Course outcomes, Programme Outcomes and Programme Specific Outcomes

Summary

R-15Course Outcomes

I Year

Course Name: ENGLISH **Course code:**A10001

C101.1	Relate listening skills for effective communication, comprehend literary text and enrich vocabulary.
C101.2	Comprehend technical correspondence, learn reading techniques and use grammar structures appropriately.
C101.3	Revise and apply the right format of formal letter writing, drafting Resumes' and know the contextual knowledge of vocabulary used.
C101.4	Compose the literary text, basic grammatical aspects and learning the etymology of words.
C101.5	Employ information transfer intelligibly and express effectively in spoken and written communication.

Course Name: Mathematics-I **Course code:**A10002

C102.1	Ability to solve linear system of equations and find Eigen values, Eigen vectors of a square matrix.(TL 4)
C102.2	Ability to apply Mean Value Theorems and estimate maxima and minima of functions. (TL 6)
C102.3	Ability to evaluate integrals using Beta and Gamma functions, compute areas and volumes using double and triple integrals. (TL6)
C102.4	Ability to solve Differential Equations and apply them to real world problems.(TL 4)
C102.5	Ability to transform functions from time domain to frequency domain using Laplace transforms and apply them to solve Ordinary Differential Equations.(TL 4)

Course Name: Mathematical Methods **Course code:**A10003

C103.1	Apply appropriate interpolation method for specific application in engineering studies(TL3)
C103.2	Solve initial and boundary value problems using numerical techniques.
C103.3	Apply Fourier series and Fourier trans forms for solving problems in engineering.
C103.4	Apply Fourier series and Fourier trans forms for solving problems in engineering.
C103.5	Apply Gauss, Green's Stokes's theorems to evaluate Line, surface and volume integrals.

Course Name: Engineering Physics **Course code:**A10004

C104.1	Define and discuss basic concepts in solid state physics used to analyze materials
C104.2	Discuss the basic concepts of quantum mechanics & statistical mechanics to solve problems related to micro particles
C104.3	Define and demonstrate the concepts of magnetism and dielectrics useful for advanced level physics in technology
C104.4	Define and discuss laser technology, optical fibers and illustrate them.
C104.5	Explain the physics of semiconductors, concepts of emerging technologies like nano-technology and acoustic engineering

Course Name: Engineering Chemistry **Course code:**A10005

C105.1	Experiment and apply the principles of electro chemical changes and choose better designs to solve problems related to it.(TL6)
C105.2	Identify engineering materials with distinguished properties to construct high rated products.(TL5)
C105.3	Experiment,analyze and report the level of hardness in water and select appropriate method to solve water related problems.(TL6)
C105.4	Test and rate the fuels comparing calorific values and observe fuels at different combustion conditions.(TL6)
C105.5	Apply the surface phenomenon and sketch the phase diagram to assess and describe heterogeneous systems.(TL6)

Course Name: Computer Programming in C **Course code:**A10501

C106.1	Demonstrate the basic knowledge of computer hardware and software. (TL3)
C106.2	Ability to apply logical skills in C language programming. (TL3)
C106.3	Identify key problems involved in the design and evaluation of social interventions and suggest appropriate solutions. (TL5)
C106.4	Plan ways to model and/or simulate an answer to the questions chosen. (TL5)
C106.5	Assess alternative strategies for collecting,analysing and interpreting data from need analyses and evaluations in direct practice. (TL6)

Course Name: Engineering Drawing **Course code:**A10301

C107.1	Apply simple geometrical construction methods to construct various engineering curves and scales using the methods described in literature.
C107.2	Apply principles of orthographic projections to draw two dimensional views of points, lines and planes considered in any angle.
C107.3	Construct two dimensional views of prism and cylindrical solids considered in any position with respect to reference planes and construct two dimensional views of pyramid and cone considered in any position with respect to reference planes.
C107.4	Sketch sectional views and development of surface of sectioned solids that are cut by various positions of section planes.
C107.5	Outline various features of solid by viewing them from front, top & sides and also apply principles of isometric and perspective projections to draw three dimensional view of solids

Course Name: CPLAB **Course code:**A10581

C108.1	Ability to design and test programs to solve mathematical and scientific problems.
C108.2	Ability to write structured programs using control structures and functions.
C108.3	Ability to write structured programs using functions and arrays & Ability to write structured programs using pointers and strings
C108.4	Ability to write structured programs using structures and unions
C108.5	Ability to store and retrieve data to and from files.

Course Name: EPECLAB **Course code:**A10681

C109.1	Define, demonstrate and estimate the mechanicalproperties of materials and able to estimate the hardness of water using EDTA.
C109.2	Study and analyze the optical properties like interference, diffraction of light and able to evaluate the strength of strength of acids using conductometry and potentiometry.
C109.3	Design, analyze and interpret electric circuits,their working and applications and able to measure the concentration of iron and copper in samples using photo colorimeter.
C109.4	Estimate and compare the magnetic properties at a given place and to estimate the viscosity of a given liquid using Ostwald Viscometer.
C109.5	Demonstrate the working of applications of physics in various fields and able to measure the concentration of copper by iodometry.

Course Name: ELCS Lab **Course code:** A10083

C1010.1	Recognise English speech sounds and understand formal and informal communication.
C1010.2	Construct required dialogues in Role Plays and express effectively in Non-verbal communication.
C1010.3	Differentiate the influence of their mother tongue while speaking English in JAM sessions and Telephonic conversations.
C1010.4	Develop professional communication and effective writing skills.
C1010.5	Remember the usage of intensive listening for better comprehension.

Course Name: IT/EW **Course code:** A10082

C1111.1	The ability to use the basic tools
C1111.2	The ability to apply suitable tools for different manufacturing operations such as materials removal carpentry, fitting ,tin – smithy,
C1111.3	To develop the right attitude and team work and the ability to connect electrical wirings between input and output source
C1111.4	The ability to Apply Different weldings to prepare joints
C1111.5	The ability to prepare the Different Castings and black smithy

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

II Year I SEMESTER(R-15) Course Outcomes

Course Name: Mathematics-III **Course code:**A30007

C201.1	Apply the Frobenius method to obtain a series solution for the given linear 2nd ODE.(TL 3)
C201.2	Identify Bessel equation and Legendre equation and solve them under special conditions with the help of series solutions method. Also recurrence relations and orthogonality properties of Bessel and Legendre polynomials. (TL 3)
C201.3	Analyze the complex functions with reference to their analyticity, Integration using Cauchy's integral theorem. (TL 2)
C201.4	Find the Taylor's and Laurent series expansion of complex functions. (TL 2)
C201.5	The conformal transformations of complex functions can be dealt with ease.(TL 4)

Course Name: PTSP **Course code:** A30405

C202.1	Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena. (TL 3)
C202.2	Characterize probability models and function of random variables based on single & multiples random variables. (TL 3)
C202.3	Evaluate and apply moments & characteristic functions and understand the concept of inequalities and probabilistic limits. (TL 3)
C202.4	Understand the concept of random processes and determine covariance and spectral density of stationary random processes. (TL 2)
C202.5	Demonstrate the specific applications to Poisson and Gaussian processes and representation of low pass and band pass noise models. (TL 4)

Course Name: STLD **Course code:** A30407

C 203.1	Able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, gray, and BCD. (TL1)
C 203.2	Able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.(TL2)
C 203.3	Able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits. (TL6)
C 203.4	Able to design and analyze small Sequential circuits and to use standard combinational functions/building blocks to build larger more complex circuits. (TL6)
C 203.5	Able to implement synchronous state machines using flip flops. (TL5)

Course Name: Electrical Circuits **Course code:** A30204

C 204.1	Understand electrical concepts, including electric charge, current, electrical potential, electrical power and energy, Analyze them for DC excitation. (TL 2)
C 204.2	Analyze all combinations of AC circuits under steady state. (TL 4)
C 204.3	Examine Locus diagrams and resonance for circuits, Understand behaviour of magnetic circuits. (TL 2)
C 204 .4	Solve different electrical networks using graph theory technique. (TL 5)
C 204 :5	Determine the solutions of networks exited by A.C or D.C by using theorems. (TL 4)

Course Name: Electronic Devices And Circuits **Course code:** A30404

C 205 :1	Design and develop electronic switching circuits using Diodes.
C 205 :2	Design D.C power supplies for various loads.
C 205 :3	Apply the knowledge of small signal model of BJT for A.C analyses and determine h parameters from characteristics.
C 205 :4	Design effective biasing circuits for amplification and Stabilization factors.
C 205 :5	Apply the knowledge of small signal model of FET for A.C analyses and design different FET amplifiers.

Course Name: Signals And Systems **Course code:**A30406

C 206.1	Characterize Continuous and Discrete signal in time domain (TL1)
C 206.2	Evaluate the Fourier Transform of given arbitrary signal and Analyze the Condition for the Reconstructionof the original signal. (TL2)
C 206.3	Analyze the System for Signal Transmission. (TL5)
C 206.4	Compute the Convolution, Correlation and Auto-Correlation of the given Signal. (TL4)
C 206 :5	Apply the Knowledge of Laplace .Transform & Z-Transform ,deduce the relationship between Laplace Transform, Z-Transform and Fourier Transform (TL3)

Course Name: Electronic Devices and Circuits Lab **Course code:**A30482

C 207.1	Understand and remember the technical involved in functioning and operations of Instruments, power supplies, and tools, identification of components & values of devices. (TL 2)
C 207.2	Understand and remember the characteristics of Semiconductor devices and evaluate the biasing conditions for design of diode and transistor applications. (TL 2)
C207.3	Design and develop D.C Power supplies for various loads and amplifiers for low frequency response. (TL 5)
C207.4	Understand and remember the characteristics of Semiconductor devices and evaluate the biasing conditions for design of diode and transistor applications. (TL 2)
C207.5	Design and develop D.C Power supplies for various loads and amplifiers for low frequency response. (TL 5)

Course Name: Basic Simulation Lab **Course code:** A30481

C208.1	To demonstrate the generation and operations of various elementary signals on MATLAB platform and perform sampling process for a given signal. (TL2)
C208.2	To analyze the response of a given sequence using convolution and correlation. (TL4)
C208.3	To analyze the linearity and time invariance characteristics of given system.

	(TL4)
C208.4	To analyze the waveform in Fourier, Laplace and Z-transform of the given signal. (TL4)
C208.5	To demonstrate the removal of noise and extraction of periodic signal using correlation. (TL2)

II Year II SEMESTER(R-15) Course Outcomes

Course Name: Principle of Electrical Engineering **Course code:** A40215

C211.1	Analyze transient response for different combinations of R,L,C circuits.(TL4)
C211.2	Analyze two-port networks. (TL4)
C211.3	Design and analyze filter and attenuator circuits. (TL4)
C211.4	Construct and Analyze DC machines. (TL3)
C211.5	Design and construct of the transformer features and calculate efficiency of it.(TL4)

Course Name: Electronic circuits analysis **Course code:**A40412

C212.1	Design of single and multistage amplifiers for required gain of low and mid frequency range. (TL 5)
C212.2	Determine the gain parameters and design amplifiers for high frequency. (TL 4)
C212.3	Design amplifiers with gain control using negative feedback and design signal generators with positive feedback. Evaluation of amplifiers gain stabilization improvement of bandwidth. (TL 5)
C212.4	Design of power amplifier for specified loads. (TL 5)
C212.5	Design of tuned amplifiers for audio and radio frequency range of transmitters and receivers. (TL 5)

Course Name: Pulse And Digital Circuits **Course code:** A40413

C213.1	Determine the response of High pass and Low pass circuits for A.C and D.C input signals. (TL 2)
C213.2	Design and develop clippers and clampers circuits for wave shaping voltage comparators, voltage regulators, Threshold voltage controllers (TL 5)
C213.3	Determine switching speed of Diodes and Transistor for given input signal of specified frequency. Design the gating controls for sampling gates. (TL 5)
C213.4	Design and develop Waveform generators and sweep generators based on time based signals. (TL 5)
C213.5	Design circuits for synchronization of signals with same or different frequencies using sweep circuits.Design of logic gates of different logic families by evaluatingPropagation delay, Power dissipation, Fan-in, Fan-out (TL 5)

Course Name: Environmental Studies **Course code:**A40009

C214.1	Student defines the importance of the existence of various biotic and abiotic components of environment.(TL1)
C214.2	Student recognizes the renewable &non-renewable resources and utilization of renewable resources.(TL2)
C214.3	Student illustrates the knowledge about various organisms for social, ethical and even economic enrichment of the country.(TL3)
C214.4	Student appraises the usage of pollution free fuels. Reduction in the pollutants concentration by treating the pollution sources.(TL4)
C214.5	Student choose Innovative ideas for the sustainable development by balancing the population growth and the existing resource in long term perspective.(TL6)

Course Name: Electromagnetic theory and transmission lines **Course code:** A40411

C215.1	Able to explain the concepts related to static electric field and to apply them for various applications.(TL3)
C215.2	Able to explain the concepts related to static magnetic field and to apply them for various applications.(TL3)
C215.3	Demonstrate and analyze the Maxwell's equations for time varying

	fields.(TL4)
C215.4	Describe Wave propagation in different media.(TL2)
C215.5	Analyze basic transmission line parameters and interpret relationship between parameters. (TL4)

Course Name: Digital Design using Verilog HDL **Course code:**A40410

C216.1	Describe the role of hardware description language (HDL) in design flows for FPGA and ASIC with a historical development of the Verilog HDL and Discuss the various constructs and conventions of Verilog (TL2)
C216.2	Describe, design, simulate, test and synthesize various combinational circuits and Flip-Flops with Gate Level and Data Flow Modelling in Verilog. Discuss types of delays and strengths used in design. (TL3, TL4 & TL5)
C216.3	Design, Develop, Simulate and Test program codes for behavioral modelling of combinational and sequential logic using Verilog HDL (TL4 & TL 5)
C216.4	Discuss about the various Transistor switches, system tasks and illustrate the functionality by simulation by implementing with Primitives, tasks and functions. (TL2 & TL3)
C216.5	Discuss the various modelling techniques for state machines and design and evaluate their functionality. Discuss the various test bench techniques for combinational and sequential testing with examples. (TL2 & TL5)

Course Name: Electronic Circuits &Pulse Circuits Lab **Course code:**A40288

C217.1	Design and test the biasing of single and multistage amplifiers and evaluate gain frequency response using software tools. (TL 5)
C217.2	Design and verify performance of diverse types of feedback amplifiers using software tools for quality improvement of amplification. (TL 5)
C217.3	Design and verify performance of power amplifier and tuned amplifiers using software tools. (TL 5)
C217.4	Evaluate High and low pass circuits response for different time constants. Design voltage comparators and reference voltage regulators using clippers and clampers. (TL 5)
C217.5	Design&develop RC time constant based switches and signal generators and evaluate and analyze frequency of signal generators. (TL 5)

Course Name: Electrical Technology Lab **Course code:**A40484

C218.1	Able to record the response of a circuit by applying KVL,KCL.(TL2)
C218.2	Able to calculate time response of first order RC / RL circuits. (TL3)
C218.3	Able to evaluate two port network parameters. (TL4)
C218.4	Able to demonstrate the utilization of various network theorems. (TL3)
C218.5	Able to demonstrate the characteristics of DC generators and single-phase transformers by conducting simple tests. (TL3)

YEAR I SEM Course Outcomes

Course Name: Control System Engineering **Course code:** A50127

C 301.1	Learn how to implement a mathematical model of any system given and Derive the Transfer function of any given system using block diagram and Signal Flow Graph. its functionality using block algebra.(TL1)
C 301.2	Analyze the Time Response of first Order and Second Order Control System and derive Steady State response.(TL3)
C 301.3	Analyze the stability of a control system using Routh's Stability Criterion, Root Locus Technique.(TL3)
C 301.4	Analyze the Frequency Response of a Control System using Bode / Polar / Nyquist Diagram / Plots and Design compensators & Controllers based on the requirement.(TL4)
C 301.5	Understand the Concepts of State Variables and derive the State Model for LTV Systems.(TL3)
C 301.6	Learn how to implement a mathematical model of any system given and Derive the Transfer function of any given system using block diagram and Signal Flow Graph. its functionality using block algebra.(TL1)

Course Name:CO&OS **Course code:**A50516

C 302.1	Understand basic structure of digital computer and arithmetic operations of binary number system. (TL2)
C 302.2	Analyze a hardwired, hardwired control unit and internal organization of Memory chips. (TL4)
C 302.3	Compare the various modes of transfer between the peripherals of a computer. (TL2)

C 302.4	Understand different ways of communications with I/O devices, Standard I/O devices. (TL2)
C 302.5	Analyze the memory management techniques and Algorithms for deadlock avoidance. (TL4)
C 302.6	Understand the concepts of file system interface and implementation. (TL2)

Course Name: Antennas And Wave Propagation **Course code:** A50418

C 303.1	Define the parameters in the design of antenna and field evaluation under various conditions and formulate the electric as well as magnetic field equations. (TL2)
C 303.2	Understand the design issues and the operation of fundamental antennas like Yagi - Uda, Horn antenna and Helical structure. (TL2)
C 303.3	Understand the designs of RF and Microwave antennas. (TL3)
C 303.4	Analyze the structure and working of Parabolic reflector antenna for a given specification. (TL4)
C 303.5	Define the array system for different antennas and field analysis. (TL2)
C 303.6	Understand the behaviour of nature on EM wave propagation. (TL2)

Course Name: Electronic Measurements & Instrumentation **Course code:**A50422

C 304.1	Understand the measuring instruments used in basic instrumentation labs and compute the parametric valves for the same. (TL2)
C 304.2	Analyze the different signals and its behaviour of Signal Analyzers. (TL4)
C 304.3	Understanding the architecture of CRO and analyses its signal behaviour, different types of CRO and uses on their functionality. (TL2)
C 304.4	Understand the functioning, specification and application of various transducers. (TL2)
C 304.5	Analyze the measuring of Physical parameter of using different transducers. (TL4)
C 304.6	Understand the measuring instruments used in basic instrumentation labs and compute the parametric valves for the same. (TL2)

Course Name: Analog Communications **Course code:** A50408

C 305.1	Classify baseband signal, band pass signal and Analyze the Need for Frequency Translation in Electronic Communication system. (TL3)
C 305.2	Analyze and design various modulation and demodulation analog systems. (TL3)

C 305.3	Perform the mathematical analysis associate with Angle Modulations (FM& PM). (TL3)
C 305.4	Understand the generation, detection of Various analog modulation techniques. (TL3)
C 305.5	Compare the performance of AM, DSB. SSB, FM and PM schemes with reference to SNR. (TL4)
C 305.6	Distinguish the concepts of Multiplexing: Time Division Multiplexing (TDM) and Frequency Division Multiplexing (FDM). (TL3)

Course Name: Linear And Digital IC Applications **Course code:**A50425

C 306.1	Construct modules for Linear and Non-Linear applications using IC's. (TL1)
C 306.2	Design of waveform generators and active filters using IC's for different bandwidths. (TL2)
C 306.3	Analyze the functioning of Analog to Digital Converters using IC's. (TL3)
C 306.4	Analyze the functioning of Digital to Analog Converters using IC's. (TL3)
C 306.5	Design of combinational logic circuits using IC's. (TL4)
C 306.6	Develop sequential logic circuits and memories using IC's. (TL5)

Course Name: Analog Communications Lab**Course code:**A50426

C 307.1	Generate, demodulate AM and FM signals and calculate modulation index. (TL4)
C 307.2	Explain the working of different modulators. (TL2)
C 307.3	Analyze spectrum of AM and FM signals. (TL4)
C 307.4	Perform signal sampling by determining the sampling rates for baseband signals and reconstruct the signals. (TL3)
C 307.5	Simulate AM, FM,Pulse Analog Modulation and different multiplexers such as FDM, TDM. (TL2)
C 307.6	Simulate frequency synthesizer. (TL4)

Course Name: IC & HDL Lab **Course code:** A50483

C 308.1	Evaluate its A.C and D.C characteristics of an op-amp. (TL5)
C 308.2	Develop waveform generators of variable frequencies by using op-amp. (TL4)
C 308.3	Design active filters for desired gain and bandwidth. (TL4)
C 308.4	Determine response of time based generators using IC's. (TL2)
C 308.5	Simulate combinational logic circuits using HDL programming Software Tool. (TL3)
C 308.6	Simulate Sequential logic circuits for using HDL programming Software Tool. (TL3)

III YEAR II SEM Course Outcomes

Course Name: MEFA **Course code:** A60010

C 311.1	To understand the basic issues governing the economic operations namely the Demand analysis. (TL2)
C 311.2	To be familiar with Production function, cost and profit analysis. (TL4)
C 311.3	Understand market structures, dynamics and pricing strategies. (TL4)
C 311.4	Understand the various forms of business organizations. (TL2)
C 311.5	Evaluation of the methods of Capital budgeting for the investing decisions. (TL5)
C 311.6	Analyze the firm's financial position with the Financial Statements and Ratio analysis. (TL4)

Course Name: Disaster Management **Course code:**A60117

C 312.1	Understand the concept of hazard, disaster, stress and different approaches to reduce the impact for the same. (TL2)
C 312.2	Explain different man-made disasters. (TL2)
C 312.3	Understand various endogenous hazards, causes and distribution of them. (TL2)
C 312.4	Understand the effects of endogenous hazards, and human perception and adjustments towards these hazards. (TL2)
C 312.5	Understand the causes, environmental impact, distribution and mitigation of exogenous hazards. (TL2)
C 312.6	Understand the emerging approaches of disaster management. (TL2)

Course Name: Digital Communications **Course code:**A60420

C 313.1	Understand basic components of Digital Communication Systems, Pulse digital modulation techniques such as PCM and DM. (TL2)
C 313.2	Design Digital Modulation Techniques. (TL3)
C 313.3	Design optimum receiver for Digital Modulation techniques. (TL3)
C 313.4	Understand the redundancy present in Digital Communication by using various source Coding techniques. (TL2)
C 313.5	Analyze different error detecting and error correction codes like block codes, cyclic codes and convolution codes. (TL4)
C 313.6	Understand the Characteristics of Spread Spectrum Modulation. (TL2)

