and Analysis and Financial Management.

FINANCIAL DERIVATIVES

CO 1 The objective of this course is to make students efficient in the area of Derivatives, giving them the knowledge of basics in Derivatives, Future Markets, Option Strategies, etc

PERFORMANCE MANAGEMENT

CO 1 The students can understand the importance of performance Management, Performance Appraisals, Reward System, and other performance related concepts

TRAINING & DEVELOPMENT

CO 2 The student after completing the course will be familiar with how to do training need analysis, understand various training methods, design training programs, implement training programs and evaluate effectiveness of training programs

MANAGEMENT OF INDUSTRIAL RELATIONS

CO 1 The student understands the industrial relations, its importance in HR and various Labour Laws like Factories Act, Wage and Bonus Act and Dispute Preventive and Corrective Mechanisms. They will also understand the role of Trade Unions, Settlement of disputes, Collective Bargaining, Wage Policy

COMPENSATION & REWARD MANAGEMENT

CO 1 The student understands how to design the compensation for various levels of jobs in the organization, designing the compensation for special groups. Government and legal issues in compensation design.

MANAGEMENT OF CHANGE

CO 1 The student understands the need to bring change, how to design change in the organizations, role of leadership in change management, change communication and resistance to change and the role of HR in change management

LEADERSHIP

CO 1 The students will be able to understand in definitions, concepts and process of leadership. The will also understand the approaches and theories of leadership, leadership styles, leadership types like transactional leadership, transformational leadership, team leadership

TOTAL QUALITY MANAGEMENT

CO 1 : Students will be able to understand a) importance of Quality b) Principles and Practices of TQM c) tools and techniques in Quality management

DATA ANALYTICS

CO 1 Learning Outcome: Students will be able to understand a) Importance of Analytics b) Understanding the analytical tools c) Application of Analytical tools to solve business problems.

DIGITAL MARKETING

CO 1 Students will be understand a) the applications of digital marketing in the globalized market b) Channels of Digital Marketing c) digital marketing plan d)Search engine marketing e) Online Advertising

CUSTOMER RELATIONSHIP MANAGEMENT

CO 1 Course Outcome: Students will be able to understand a) need of CRM b) building customer relations c) CRM process d) CRM structures e) Planning and Implementation of CRM.

RISK MANAGEMENT

CO 1 Students will be able to understand a) Concepts of Risk Management b) Risk Management Measurement c) Risk Management using Forward and Futures d) Risk Management using Options and Swaps.

TALENT AND KNOWLEDGE MANAGEMENT

CO 1 Students will be able to understand a) Talent Management Process b) Succession and career planning approaches c) Knowledge management aspects d) Knowledge management assessment and solutions