Course Name: VLSI Design **Course code:**A60432

C 314.1	Understand the IC fabrication process and MOS transistor functioning. (TL2)
C 314.2	Design of VLSI circuits by applying design flow standards. (TL4)
C 314.3	Implement the principles of gate level designs . (TL3)
C 314.4	Understand the parameters for gate level designs. (TL1)
C 314.5	Design subsystems for reducing design time and cost of developing IC. (TL4)
C 314.6	Evaluation of designs for logical memories and Testing principle strategies of IC design. (TL5)

Course Name: Microprocessor And Microcontroller **Course code:**A60430

C 315.1	Understand the internal organization of 8086 Microprocessor. (TL2)
C 315.2	Apply knowledge and demonstrate programs using the various addressing modes of 8086. (TL3)
C 315.3	Analyze and interface various components like keyboard, display, memory, PPI, A/D, and D/A to 8086 Microprocessor. (TL4)
C 315.4	Analyze the data transfer information through serial and parallel ports of 8086. (TL4)
C 315.5	Understand the internal organization of 8051 Microcontroller. (TL2)
C 315.6	Analyze the programming of interrupts, timers and counters of 8051 Microcontroller. (TL4)

Course Name: DSP **Course code:**A60421

C 316.1	Apply the principles of Z-transforms to finite difference equations for stability analysis. (TL3)
C 316.2	Compute the discrete time domain & frequency domain of signals using DFS, DFT , FFT. (TL3)
C 316.3	Analyze various analog filter approximations and compare Chebyshev and Butterworth filters. (TL4)
C 316.4	Design of IIR digital filters using Impulse Invariant & Bilinear transformation techniques. (TL4)
C 316.5	Design FIR digital filters using Fourier series, window method. (TL4)
C 316.6	Understand the trade-off between normal and multi-rate DSP techniques, finite word length effects and round-off errors. (TL2)

Course Name:MPMC LAB **Course code:**A60494

C 317.1	Select appropriate assembly language instructions to perform arithmetic operations, string manipulations for 8086. (TL2)
C 317.2	Design and generate assembly language code for digital clock ,analog to digital and digital to analog conversion. (TL4)
C 317.3	Demonstrate serial communication and parallel communication between two microprocessors using 8251 & 8255. (TL3)
C 317.4	Interface between microprocessors & its peripherals devices using instruction set. (TL4)
C 317.5	Develop the program segments for arithmetic logical & bit manipulation for 8051 microcontroller. (TL5)
C 317.6	Compose instructions for various operations among microcontroller peripherals and to verify the functionality of timer/counter. (TL4)

Course Name: DSP LAB **Course code:**A60493

C 318.1	Generate synthetic Sinusoidal waveform based on recursive difference equations. (TL2)
C 318.2	Compute DFT, IDFT, FFT of a given sequence and determine the power spectrum. (TL3)
C 318.3	Design and implementation of low pass, high pass of FIR and IIR filters for a given sequence. (TL4)
C 318.4	Compute multi-rate Digital signal processing (decimation, Interpolation, sampling rate conversion) of a given sequence. (TL3)
C 318.5	Analyze real time applications and verification of audio signals. (TL4)
C 318.6	Analyze the first order and second order system with impulse response. (TL4)

IV YEAR I SEM Course Outcomes

Course Name: Management Science **Course code:** A70014

C401.1	Evaluate an organizational structure for a given context in the organization. (TL5)
C401.2	Evaluate (appraise) the production operations through work study and understand the markets. (TL6)
C401.3	Understand the HR functions and their implementation. (TL2)
C401.4	Evaluate the grievance handling, Performance appraisal, welfare and other HR functions. (TL5)
C401.5	Evaluate the projects through PERT and CPM. (TL5)
C401.6	Develop (Create/Evolve) a strategy for a business or service organization. (TL6)

Course Name: Microwave Engineering **Course code:**A70422

C402.1	Understand Electro-Magnetic wave theory to analyze microwave parameters. (TL3)
C402.2	Analyze microwave components such as directional couplers, power dividers / combiner etc., (TL3)
C402.3	Study the performance of specialized microwave tubes such as Klystron, reflex klystron and travelling wave tubes. (TL2)
C402.4	Study the performance of specialized microwave tubes such as M-type tubes. (TL2)
C402.5	Understand the operation of microwave solid state devices. (TL3)
C402.6	Measure various Microwave parameters (power, reflection coefficient, VSWR etc.) (TL3)

Course Name: Computer Networks **Course code:**A70515

C403.1	Examine OSI and TCP/IP models for the detection and correction methods in Data Link Layers. (TL3)
C403.2	Understand the various computer networking devices and concepts of collision

	methods in multiple access techniques. (TL2)
C403.3	Estimate the paths for various routing protocols. (TL3)
C403.4	Understand the congestion control mechanism for the Networks. (TL2)
C403.5	Understand the compatibility between IPv4 and IPv6 Protocols. (TL2)
C403.6	Understand the Application layer protocol and compare the TCP and UDP Protocols. (TL2)

Course Name: Cellular And Mobile Communication **Course code:**A70434

C404.1	Identify the limitations of conventional Mobile Telephone Systems; understand the basic cellular mobile system and concept of frequency Reuse channels. (TL2)
C404.2	Differentiate Co-channel interference and Non-Co-channel Interferences and to understand cell site components. (TL4)
C404.3	Analyze signal reflections in terrain counters, Path Losses and understand Lee Model. (TL4)
C404.4	Understand Space diversity Antennas, Umbrella Pattern Antennas and mobile antennas. (TL2)
C404.5	Understand frequency management, channel assignment strategies and channel sharing and borrowing. (TL2)
C404.6	Explain Handoff initiation, Distinguish types of handoffs and evaluation of dropped call rates. (TL4)

Course Name: Digital Image Processing **Course code:** A70436

C405.1	Explain the limitations of the computational methods on digital images. (TL2)
C405.2	Implement the spatial and frequency domain image transforms on enhancement of images. (TL4)
C405.3	Implement the spatial and frequency domain image transforms on restoration of images. (TL4)
C405.4	Perform image segmentation operations on images using various computational methods. (TL3)
C405.5	Apply various mathematical transformations on images to implement

	Morphological Image Processing. (TL3)
C405.6	Define the need for compression and evaluate the basic compression algorithms. (TL2)

Course Name: Embedded System Design **Course code:** A70440

C406.1	Analyze the quality attributes of the Embedded Systems. (TL4)
C406.2	Design embedded system with customized processors, Commercial Off-The-Shelf Components (COTS) and memory. (TL4)
C406.3	Efficiently utilise other system components such as Reset circuit, Brownout protection circuit, Real Time Clock, Watch Dogtimer in building embedded system. (TL3)
C406.4	Develop Embedded Firmware using various design approaches and development languages. (TL5)
C406.5	Classify various types of operating systems used for Embedded Systems. (TL4)
C406.6	Analyze the importance of task communication, task synchronization in operating systems. (TL4)

Course Name: Advanced Communication Skills Lab **Course code:** A70086

C407.1	Relate functional English for effective communication, comprehend literary text and enrich vocabulary. (TL1)
C407.2	Comprehend technical correspondence like writing Resumes', Report Writing, Covering Letter. (TL2)
C407.3	Revise and apply the strategies for effective reading and to know the contextual knowledge of vocabulary used. (TL1)
C407.4	Compose the technical presentations to enhance Oral skills & public speaking. (TL1)
C407.5	Employ intelligibly and express effectively in spoken and written communication. (TL1)
C407.6	Appraise the linguistic and communication competencies in facing interviews. (TL1)

Course Name: Microwave Engineering & Digital Communications Lab

Course Code:A70499

C408.1	Understand the different microwave components working and their applications. (TL2)
C408.2	Demonstrate microwave bench setup for the generation of microwave frequencies. (TL2)
C408.3	Calculate Wavelength, Frequency, VSWR, and Power of microwave frequencies using microwave bench setup. (TL4)
C408.4	Understand basic theories of Digital communication system in practical. (TL2)
C408.5	Generate pulse modulationtechniques. (TL3)
C408.6	Implement and analyze various digital modulation schemes. (TL3)

IV YEAR II SEM Course Outcomes

Course Name: Satellite Communications **Course code:** A80542

C411.1	Understand the Orbital Mechanisms and Parameters. (TL2)
C411.2	Design link budget. (TL4)
C411.3	Describe various propagational effects and its access mechanism of a link. (TL2)
C411.4	Understand the mechanism of CDMA/DAMA Spread spectrum transmission and reception. (TL2)
C411.5	Analyze the earth station technology, Satellite Navigation and Positioning Systems. (TL3)
C411.6	Understand the message transmissions for satellite communication over the Multiple access. (TL2)

Course Name: Radar Systems **Course code:**A80450

C412.1	Analyze the radar range equation. (TL4)
C412.2	Apply the knowledge of Doppler effect to analyze the characteristics of CW and FM-CW radars. (TL4)
C412.3	Understand the characteristics of MTI Radar(TL2)

C412.4	Analyze the behaviour of Pulse Doppler Radars. (TL4)
C412.5	Distinguish different tracking methods and range measurements in radars. (TL2)
C412.6	Apply radar range equation to understand beam steering methods in the phased array radar. (TL3)

Course Name: DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

Course code:A80437

C413.1	Analyze the digital filters and compute various computational and conversion errors. (TL4)
C413.2	Distinguish between the architectural features of general purpose processors and DSP processors. (TL2)
C413.3	Describe Commercial Digital Signal processing Devices and Develop simple assembly language programs using instruction set of TMS320C54XX. (TL3)
C413.4	Analyze memory space requirement for TMS320C54XX processors, on chip peripherals and implement pipeline operation. (TL4)
C413.5	Analyze various analog devices of DSP processors and also the architecture of Blackfin DSP processor. (TL4)
C413.6	Interface the memory and i/o peripheral devices to programmable DSP devices. (TL3)

DEPARTMENT OF COMUTER SCIENCE ENGINEERING

II Year I SEMESTER(R-15) Course Outcomes

Course Name: Probability and Statistics**Course code:**A30008

C211.1	Ability to comprehend the distribution models using probability density functions and moment generating functions.(TL2)
C211.2	Ability to calculate covariance, correlation and regression between two random variables.(TL4)
C211.3	Ability to test the validity of hypothesis by different distribution techniques and construct confidential interval.(TL5)
C211.4	Ability to calculate expected queue length, idle time, waiting time and traffic intensity for some queuing models.(TL4)
C211.5	Ability to distinguish between random process, Markov process and Markov Chains and compute n^{th} state probabilities for engineering applications.(TL4)

Course Name: Mathematical Foundations of Computer Science**Course code:**A30504

C212.1	Understand sets, relations, functions, and Discrete structures. .(TL2)
C212.2	Demonstrate in practical application with the use of basic counting principles of permutations and combinations. Use of basic principles of inclusion and exclusion. .(TL3)
C212.3	Formulate problems and solve recurrence relations. .(TL3)
C212.4	Model and solve real-world problems using graphs and trees. .(TL3)
C212.5	Analyze one dimensional wave and heat equation

Course Name: Data Structures **Course code:**A30502

C213.1	Understand the basic concepts of C++. learn data structures to represent data items in real world problems. Ability to Analyze the time and space complexities of algorithms. .(TL2)
C213.2	Design programs using a variety of data structures such as stacks, queues. .(TL6)
C213.3	Implement binary trees, Priority Queues,Heap data structure .(TL3)
C213.4	Analyze and implement various kinds of searching and sorting techniques. .(TL4)
C213.5	Understand graphs and balanced search trees.(TL2)

Course Name: Digital Logic Design **Course code:** A30401

C214.1	Apply knowledge of number system, codes and Boolean Algebra to the analysis and design of digital logic circuits.(TL3)

C214.2	Simplify K-maps to minimize number of gates using NAND and NOR implementation.(TL2)
C214.3	Design and interpret combinational circuit by utilizing digital logic techniques and multiplex, demultiplex circuits. (TL6)
C214.4	Design and interpret sequential circuit like latches, flip-flops, counters, registers and discuss register transfer language.(TL6)
C214.5	Understand the basics of various memories. Analyze and design simple systems composed of programmable logic, such as ROMs, PLAs and PLAs(TL2)

Course Name: Electronic Devices and Circuits **Course code:**A30404

C215.1	The ability to identify various electronic components like diodes, Transistors, etc., (TL2)
C215.2	The ability to describe the construction and basic principles of BJTs, FETs, MOSFETs etc., (TL2)
C215.3	The ability to demonstrate the functionality of the electronic components. (TL3)
C215.4	The ability to Analyze and solve problems for a given electronic circuit. (TL4)
C215.5	The ability to design biasing circuits for BJTs and FETs.(TL6)

Course Name: Basic Electrical Engineering**Course code:**A30202

C216.1	Able to explain the consequences of linearity, in particular the principle of superposition and Thevinin's and Norton equivalent circuits. (TL2)
C216.2	Able to analyze the sinusoidal-steady-state (SSS) response of first and second-order systems. (TL4)
C216.3	Able to define the principles and analysis of electromechanical systems. (TL4)
C216.4	Able to explain the transformer working and its applications. (TL2)
C216.5	Explain the design of electromechanical instruments. (TL6)

Course Name: Electrical and electronics Lab**Course code:**A30282

C217.1	Able to interpret network theorems (TL3)
C217.2	Able to demonstrate the operation of DC motors and generators. (TL3)
C217.3	Able to explain the working principles of basic electronic devices (TL2)
C217.4	Able to compute and compare rectifier parameters. (TL6)
C217.5	Able to implement Rectifier without Filters (Full wave & Half wave).(TL3)

Course Name: Data structures Lab**Course code:**A30582

C218.1	Design programs using a variety of data structures such as stacks, queues. .(TL6)
C218.2	Implement binary trees, Priority Queues, heap data structures. .(TL3)
C218.3	Analyze various kinds of searching and sorting techniques. .(TL4)
C218.4	Implement graphs and balanced search trees. .(TL3)
C218.5	Implement time and space complexities of algorithms.(TL3)

II-II (R-15) Course Outcomes

Course Name: Computer Organization**Course code:**A40506

C221.1	Understand the basic components & organization of computer and to study micro-programmed control unit (TL2)
C221.2	Understand the architecture of 8086 processor, instruction sets, instruction formats and various addressing modes of 8086(TL2).
C221.3	Demonstrate 8086 instruction sets in assembly language and understand macros, stack structure and interrupt cycle of 8086(TL3)
C221.4	Illustrate algorithms for addition, subtraction,division,multiplication to understand the i/o organization(TL3)
C221.5	Understand the memory organization and parallelism in terms of single and multiple processors(TL2)

Course Name: Data Base Management System Lab **Course code:**A40584

C222.1	Design DataBase requirement specification with Entity Relationship Model.(TL6)
C222.2	Design DataBase schema using Relational Model.(TL6)
C222.3	Apply normalization techniques for development of application software to realistic problems and Formulate queries using SQL DML/DDL/DCL commands.(TL3)
C222.4	Formulate simple triggers.(TL3)
C222.5	Create stored procedures and cursors.(TL3)

Course Name: Object oriented programming **Course code:**A40503

C223.1	solve real world problems using OOP techniques(TL3)
C223.2	Understand the use of packages and abstract classes.(TL2)
C223.3	Able to create user defined exceptions and handle them develop multi threaded applications with synchronization.(TL3)

C223.4	Able to solve problems using java collection framework and i/o classes.(TL3)
C223.5	Design applets for web applications and GUI based applications(TL6)

Course Name: Environmental studies**Course code:**A40009

C224.1	Able to define the importance and existence of various biotic and abiotic components of environment.(TL1)
C224.2	Able to recognize the renewable & non-renewable resources and utilization of renewable resources.(TL2)
C224.3	Able to illustrate various organisms for social, ethical and economic enrichment of the country.(TL3)
C224.4	Able to appraise the usage of pollution free fuels for reduction in the pollutants concentration. (TL4)
C224.5	Able to choose innovative ideas for the sustainable development by balancing the population growth and the existing resource in long term perspective. (TL6)

Course Name: Formal Languages & Automata Theory **Course code:**A40509

C225.1	Illustrate finite automata,Inter -conversion, equivalence and minimization, language recognizers(TL3)
C225.2	Construct finite automata from regular grammar and regular grammar to automata(TL3)
C225.3	Understand sentential forms, Derivations using Context free grammar, Ambiguity of context free grammers(TL2)
C225.4	Describe Turing machine and language accepted by turing machines-programming techniques, and conversion among CFL's and PDA's(TL2)
C225.5	Differentiate decidability of problems and completeness of language(TL4)

Course Name: Design & Analysis of Algorithms **Course code:**A40508

C226.1	Able to analyze and improve efficiency of algorithms.(TL 4)
C226.2	Able apply Different designing methods for development of algorithms to realistic problems such as divide and conquer, greedy, etc.(TL 3)
C226.3	Able to understand and estimate the performance of algorithms. (TL2)
C226.4	Able to apply the Graph Traversals. (TL3)
C226.5	Ability to compare different types of P, NP hard and NP complete problems. (TL 4)

Course Name: Object oriented programming Lab**Course code:**A40585

C227.1	Implement programs for solving real world problems using java collection frame work(TL3)
C227.2	Execute programs using abstract classes(TL3)
C227.3	Create user defined packages and demonstrate multithreaded programs.(TL3)
C227.4	Implement data structures in java(TL3)
C227.5	Create GUI programs using swing controls in java(TL3)

Course Name: Data Base Management Systems **Course code:**A40507

C228.1	Demonstrate the basic elements of a relational database management system(TL3)
C228.2	Design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data(TL6)
C228.3	Identify need of schema refinement and Apply normalization techniques for the development of application software's.(TL3)
C228.4	Identify and apply the basics of Transaction management and Concurrency control.(TL2)
C228 .5	Understanding various indexing techniques and basic database storage structures and access techniques(TL2)

III-I (R-15) Course Outcomes

Course Name: Principles Of Programming Languages **Course code:**A50511

C311.1	Demonstrate programming languages paradigm(TL3)
C311.2	Distinguish implementation of Data types in various programming languages(TL4)
C311.3	Explain scope and lifetime of a variable(TL2)
C311.4	Demonstrate the implementation of subprograms in programming languages(TL3)
C311.5	Explain the implementation of Abstract Data types, Concurrency and Exception handling(TL2)
C311.6	Relate logic and functional programming languages(TL1)

Course Name: Disaster management**Course code:**A50117

C312.1	Understand the concept of hazard, disaster, stress and different approaches to reduce the impact for the same.(TL2)
C312.2	Categorize and explain different man-made disasters(TL4)
C312.3	Understand various endogenous hazards, causes and distribution of them.(TL2)
C312.4	Understand the effects of endogenous hazards, and human perception and adjustments towards these hazards.(TL2)
C312.5	Understand the causes, environmental impact, distribution and mitigation of exogenous hazards.(TL2)
C312.6	Understand the emerging approaches of disaster management.(TL2)

Course Name: Software Engineering **Course code:**A50518

C313.1	Explain software engineering process, including view of process and process models methodologies and work flows.(TL2)
C313.2	Identify the requirements and differentiate functional requirements and non-functional requirements.TL2)
C313.3	Make use of different system models through analysis of requirements and develop an appropriate software design(TL1)
C313.4	Implement system design ,domain model , architectural design and component

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	level design using DFD and OOAD diagrams(TL3)
C313.5	Identify different testing strategies and know more about product metrics(TL2)
C313.6	Identify risk in the product by using different techniques and know how to maintain the quality of the product (TL2)

Course Name: Compiler Design **Course code:**A50514

C314.1	Describing translation in each phase of the compilation.(TL2)
C314.2	Design parsers for the compilers.(TL6)
C314.3	Define the specific semantic test and enhance the parser to construct a symbol table(TL1)
C314.4	Describing the different forms of Intermediate code(TL2)
C314.5	Perform Code Optimization and understanding runtime environment(TL2)
C314.6	Design code generation schemes on machine dependent optimizations(TL6)

Course Name: Operating Systems**Course code:**A50510

C315.1	Apply optimization techniques for the improvement of system performance. (TL3)
C315.2	list the synchronous and asynchronous communication mechanisms in their respective OS(TL1)
C315.3	Illustrate different Memory Management Techniques(TL3)
C315.4	Generating different page replacement algorithms(TL3)
C315.5	Designing File system Structure and compiling different Disk scheduling Algorithms(TL6)
C315.6	Distinguish between Deadlock Prevention, Avoidance and Recovery from Deadlock(TL4)

Course Name: Computer Networks **Course code:**A50515

C316.1	Define network and network communication. Know OSI and TCP/IP model (TL1)
C316.2	Explain medium access layer and its operation. Appraise the Functionalities of different networking devices (TL2)
C316.3	Design the issues involved in network layer(TL6)
C316.4	Differentiate the types of routing protocols and Congestion control mechanisms(TL4)
C316.5	Discriminate IPv4 and IPv6 formats, how fragmentation and tunnelling happens.(TL4)
C316.6	Distinguish UDP and TCP transport layer protocol and compare Application layer protocol such as HTTP, FTP. How client server communication takes place.(TL4)

Course Name:OPERATING SYSTEMS LAB **Course code:**A50589

C317.1	Implement system that minimizes turnaround time, waiting time and response time and also maximize throughput by keeping CPU as busy as possible(TL3)
C317.2	Create access controls to protect files (Directory Level)(TL3)

C317.3	Apply optimization techniques for the improvement of secondary memory allocation(TL3)
C317.4	Design different memory management techniques (Main Memory)(TL6)
C317.5	Implement the virtual memory concepts(TL3)
C317.6	Implementing the concepts of Deadlock prevention, occurrence and avoidance(TL3)

Course Name: Compiler Design Lab **Course code:**A50587

C318.1	To describe translation in each phase of the compilation(TL2)
C318.2	To design parsers for the compilers(TL6)
C318.3	To design a compiler for given features of the languages(TL6)
C318.4	To design a BNG grammar for a language(TL6)
C318.5	To illustrate practical aspects of automata theory(TL3).
C318.6	To apply the knowledge of powerful compiler generation tools(TL3)

I-II (R-15) Course Outcomes

Course Name: Distributed Systems **Course code:**A60521

C321.1	Comprehend and design a new distributed system with the desired features.(TL3)
C321.2	Differentiate physical time and logical time and clock synchronization (TL4)
C321.3	Produce a literature survey in Distributed systems(TL3)
C321.4	Identify different kinds of IPC in different operating systems (TL2)
C321.5	Explain File service architectures and DSM Concepts(TL2)
C321.6	Analyze transaction flow techniques among different concurrency methods(TL4)

Course Name: Information Security**Course code:**A60522

C322.1	To identify the importance of information security and security mechanisms in real world applications.(TL2)
C322.2	Analyze the different conventional and public key encryption algorithms(TL4)
C322.3	Demonstrate various methods to calculate authentication codes using Message Authenticate Code(TL3)
C322.4	Demonstrate various methods to calculate authentication codes using Hash Functions(TL3)
C322.5	Describe the security done at different layers of network, Email and Web(TL2)
C322.6	Categorize viruses and mechanisms used for intrusion detection. (TL3)

Course Name: Object Oriented Analysis & Design**Course code:**A60524

C323.1	Describe the object- oriented software development process, including object oriented methodologies and work flows(TL2)
C323.2	Create a system architecture (the Architecture model) supporting the non-functional requirements and development constraints(TL3)
C323.3	Create a system design (the Solution model) supporting the functional requirements(TL3)
C323.4	Design a behavioral model using Activity diagrams(TL6)

C323.5	Design a dynamic behaviour of a system (TL6)
C323.6	Explain and Justify designs based on design principles, patterns, and heuristics(TL2)

Course Name: Software Testing Methodologies **Course code:**A60525

C324.1	Introduce purpose of Testing, various Dichotomies, and Model for Testing and Consequences of Bugs.(TL1)
C324.2	To Apply the Concepts of Path Testing, Transaction flow Testing and Data Flow Testing(TL3)
C324.3	To Analyze different types of domains(TL4)
C324.4	Perform domain testing techniques(TL2)
C324.5	To Generate and understand Path product and regular expression ,good and bad state graphs(TL3)
C324.6	To Design Matrix of a Graph, relations, node reduction Algorithm and To identify Power of Matrix with tools(TL6)

Course Name: Managerial Economics And Financial Analysis**Course code:**A60010

C325.1	To understand the basic issues governing the economic operations namely the Demand analysis. (TL2)
C325.2	To be familiar with Production function, cost and profit analysis.(TL1)
C325.3	Understand market structures, dynamics and pricing strategies.(TL2)
C325.4	Understand the various forms of business organization.(TL2)
C325.5	Understand the terminology of accountancy and preparation and evaluation of final accounts so that the engineers excel in the business.(TL2)
C325.6	To study and analyze the firm's financial position by analyzing the Financial Statements and Ratio analysis.(TL3)

Course Name: Web Technologies **Course code:**A60512

C326.1	Understanding the server side scripting through PHP(TL2)
C326.2	Understanding XML, how to parse and using XML data in web pages(TL2)
C326.3	Generate server side scripting with Java serves(TL3)
C326.4	Demonstrate Database Connectivity using JDBC(TL3)
C326.5	Support server side scripting with JSP(TL2)
C326.6	Gain and applying knowledge of client side scripting, validations of forms and AJAX programming(TL3)

Course Name: Case Tools & Web Technologies Lab**Course code:**A60591

C327.1	Use LAMP Stack for web applications. (TL1)
C327.2	Use TOMCAT Servers for Servest & JSPs. (TL1)
C327.3	Write simple applications using Technologies JAVA SCRIPT, HTML,AJAX,PHP,JSP,Servlets. (TL3)
C327.4	Connect to the Database and get the results. (TL3)

C327.5	Parse XML files using JAVA (DOM & SAX PARSERS). (TL2)
C327.6	Validate Web forms using JAVA SCRIPT. (TL3)

Course Name: Advanced Communication Skills Lab **Course code:**A60086

C328.1	Relate functional Englishfor effective communication, comprehend literary text and enrich vocabulary.(TL3)
C328.2	Comprehend technical correspondence like writing Resumes', Report Writing, Covering Letter.(TL3)
C328.3	Revise and apply the strategies for effective reading and to know the contextual knowledge of vocabulary used.(TL3)
C328.4	Compose the technical presentations to enhance Oral skills & public speaking.(TL3)
C328.5	Employ intelligibly and express effectively in spoken and written communication.(TL3)
C328.6	Appraise the linguistic and communication competencies in facing interviews.(TL3)

IV-I (R-15) Course Outcomes

Course Name: Linux Programming**Course code:**A70511

C411.1	List the Linux utilities for file processing(TL1)
C411.2	Illustrate the system calls to create, manage and control the processes in Unix file system(TL3)
C411.3	Develop the methods to overcome conflicts arise in the processes (TL3)
C411.4	Classify the various system calls used in signal management(TL4)
C411.5	Analyze inter process communication (ipc) and semaphores for message passing and synchronization between processes(TL4)
C411.6	Design the socket programming for client/server architecture(TL6)

Course Name: Design Patterns **Course code:**A70530

C412.1	Construct design patterns to the recurring problems in software development.(TL3)
C412.2	Justify the design patterns for case study of document editor be able to determine the applications context refers to creational, structural and behavioral. (TL5)
C412.3	Demonstrate the creational, structural and behavioral patterns for complex designs patterns(TL3)
C412.4	Represent interfaces to be implemented between the objects and classes (TL2)
C412.5	Understand the fundamental notions of data abstraction, the appropriate roles of sub typing and inheritance.(TL2)
C412.6	Design problems by using design patterns.(TL6)

Course Name: Data Mining and Data Warehousing**Course code:**A70520

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C413.1	Analyze the work on data cube and perform the computations(TL4)
C413.2	understand the fundamentals of data mining(TL2)
C413.3	Apply knowledge on association rules and its uses in real time.(TL3)
C413.4	Understanding about different algorithms on generation on frequent patterns.(TL2)
C413.5	Synthesize the information about methods for classification and prediction (TL2)
C413.6	Analyze the various methods for creating clusters.(TL4)

Course Name: Cloud Computing **Course code:**A70529

C414.1	Analyze the system models with its vulnerabilities and applications using different architectures for data centers. (TL4)
C414.2	Understanding of different evaluating computer model cloud computing(TL2)
C414.3	Understanding different services model of cloud computing. (TL2)
C414.4	Analyze cloud storage systems and cloud security, the risks involved, its impact and develop cloud scientific application. (TL4)
C414.5	Understand the design of federation concept, sla management and cloud mash up(TL2)
C414.6	Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing. (TL1)

Course Name: Computer Graphics **Course code:**A70629

C415.1	Understand various types of computer graphics systems, its applications and solve the basic output primitive algorithms for producing custom shapes.(TL2)
C415.2	Implement 2d geometric transformations for doing manipulations on object's position, shape, size ,orientation and also object view using appropriate clipping techniques(TL3)
C415.3	Use 3d object representation and curve generation techniques(TL1)
C415.4	Use 3d geometric transformations and viewing process with appropriate clipping techniques for producing view of objects , distinguish various types of projections in 3d(TL1)
C415.5	Formulate different views of objects and describe visible surface detection algorithms(TL2)
C415.6	Implement the animated scenes using conventional or raster animation steps(TL3)

Course Name: Computer Forensics **Course code:**A70628

C416.1	Understand the usage of computers in forensics.(TL2)
C416.2	Identify the types of evidence and create processing steps for preserving evidence. (TL2)
C416.3	Synthesize the data for collecting and validating.(TL2)
C416.4	Formulate the processing of crime and incident situations. (TL2)
C416.5	Identify the forensics tools for a wide verity of investigations. (TL2)

C416.6	Design computer forensics tools and techniques in various operating systems.(TL6)

Course Name: Linux Programming Lab**Course code:**A70596

C417.1	Understand the basic usage of shell script with control structures and loops.(TL2)
C417.2	Analyze the usage of awk utility in Unix environment. (TL4)
C417.3	Classify the basic principles of system calls related to file system. (TL4)
C417.4	Apply the usage of communication by process using inter process communications (ipc) methods. (TL3)
C417.5	Illustrate the conflicts over processes and signals(TL3)
C417.6	Design connection oriented and connection less sockets with tcp and udp protocols. (TL6)

Course Name: Data Warehousing and Data Mining Lab**Course code:**A70595

C418.1	Understand the various kinds of tools.(TL2)
C418.2	Implementing the mining techniques for realistic data and the need for pre-processing.(TL3)
C418.3	Develop the algorithms used for various types of data mining problem(TL3)
C418.4	Design algorithms to solve data mining problems using weak tool(TL6)
C418.5	Demonstrate the classification and clusters techniques in large datasets.(TL3)
C418.6	Ability to add mining algorithms as a component to the existing tools.(TL1)

IV-II (R-15) Course Outcomes

Course Name: Management Science **Course code:**A80014

C421.1	To understand the fundamentals of management science (TL2)
C421.2	Describe the concept and importance of organization structures(TL2)
C421.3	Demonstrate the role of management in production through ppc, plant location & layout techniques(TL3)
C421.4	Study the materials/purchases/stores/inventory(TL1)
C421.5	Design the management of marketing,pert,cpm, project crashing(TL6)
C421.6	Demonstration of contemporary management systems.(TL3)

Course Name: Web Services **Course code:**A80551

C422.1	Understand the details of web services evolution of distributed computing.(TL2)
C422.2	Fundamental knowledge about SOAP and its operations. (TL1)
C422.3	Describing web services about WSDL(TL2)
C422.4	Describe web service life cycle using WSDL tools.(TL2)
C422.5	Identifying web services discovery mechanisms-UDDI(TL2)
C422.6	Implement the web service client and server with interoperable systems.(TL3)

Course Name: Storage Area Networks **Course code:**A80550

C423.1	Describe about information availability and business continuity(TL2)
C423.2	Discuss the backup/recovery topologies(TL2)
C423.3	Demonstrate the architecture of a data center environment with raid and intelligent

	storage systems.(TL3)
C423.4	Classify the local replication and remote replication technologies(TL4)
C423.5	describe the process and technologies for identifying,analyzing,mitigating security risks in storage infrastructure(TL2)
C423.6	To understand industry standards for data center monitoring and management(TL2)

DEPARTMENT OF MECHANICAL ENGINEERING

R15 Mechanical Engineering II year I semester Course outcomes

Course Name: Environmental studies

C211.1	Define the importance and existence of various biotic and abiotic components of environment
C211.2	Recognize the renewable and non-renewable resources and utilization of renewable resources
C211.3	Illustrate the knowledge about various organisms for social, ethical and economical enrichment of the country
C211.4	Appraise the usage of pollution free flues for reduction in the pollutants concentration
C211.5	Innovative ideas for the sustainable development by balancing the population growth and the existing resource in long term perspective

Course Name: Probability and Statistics

C212.1	Ability to comprehend the distribution models using probability density functions and moment generating functions
C212.2	Ability to calculate covariance, correlation and regression between two random variables
C212.3	Ability to test the validity of hypothesis by different distribution techniques and construct confidential interval
C212.4	Ability to calculate expected queue length, idle time, waiting time and traffic intensity for some queuing models
C212.5	Ability to distinguish between random process, Markov process and Markov chains and compute nth state probabilities for engineering applications

Course Name: Electrical & Electronics Engineering

C213.1	Understand basic laws of electricity and instruments to measure the electrical quantities
C213.2	Describe the constructional operational features of energy conversion devices i.e. DC and AC machines.
C213.3	Understand the principle of single phase transformers and calculate its losses and

	efficiency
C213.4	Understand the basics of electronics, semiconductor devices and their characteristics.
C213.5	Explain the working of cathode ray tube and oscilloscope and list their applications

Course Name: Mechanics of Solids

C214.1	Describe the stress and strains in mechanics of solids and impact loads
C214.2	Solve problems on beams subjected to shear forces and bending moments ,relation between force and moment
C214.3	Analyze the distribution of flexural bending stress and shear stress on various sections
C214.4	Justify the stresses induced in thin and thick cylinders using theory of failures
C214.5	Design of structural members such as shafts and thin cylinders

Course Name: Thermodynamics

C215.1	Define thermodynamic system and explain heat and work functions
C215.2	Describe about energy consuming devices that produce work output
C215.3	Compute the magnitude of entropy change and analyze the behaviour of mixture of gases
C215.4	Define various psychometric processes
C215.5	Evaluate the behaviour of various air standard cycles

Course Name: Metallurgy & Material Science

C216.1	Ability to remember basic concept of about crystal structures, Engineering materials, metals, alloys and their properties.
C216.2	Ability to understand alloy system , phase diagram and various invariant reactions
C216.3	Ability to apply leaver rule and tile line rule for identifying the phase present in phase diagram and to examineFe-Fe3C phase diagrams, TTT diagram, various heat treatments.
C216.4	Abilityto examine various cast irons based up the Carbon % and heat treatment and examine various non ferrous metals

C216.5	Ability to understand Modern materials & Unconventional materials such as composites,plastics,polymers etc.

Course Name: Electrical & Electronics Engineering Lab

C217.1	Understand the response of different types of electrical circuits to differentexcitations.
C217.2	Understand the measurement, calculation and relation between the basic electricalparameters
C217.3	Understand the basic characteristics of transformers and electrical machines.
C217.4	Understand the functioning of CRO.
C217.5	Understand the characteristics of electronic components.

Course Name: Metallurgy & Mechanics of Solids lab

C218.1	Define and calculate the strength of the material by conducting experiments.
C218.2	Able to list out the mechanical properties of materials experimentally.
C218.3	Differentiate the Strength, Hardness, Toughness, Stress etc,.by conducting experiments.
C218.4	Explain the Stress- strain curve for different materials by conducting experiments.
C218.5	Ability to visualize microstructure of ferrous and non ferrous alloys

R13 Mechanical Engineering II year II semester Course outcomes

Course Name: Production Technology

C221.1	Ability to demonstrate about Casting process 'casting design' their defects and to describe various casting methods
C221.2	Ability to distinguish various welding methods and appraise welding defects and their remedies
C221.3	Ability to analyze the various type of weld such as TIG, MIGand friction welding and to study remedies of weld defect through NDT techniques.
C221.4	Ability to describe various hot and cold deformation processes and also study the various sheet metal operations.
C221.5	Ability to understand various extrusion and forging processes..

Course Name: Kinematics of Machinery

C222.1	Explain the mechanisms used in various machines
C222.2	Analyze the velocity and acceleration in the mechanisms using graphical methods
C222.3	Able to differentiate various motion mechanisms
C222.4	Illustrate various types of motion in cams and draw the respective cam profiles
C222.5	Discuss the various technical terms in gear profile and to know the various kinematic aspects of gears

Course Name: Thermal Engineering-I

Course Name	**Course Outcomes**
C223.1	Identify IC engines based on general design features.
C223.2	Recognize and analyze and define basic sub systems of an IC engine with their functions.
C223.3	Select a refrigeration system for a particular application.
C223.4	Explain the working of various types of air compressors.
C223.5	Compare and analyze the effects of varying conditions on engine performance and volumetric efficiency.

Course Name: Mechanics of Fluids and Hydraulic Machines

C224.1	Apply the knowledge of basic principles of fluid mechanics.
C224.2	Analyze fluid flow problems with the application of momentum and energy equations.
C224.3	Calculate the friction factor in pipes by considering losses in pipes.
C224.4	Analyze the performance of turbines
C224.5	Analyze the performance of pumps.

Course Name: Machine Drawing

C225.1	Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, rib
C225.2	Types of sections – selection of section planes and drawing of sections and auxiliary sectional views.
C225.3	Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features, Title boxes, their size, location and details - common abbreviations and their liberal usage
C225.4	Preparation of engineering and working drawings with dimensions and bill of material during design and development. Developing assembly drawings using part drawings
C225.5	Types of Drawings – working drawings for machine

Course Name: Mathematics-II

C226.1	Apply Gauss, Green's, Stoke's theorems to evaluate Line, surface and volume integrals.
C226.2	Apply Fourier series and Fourier transforms for solving problems in engineering.
C226.3	Use appropriate interpolation method for specific application in engineering studies.
C226.4	Solve algebraic and transcendental equations.
C226.5	Calculate numerical solution of differential equations using numerical techniques.

Course Name: Production Technology Lab

C227.1	Design and manufacture simple patterns.
C227.2	Create the moulds using sand and determine its properties.
C227.3	Operate arc welding, gas welding and resistance welding equipment.
C227.4	Use pipe bending injection moulding equipment blow moulding operation.
C227.5	Equipment blow moulding operation.

Course Name: Mechanics of Fluids and Hydraulic MachinesLab

C228.1	Able to apply the knowledge of basic principles of fluid mechanics
C228.2	Able to analyze fluid flow problems with the application of momentum and energy equations
C228.3	Able to calculate the friction factor in pipes by considering losses in pipes & analyze the performance of turbines
C228.4	Able to analyze the performance of pumps
C228.5	Compare the performance of different turbines

3 Mechanical Engineering III year I semester Course outcomes

Course Name: Managerial Economics and Financial Analysis

C311.1	Describe the market dynamics and pricing strategies.
C311.2	Able to explain production cost function and to achieve least cost, for cost analysis.
C311.3	State and analyze capital budgeting and decision making.
C311.4	Prepare the framework for accounting process.
C311.5	Analyze and interpret the financial statements through ratio analysis.

Course Name: Engineering Metrology

C312.1	Explain the basics of standard measurements,limits ,fits and tolerances and industrial applications
C312.2	Identify the uses of gauges and comparators

C312.3	Understand the significance of measurement system, errors, transducers, intermediate modifying and terminating devices understand the significance of measurement system,errors,transducers,intermediate modifying and terminatining devices, measurement of flatness of the surface and utilisation of surface plate and optical flat
C312.4	Interpret the numerical assessment of surface finish using RMS,CLA,RZ methods
C312.5	Explain the working of CMM and alignment tests of machine tools and gears

Course Name: Dynamic of Machinery

C313.1	Calculation of gyroscopic couple for automobile ships and aeroplanes
C313.2	Analyze the static and dynamic forces for machines
C313.3	Explain the different types brakes and clutches, different types transmission and absorption dynamometers for machines.
C313.4	Describe the concepts of flywheel and governors used in automobiles and demonstrate the balancing of multi cylinder in line engine and v-engine
C313.5	Evaluate the natural frequency for different vibrations produced in machines

Course Name: Machine Tools

C314.1	Apply the mechanics of metal cutting.
C314.2	Apply the knowledge of using lathe machine for removal of material.
C314.3	Explain the working of shaper, planer, drilling, milling and boring..
C314.4	Comprehend speed and feed mechanisms of machine tools.
C314.5	Explain the working of grinding machine.

Course Name: Design of Machine Members-I

C315.1	Analyze the stress and strain on mechanical components and also identify the failure modes for mechanical parts.
C315.2	Demonstrate basic machine elements used in machine design.
C315.3	Assemble the two parts together with different joining processes& analyze the Joining processes
C315.4	Analyze the joints used for axial loaded members and also analyze the keys.

C315.5	Evaluate the shafts and Couplings

Course Name: Thermal Engineering-II

C316.1	Identify and represent various cycles on different co-ordinates, analyze flue gases.
C316.2	Explain the working principle of different boilers.
C316.3	Distinguish Impulse & Reaction steam turbines and explain friction effects by plotting velocity diagrams.
C316.4	Distinguish between gas turbines.
C316.5	Principles of jet propulsion and list out various jet propulsive engines

Course Name: Machine Tools & Metrology Lab

C317.1	Able to operate lathe machine to perform plain turning, step turning, knurling, threading, eccentric turning, chamfering and facing.
C317.2	Practice drilling holes and produce internal threads.
C317.3	Construct spur machine and helical gears on a milling and apply the procedures to measure various parameters using different instruments.
C317.4	Identifies Thread profile of a Threaded component.
C317.5	Conduct different tests for checking machine alignment.

Course Name: Thermal Engineering Lab

C318.1	Identify and represent various cycles on different co-ordinates, analyse flue gases
C318.2	Explain the working principle of different boilers
C318.3	Understand the various devices used in power plants transducers, intermediate modifying and terminating devices understand the significance of measurement system, errors, transducers, intermediate modifying and terminating devices, Distinguish Impulse & Reaction steam turbines and explain friction effects by plotting velocity diagrams.
C318.4	Distinguish between gas turbines
C318.5	Define the principles of jet propulsion and list out various jet propulsive engines

R13 Mechanical Engineering III year II semester Course outcomes

Course Name: Automobile Engineering

C321.1	Explain the structure of vehicle with SI and CI engines
C321.2	Make use of the cooling system , ignition system and electrical system of an engine
C321.3	Functioning of transmission system with gears&Evaluate clutches and suspension systems.
C321.4	Determine steering geometry with different steering systems and braking systems
C321.5	Identify different pollutant emissions from automobile engines and their effects on environment

Course Name: Finite Element Methods

C322.1	Solve the linear and nonlinear equations for FEM.
C322.2	Analyze Truss elements & beam elements.
C322.3	Able to two dimensional stress analysis on stain triangle and boundary conditions&Finite element modelling of axi- symmetric solids and 2-D four node isoperimetric elements.
C322.4	Heat transfer analysis on 1-d and 2-d objects
C322.5	Dynamic analysis of fem Eigen values and vectors, formulation of stress analysis on 3d models with automatic software

Course Name: Refrigeration & Air Conditioning

C323.1	Illustrate the C.O.P of a Refrigeration system for a given Refrigerant
C323.2	Demonstrate working principle and components of RAC system
C323.3	Model the performance of vapor absorption refrigeration systems&Test the performance of vapor compression refrigeration systems.
C323.4	Estimate the internal heat loads, sensible heat factor and grand sensible heat factor. Illustrate concept of human comfort
C323.5	Evaluate components of air conditioning systems for effective utilization of the system

Course Name: Design of Machine Members-II

C324.1	Able to analyze different bearings
C324.2	Able to analyze the IC Engine parts
C324.3	Demonstrates the application of chain drive systems &belt drive systems
C324.4	Able to analyse the gears for transmitting power.
C324.5	Ability to evaluate power screws

Course Name: Heat Transfer

C325.1	Student can able to grasp the concept of steady state conduction.
C325.2	Student is expected understand the concept of extended surfaces and its applications. Also, student can aware transient heat conduction and how it vary w.r.t time.
C325.3	Student understands the physical phenomena associated with convection and have the ability to formulate practical forced and natural convection heat transfer problems.
C325.4	Student will be able to calculate heat transfer in condensation and boiling systems, student can have knowledge on fundamental laws of radiative heat transfer..
C325.5	Student can able to grasp the fundamentals of heat exchanger and analyze its performance by using LMTD and NTU methods

Course Name: Human Values & Professional Ethics

C326.1	Acquire knowledge about the basic requirement of human aspirations with their correct priority.
C326.2	Acquire knowledge about himself with his potentials for happiness himself and others.
C326.3	Understanding harmony in the family/ society and values in human-human relationship.
C326.4	Learn the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature
C326.5	Justify the importance of human values, ethical values and humanistic education

Course Name: Intellectual Property Rights

1	Able to understand the importance of intellectual property rights.

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2	Able to explain the trademark evaluation and registration process.
3	Able to illustrate international copyright law with respect to ownership and registration of copyright
4	Able to understand the trade secrets determination, misappropriation, protection for submission and litigation.
5	Able to explain the new international developments in trademarks law, copyright law and patent law.

Course Name: Heat Transfer Lab

C327.1	Estimate the thermal conductivity of powders, bars, pipes and composite labs
C327.2	Measure heat transfer coefficient in free and forced convection
C327.3	Find radiation heat transfer & analyze on Transient Heat Conduction.
C327.4	Compare heat transfer in drop and film wise condensation.
C327.5	Experiment with Parallel and counter flow heat exchanger.

Course Name: Advance Communication Skill Lab

C328.1	Relate functional English for effective communication comprehend literary text and enrich vocabulary.
C328.2	Comprehend technical correspondence like writing Resumes', Report Writing, Covering Letter.
C328.3	Revise and apply the strategies for effective reading and to know the contextual knowledge of vocabulary used &Compose the technical presentations to enhance Oral skills & public speaking.
C328.4	Employ intelligibly and express effectively in spoken and written communication.
C328.5	Appraise the linguistic and communication competencies in facing interviews.

R15 Mechanical Engineering IV year I semester Course outcomes

Course Name: Operation Research

Course Name	Course Outcomes
C411.1	Able to understand definition of OR, various types of models with their applications. understandthe formulation of linear programming problems and solve them.
C411.2	Able to identify and solve various variants of transportation and assignment problems.
C411.3	Able to differentiate and solve flow -shop sequencing, job shop sequencing problems and replacement models.
C411.4	Able to understand theory of games/ inventory models and use them to provide optimum strategies in a competitive situation/ ordering quantity & cost.
C411.5	The ability to define Waiting lines terminology and Dynamic programming terminology -bellman's principle of optimality& Applications

Course Name: Power Plant Engineering

C412.1	Ability to identify Various Resources for the development of power in India.
C412.2	Define different layouts of power plants and classify them. With the knowledge of different layouts of power plant, one can improve the performance.
C412.3	Demonstrate characteristics of different layouts and plant auxiliaries of hydroelectric power plant& describe different types non-conventional power sources.
C412.4	Explain the working of nuclear power plant.
C412.5	Define load curve, connected load, max demand, demand factor, load factor, diversity factor. Explain how pollution from power plant affects the system and its control by using control methods.

Course Name: CAD/CAM

C413.1	Defines the stages of product life cycles necessary to design manufacturing industries using computers.
C413.2	Illustrate the hierarchy of database structure, Various transformations needed to model the component, Process of Rasterization.
C413.3	Distinguishes between the parametric representation and non-parametric representation

	of Various Analytical and Synthetic curves, plane surfaces.
C413.4	Differentiate between NC, CNC and DNC. Perform part programming on CNC machine.
C413.5	Categorize the various parts of families and to know the various types of Manufacturing layouts.

Course Name: Instrumentation & Control Systems

C414.1	Apply the principles of measurement systems and elimination of errors.
C414.2	Apply theory and construction of various transducers to measure displacement, temperature and pressure.
C414.3	Able to describe the working of flow and vibration measurement methods.
C414.4	Apply direct method & Indirect methods for measurement of stress, strain and humidity.
C414.5	Ability to apply the control elements.

Course Name: Robotics

C415.1	Student should be able to describe the need of Automation for Robotics.
C415.2	Student should be able to analyze the Robot configuration and types.
C415.3	Student should be able to explain Matrix for Co-ordination robots & describe the sensors.
C415.4	Student should be able to demonstrate simple Robot with sensors.
C415.5	Student should be able to identify different types of feedback systems.

Course Name: Unconventional Machining Processes

C416.1	Ability to acquire the concepts of unconventional machining processes and able to distinguish between the traditional and non- traditional machining.
C416.2	Categorization of unconventional machining processes based up on the utilization of energies in their direct form.
C416.3	Apply the knowledge of machining of materials with help of chemicals and thermo electric methods.Describe the wire EDM process and its applications.

C416.4	Apply the energy beam techniques for material removal
C416.5	Differentiate Working and Applications of plasma arc welding process for machining of metals.

Course Name: Computer Aided Design & Manufacturing Lab

C417.1	Identify the types of computer devices and solve the problems on transformations and use them in CAD software.
C417.2	Prepare part programs involving various operations for the manufacturing of simple and complex products.
C417.3	Apply the knowledge learnt in integrating CAD and CAM & Understand the mathematics behind the transformations and projections in design of products on CAD devices.
C417.4	Explain the fundamentals of part programming required for manufacturing a product.
C417.5	Understand the integration of design and manufacturing functions through CAD and CAM.

Course Name: Production Drawing Practice & Instrumentation Lab

C418.1	Create the drawings to indicate various symbols & conventions and Explain construction of various parts of machine
C418.2	Define the quantities to measure, Explain theory and construction of various transducers to measure displacement, temperature, speed and Demonstrate various instruments in measuring physical quantities.
C418.3	Demonstrate, Differentiate & Categorize various parts and its disassemblies, representations in drawings of parts and symbols to indicate the drawings&Differentiate various measuring instruments and Categorize.
C418.4	Compare various measured quantities using different instruments.
C418.5	Create the drawing and prepare the operation chat of various machine members and CAD drawing.

R15 Mechanical Engineering IV year II semester Course outcomes

Course Name: Production Planning & Control

C421.1	Apply production planning and control techniques for efficient management of manufacturing and services.
C421.2	Apply forecasting techniques for short, medium and long range forecasting.
C421.3	Apply quantitative models to manage inventory systems and analyze material requirements.
C421.4	Examine various techniques and policies used in standard scheduling methods.
C421.5	Identify dispatching & follow up activities. Usage of computers in production planning and control.

Course Name: Plant Layout and Material Handling

C422.1	Able to plan a detailed Plant layout
C422.2	Able to demonstrate process layout and explain advantages of product layouts
C422.3	Understand the material handling systems&finding relationship between the material and handling systems.
C422.4	Basic knowledge on the selection of material handling systems.
C422.5	To propose the material handling process to minimize the cost and time.

Course Name: Renewable Energy Sources

C423.1	Describe the importance of Renewable energy sources compared to Fossil fuels
C423.2	Choose the most appropriate renewable energy technology based on local conditions
C423.3	Illustrate source, potential, types and performance characteristics of wind mills&Categorize different types of bio-gas digesters and list their applications
C423.4	Design renewable/hybrid energy systems to meet specific energy environment
C423.5	Design renewable energy system to meet specific energy environment without any losses

Course Name: Industry Oriented Mini Project

C424.1	Able to define problem statement in the selected domain
C424.2	Able to perform literature survey on the specific topic
C424.3	Able to Design and implement proposed projects & draw the results and conclude the selected project.
C424.5	Able to present technical material in both oral and written form and effectively manage their time and complex projects
C424.6	Integrate into a group environment to pursue technical goals.

Course Name: Seminar

C425.1	Able to select Novel topics
C425.2	Able to acquire command over the selected topic
C425.3	Able to present technical material in both oral and written form
C425.4	Able to defend over the queries
C425.5	Able to effectively manage time.

Course Name: Project Work

C426.1	Find the scope of the project for the societal benefit after thorough literature review / interaction with industry.
C426.2	Identify the research gap after referring and understanding the existing literature.
C426.3	Prepare project execution schedule for on time completion of the project & Using of selected materials/experiment set up/machinery/methods/mathematical model/algorithms/softwares to develop a prototype or to obtain a experimental result/simulation result.
C426.5	Concluding the analysis of the obtained results and recommendations for future scope of research.
C426.6	Write a technical report as per the format, covering the problem definition, related literature analysis of the problem and methodology adopted to carry out the work

DEPARTMENT OF CIVIL ENGINEERING

II Year I SEMESTER(R-15) Course Outcomes

Course Name: Strength Of Materials-I **Course Code :** 30107

C203.1	Analyse the behaviour of the solid bodies and to understand the concept of stress, strain and their relations based on linear elasticity.
C203.2	Create shear force and bending moment diagrams for shear force and bending moment of beams
C203.3	To evaluate the flexural stresses and design of simple beam members of different cross-sections to withstand the loads imposed on them
C203.4	To Analyse the shear stresses of various beam sections
C203.5	To Analyse the loaded structural beams for slope and deflections and failure strength
C203.6	Evaluate the principle stress and principal strain and predict various theories of failure.

Course Name: Surveying **Course Code :** 30108

C204.1	Calculate angles, distances and levels
C204.2	Identify data collection methods and prepare field notes
C204.3	Understand the working principles of survey instruments
C204.4	Estimate measurement errors and apply corrections
C204.5	Interpret survey data and compute areas and volumes
C204.6	Learning of photogrammetric surveying

Course Name: Fluid Mechanics **Course Code**: 30101

C205.1	Physical properties of fluids, Hydrostatic law, measurement of pressure, Hydrostatic forces on submerged plane, Center of pressure
C205.2	Buoyancy and floatation, Classification of flows, Equation of continuity for one, two, three dimensional flows, stream and velocity potential functions, circulation and vorticity, flownet analysis

C205.3	Surface and body forces, Euler's and Bernoulli's equation, Momentum equation
C205.4	Apply forces on pipe bend. Pitot tube,
C205.5	Reynolds experiment, Characteristics of Laminar & turbulent flows, Laws of fluid friction, Minor losses, T.E.L, H.G.L, Pipe network problems, water hammer
C205.6	Navier stokes equation, Boundary layer , Vonkarmen momentum integral equation, Boundary layer transition, separation, control, flow around submerged objects, drag and lift, Magnus effect

Course Name: Surveying Lab-I **Course Code :** 30185

C206.1	To acquire an awareness of the limitations of the basic surveying instruments and the possible errors that could arise
C206.2	To understand the different methods of calculation of heights and distances using angular measurements
C206.3	To understand field procedures in basic types of surveys, and the responsibilities of a surveying team
C206.4	To apply geometric and trigonometric principles to basic surveying calculations
C206.5	To understand the different methods of calculation of areas and volumes of an irregular boundaries
C206.6	Develop confidence for self education and ability for life-long learning in field works

Course Name: SOM LAB **Course Code :** 30183

C207.1	Conduct tension test on materials like steel etc.
C207.2	Conduct compression tests on spring, wood and concrete
C207.3	Conduct flexural and torsion test to determine elastic constants
C207.4	Determine hardness of metals
C207.5	Conduct shear test on metals

II Year II SEMESTER(R-15) Course Outcomes

Course Name: Strength Of Materials-II**Course Code :** A40114

C212.1	Analyze stresses in the member subjected to torsion and deflection in springs
C212.2	Analyze columns and struts
C212.3	Understand the concept of direct and bending stresses
C212.4	Analyze circular and semi circular beams
C212.5	Analyze and design thin and thick cylinders
C212.6	Understand the concept of unsymmetrical bending and shear center

Course Name: HHM **Course Code :** A40111

C213.1	Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.
C213.2	Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
C213.3	Apply dimensional analysis and to differentiate the model
C213.4	Apply prototype and similitude conditions for practical problems
C213.5	Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages
C213.6	To introduce the concepts of the working and design aspects of hydraulic machines like turbines and pumps and their applications

Course Name: Environmental Studies **Course code:** A40009

C214.1	Will learn about ecosystem and energy flow in ecosystem.
C214.2	Will learn about natural resources, living and non living resources.
C214.3	Will gain knowledge on Biodiversity and value of biodiversity.
C214.4	Will learn about conservation of biodiversity, insitu and exsitu.
C214.5	Will have an idea on Environmental pollution and control technologies.
C214.6	Will learn about Environmental legislation and EIA.

Course Name: Structure Analysis-I **Course Code :** A40115

C215.1	To analyse statically determinate trusses, beams and frames using method of joints and method of sections
C215.2	To calculate deflections of beams and pin jointed frame trusses using classical methods like strain energy and unit load method Ability to analyse three hinged arch structures and to solve normal thrust and radial shear
C215.3	To analyse statically indeterminate structures like propped cantilever using SFD and BMD.
C215.4	To analyse statically indeterminate structures like fixed beams using SFD and BMD.
C215.5	To evaluate slope deflection and moment distribution method to find moments in the continuous beams.
C215.6	To explain the effect of moving loads on structures using influence lines.

Course Name: BMCP **Course Code :** A40109

C216.1	Predict the properties of building stones and its classification and to understand the concepts of various methods of manufacture of bricks
C216.2	Explain various types of cement and their applications in construction and to analyse the importance of mineral and chemical admixtures
C216.3	Understand the different types of lintels, arches, trusses and materials which are commonly used for the construction
C216.4	Understand the plumbing services, ventilation and acoustic design in buildings
C216.5	To understand masonry, english and Flemish bonds and finishing, plastering and painting in buildings
C216.6	To understand the principles of building planning and bye laws

Course Name: CAD LAB **Course Code :** A40186

C217.1	Introduction to computer aided softwares
C217.2	Introduction to different softwares
C217.3	Drawing plans of single storied and multi storied buildings
C217.4	Drawing sections of single storied and multi storied buildings
C217.5	Detailing of building components

C217.6	Development of working drawings of buildings

Course Name: Surveying Lab-I **Course Code :** A40190

C218.1	Apply the knowledge of Theodolite in different operations in civil engineering projects
C218.2	Formulate the setting out of curve by linear and angular methods
C218.3	Use total station in the field of civil engineering land survey
C218.4	Summarize the basic principles of GPS and GIS in civil engineering
C218.5	Manage the suggested or identified constructional problems, solve in teams, in order to improve future problem solving ability and able to present it
C218.6	Estimate measurement errors and apply corrections

III Year I SEMESTER(R-15) Course Outcomes

Course Name: CONCRETE TECHNOLOGY **Course Code :** A50116

C301.1	Understand the properties of the constituent materials of concrete
C301.2	Analyze the behavior of fresh concrete and test the workability of fresh concrete
C301.3	Recognize the water cement ratio of concrete, describe and carry out tests relevant to the use of hardened concrete on site
C301.4	Explain factors affecting strength of concrete
C301.5	Understand the factors influencing concrete mix & know the BIS method of mix design
C301.6	Define special concretes, their application for practical purpose.

Course Name: RCSD&D **Course Code :** A50121

C302.1	Design of RC Structural elements
C302.2	Design of RC beams using Limit state Design
C302.3	Design of RC slabs
C302.4	Design of RC Columns and Footings

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C302.5	Design of Structures for Serviceability
C302.6	Design of Staircase and Canopy

Course Name: EG **Course code:** A50118

C303.1	Evaluate the student's understanding towards engineering geology, petrology and structural geology
C303.2	Be able to identify and classify rocks and minerals using basic geological classification system
C303.3	To discuss the structural geology, ground water exploration and landslides
C303.4	Analyse civil engineering structure is considerably increased if the geological feature like faults, joints, bedding planes, folding solution channels etc in the rock beds are properly located and suitably treate
C303.5	Have knowledge of investigation methods, primarily geophysical methods, for determining the rock mass properties underground, their strengths and weaknesses
C303.6	Demonstrate conditions under which excessive over break occurs in tunnels and its economic importance

Course Name: GTE Course Code : A50120

C304.1	Understand the basic properties of soil formation and structure..
C304.2	Understand the index properties of soils.
C304.3	Analyse the properties and factors of permeability.
C304.4	Analyse the effective stress and seepage through soils
C304.5	Demonstrate the properties of flow nets and uses.
C304.6	Understand different types of tests on shear strength of soil.

Course Name: WRE-I **Course Code :** A50122

C305.1	Analyze hydro-meteorological data
C305.2	Estimate abstractions from precipitation
C305.3	Compute yield from surface and subsurface basin

C305.4	Develop rainfall-runoff models
C305.5	Formulate and solve hydrologic flood routing models
C305.6	Estimate runoff, design discharge from catchment

Course Name: DM **Course Code :** A50117

C306.1	Will have awareness on Environmental hazards and disasters.
C306.2	Will learn the types of environmental hazards and disasters.
C306.3	Will gain knowledge on Endogenous hazards.
C306.4	Will learn effects of earthquake and volcanic eruptions.
C306.5	Will gain knowledge on Exogenous hazards.
C306.6	Will learn Emerging approaches in disaster management.

Course Name: FM&HM LAB **Course Code :** A50181

C307.1	Determine coefficient of discharge for orifice and mouthpiece
C307.2	Calibrate notches venturimeter orifice meters
C307.3	Verification of Bernoulli's equation
C307.4	Describe the basic measurement techniques of fluid mechanics and its appropriate application.
C307.5	Discover the practical working of Hydraulic machines
C307.6	Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows.

Course Name: EG LAB **Course Code :** A50191

C308.1	physical properties of minerals - study of the rock forming minerals and their properties - Fundamentals of process of formation of ore minerals - Coal and Petroleum
C308.2	Sub surface investigations in rocks and engineering characteristics or rocks masses; Structural geology of rocks. Classification of rocks,
C308.3	The fundamentals of the engineering properties of Earth materials and fluids.
C308.4	Required geological consideration for selecting dam and reservoir site. Failure of Reservoir. Favourable & unfavourable conditions in different types of rocks in presence of various structural features,
C308.5	Apply the factor of safety equation to solve planar rock slide and toppling problems
C308.6	Rock mass characterization and the mechanics of planar rock slides and topples.

III Year II SEMESTER(R-15) Course Outcomes

Course Name: SSDD **Course code:** A60130

C311.1	Design tension and compression members
C311.2	Design beams and beam columns
C311.3	Design bolt and weld connections
C311.4	Design built up members and Column base
C311.5	Design of Lacing and battening systems
C311.6	Design of plate girders and Roof Trusses

Course Name: EE Course Code : A60119

C312.1	Analyze characteristics of water and wastewater
C312.2	Estimate the quantity of drinking water and domestic wastewater generated
C312.3	Design components of water supply systems
C312.4	Design sewerage system
C312.5	Ability to analyze, examine the different physical, chemical and biological properties of water
C312.6	Ability to analysis a distribution system

Course Name: TE-I **Course Code :** A60132

C313.1	Understand the basic concepts and importance of highway development, road classification of roads in India.
C313.2	Impart knowledge regarding highway cross section elements
C313.3	Design various geometric elements like sight distance, super elevation, horizontal curves, gradients etc
C313.4	Interpret the various traffic parameters, regulations and methods of traffic data collection.
C313.5	Analyze traffic signal designs, the importance of intersection designs, grade intersections and rotaries
C313.6	Explain about highway construction, maintenance and their importance

Course Name: FE **Course Code :** A60126

C314.1	Check the stability of slopes of pile foundation
C314.2	Check the stability of analysis of pile foundation
C314.3	Check the stability of design of pile foundation and shallow foundations
C314.4	Check the stability of slopes of shallow foundations
C314.5	Check the stability of analysis of shallow foundations
C314.6	Know about earth retaining structures.

Course Name: SA-II **Course code:** A60131

C315.1	To Analyse frames and continuous beams by moment distribution and kanis method
C315.2	To Analyse frames by slope deflection method and analysis of two hinged arches
C315.3	To Analyse frames using cantilever and factor method
C315.4	To Analyse of frames using substitute frame method
C315.5	To Analyse the continuous beams and frames by matrix method of analysis

C315.6	To explain the influence lines of beams and trusses

Course Name: GWH **Course code:** A60128

C316.1	Understand Ground Water occurrence, Ground Water Movement Well construction
C316.2	Able to determine aquifer parameters.
C316.3	Apply Geographical information system and remote sensing knowledge in ground water.
C316.4	Derive necessary 3 or 2 dimensional equations for ground water motion.
C316.5	Understand the porous medium properties that control groundwater flow and transport, including porosity, hydraulic conductivity, and compressibility
C316.6	Able to determine saline water intrusion

Course Name: GTE LAB **Course code:** A60194

C317.1	Determine the liquid limit and plastic limit of fine grained soils & plot flow curve for a given soil.
C317.2	Determine California bearing ratio of the soil
C317.3	Determine maximum dry density and optimum moisture content of the soil by standard proctor test.
C317.4	Determine the shear strength parameters of soil by direct shear test
C317.5	Determine the drained shear strength parameters of soil by tri-axial shear test
C317.6	Determine the un-drained shear strength parameters of soil by tri-axial shear test

IV Year I SEMESTER(R-15) Course Outcomes

Course Name: RS&GIS **Course code:** A70140

C401.1	Explain basic concepts of using GIS in mapping the earth in spatial terms and populating the GIS's system to access data.
C401.1	Develop and print maps with industry standard legends.
C401.1	Capture positional and attribute information with correct and accurate geographic referencing.

C401.1	Convert geographic information among several coordinate systems.
C401.1	Create and access data in the GIS's system using an appropriate software Package.
C401.1	Acquire GIS's system information from databases, existing maps, and the Internet.

Course Name: TE-II **Course code:** A70143

C402.1	Understanding the functions of various components in Rail, Air, Water transport systems and their importance.
C402.2	Calculate entities like maximum permissible loads on rails ,degree of curves, permissible speeds on various gauges etc
C402.3	Have a in depth knowledge on curve sections super elevations and many other design elements
C402.4	Prepare master plans for Airport site considering natural phenomenon and other airport elements
C402.5	Exposure to new technologies which are currently in use for safe and efficient travel
C402.6	Introduce the recent advancements in the field of Sustainable Urban Development, Traffic Engineering and Management, Systems Dynamics Approach to Transport Planning

Course Name: E&C **Course code:** A70138

C403.1	Prepare an Abstract and detailed Estimate for a residential building
C403.2	Prepare earth work quantity for roads and canals.
C403.3	Analyze rates for various items of work. .
C403.4	To Prepare Bar bending schedule for reinforcement works
C403.5	Able to prepare a Notice inviting tender document for bidding
C403.6	Able to prepare a Specification report and valuate a building.

Course Name: WRE-II **Course code:** A70133

C404.1	Understand different terminology Related to water resources engineering
C404.2	Identify various types of reservoirs and their design aspects various channel system
C404.3	Design of cross drainage works
C404.4	Design of dams
C404.5	Design headregulators and cross regulators structures
C404.6	Mathematical application in the field of water resources engineering

Course Name: WSM **Course code:** A70145

C405.1	Will learn concept of watershed and need of watershed management.
C405.2	Will gain knowledge on soil erosion its types and control methods.
C405.3	Will learn rain water harvesting and methods of harvesting.
C405.4	Will learn design of harvesting structure
C405.5	Will gain knowledge on artificial recharge of ground water and methods of artificialRecharge.
C405.6	Will gain knowledge on soil reclamation methods, micro farming and biomass.

Course Name: IWWT **Course code:** A70139

C406.1	Will learn Different characteristics of industrial wastewater and Sources of Pollution.
C406.2	Will gain knowledge on diverse Pre and Primary Treatment methods of Industrial waste water.
C406.3	Will learn to remove nitrogen and phosphorous from water.
C406.4	Will learn membrane separation process and air stripping process.
C406.5	Will gain knowledge on characteristics of sugar, food processing, steel industrialWastewater.
C406.6	Will gain knowledge on characteristics of textile, tannery, and atomic energy industrial wastewater.

Course Name: C&HM LAB **Course code:** A70195

C407.1	Conduct Quality Control tests on concrete making materials
C407.2	Conduct Quality Control tests on fresh & hardened concrete
C407.3	Conduct Non-destructive tests on concrete
C407.4	Perform quality control tests on pavements and pavement materials
C407.5	Characterize the pavement materials
C407.6	Conduct traffic studies for estimating traffic flow characteristics

Course Name: EE LAB **Course code:** A70192

C408.1	The laboratory provides knowledge of estimating various parameters like PH, Chlorides.
C408.2	Estimation parameters likeSulphates and Nitrates in water.
C408.3	Estimation parameters like Electrical conductivity and total dissolved solids.
C408.4	Estimation DO of drinking water.
C408.5	Estimation of optimum dosage of coagulant and chlorine demand.
C408.6	Estimation of BOD and COD.

IV Year II SEMESTER(R-15) Course Outcomes

Course Name: RRS **Course code:** A80151

C411.1	Recognize the mechanisms of degradation of concrete structures and conduct Preliminary forensic assessment of deteriorated concrete structures.
C411.2	Focusing on repairing, maintaining, rehabilitating, and retrofitting of existing infrastructures to extend their life and maximize economic return.
C411.3	Assess the causes of distress in structures and suggest suitable measures for prevention.
C411.4	Analyze the mechanisms of damage in structures and their types.
C411.5	Categorize the causes and prevention mechanisms of corrosion in steel

	reinforcement and fire induced damages
C411.6	Able to Examine to inspect and assess the structures using techniques of visual inspection and NDT.

Course Name: PCS **Course code:** A80150

C412.1	able to analyze and design pre-stressed concrete flexural members
C412.2	able to analyze and design for vertical and horizontal shear in pre-stressed concrete
C412.3	able to analyze and design for deflection and crack control of pre-stressed concrete members
C412.4	able to analyze and design simple connections of pre-stressed concrete members
C412.5	understand the general mechanical behavior of pre-stressed concrete
C412.6	able to analyze transfer and development length as well as pre-stress losses

Course Name: Construction Management **Course Code :** A80146

C413.1	Create a construction project safety plan.
C413.2	analyze professional decisions based on ethical principles
C413.3	analyze methods, materials, and equipment used to construct projects
C413.4	understand construction accounting and cost control
C413.5	understand the legal implications of contract, common, and regulatory law to manage a construction project
C413.6	understand the basic principles of structural behavior

I YEAR - I SEM R-16(ECE/CSE)

Course Name: Mathematics-I **Course Code :**MA101BS

C111.1	Ability to solving differential equations and apply them to real world problems.
C111.2	Analyze the solution of system of equations by matrix representation.

C111.3	Ability to find eigen values, eigen vectors of a square matrix and diagonalization of matrix.
C111.4	Judging the nature signature Rank and index of quadratic form by transformations.
C111.5	Able solve linear and non linear partial differential equation.

Course Name: Engineering Chemistry **Course Code:**CH102BS

C112.1	Experiment, analyze and report the level of hardness in water and select appropriate method to solve water related problems.(TL6)
C112.2	Experiment and apply the principles of electrochemical changes and choose better designs to solve problems related to it. (TL6)
C112.3	Identify engineering materials with distinguished properties to construct high rated products. (TL5)
C112.4	Test and rate the fuels comparing calorific values and observe fuels at different combustion conditions. (TL6)
C112.5	Identify basic construction material and composite engineering materials with typical properties to develop high quality products. (TL5)

Course Name: Engineering Physics – I**Course Code :**PH103BS

C113.1	Realize the importance of light phenomena in thin films and resolution.
C113.2	Learn principle and working of various laser systems and applications.
C113.3	Learn principle and propagation of light through optical fiber.
C113.4	Distinguish various systems and understand atomic packing factor.
C113.5	Know the various crystal defects.

Course Name:PCE**Course Code:**EN104HS

C114.1	Relate listening skills for effective communication, comprehend literary text and enrich vocabulary.
C114.2	Comprehend technical correspondence, learn reading techniques and use grammar structures appropriately.
C114.3	Revise and apply the right format of formal letter writing, drafting Resume' and know the contextual knowledge of vocabulary used.

C114.4	Compose the literary text,basic grammatical aspects and learning the etymology of words.
C114.5	Employ information transfer intelligibly and express effectively in spoken and written communication.

Course Name: Engineering Mechanics**Course Code :**ME105ES

C115.1	Understand definition of force,static,dynamics and analyze the free body diagram of various static object
C115.2	Define friction and understand the operation of srew jack ,how friction is involved in operation
C115.3	Determine the centroid of 2D geometrical object and Determine the center of gravity of basic geometrical object.
C115.4	Discuss the application of mass moment of inertia in engineering problem
C115.5	Analyze the work energy method for various components under various dynamic motion

Course Name:BEEE **Course Code :**EE106ES

C116.1	Understand the basic concepts of electric circuits, solve the problems of electric circuits by using network laws & some network reduction techniques(TL3)
C116.2	The students will be able to analyze the circuits by using network theorems & study about their applications. (TL4)
C116.3	Understand the basic semiconductor devices and Analyze them on the basis of characteristic curves(TL4)
C116.4	Describe the construction and basic principles of transistors like BJT's, FET's etc.. (TL3)
C116.5	The ability to analyze & design simple biasing circuits using transistors. (TL4)

Course Name:ELCS Lab **Course Code:**EN107HS

C117.1	Recognise English speech sounds and understand formal and informal communication.
C117.2	Construct required dialogues in Role Plays and express effectively in Non-verbal communication.
C117.3	Differentiate the influence of their mother tongue while speaking English in

	JAM sessions and Telephonic conversations.
C117.4	Develop professional communication and effective writing skills
C117.5	Remember the usage of intensive listening for better comprehension.

Course Name: Engineering Workshop **Course Code :**ME108ES

C118.1	The ability to use the basic tools
C118.2	The ability to apply suitable tools for different manufacturing operations such as materials removal carpentry, fitting ,tin – smithy,
C118.3	To develop the right attitude and team work and the ability to connect electrical wirings between input and output source
C118.4	The ability to Apply Different weldings to prepare joints
C118.5	The ability to prepare the Different Castings and black smithy

I YEAR - II SEM (ECE/CSE)

Course Name: Engineering Physics – II **Course Code :**PH201BS

C101.1	Explain the behavior of material particle in quantum mechanics
C101.2	learn concentration estimation of charge carriers is semi conductors
C101.3	Realize the importance of the properties of the dielectric materials
C101.4	learn various magnetic properties and apply them in engineering applications
C101.5	know the basic principles and applications of nano materials

Course Name: Mathematics -II**Course Code :** MA202BS

C102.1	Ability to calculate Laplace transforms and inverses with application to solution of differential and integral equations.
C102.2	Able to find the solutions of the problems which can not be expressed interms of elementary functions but can be evaluated using beta and gamma functions.
C102.3	Able to understand the physical meaning of double and triple integrals.
C102.4	Ability understands parameterized curves and vector operators
C102.5	Ability to explain the significance of vector calculus

Course Name: Mathematics-III **Course Code :**MA203BS

C103.1	Apply the concept of random variables and probability distributions and apply the same to solve simple engineering problems
C103.2	Enhance the concepts of mean, proportions and variances of sampling distribution and to make decisions for few samples which are selected from large samples.
C103.3	Apply appropriate test for hypothesis testing for large samples and apply the same to solve simple engineering problems and ANOVA for one way classified data.
C103.4	Find roots of a given equations, solution of system of equations and fitting of a curve for a given data.
C103.5	Solve initial value problems using numerical methods.

Course Name:CP **Course Code :**CCS204ES

C104.1	Understand various steps in Program development and basic concepts in C ProgrammingLanguage.
C104.2	Understand the functions, arrays and apply them for sorting, searching techniques.
C104.3	Understand the concepts of pointers and their applications in C Programming &Understand the concepts of strings and their applications in C Programming.
C104.4	Differentiate structures and union concepts.
C104.5	Understand file concepts and accessing data from files.

Course Name: Engineering Graphics**Course Code :**ME205ES

C105.1	Apply simple geometrical construction methods to construct various engineering curves and scales using the methods described in literature.
C105.2	Apply principles of orthographic projections to draw two dimensional views of points, lines and planes considered in any angle.
C105.3	Construct two dimensional views of prism and cylindrical solids considered in any position with respect to reference planes and Construct two dimensional views of pyramid and cone considered in any position with respect to reference planes.
C105.4	Sketch sectional views and development of surface of sectioned solids that are cut by various positions of section planes.
C105.5	Outline various features of solid by viewing them from front, top & sides and also apply principles of isometric projections to draw three dimensional view of solids

Course Name: Engineering Chemistry LAB**Course Code :**CH206BS

C106.1	Able to estimate the hardness of water using EDTA. (TL6)
C106.2	Able to evaluate the strength of strength of acids using conductometry and potentiometry.(TL6)
C106.3	Able to measure the concentration of iron and copper in samples using photo

	colorimeter. (TL6)
C106.4	To estimate the viscosity of a given liquid using Ostwald Viscometer.(TL6)
C106.5	Able to measure the concentration of copper by iodometry. (TL6)

Course Name: Engineering Physics Lab**Course Code :**PH207BS

C107.1	Define, demonstrateand estimate themechanicalproperties ofmaterials.(TL6)
C107.2	Study and analyzethe optical propertieslike interference,diffraction oflight(TL4)
C107.3	Design, analyze and interpret electriccircuits,their working andapplications(TL4)
C107.4	Estimate andcompare themagnetic propertiesat a givenplace.(TL6)
C107.5	Demonstrate the working of applications ofphysics in various fields(TL3)

Course Name:CP LAB**Course Code :**CS208ES

C108.1	Ability to design and test programs to solve mathematical and scientific problems.
C108.2	Ability to write structured programs using control structures and functions.
C108.3	Ability to write structured programs using functions and arrays&Ability to write structured programs using pointers and strings
C108.4	Ability to write structured programs using structures and unions
C108.5	Ability to store and retrieve data to and from files.

I Year – I Sem R-16 (CIVIL and MECH) Course Outcomes

Course Name: Mathematics-I **Course code:**MA101BS

C111.1	Ability to solving differential equations and apply them to real world problems.
C111.2	Analyze the solution of system of equations by matrix representation.
C111.3	Ability to find eigen values , eigen vectors of a square matrix and diagonalization of matrix
C111.4	judging the nature signature Rank and index of quadratic form by transformations.(TL6)
C111.5	Able solve linear and non linear partial differential equation.

Course Name: Mathematics- II**Course code:** MA102BS

C112.1	Ability to calculate laplace transforms and inverses with application to solution of differential and integral equations.
C112.2	Able to find the solutions of the problems which can not be expressed interms of elementary functions but can be evaluated using beta and gamma functions.
C112.3	Able to understand the physical meaning of double and triple integrals.
C112.4	Ability understands parameterized curves and vector operators
C112.5	Ability to explain the significance of vector calculus

Course Name: Engineering Physics **Course code:** PH103BS

C113.1	Realize the importance of light phenomena in thin films and resolution
C113.2	Learn principle and working of various laser systems and applications
C113.3	Learn principle and propagation of light through optical fiber
C113.4	Distinguish various systems and understand atomic packing factor

C113.5	Know the various crystal defects

Course Name:CP in C **Course code:** CS104ES

C114.1	Understand various steps in Program development and basic concepts in C Programming Language.
C114.2	Understand functions, arrays and apply them for sorting, searching techniques.
C114.3	Understand the concepts of pointers and their applications in C Programming & Understand the concepts of strings and their applications in C Programming.
C114.4	Differentiate structures and union concepts.
C114.5	Understand file concepts and accessing data from files.

Course Name:EM **Course code:**ME105ES

C115.1	Understand definition of force,static,dyanamics and analyze the free body diagram of various static object
C115.2	Define friction and understand the operation of srew jack ,how friction is involved in operation
C115.3	Determine the centroid of 2D geometrical object and Determine the center of gravity of basic geometrical object.
C115.4	Discuss the application of mass moment of inertia in engineering problem
C115.5	Analyze the work energy method for various components under various dyanamic motion

Course Name: Engineering Graphics **Course code:** ME106ES

C116.1	Apply simple geometrical construction methods to construct various engineering curves and scales using the methods described in literature
C116.2	Apply principles of orthographic projections to draw two dimensional views

	of points, lines and planes considered in any angle.
C116.3	Constuct two dimensional views of prism and cylindrical solids considered in any position with respect to reference planes and Constuct two dimensional views of pyramid and cone considered in any position with respect to reference planes.
C116.4	Sketch sectional views and development of surface of sectioned solids that are cut by various positions of section planes.
C116.5	Outline various features of solid by viewing them from front, top & sides and also apply principles of isometric projections to draw three dimensional view of solids

Course Name: Engineering Physics Lab **Course code:** PH107BS

C117.1	Define, demonstrate and estimate the mechanical properties of materials.(TL6)
C117.2	Study and analyze the optical properties like interference,diffraction of light(TL4)
C117.3	Design, analyze and interpret electric circuits, their working and applications(TL4)
C117.4	Estimate and compare the magnetic properties at a given place.(TL6)
C117.5	Demonstrate the working of applications of physics in various fields(TL3)

Course Name:CP in C Lab **Course code:** CS108ES

C118.1	Ability to design and test programs to solve mathematical and scientific problems.
C118.2	Ability to write structured programs using control structures and functions.
C118.3	Ability to write structured programs using functions and arrays & Ability to write structured programs using pointers and strings
C118.4	Ability to write structured programs using structures and unions
C118.5	Ability to store and retrieve data to and from files.

I Year – II Sem(MECH/CIVIL)

Course Name: Applied Physics **Course code:** AP201BS

C101.1	Explain the behavior of material particle in quantum mechanics
C101.2	learn concentration estimation of charge carriers is semi conductors
C101.3	Realize the importance of the properties of the dielectric materials
C101.4	learn various magnetic properties and apply them in engineering applications
C101.5	know the basic principles and applications of nano materials

Course Name: Engineering Chemistry **Course code:** CH202BS

C102.1	Experiment, analyze and report the level of hardness in water and select appropriate method to solve water related problems.(TL6)
C102.2	Experiment and apply the principles of electrochemical changes and choose better designs to solve problems related to it. (TL6)
C102.3	Identify engineering materials with distinguished properties to construct high rated products. (TL5)
C102.4	Test and rate the fuels comparing calorific values and observe fuels at different combustion conditions. (TL6)
C102.5	Identify basic construction material and composite engineering materials with typical properties to develop high quality products. (TL5)

Course Name:M-III **Course code:** MA203BS

C103.1	Apply the concept of random variables and probability distributions and apply the same to solve simple engineering problems
C103.2	Enhance the concepts of mean, proportions and variances of sampling distribution and to make decisions for few samples which are selected from large samples.
C103.3	Apply appropriate test for hypothesis testing for large samples and apply the same to solve simple engineering problems and ANOVA for one way classified data.
C103.4	Find roots of a given equations, solution of system of equations and fitting of

	a curve for a given data.
C103.5	Solve initial value problems using numerical methods.

Course Name:PCE **Course code:** EN204HS

C104.1	Relate listening skills for effective communication, comprehend literary text and enrich vocabulary.
C104.2	Comprehend technical correspondence, learn reading techniques and use grammar structures appropriately.
C104.3	Revise and apply the right format of formal letter writing, drafting Resumes' and know the contextual knowledge of vocabulary used.
C104.4	Compose the literary text, basic grammatical aspects and learning the etymology of words.
C104.5	Employ information transfer intelligibly and express effectively in spoken and written communication.

Course Name:BEEE **Course code:** EE205ES

C105.1	Understand the basic concepts of electric circuits, solve the problems of electric circuits by using network laws & some network reduction techniques(TL3)
C105.2	The students will be able to analyze the circuits by using network theorems & study about their applications. (TL4)
C105.3	Understand the basic semiconductor devices and Analyze them on the basis of characteristic curves(TL4)
C105.4	Describe the construction and basic principles of transistors like BJT's, FET's etc.. (TL3)
C105.5	The ability to analyze & design simple biasing circuits using transistors. (TL4)

Course Name: EC Lab **Course code:** CH206BS

C106.1	Able to estimate the hardness of water using EDTA. (TL6)

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GSI, Bandlaguda, Nagole, Hyd-68.

C106.2	Able to evaluate the strength of strength of acids using conductometry and potentiometry.(TL6)
C106.3	Able to measure the concentration of iron and copper in samples using photo colorimeter. (TL6)
C106.4	To estimate the viscosity of a given liquid using Ostwald Viscometer.(TL6)
C106.5	Able to measure the concentration of copper by iodometry. (TL6)

Course Name: ELCS Lab **Course code:** EN207HS

C107.1	Recognise English speech sounds and understand formal and informal communcation.
C107.2	Construct required dialogues in Role Plays and express effectively in Non-verbal communication.
C107.3	Differentiate the influence of their mother tongue while speaking English in JAM sessions and Telephonic conversations.
C107.4	Develop professional communication and effective writing skills
C107.5	Remember the usage of intensive listening for better comprehension.

Course Name: EW **Course code:**ME208ES

C108.1	The ability to use the basic tools
C108.2	The ability to apply suitable tools for different manufacturing operations such as materials removal carpentry, fitting ,tin – smithy,
C108.3	To develop the right attitude and team work and the ability to connect electrical wirings between input and output source
C108.4	The ability to Apply Different weldings to prepare joints
C108.5	The ability to prepare the Different Castings and black smithy

DEPARTMENT OF ELCTRONICS & COMMUNICATION ENGINEERING

II-I ECE (R16) Course Outcomes

Course Name : Mathematics-IV **Course Code:**MA301BS

C201.1	Able to identify domains and compute limits in the complex plane. And verify analyticity of complex functions.
C201.2	Analyze the complex functions with reference to their analyticity, Integration using Cauchy's integral theorem and express interms of series.
C201.3	Able to evaluate integral over unit circle and semi circles using residue theorem.
C201.4	Able to sketch The conformal transformations of complex functions.
C201.5	Ability to construct a function as fourier series and transforms.
C201.6	Analyze one dimensional wave and heat equation.

Course Name : Analog Electronics **Course Code:**EC302ES

C202.1	Analyzation of single and multistage amplifiers for low frequencies.
C202.2	Determine the gain parameters of amplifiers for high frequencies.
C202.3	Design amplifiers with gain control using negative feedback.
C202.4	Asses the gain & bandwidth of amplifiers for stabilization and improvement of bandwidth.
C202.5	Design of power amplifier for specified loads.
C202.6	Design of tuned amplifiers for audio and radio frequency range of transmitters and receivers.

Course Name : Electrical Technology **Course Code:**EC303ES

C203.1	Analyze the performance of dc generators and motors.
C203.2	Analyze the performance of transformers.
C203.3	Learn the in-depth knowledge on three phase induction motors.
C203.4	Analyze the performance and characteristics of three phase induction motors.

C203.5	Analyze the performance of AC Generators or Alternator
C203.6	Analyze the performance of special motors and electrical instruments in real time Applications.

Course Name : Signals & Stochastic Process **Course Code:**EC304ES

C204.1	Represent any arbitrary analog or digital time domain signal
C204.2	Analyze Fourier series and Fourier transform for standard signals, sampling of band limited signals.
C204.3	Apply the LT and ILT to find the ROC for different types of signals.
C204.4	Apply the ZT and IZT for discrete time signals and to find the ROC of ZT, of different types of signals
C204.5	Describe and interpret the basic concepts of Probability and Stochastic Process.
C204.6	Learn spectral characteristics of random process.

Course Name : Network Analysis **Course Code**:EC305ES

C205.1	To understand the basic concepts of RLC Circuits
C205.2	Analyze the behavior of steady states and transient states in RLC circuits
C205.3	Apply Laplace transform techniques to perform time domain analysis
C205.4	Analyse the performance of Periodic Waveforms
C205.5	Apply network theorems to test linear passive two port networks.
C205.6	Analyze the filter design concepts in real time applications

Course Name : Electronic Devices And Circuits Lab **Course Code** EC306ES

C206.1	Understand the technical's involved in functioning and operations of Instruments, power supplies, and tools, identification of components and values of devices
C206.2	Evaluate the VI characteristics Diodes.

C206.3	Understand the biasing conditions and characteristics of Semiconductor diode applications.
C206.4	Evaluate VI characteristics and Biasing of different types of transistors.
C2065.5	Understand the biasing conditions and characteristics of Semiconductor transistor applications.
C206.6	Evaluate the VI characteristics and Biasing of UJT.

Course Name : Basic Simulation Lab **Course Code:**EC307ES

C207.1	Generate various synthetic signals and sequences.
C207.2	Perform various operations on signals, sequences and verify signal properties.
C207.3	Analyze the linearity and time invariance characteristics of given system
C207.4	Analyze the waveform in Fourier, Laplace and Z-transform of the given signal
C207.5	Demonstrate the noise removal process and extraction of periodic signal using correlation
C207.6	Analyze the noise waveform for random variables and stochastic process

Course Name : Basic Electrical Engineering Lab **Course Code:** EC308ES

C208.1	Understand and remember the technical's involved in functioning and operations of Instruments, power supplies, and tools, identification of components and values of devices.
C208.2	The student can understand and evaluate the Kirchhoff's Laws, Super position theorem & Thevinin's Theorem
C208.3	Understand and remember the Norton's theorem and Maximum theorem and Two port network applications.
C208.4	The student can understand and performance of DC machines and its Characteristics
C208.5	Understand and performance of single phase Transformer and its characteristics
C208.6	The student can understand and performance of AC machines and its Characteristics

II-II (R16) ECE

Course Name : Switching Theory and Logic Design **Course Code:** EC401ES

C211.1	Understand the number systems and algebraic simplification of digital logic gates using Boolean Algebra
C211.2	Analyze of combinational circuits and to use standard combinational functions /building blocks to build larger more complex circuits
C211.3	Design of sequential circuits and to use standard combinational functions /building blocks to build larger more complex circuits
C211.4	Analyze the sequential circuits and to use standard building blocks to build the application like registers and counters.
C211.5	Evaluate the synchronous sequential circuits using state machines.
C211.6	Analyze the sequential circuits using state minimization techniques.

Course Name : Pulse and Digital Circuits **Course Code**:EC402ES

C212.1	Identify the response of High pass and Low pass circuits for A.C and D.C input signals.
C212.2	Construct clippers and clampers circuits for wave shaping and voltage comparators.
C212.3	Asses switching speed of Diodes and Transistor for specified frequencies.
C212.4	Design the gating controls for sampling gates.
C212.5	Design Waveform generators and sweep generators based on time based signals.
C212.6	Develop logic gates for different logic families

Course Name : Control System Engineering **Course Code**:EC404ES

C213.1	Learn to implement mathematical model of a system through Transfer Function for a LTI system
C213.2	Analyze the response of First and Second order systems in the domain using

	characteristic Equations for feedback control systems
C213.3	Analyze the stability of a system in Time Domain using RH Criterion and Root Locus
C213.4	Analyze the response of a Control System in Frequency domain and determine the stability of the system using BODE Plots
C213.5	Analyze the stability of a system in frequency domain using polar and nyquist plots and improve the stability by design and implementation of Compensators and Controllers
C213.6	Implement the state model of a system and determine the transfer function for Linear Time Variant Systems

Course Name : Analog Communications **Course Code**:EC405ES

C214.1	Distinguish the baseband signal, band pass signals in electronic communication systems and Understand the Need for Frequency Translation.
C214.2	Analyze and design various modulation and demodulation analog systems.
C214.3	Perform the mathematical analysis associate with Angle Modulations (FM& PM)
C214.4	Understand the generation, detection of Various analog modulation techniques
C214.5	Analyze signal to noise ratio (SNR) performance of various Analog communication system.
C214.6	Distinguish the concepts of Multiplexing: Time Division Multiplexing (TDM) and Frequency Division Multiplexing (FDM).

Course Name :BEFA **Course Code**:SM405MS

C 215.1	Evaluate the various Forms of Business and the impact of economic variables on the Business.
C 215.2	Analyze the basic issues governing the business operations namely, the Demand and Supply.
C 215.3	Analyze Production function and cost-output relationship
C 215.4	Evaluate the pricing strategies under different market structures
C 215.5	Evaluate and prepare accounts so that the engineers excel in the business.

C 215.6	Evaluate the firm's financial position by analysing the Financial Statements, Ratios, Funds and Cash flow statements of a Company.

Course Name : Analog Communications Lab **Course Code:** EC406ES

C216.1	Generate, demodulate AM and FM signals and calculate modulation index.
C216.2	Explain the working of different modulators
C216.3	Analyze spectrum of AM and FM signals
C216.4	Perform signal sampling by determining the sampling rates for baseband signals and reconstruct the signals
C216.5	Simulate AM, Impulse Analog Modulation and different multiplexers such as FDM, TDM.
C216.6	Simulate frequency synthesizer.

Course Name : Pulse and Digital Circuits LAB **Course Code:** EC407ES

C217.1	Gain expertise in designing of pulse shaping circuits by analyzing different characteristics of circuits
C217.2	Extend and comprehend the concept of circuit modelling to design linear and nonlinear wave shaping and multi-vibrators
C217.3	Extend and comprehend the concept of circuit modelling to design sampling and logic gates for digital circuits
C217.4	Design and implement analog electronic circuits using transistor and diodes
C217.5	Implement the electronic projects for real world applications
C217.6	Design time base generators using BJT's

Course Name : Analog Electronics LAB **Course Code:** EC408ES

C218.1	Simulate single stage amplifiers for different gain and bandwidth considerations

C218.2	Simulate different multi stage amplifiers for different gain and bandwidth considerations
C218.3	Simulate the performance of diverse types of feedback amplifiers for quality improvement in amplification.
C218.4	Simulate different types of oscillators and understand performance of oscillators
C218.5	Simulate power amplifiers and their performance.
C218.6	Simulate tuned amplifiers and their performance.

III-I (R16) ECE

Course Name: Electromagnetic Theory and Transmission Lines **Course Code:**EC501PC

C301.1	Able to explain the concepts related to static electric field and to apply them for various applications.(TL-3)
C301.2	Able to explain the concepts related to static magnetic field and to apply them for various applications.(TL-3)
C301.3	Demonstrate and analyze the Maxwell's equations for time varying fields.(TL-4)
C301.4	Describe Wave propagation in different media.(TL-2)
C301.5	Analyze basic transmission line parameters and interpret relationship between parameters. (TL-4)
C301.6	Analyze interpret relationship between parameters. (TL-4)

Course Name: Linear and Digital IC APPLICATIONS **Course code:**EC502PC

C302.1	Construct modules for Linear and Non-Linear applications using IC's.
C302.2	Design of waveform generators and active filters using IC's for different bandwidths.
C302.3	Analyze the functioning of Analog to Digital Converters using IC's.

C302.4	Analyze the functioning of Digital to Analog Converters using IC's.
C302.5	Design of combinational logic circuits using IC's.
C302.6	Develop sequential logic circuits and memories using IC's.

Course Name: Digital communications **Course code:**EC503PC

C 303.1	Understand basic components of Digital Communication Systems, Pulse digital modulation techniques such as PCM and DM. (TL2)
C 303.2	Design Digital Modulation Techniques. (TL3)
C 303.3	Design optimum receiver for Digital Modulation techniques. (TL3)
C 303.4	Understand the redundancy present in Digital Communication by using various source Coding techniques. (TL2)
C 303.5	Analyze different error detecting and error correction codes like block codes, cyclic codes and convolution codes. (TL4)
C 303.6	Understand the Characteristics of Spread Spectrum Modulation. (TL2)

Course Name:FOM **Course Code:**SM504MS

C 304.1	The student will understand the fundamentals of management functions and the evolution of management.
C 304.2	Carry out the planning function and decision making in problem solving.
C 304.3	Construct organization structure and maintain its culture and change.
C 304.4	Present the concepts of authority and the importance of HRM.
C 304.5	Understand leadership skills and leading during adversity and crisis and motivating the followers.
C 304.6	Identify strategies for control and establish control systems.

Course Name:LINEAR IC Applications lab **Course Code:**EC505PC

C305.1	The student will be able to determine response of Linear applications of op-amp(TL3).
C305.2	The student will be able to determine response of Non -Linear applications of op-amp (TL4).
C305.3	The student will be able to design waveform generators using IC 741(TL4).
C305.4	The student will be able to design Comparator Circuit using IC'S(TL3).
C305.5	The student will be able determine the response of active filters(TL3).
C305.6	The student will be able to Verify the output of special purpose of IC'S(TL2).

Course Name: Digital IC Applications lab **Course Code:**EC506PC

C306.1	Design 16x4 Priority encoder using 8x3 priority encoder
C306.2	Design 16 bit comparator using 4 bit comparator
C306.3	Design 16xMUX using 8x1 MUX
C306.4	Design 4 bit binary to gray & gray to binary
C306.5	Design 8-bit parallel load and serial out shift register using two 4- bit shift register
C307.6	Design Ring counter & twisted ring counter using 4- bit shift register

Course Name: Digital communication lab **Course Code:**EC507PC

C307.1	Understand basic theories of Digital communication system in practical. (TL2)
C307.2	Generate pulse modulationtechniques. (TL3)
C307.3	Implement and analyze various digital modulation schemes. (TL3)
C307.4	Generate delta modulation. (TL3)
C307.5	Generate Adaptive delta modulation. (TL3)
C307.6	DPSK Generation and Detection. (TL3)

III-II ECE (R16)

Course Name: Digital Image Processing **Course Code:**EC612PE

C311.1	Explain the limitations of the computational methods on digital images. (TL2)
C311.2	Implement the spatial and frequency domain image transforms on enhancement of images. (TL4)
C311.3	Implement the spatial and frequency domain image transforms on restoration of images. (TL4)
C311.4	Perform image segmentation operations on images using various computational methods. (TL3)
C311.5	Apply various mathematical transformations on images to implement Morphological Image Processing. (TL3)
C311.6	Define the need for compression and evaluate the basic compression algorithms. (TL2)

Course Name:AWP **Course Code:** EC601PC

C312.1	Define the parameters in the design of antenna and field evaluation under various conditions and formulate the electric as well as magnetic field equations. (TL2)
C312.2	Understand the design issues and the operation of fundamental antennas like Yagi - Uda, Horn antenna and Helical structure. (TL2)
C312.3	Understand the designs of RF and Microwave antennas. (TL3)
C312.4	Analyze the structure and working of Parabolic reflector antenna for a given specification. (TL4)
C312.5	Define the array system for different antennas and field analysis. (TL2)
C312.6	Understand the behavior of nature on EM wave propagation. (TL2)

Course Name:MPMC **Course Code:**EC602PC

C313.1	Select appropriate assembly language instructions to perform arithmetic operations, string manipulations for 8086. (TL2)
C313.2	Design and generate assembly language code for digital clock ,analog to digital and digital to analog conversion. (TL4)
C313.3	Demonstrate serial communication and parallel communication between two microprocessors using 8251 & 8255. (TL3)
C313.4	Interface between microprocessors & its peripherals devices using instruction set. (TL4)
C313.5	Develop the program segments for arithmetic logical & bit manipulation for 8051 microcontroller. (TL5)
C313.6	Compose instructions for various operations among microcontroller peripherals and to verify the functionality of timer/counter. (TL4)

Course Name:DSP **Course Code:** EC603PC

C314.1	Apply the principles of Z-transforms to finite difference equations for stability analysis. (TL3)
C314.2	Compute the discrete time domain & frequency domain of signals using DFS , DFT , FFT. (TL3)
C314.3	Analyze various analog filter approximations and compare Chebyshev and Butterworth filters. (TL4)
C314.4	Design of IIR digital filters using Impulse Invariant & Bilinear transformation techniques. (TL4)
C314.5	Design FIR digital filters using Fourier series, window method. (TL4)
C314.6	Understand the tradeoff between normal and multi-rate DSP techniques, finite word length effects and round-off errors. (TL2)

Course Name:DSP LAB **Course Code:**EC604PC

C315.1	Generate synthetic Sinusoidal waveform based on recursive difference equations. (TL2)
C315.2	Compute DFT, IDFT, FFT of a given sequence and determine the power spectrum. (TL3)
C315.3	Design and implementation of low pass, high pass of FIR and IIR filters for a given sequence. (TL4)
C315.4	Compute multi-rate Digital signal processing (decimation, Interpolation, sampling rate conversion) of a given sequence. (TL3)
C315.5	Analyze real time applications and verification of audio signals. (TL4)
C315.6	Analyze the first order and second order system with impulse response. (TL4)

Course Name:MPMC LAB **Course Code:** EC605PC

C316.1	Select appropriate assembly language instructions to perform arithmetic operations, string manipulations for 8086. (TL2)
C316.2	design and generate assembly language code for digital clock,analog to digital and digital to analog conversion. (TL4)
C316.3	Demonstrate serial communication and parallel communication between two microprocessors using 8251 & 8255. (TL3)
C316.4	Interface between microprocessors & its peripherals devices using instruction set. (TL4)
C316.5	Develop the program segments for arithmetic logical & bit manipulation for 8051 microcontroller. (TL5)
C316.6	Compose instructions for various operations among microcontroller peripherals and to verify the functionality of timer/counter. (TL4)

Course Name: Advanced English Communication Skills Lab**Course Code:**EN606HS

C317.1	Relate functional English for effective communication comprehend literary text and enrich vocabulary. (TL1)
C317.2	Comprehend technical correspondence like writing Resumes', Report Writing, Covering Letter. (TL2)
C317.3	Revise and apply the strategies for effective reading and to know the contextual knowledge of vocabulary used. (TL1)
C317.4	Compose the technical presentations to enhance Oral skills & public speaking. (TL1)
C317.5	Employ intelligibly and express effectively in spoken and written communication. (TL1)
C317.6	Appraise the linguistic and communication competencies in facing interviews. (TL1)

IV-I (R16) ECE

Microwave Engineering EC701PC

C401.1	To analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical microwave transmission line problems
C401.2	To distinguish between the different types of waveguide and ferrite components, explain their functioning and select proper components for engineering applications.
C401.3	To distinguish between the methods of power generation at microwave frequencies, derive the performance characteristics of 2-Cavity and Reflex Klystrons, Magnetrons, TWTs and estimate their efficiency levels, and solve related numerical problems
C401.4	To realize the need for solid state microwave sources, understand the concepts of TEDs, RWH Theory and explain the salient features of Gunn Diodes and ATT Devices
C401.5	To establish the properties of Scattering Matrix, formulate the S-Matrix for various microwave junctions, and understand the utility of S-parameters in microwave component design.
C401.6	To set up a microwave bench, establish the measurement procedure and conduct the experiments in microwave lab for measurement of various microwave parameters.

COMPUTER NETWORKS EC721PE/ET702PC

C402.1	Examine OSI and TCP/IP models for the detection and correction methods in Data Link Layers
C402.2	Understand the various computer networking devices and concepts of collision methods in multiple access techniques
C402.3	Estimate the paths for various routing protocols
C402.4	Understand the compatibility between IPv4 and IPv6 Protocols
C402.5	Understand the Application layer protocol and compare the TCP and UDP Protocols
C402.6	Analyze the various security and cryptography levels for networks.

INTERNET OF THINGS EC732PE

C403.1	Familiarize with the fundamentals of Internet of Things for communication models.
C403.2	Explore appropriate architectures and approaches for IOT System/Device Management.
C403.3	Understand the basics of python programming.
C403.4	Familiarize with the python programming packages.
C403.5	Develop python programs for interfacing external gadgets to control.
C403.6	Work with Cloud Storage models, communication APIs and webservers to developing IOT solutions.

ARTIFICIAL INTELLIGENCE EC7440PE

C404.1	To formulate an efficient algorithm for a problem expressed in natural language.
C404.2	To analyze search algorithm and to identify an optimal solution to reduce the time and space complexities.
C404.3	To understand the logical and knowledge based techniques.
C404.4	To apply the appropriate knowledge based technique for a given problem.
C404.5	To apply AI techniques to solve the real world problems.
C404.6	To apply AI techniques to solve problems of machine learning.

VLSI DESIGN EC702PC

C405.1	Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors.
C405.2	Choose an appropriate inverter depending on specifications required for a circuit and Draw the layout of any logic circuit which helps to understand and estimate parasitic of any logic circuit
C405.3	Design different types of logic gates using CMOS inverter and analyze their transfer characteristics
C405.4	Provide design concepts required to design building blocks of data path using gates. And design simple memories using MOS transistors and can understand design of large memories
C405.5	Design simple logic circuit using PLA, PAL, FPGA and CPLD.
C405.6	Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve testability of system.

VLSI & ECAD LAB **EC703PC**

C406.1	To Code HDL programme to realize all the logic gates
C406.2	To design 2 to 4 encoder and 8 to 3 decoder.
C406.3	To design 8 to 1 multiplexer and 1 to 8 demultiplexer
C406.4	To design of 4 bit binary to gray code converter and 4 bit comparator
C406.5	To design of Full adder using 3 modeling styles and flip flops: SR, D, JK, T
C406.6	To design of 4-bit binary, BCD counters (synchronous/ asynchronous reset) or any sequence counter and to design Finite State Machine.

MICROWAVE ENGINEERINGLAB **EC704PC**

C407.1	Understand the different microwave components working and their applications.
C407.2	Demonstrate microwave bench setup for the generation of microwave frequencies.
C407.3	Calculate Wavelength, Frequency, VSWR, and Power of microwave frequencies using microwave bench setup.
C407.4	Understand basic theories of Digital communication system in practical.
C407.5	Implement different digital modulation and techniques.
C407.6	Implement different digital Demodulation and techniques.

IV-II

GPS **EC863PE**

C411.1	Describe the fundamental theory and concepts of the GPS.
C411.2	Estimate User Position using GPS Pseudorange data.
C411.3	Understand GPS receiver Architecture.
C411.4	Analyze error sources for GPS user position calculation.
C411.5	Analyze the corrective methods for GPS user position errors by differential GPS.
C411.6	Analyze the various applications of GPS.

DEPARTMENT OF CSE

II-I (R16)

Course Name: Mathematics-IV **Course Code:**MA301BS

C211.1	Analyze the complex functions with reference to their analyticity,integration using Cauchy,s integral theorem.(TL4)
C211.2	Find the taylor's and laurents series expansion of complex functions.(TL1)
C211.3	Learn the bilinear transformation.(TL1)
C211.4	Express any periodic function in term of sines and cosines.(TL3)
C211.5	Express a non periodic function as integral representation(TL3)
C211.6	Analyze one dimensional wave and heat equation(TL4)

Course Name: Data Structures through c++ **Course Code:**CS302ES

C212.1	Understand the basic concepts of C++. learn data structures to represent data items in real world problems. (TL1)
C212.2	Ability to Analyze the time and space complexities of algorithms.(TL1)
C212.3	Design programs using a variety of data structures such as stacks, queues .(TL6)
C212.4	Implement binary trees, Priority Queues,Heap data structure .(TL3)
C212.5	Analyze and implement various kinds of searching and sorting techniques. .(TL4)
C212.6	Understand graphs and balanced search trees.(TL2)

Course Name: Mathematical Foundations of Computer Science **Course Code:**CS303ES

C213.1	Apply mathematic logic to solve problems(TL3)
C213.2	Understand sets, relations, functions, and Discrete structures. .(TL2)
C213.3	Demonstrate in practical application with the use of basic counting principles of permutations and combinations. Use of basic principles of inclusion and exclusion. .(TL3)
C213.4	Formulate problems and solve recurrence relations.(TL3)
C213.5	Model and solve real-world problems using graphs and trees.(TL3)
C213.6	Use logical notations to define fundamental mathematical concepts(TL1)

Course Name: Digital Logic Design **Course Code:**CS304ES

C214.1	Apply knowledge of number system, codes and Boolean Algebra to the analysis and design of digital logic circuits.(TL3)
C214.2	Simplify K-maps to minimize number of gates using NAND and NOR implementation.(TL2)

C214.3	Design and interpret combinational circuit by utilizing digital logic techniques and multiplexe, demultiplex circuits. (TL6)
C214.4	Design and interpret sequential circuit like latches, flipflops, counters, registers and discuss register transfer language.(TL6)
C214.5	Understand the basics of various memories. (TL1)
C214.6	Analyze and design simple systems composed of programmable logic, such as ROMs, PLAs and PLAs(TL2)

Course Name: Object Oriented Programming through Java **Course Code:**CS305ES

C215.1	solve real world problems using OOP techniques(TL3)
C215.2	Understand the use of packages and abstract classes.(TL2)
C215.3	Able to create user defined exceptions and handle them develop multithreaded applications with synchronization.(TL3)
C215.4	Able to solve problems using java collection framework and i/o classes.(TL3)
C215.5	Design applets for web applications and GUI based applications(TL6)
C215.6	Design GUI based applications(TL6)

Course Name: Data structures through C++ Lab **Course Code:**CS306ES

C216.1	Design programs using a variety of data structures such as stacks, queues. .(TL6)
C216.2	Implement binary trees, Priority Queues, heap data structures. .(TL3)
C216.3	Analyze various kinds of searching and sorting techniques. .(TL4)
C216.4	Implement graphs and balanced search trees. .(TL3)
C216.5	Implement time and space complexities of algorithms.(TL3)
C216.6	Implement hash table to solve various computing problems(TL3)

Course Name: IT Workshop **Course Code:**CS307ES

C217.1	Apply knowledge for computer assembling and software installation(TL3)
C217.2	Solve trouble shooting problems(TL3)
C217.3	Learn tools for preparation of ppts(TL1)
C217.4	Learn tools for preparation of documentation(TL1)
C217.5	Learn tools for preparation of budget sheets(TL1)
C217.6	Learn installation of OS(TL1)

Course Name: Object Oriented Programming through java lab **Course Code:**CS308ES

C218.1	Implement programs for solving real world problems using java collection frame work(TL3)

C218.2	Execute programs using abstract classes(TL3)
C218.3	Create user defined packages and demonstrate multithreaded programs.(TL3)
C218.4	Implement data structures in java(TL3)
C218.5	Create GUI programs using Applets controls in java(TL3)
C218.6	Create GUI programs using swing controls in java(TL3)

II-II(CSE)

Course Name: Computer Oganization **Course Code:**CS401BS

C221.1	Understand the basic components & organization of computer and to study micro-programmed control unit (TL2)
C221.2	Understand the architecture of 8086 processor, instruction sets, instruction formats and various addressing modes of 8086(TL2).
C221.3	Demonstrate 8086 instruction sets in assembly language and understand macros, stack structure and interrupt cycle of 8086(TL3)
C221.4	Illustrate algorithms for addition,substraction,division,multiplication to understand the i/o organization(TL3)
C221.5	Understand the memory organization and parallelism in terms of single processors(TL2)
C221.6	Understand the memory organization and parallelism in terms of multiple processors(TL2)

Course Name: Data Base Management Systems **Course Code:**CS402ES

C222.1	Demonstrate the basic elements of a relational database management system(TL3)
C222.2	Design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data(TL6)
C222.3	Identify need of schema refinement and Apply normalization techniques for the development of application software's.(TL3)
C222.4	Identify and apply the basics of Transaction management and Concurrency control.(TL2)
C222 .5	Understanding various indexing techniques and basic database storage structures (TL2)
C222.6	Learn access techniques(TL1)

Course Name: Operating systems**Course Code:**CS403ES

C223.1	Apply optimization techniques for the improvement of system performance (TL3)
C223.2	list the synchronous and asynchronous communication mechanisms in their respective OS(TL1)

C223.3	Illustrate different Memory Management Techniques(TL3)
C223.4	Generating different page replacement algorithms(TL3)
C223.5	Designing File system Structure and compiling different Disk scheduling Algorithms(TL6)
C223.6	Distinguish between Deadlock Prevention, Avoidance and Recovery from Deadlock(TL4)

Course Name: Formal Languages & Automat Theory **Course Code:**CS404ES

C224.1	Ilustrate finite automata,Inter -conversion, equivalence and minimization,language recognizers(TL3)
C224.2	Construct finite automata from regular grammer and regular grammer to automata(TL3)
C224.3	Understand sentential forms, Derivations using Context free grammer, Ambiguity of context free grammers(TL2)
C224.4	Describe Turing machine and language accepted by turing machines-programming techniques, (TL2)
C224.5	Differentiate decidablility of problems and completeness of language(TL4)
C224.6	Understand conversion among CFL's and PDA's(TL2)

Course Name:BEFA **Course Code:**SM405MS

C225.1	To learn business types(TL1)
C225.2	Learn impact of the economy onm business and firms specifically(TL1)
C225.3	To analyze the business from the financial perspecpive(TL2)
C225.4	To underatand various forms of business(TL2)
C225.5	To understand the impact of economic variable on businesss(TL2)
C225.6	To analyze the financial statements of a company(TL2)

Course Name: Computer Organization LAB **Course Code:**CS406ES

C226.1	To implement logic gates using nand and nor gates(TL3)
C226.2	Design full adder using gates(TL3)
C226.3	Design and implement 4:1 MUX,8:1 MUX using gates(TL3)
C226.4	Design ans implement 3:8 decoder(TL3)
C226.5	Design a four bit comparator(TL3)
C226.6	Design 4 bit shift register using flip flop(TL3)

Course Name:OS LAB **Course Code:**CS408ES

C228.1	implement system that minimizes turnaround time, waiting time and response time and also maximize throughput by keeping CPU as busy as possible(TL3)
C228.2	create access controls to protect files (Directory Level)(TL3)
C228.3	Apply optimization techniques for the improvement of secondary memory allocation(TL3)
C228.4	design different memory management techniques (Main Memory)(TL6)
C228.5	Implement the virtual memory concepts(TL3)
C228.6	implementing the concepts of Deadlock prevention, occurrence and avoidance(TL3)

III-I (CSE)

1.Design and analysis of algorithmsCS501PC

COURSE NAME	COURSE OUTCOMES
C311.1	Able to analyze and improve efficiency of algorithms.(TL 4)
C311.2	Able apply Different designing methods for development of algorithms to realistic problems such as divide and conquer, greedy, etc.(TL 3)
C311.3	Able to understand and estimate the performance of algorithms. (TL2)
C311.4	Able to apply the Graph Traversals. (TL3)
C311.5	Ability to compare different types of P, NP hard and NP complete problems. (TL 4)
C311.6	

2. Data communication and computer networksCS502PC

COURSE NAME	COURSE OUTCOMES
C312.1	Define network and network communication. Know OSI and TCP/IP model (TL1)
C312.2	Explain medium access layer and its operation. Appraise the Functionalities of different networking devices (TL2)
C312.3	Design the issues involved in network layer(TL6)
C312.4	Differentiate the types of routing protocols and Congestion control mechanisms(TL4)
C312.5	Discriminate IPv4 and IPv6 formats, how fragmentation and tunneling happens.(TL4)
C312.6	Distinguish UDP and TCP transport layer protocol and compare Application layer protocol such as HTTP, FTP. How client server communication takes place.(TL4)

SOFTWARE ENGINEERING CS503PC

COURS	COURSE OUTCOMES

E NAME	
C313.1	Explain software engineering process, including view of process and process models methodologies and work flows.(TL2)
C313.2	Identify the requirements and differentiate functional requirements and nonfunctional requirements.TL2)
C313.3	Make use of different system models through analysis of requirements and develop an appropriate software design(TL1)
C313.4	Implement system design ,domain model , architectural design and component level design using DFD and OOAD diagrams(TL3)
C313.5	Identify different testing strategies and know more about product metrics(TL2)
C313.6	Identify risk in the product by using different techniques and know how to maintain the quality of the product (TL2)

Fundamentals of management(SM504MS)

COURSE NAME	COURSE OUTCOMES
C314.1	To understand the basic issues governing the economic operations namely the Demand analysis. (TL2)
C314.2	To be familiar with Production function, cost and profit analysis.(TL1)
C314.3	Understand market structures, dynamics and pricing strategies.(TL2)
C314.4	Understand the various forms of business organization.(TL2)
C314.5	Understand the terminology of accountancy and preparation and evaluation of final accounts so that the engineers excel in the business.(TL2)
C314.6	To study and analyze the firm's financial position by analyzing the Financial Statements and Ratio analysis.(TL3)

DAA LAB(CS505PC)

COURSE NAME	COURSE OUTCOMES
C315.1	solve problem using divide and conquer strategies(TL3)
C315.2	solve problem using backtracking strategies(TL3)
C315.3	solve problem using greedy techniques(TL3)
C315.4	solve problem using dynamic programming techniques(TL3)
C315.5	Implement Dijkstra's algorithm(TL3)
C315.6	Implement prim's and kruskal's algorithm(TL3)

Computer Networks LabCS506PC

COURSE NAME	COURSE OUTCOMES
C316.1	Understand the data link layer framing techniques(TL2)

COURSE NAME	COURSE OUTCOMES
C317.1	understand the software engineering methodologies involved in the phases for projectdevelopment.(TL1)
C317.2	gain knowledge about open source tools used for implementing software engineering methods.(TL1)
C317.3	exercise developing product-startups implementing software engineeringmethods(TL2).
C317.4	Learn Open source Tools: StarUML / UMLGraph /Topcased(TL1)
C317.5	design and develop innovative and creative software applications(TL3)
C317.6	understand a complex real world problem and develop an efficient practical solution(TL2)
C316.2	Implement error detection and correction method(TL3)
C316.3	Understand the encryption and decryption concepts(TL2)
C316.4	Apply appropriate algorithm to find shortest path(TL3)
C316.5	Implement algorithms to configure routing tables(TL3)
C316.6	Understand the broad cast tree concept within subnet(TL2)

III-II (CSE)

1.COMPILER DESIGN

COURSE NAME	COURSE OUTCOMES
C321.1	Describing translation in each phase of the compilation.(TL2)
C321.2	Design parsers for the compilers.(TL6)
C321.3	Define the specific semantic test and enhance the parser to construct a symbol table(TL1)
C321.4	Describing the different forms of Intermediate code(TL2)
C321.5	Perform Code Optimization and understanding runtime environment(TL2)
C321.6	Design code generation schemes on machine dependent optimizations(TL6)

2.WEB TECHNOLOGIES(CS602PC)

COURSE NAME	COURSE OUTCOMES
C322.1	Understanding the server side scripting through PHP(TL2)
C322.2	Understanding XML, how to parse and using XML data in web pages(TL2)
C322.3	Generate server side scripting with Java serves(TL3)
C322.4	Demonstrate Database Connectivity using JDBC(TL3)
C322.5	Support server side scripting with JSP(TL2)
C322.6	Gain and applying knowledge of client side scripting, validations of forms and AJAX programming(TL3)

3.CRYPTOGRAPHY AND NETWORK SECURITY(CS603PC)

COURSE NAME	COURSE OUTCOMES
C323.1	To identify the importance of information security and security mechanisms in real world applications.(TL2)
C323.2	Analyze the different conventional and public key encryption algorithms(TL4)
C323.3	Demonstrate various methods to calculate authentication codes using Message Authenticate Code(TL3)
C323.4	Demonstrate various methods to calculate authentication codes using Hash Functions(TL3)
C323.5	Describe the security done at different layers of network, Email and Web(TL2)
C323.6	Categorize viruses and mechanisms used for intrusion detection. (TL3)

4.CRYPTOGRAPHY AND NETWORK SECURITY LAB(CS604PC)

COURSE NAME	COURSE OUTCOMES

E NAME	
C324.1	Implement DES Algorithm(TL3)
C324.2	Implement Blowfish algorithm logic(TL3)
C324.3	Implement Rijndael algorithm logic(TL3)
C324.4	Implement RSA algorithm (TL3)
C324.5	Implement diffie-hellman key exchange mechanism using html and javascript(TL3)
C324.6	Implement SHA-1 and MD5 Algorithm in java(TL3)

5.WEB TECHNOLOGIES LAB(CS605PC)

COURSE NAME	COURSE OUTCOMES
C325.1	Use LAMP Stack for web applications(TL1)
C325.2	Use TOMCAT Servers for Servest & JSPs(TL1)
C325.3	Write simple applications using Technologies JAVA SCRIPT, HTML,AJAX,PHP,JSP,Servlets(TL3)
C325.4	Connect to the Database and get the results(TL3)
C325.5	Parse XML files using JAVA (DOM & SAX PARSERS)(TL2)
C325.6	Validate Web forms using JAVA SCRIPT(TL3)

6.ADVANCED ENGLISH COMMMUNICATION SKILLLS LAB(EN606HS)

COURSE NAME	COURSE OUTCOMES
C326.1	Relate functional Englishfor effective communicationcomprehend literary text and enrich vocabulary.(TL3)
C326.2	Comprehend technical correspondence like writing Resumes', Report Writing, Covering Letter.(TL3)
C326.3	Revise and apply the strategies for effective reading and to know the contextual knowledge of vocabulary used.(TL3)
C326.4	Compose the technical presentations to enhance Oral skills & public speaking.(TL3)
C326.5	Employ intelligibly and express effectively in spoken and written communication.(TL3)
C326.6	Appraise the linguistic and communication competencies in facing interviews.(TL3)

7.DESIGN PATTERNS(CS612PE)

COURS	COURSE OUTCOMES

E NAME	
C327.1	Construct design patterns to the recurring problems in software development.(TL3)
C327.2	Justify the design patterns for case study of document editor(TL5) be able to determine the applications context refers to creational, structural and behavioral.
C327.3	Demonstrate the creational, structural and behavioral patterns for complex designs patterns(TL3)
C327.4	Represent interfaces to be implemented between the objects and classes (TL2)
C327.5	Understand the fundamental notions of data abstraction, the appropriate roles of sub typing and inheritance.(TL2)
C327.6	Design problems by using design patterns.(TL6)

IV-I

1.DATA MINING(CS701PC)

COURSE NAME	COURSE OUTCOMES
C411.1	Analyze the work on data cube and perform the computations(TL4)
C411.2	understand the fundamentals of data mining(TL2)
C411.3	Apply knowledge on association rules and its uses in real time.(TL3)
C411.4	Understanding about different algorithms on generation on frequent patterns.(TL2)
C411.5	Synthesize the information about methods for classification and prediction (TL2)
C411.6	Analyze the various methods for creating clusters.(TL4)

2.PRINCIPLES OF PROGRAMMING LANGUAGES(CS702PC)

COURSE NAME	COURSE OUTCOMES
C412.1	To express syntax and semantics in formal notation(TL2)
C412.2	Apply suitable programming paradigm for the application(TL3)
C412.3	Compare the features of various programming languages(TL4)
C412.4	Understand the programming paradigms of modern programming languages(TL1)
C412.5	Understand the concepts of ADT and OOP(TL1)
C412.6	Learn different languages paradigms and evaluate their relative benefits(TL1)

3.DATA MINING LAB(CS703PC)

COURSE NAME	COURSE OUTCOMES
C413.1	Understand the various kinds of tools.(TL2)
C413.2	Implementing the mining techniques for realistic data and the need for pre-processing.(TL3)
C413.3	Develop the algorithms used for various types of data mining problem(TL3)
C413.4	Design algorithms to solve data mining problems using weak tool(TL6)
C413.5	Demonstrate the classification and clusters techniques in large datasets.(TL3)
C413.6	Ability to add mining algorithms as a component to the existing tools.(TL1)

4.PYTHON PROGRAMMING(CS721PE)

COURSE NAME	COURSE OUTCOMES
C414.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.(TL2)
C414.2	Demonstrate proficiency in handling Strings and File Systems.(TL3)
C414.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.(TL3)
C414.4	Illustrate Programs using Regular Expressions.(TL4)
C414.5	Interpret the concepts of Object-Oriented Programming as used in Python(TL2)
C414.6	Implement exemplary applications related to Network Programming, Web Services and Databases in Python(TL3)

5.SOFTWARE PROCESS AND PROJECT MANAGEMENT(CS734PE)

COURSE NAME	COURSE OUTCOMES
C415.1	Implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success.(TL3)
C415.2	Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation(TL2).
C415.3	Apply project management practices to the launch of new programs, initiatives, products, services, and events relative to the needs of stakeholders(TL3)
C415.4	Interact with team and stakeholders in a professional manner, respecting differences, to ensure a collaborative project environment.(TL2)
C415.5	Analyze the major and minor milestones, artifacts and metrics from management and technical perspective(TL4)

C415.6	Design and develop software product using conventional and modern principles of software project management.(TL3)

6.CLOUD COMPUTIN(CS742PE)

COURSE NAME	COURSE OUTCOMES
C416.1	Analyze the system models with its vulnerabilities and applications using different architectures for data centers. (TL4)
C416.2	Understanding of different evaluating computer model cloud computing(TL2)
C416.3	Understanding different services model of cloud computing. (TL2)
C416.4	Analyze cloud storage systems and cloud security, the risks involved, its impact and develop cloud scientific application. (TL4)
C416.5	Understand the design of federation concept, sla management and cloud mash up(TL2)
C416.6	Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing. (TL1)

7.PYTHON PROGRAMMING LAB(CS751PC)

COURSE NAME	COURSE OUTCOMES
C417.1	Student should be able to understand the basic concepts scripting and the contributions of scripting language.(TL2)
C417.2	Ability to explore python especially the object oriented concepts, and the built in objects of Python(TL2)
C417.3	Ability to create practical and contemporary applications such as TCP/IP network programming(TL3)
C417.4	Ability to create Web applications, discrete event simulations(TL3)
C417.5	Implement the back end using PyMsql concepts which would be easy to create web applications(TL3)
C417.6	Proficiency in modules like to Tkinter to create GUI applications(TL2).

IV-II

1.ENTERPRENEURSHIP AND SMALL BUSINESS ENTERPRISES(CE833OE)

COURSE NAME	COURSE OUTCOMES
C421.1	Understanding basic concepts in the area of entrepreneurship(TL2)
C421.2	Understanding the role and importance of entrepreneurship for economic development,(TL2)
C421.3	Developing personal creativity and entrepreneurial initiative(TL2)
C421.4	Adopting of the key steps in the elaboration of business idea(TL2)
C421.5	Understanding the stages of the entrepreneurial process (TL2)
C421.6	Understand the resources needed for the successful development of entrepreneurial ventures. (TL2)

2.MODERN SOFTWARE ENGINEERING(CS854PE)

COURSE NAME	COURSE OUTCOMES
C422.1	Learn agile software development(TL1)
C422.2	Learn XP life cycle(TL1)
C422.3	Understand collaborating concept(TL2)
C422.4	Understand releasing concept in software(TL2)
C422.5	Understand planning concept in software(TL2)
C422.6	Understand developing in software(TL2)

3.COMPUTER FORENSICS(CS863PE)

COURSE NAME	COURSE OUTCOMES
C423.1	Understand the usage of computers in forensics.(TL2)
C423.2	Identify the types of evidence and create processing steps for preserving evidence. (TL2)
C423.3	Synthesize the data for collecting and validating.(TL2)
C423.4	Formulate the processing of crime and incident situations(TL2)
C423.5	Identify the forensics tools for a wide verity of investigations. (TL2)
C423.6	Design computer forensics tools and techniques in various operating systems.(TL6)

DEPARTMENT OF MECHANICAL ENGINEERING(R16)

II YEAR I SEM

Course Name: Mathematics-IV

C211.1	Analyze the complex functions with reference to their analyticity, Integration using Cauchy's integral theorem and express in terms of series
C211.2	Acquire the knowledge to solve differential equations using power series by Taylor's series- Laurent series method.
C211.3	Acquire knowledge about the ability to solve problems using evaluation of integration.
C211.4	Able to express any periodic function in term of sines and cosines and non-periodic function as integral representation
C211.5	Able to analyze quantum mechanics and signal processing by using Fourier series and transforms.
C211.6	Analyze one dimensional wave and heat equation

Course Name: Thermodynamics

C212.1	Understand and differentiate between different thermodynamic systems and processes
C212.2	Understand and apply laws of thermodynamics to different types of systems undergoing various processes and to perform thermodynamic analysis
C212.3	Evaluate the available energy and irreversibility in various processes
C212.4	Evaluate the thermodynamic properties of steam
C212.5	Understand and evaluate properties of gases and gaseous mixtures
C212.6	Understand and analyze the thermodynamic cycles and evaluate performance parameters

Course Name: Kinematics of Machines

C213.1	Understand the principles of kinematic pairs, chains and their classification, degree of freedom, inversions, equivalent chains and planar mechanisms.
C213.2	Analyze the velocity and acceleration in the mechanisms using graphical methods
C213.3	Apply planar four bar and slider crank mechanisms for specified kinematic conditions.
C213.4	Differentiate various motion of straight-line mechanisms
C213.5	Illustrate various types of motion in cams and draw the respective cam profiles
C213.6	Discuss the various technical terms in gear profile and to know the various kinematic aspects of gears

Course Name: Metallurgy and Material Science

C214.1	Ability to remember basic concept of about crystal structures, Engineering materials, metals, alloys and their properties.
C214.2	Ability to understand alloy system, phase diagram and various invariant reactions
C214.3	Ability to apply leaver rule and tile line rule for identifying the phase present in phase diagram
C214.4	Ability to examine Fe-Fe3C phase diagrams, TTT diagramw.r.t. various heat treatments
C214.5	Ability to examine various cast irons based up the Carbon % and heat treatment and examine various nonferrous metals
C214.6	Ability to understand Modern materials & Unconventional materials such as composites, plastics, polymers etc.

Course Name: Mechanics of Solids

C215.1	Able to calculate the stress and strains developed in members due to applied external load and temperature changes.
C215.2	Able to draw shear force diagram and bending moment diagram for different type of beams
C215.3	Able to describe behavior of beams under lateral loads and draw bending stress distribution diagram.
C215.4	Analyze the distribution of shear stress on various sections.
C215.5	Evaluate principal stresses, strains and apply the concept of failure theories for design.
C215.6	Design of structural members such as shafts and thin cylinders

Course Name: Fuels and Lubricants Lab

C216.1	Able to identify the flash, fire points of different fuels
C216.2	Able to measure the residue of combustion of liquid fuels
C216.3	Able to find the absolute and kinematic viscosity of different fuels
C216.4	Able to find the calorific value of different fuels
C216.5	Able to weigh the consistency of semisolid fuel
C216.6	Able to select fuels and lubricants for the application in specific conditions of exploitation.

Course Name: Mechanics of Solids Lab

C217.1	Analyze the behavior of the solid bodies subjected to various types of loading.
C217.2	Apply knowledge of materials and structural elements to the analysis of simple structures.
C217.3	Differentiate the Strength, Hardness, Toughness, Stress etc., by conducting experiments.
C217.4	Analyze and interpret laboratory data relating to behavior of structures and the materials they are made of, and undertake associated laboratory work individually andin teams.
C217.5	Able to acquire lifelong learning.

Course Name: Metallurgy & Material Science Lab

C218.1	Able to understand various crystal structures of metal relating to the mechanical properties.
C218.2	Able to Understand and analyze various phases in microstructure of metals
C218.3	Understanding the effect of heat treatment on the metals and theirs alloys
C218.4	Able to conduct experiments for evaluating microstructure of ferrous and non-ferrous alloys.
C218.5	Acquired fundamental knowledge based associated materials properties, and their selection and application.

Course Name: Gender Sensitization Lab

C219.1	Students will have developed a better understanding of important issues related to gender in contemporary India.
C219.2	Students will be sensitized to basic dimensions of the biological, sociological psychological and legal aspects of gender. This will be acquired through discussion ofmaterials derived from research, facts, everyday life, literature and film.
C219.3	Students will attain a finer grasp of how gender discrimination works in our societyand how to counter it.
C219.4	Students will acquire insight into the gendered division of labour and its relation topolitics and economics.
C219.5	Men and women students and professionals will be better equipped to work and livetogether as equals.
C219.6	Students will develop a sense of appreciation of women in all walks of life.

R16 Mechanical Engineering II year II semester

Course Name: Dynamics of Machinery

C221.1	Calculation of gyroscopic couple for automobile ships and aeroplanes
C221.2	Analyze the static and dynamic forces for machines
C221.3	Able to differentiate types brakes and clutches
C221.4	Explain the different types transmission and absorption dynamometers for machines
C221.5	Describe the concepts of flywheel and governors used in automobiles.
C221.6	Evaluate the natural frequency for different vibrations produced in machines.

Course Name: Fluid Mechanics and Hydraulic Machines

C222.1	Apply the knowledge of basic principles of fluid mechanics
C222.2	Analyze the fluid flow problems with application of momentum and energy equations
C222.3	Analyze the boundary layer concept
C222.4	Calculate the friction factor in pipes by considering the losses in pipes
C222.5	Analyze the performance of turbines
C222.6	Analyze the performance of pumps

Course Name: Machine Drawing

C223.1	Able to Consolidate engineering working drawings with dimensions and bill of material during design and development.
C223.2	Able to create the section planes and drawing of sections.
C223.3	Able to sketch with details of interior dimensions for holes, centers, curved and tapered features.
C223.4	Able to Compile conventions and standards related to machine drawings in order to become professionally efficient.
C223.5	Interpret the orthographic projections and Create different views of machine components.
C223.6	Develop the drawings of assembly views for the part drawings.

Course Name: Manufacturing Process

C224.1	Ability to demonstrate about Casting process 'casting design' their defects and to

	describe various casting methods
C224.2	Ability to distinguish various welding methods and appraise welding defects and their remedies
C224.3	Ability to understand various fusion welding techniques and their Applications
C224.4	Ability to understand HAZ and analyze welding defects through NDT methods
C224.5	Ability to describe various hot and cold deformation processes and also study the various sheet metal operations.
C224.6	Identify the effect of process variables to manufacture defect free products.

Course Name: Business Economics and Financial Analysis

C225.1	Evaluate the various Forms of Business and the impact of economic variables on the Business.
C225.2	Analyse the basic issues governing the business operations namely, the Demand and Supply.
C225.3	Analyse production function and cost-output relationship
C225.4	Evaluate the pricing strategies under different market structures
C225.5	Evaluate and prepare accounts so that the engineers excel in the business.
C225.6	Evaluate the firm's financial position by analysing the Financial Statements, Ratios, Funds and Cash flow statements of a company.

Course Name: Kinematics and Dynamics Lab

C226.1	Students should be able to Understand types of motion
C226.2	Students should be able to analyze forces and torques of components in linkages
C226.3	Students should be able to understand static and dynamic balance
C226.4	Students should be able to understand forward and inverse kinematics of open-loop mechanisms
C226.5	Understand forward and inverse kinematics of open loop mechanism
C226.6	Students should be able to apply principles of gyroscope

Course Name: Fluid Mechanics and Hydraulic Machines Lab

C227.1	Understand the concept of pipe flow losses.
C227.2	Verify the Bernoulli's theorem

C227.3	Understand the impact of jet on vanes
C227.4	Experiment with flow measurement devices like venturimeter and orifice meter
C227.5	Examine the performance of Pelton wheel, Francis and Kaplan turbine
C227.6	Examine the performance of centrifugal and reciprocating pumps.

Course Name: Manufacturing Process lab

C228.1	Interpret foundry practices like pattern making, mold making, Core making and Inspection of defects.
C228.2	Understanding the properties of moulding sands and pattern making.
C228.3	Select appropriate Joining Processes to join Work piece like ARC, TIG, Plasma and Spot welding.
C228.4	Fabricate basic parts and assemblies using powered and non-powered machine shop equipment.
C228.5	Able to create pipe bending injection molding.
C228.6	Select appropriate Manufacturing Processing to manufacture any component.

Course Name: Environmental Science & Technology

C228.1	Understanding the importance of ecological balance for sustainable development.
C228.2	Understanding the impacts of developmental activities and mitigation measures
C228.3	Understanding the environmental policies and regulations.
C228.4	graduate will understand technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development Engineering
C228.5	graduate will evaluate technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development Engineering
C228.6	graduate will develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development Engineering

Course Name: Design of Machine Members – I

C311.1	The student acquires the knowledge about the principles of design, material selection, component behavior subjected to loads, and criteria of failure.
C311.2	Understands the concepts of principal stresses, stress concentration in machine members and fatigue loading.
C311.3	Design on the basis of strength and rigidity and analyze the stresses and strains induced in a machine element.
C311.4	Solve problems in machine elements subjected to varying loads.
C311.5	Design keys, cotters, couplings and joints including riveted, bolted and welded joints.
C311.6	Design shafts and couplings for various applications

Course Name: Thermal Engineering-I

C312.1	Understand the principles of air standard cycles and working principles an IC Engines.
C312.2	Understand the combustion phenomena in SI & CI Engines.
C312.3	Able to evaluate the heat balance sheet, losses and performance of an IC Engines.
C312.4	Understand the working of types of reciprocating compressors and analyze their performance.
C312.5	Understand the working of various types of air compressors and analyze their performance.
C312.6	Understand the working of refrigeration systems,air conditioning systems and evaluate their COP

Course Name: Metrology & Machine Tools

C313.1	Understand and apply the mechanics of metal cutting and selection of tool materials
C313.2	Understand and apply the mechanics of metal cutting and selection of tool materials
C313.3	Comprehend speed and feed mechanisms of machine tools.
C313.4	Estimate machining times for machining operations on machine tools
C313.5	Identify techniques to minimize the errors in measurement.
C313.6	Identify methods and devices for measurement of length, angle, gear & thread parameters, surface roughness and geometric features of parts.

Course Name: Fundamentals of Management

C314.1	The students understand the significance of Management in their Profession.
C314.2	Understand the various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course.
C314.3	The students can explore the Management Practices in their domain area.
C314.4	Determine the most effective action to take in specific situations.
C314.5	Evaluate leadership styles to anticipate the consequences of each leadership style.
C314.6	Gather and analyze both qualitative and quantitative information to isolate issues and formulate best control methods

Course Name: Disaster Management

C315.1	Understanding Disasters, man-made Hazards and Vulnerabilities
C315.2	Understanding disaster management mechanism
C315.3	Understanding capacity building concepts and planning of disaster managements
C315.4	Decision-making and Problem-solving methods for Disaster Management.
C315.5	The course also facilitates students to globally share their views, ideas and informationpertaining to Disaster Management on a common platform.
C315.6	To provide students an exposure to disasters, their significance, types & Comprehensive

Course Name: Thermal Engineering Lab

C316.1	Sketch the valve timing diagram and port timing diagram for single cylinder four stroke diesel engine and two stroke petrol engines.
C316.2	Able to analyze heat balance sheet of IC Engine.
C316.3	Examine the performance parameters of internal combustion engines.
C316.4	Determine the performance characteristics of reciprocating air compressor.
C316.5	Explain the working principle of different boilers
C316.6	Able to examine, Dis-assemble and Assemble a 4-stroke and 2-stroke engine

Course Name: Machine Tools Lab

C317.1	Understand the different shapes of products that can be produced on these machine tools.
C317.2	Understand the parts of various machine tools and operate them

C317.3	Evaluate various parameters using different instruments.
C317.4	Create products components using plain turning, step turning, knurling, threading, eccentric turning, chamfering and facing.
C317.5	Able to create Thread profile of a Threaded component.
C317.6	Able to crate different part features to the desired quality

Course Name: Engineering Metrology Lab

C318.1	Measurement of linear and angular dimensions.
C318.2	To import practical exposure to the Machine tools.
C318.3	To conduct experiments and understand the working of the same.
C318.4	Able to measure thread.
C318.5	Able to measure angle and taper measurements
C318.6	Appraise machine tool alignment.

Course Name: Professional Ethics

C319.1	The students will understand the importance of Values and Ethics in their personal lives and professional careers.
C319.2	The students will learn the rights and responsibilities as an employee, team member and a global citizen.
C319.3	Ability to understand critical reflection on the nature of professionalism and ethical challenges inherent in professionalism
C319.4	Ability to relate ethical concepts and materials to ethical problems in specific professions and professionalism
C319.5	Able to understand Work Place Rights & Responsibilities
C319.6	Able to understand Global issues in Professional Ethics

Course Name: Thermal Engineering II

C321.1	Describe knowledge of Ranking cycle and heat equation in different processes.
C321.2	Demonstrate knowledge of ability to identify & apply fundamentals to solve problems involving nozzles and turbines, jet propulsion systems and rockets.
C321.3	Explore their knowledge & ability to design the constructional features of various types of boilers.
C321.4	Able to distinguish Impulse & Reaction steam turbines and explain friction effects by plotting velocity diagrams
C321.5	Compare the working of various jet engines and calculate thrust & efficiency in jet propulsion using gas dynamics principles
C321.6	Knowledge of impact of engineering solutions on the society and also on contemporary issues related to different types of steam cycles and propulsion systems.

Course Name: Design of Machine Members – II

C322.1	Knowledge about journal bearing design using different empirical relations.
C322.2	Acquaintance with design of the IC Engine components as per the standard.
C322.3	Design belt drives (flat belt, V-belt), chain drives, rope drives, belt drive pulleys & chain sprockets.
C322.4	Design spur and helical gear by considering strength and life.
C322.5	Estimate and analyzes the dimensions of bevel and worm gears
C322.6	Design different types of spring under static and variable load conditions

Course Name: Heat Transfer

C323.1	To understand the different ode heat transfer laws and mechanisms of three modes of heat transfer, conduction heat transfer in cylindrical spherical and radial coordinates system.
C323.2	Able to understand the concept of extended surfaces, critical radius of insulation, system with heat generation, and electrical analogy.
C323.3	Student understands the physical phenomena associated with free and forced convection and the significance of non-dimensional parameters in convection heat transfer.
C323.4	Student will have the ability to formulate practical forced and natural convection heat transfer problems.
C323.5	Student will be able to evaluate heat transfer in condensation and boiling systems, fundamental laws of radioactive heat transfer and radioactive heat transfer between black bodies and grey bodies.

C323.6	Student can able to grasp the fundamentals of heat exchanger and analyze its performance by using LMTD and NTU methods.

Course Name: Environmental Impact Assessment

C324.1	Identify the environmental attributes to be considered for the EIA study.
C324.2	Formulate objectives of the EIA studies.
C324.3	Identify the suitable methodology and prepare Rapid EIA.
C324.4	Identify and incorporate mitigation measures.
C324.5	Understand aspects of Environment Impact Assessment methodologies, impact of development activities
C324.6	Understand Air and Biological Environment, Environment legislation Environment.

Course Name: Refrigeration & Air Conditioning

C325.1	Able to Differentiate between different types of refrigeration systems with respect to application as well as conventional and unconventional refrigeration systems.
C325.2	Thermodynamically analyses refrigeration and air conditioning systems and evaluate performance parameters.
C325.3	Apply the principles of Psychometrics to design the air conditioning loads for the industrial applications.
C325.4	Understand the functionality of the major components by thermodynamics analyze different types ofrefrigeration and air conditioning systems.
C325.5	Estimate the internal heat loads, sensible heat factor and grand sensible heat factor. Illustrate concept of human comfort
C325.6	Evaluate components of air conditioning systems for effective utilization of the system

Course Name: Heat Transfer Lab

C326.1	Estimate the thermal conductivity of metal rod, bars, pipes, pin-fin and composite labs
C326.2	Compare the heat transfer coefficient in forced and free convention and correlates with theoretical values.
C326.3	Perform radiation experiments: Determine surface emissivity of a test plate and Stefan- Boltzmann's constant and compare with theoretical value.
C326.4	Analyze on Transient Heat Conduction experiment.
C326.5	Compare heat transfer in film and drop wise condensation.

C326.6	Estimate LMTD and effectiveness of Parallel and counter flow heat exchanger.

Course Name: CADD & MAT Lab

C327.1	Students should be able to apply computer methods for solving a wide range of engineering problems.
C327.2	Students able to investigate very complex engineering problems in a very simple manner.
C327.3	Students should be able to utilize computer skills to enhance learning and performance in other engineering and science courses.
C327.4	Ability to create program, model & simulation for engineering problems.
C327.5	Articulate importance of software's in research by modelling and simulation work.
C327.6	Create comprehensive design system which incorporates advanced database management concepts by integrating CAD and MAT Lab tools.

Course Name: Advance English Communication Skill lab

C328.1	Students will be able to Acquire vocabulary and use it contextually
C328.2	Students will be able to Acquire skill to Listen and speak effectively
C328.3	Students will be able to Develop English proficiency in academic reading and writing
C328.4	Students will be able to defend his stand and Increase possibilities of job prospects
C328.5	Students will be able to Acquire English skill, Communicate confidently in formal and informal contexts
C328.6	To make students industry-ready, Able to respond appropriately in different socio-cultural and professional contexts.

R16 Mechanical Engineering IV year I semester

Course Name: CAD/CAM

C411.1	Defines the stages of product life cycles necessary to design manufacturing industries using computers.
C411.2	Illustrate the hierarchy of database structure, Various transformations needed to model the component, Process of Rasterization.
C411.3	Distinguishes between the parametric representation, non-parametric and representation of Various Analytical and Synthetic curves, plane surfaces.
C411.4	Compare Various Analytical and Synthetic curves, plane surfaces.
C411.5	Differentiate between NC, CNC and DNC. Perform part programming on CNC machine.
C411.6	Categorize the various parts of families and to know the various types of Manufacturing layouts.

Course Name: Instrumentation and Control Systems

C412.1	Apply principles of measurement systems and elimination of errors
C412.2	Apply theory and construction of various transducers to measure displacement, temperature and pressure
C412.3	Describe working of flow measurement methods
C412.4	Describe working of vibration measurement methods
C412.5	Apply Direct and Indirect methods for measurement of stress, strain and humidity
C412.6	Ability to apply the control elements

Course Name: Power Plant Engineering

C413.1	Relate various resources of energy and power that is developed in India.
C413.2	Compare different layouts of power plants and classify them. With the knowledge of different layouts of power plant, one can improve the performance.
C413.3	Demonstrate characteristics of different layouts and plant auxiliaries of hydroelectric power plant
C413.4	Analyzes types non-conventional power sources
C413.5	Explain the working of nuclear power plant
C413.6	Define load curve, connected load, max demand, demand factor, load factor, diversity factor. Explain how pollution from power plant affects the system and its control by using control methods.

Course Name: CNC Technologies

C414.1	Able to identify importance of CNC machines
C414.2	Able to understand the fundamentals of CNC machines.
C414.3	Able to differentiate various methods of tooling the CNC machines.
C414.4	Able to understand various controlling methods.
C414.5	Able to write the part programming.

Course Name: Additive Manufacturing Technology

C415.1	Describe various CAD issues for 3D printing and rapid prototyping and related Operations for STL model manipulation.
C415.2	Formulate and solve typical problems on reverse engineering for surface reconstruction from physical prototype models through digitizing and spline-based Surface fitting.
C415.3	Formulate and solve typical problems on reverse engineering for surface reconstruction from digitized mesh models through topological modelling and Subdivision surface fitting.
C415.4	Explain and summarize the principles and key characteristics of additive manufacturing technologies and commonly used 3D printing and additive Manufacturing systems.
C415.5	Explain and summarize typical rapid tooling processes for quick batch production of plastic and metal parts.
C415.6	Prepare STL Files and Print Parts

Course Name: CAD/CAM Lab

C416.1	Identify the types of computer devices and solve the problems on transformations and use them in a CAD software.
C416.2	Prepare part programs involving various operations for the manufacturing of simple and complex products.
C416.3	Apply the knowledge learnt in integrating CAD and CAM
C416.4	Able to design of products on CAD devices by understand the mathematics behind the transformations and projections in
C416.5	Explain the fundamentals of part programming required for manufacturing a product.
C416.6	Understand the integration of design and manufacturing functions through CAD and CAM.

Course Name: Instrumentation lab

C417.1	Create the drawings to indicate various symbols & conventions and Explain

	construction of various parts of machine
C417.2	Define the quantities to measure, explain theory and construction of various transducers to measure displacement, temperature, speed and Demonstrate various instruments in measuring physical quantities.
C417.3	Demonstrate, Differentiate & Categorize various parts and its disassembles, representations in drawings of parts and symbols to indicate the drawings
C417.4	Differentiate various measuring instruments and Categorize
C417.5	Compare various measured quantities using different instruments
C417.6	Create the drawing and prepare the operation chat of various machine members and CAD drawing

Course Name: Industry Oriented Mini Project

C418.1	Able to define problem statement in the selected domain
C418.2	Able to perform literature survey on the specific topic
C418.3	Able to Design and implement proposed projects
C418.4	Able to draw the results and conclude the selected project.
C418.5	Able to present technical material in both oral and written form and effectively manage their time and complex projects
C418.6	Able to integrate into a group environment to pursue technical goals

Course Name: Seminar

C419.1	Able to select Novel topics
C419.2	Able to acquire command over the selected topic
C419.3	Able to justify a stand on technical presentation.
C419.4	Able to defend over the queries
C419.5	Able to effectively manage time

R16 Mechanical Engineering IV year II semester

Course Name: Production Planning & Control

C421.1	Apply production planning and control techniques for efficient management of manufacturing and services
C421.2	Apply forecasting techniques for short, medium and long range forecasting.
C421.3	Design quantitative models to manage inventory systems
C421.4	Examine various concepts resource planning
C421.5	Examine various techniques and policies used in standard scheduling methods, aggregate planning, line balancing problems
C421.6	Identify dispatching & follow up activities. Usage of computers in production planning and control

Course Name: Unconventional Machining Processes

C422.1	Acquire knowledge about unconventional machining processes and the difference between the traditional and non-traditional machining.
C422.2	Acquire knowledge about categorization of unconventional machining process based up on the utilization of energies in their direct form.
C422.3	Apply the knowledge of machining of materials with help of chemicals and thermo electric methods.
C422.4	Describe the wire EDM process and its applications
C422.5	Differentiate Working and Applications of Laser beam machining process
C422.6	Examine the working and applications of plasma arc welding process.

Course Name: Renewable Energy Source

C423.1	Able to understand important of renewable energy sources compared to fossil fuel.
C423.2	Able to understand physics of sun and solar system.
C423.3	Able to select most appropriate renewable energy technology based on local conditions.
C423.4	Understand energy storage technologies and applications.
C423.5	Able to analysis different types of bio-gas digesters and list their applications.
C423.6	Able to examine wind geothermal, wind, geothermal, tidal, wave and nuclear energy conversion process.

Course Name: MainProject

C424.1	Able to select the scope of the project for the societal benefit after thorough literature review / interaction with industry.
C424.2	Identify the research gap after referring and understanding the existing literature.
C424.3	Prepare project execution schedule for on time completion of the project.
C424.4	Able to create a prototype or to obtain a experimental result/simulation result by using of selected materials/experiment set up/machinery/methods/mathematical model/algorithms/software.
C424.5	Able to analysis of the obtained results and recommendations for future scope of research.
C424.6	Write a technical report as per the format, covering the problem definition, related literature analysis of the problem and methodology adopted to carry out the work

DEPARTMENT OF CIVIL ENGINEERING

II Year I SEMESTER(R-16)Course Outcomes

Course Name : Strength Of Materials-I **Course Code :**CE302ES

C202.1	Analyse the behaviour of the solid bodies and to understand the concept of stress, strain and their relations based on linear elasticity.
C202.2	Create shear force and bending moment diagrams for shear force and bending moment of beams
C202.3	To evaluate the flexural stresses and design of simple beam members of different cross-sections to withstand the loads imposed on them
C202.4	To Analyse the shear stresses of various beam sections
C202.5	To Analyse the loaded structural beams for slope and deflections and failure strength
C202.6	Evaluate the principle stress and principal strain and predict various theories of failure.

Course Name: Fluid Mechanics-I **Course Code :**CE303ES

C203.1	Physical properties of fluids, Hydrostatic law, measurement of pressure, Hydrostatic forces on submerged plane, Center of pressure
C203.2	Buoyancy and floatation, Classification of flows, Equation of continuity for one, two, three dimensional flows, stream and velocity potential functions, circulation and vorticity, flownet analysis
C203.3	Surface and body forces, Euler's and Bernoulli's equation, Momentum equation
C203.4	Apply forces on pipe bend. Pitot tube,
C203.5	Reynolds experiment, Characteristics of Laminar & turbulent flows, Laws of fluid friction, Minor losses, T.E.L, H.G.L, Pipe network problems, water hammer
C203.6	Navier stokes equation, Boundary layer , Vonkarmen momentum integral equation, Boundary layer transition, separation, control, flow around submerged objects, drag and lift, Magnus effect

Course Name : BMCP **Course Code :**CE304ES

C204.1	Predict the properties of building stones and its classification and to understand the concepts of various methods of manufacture of bricks
C204.2	Explain various types of cement and their applications in construction and to analyse the importance of mineral and chemical admixtures
C204.3	Understand the different types of lintels, arches, trusses and materials which are commonly used for the construction
C204.4	Understand the plumbing services, ventilation and acoustic design in buildings
C204.5	To understand masonry, english and flemish bonds and finishing, plastering and painting in buildings
C204.6	To understand the principles of building planning and bye laws

Course Name: Surveying **Course Code :**CE305ES

C205.1	Calculate angles, distances and levels
C205.2	Identify data collection methods and prepare field notes
C205.3	Understand the working principles of survey instruments
C205.4	Estimate measurement errors and apply corrections
C205.5	Interpret survey data and compute areas and volumes
C205.6	Learning of photogrammetric surveying

Course Name :SOM LAB **Course Code :**CE306ES

C206.1	Conduct tension test on materials like steel etc.
C206.2	Conduct compression tests on spring, wood and concrete
C206.3	Conduct flexural and torsion test to determine elastic constants
C206.4	Determine hardness of metals
C206.6	Conduct shear test on metals

Course Name : CAD-I LAB **Course Code :**CE307ES

C207.1	Introduction to computer aided software's
C207.2	Introduction to different software's
C207.3	Drawing plans of single storied and multi storied buildings
C207.4	Drawing sections of single storied and multi storied buildings
C207.5	Detailing of building components
C207.6	Development of working drawings of buildings

Course Name: Surveying Lab-I **Course Code :**CE308ES

C208.1	To acquire an awareness of the limitations of the basic surveying instruments and the possible errors that could arise
C208.2	To understand the different methods of calculation of heights and distances using angular measurements.
C208.3	To understand field procedures in basic types of surveys, and the responsibilities of a surveying team
C208.4	To apply geometric and trigonometric principles to basic surveying calculations
C208.5	To understand the different methods of calculation of areas and volumes of an irregular boundaries
C208.6	Develop confidence for self education and ability for life-long learning in field works

IIYear II SEMESTER(R-16) Course Outcomes

Course Name : Strength Of Materials-II**Course Code :**CE401ES

C211.1	Analyze stresses in the member subjected to torsion and deflection in springs
C211.2	Analyze columns and struts
C211.3	Understand the concept of direct and bending stresses
C211.4	Analyze circular and semi circular beams
C211.5	Analyze and design thin and thick cylinders
C211.6	Understand the concept of unsymmetrical bending and shear center

Course Name :FM-II **Course Code :** CE402ES

C212.1	Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.
C212.2	Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
C212.3	Apply dimensional analysis and to differentiate the model
C212.4	Apply prototype and similitude conditions for practical problems
C212.5	Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages
C212.6	To introduce the concepts of the working and design aspects of hydraulic machines like turbines and pumps and their applications

Course Name :SA **Course Code :** CE403ES

C213.1	To analyse statically determinate trusses, beams and frames using method of joints and method of sections
C213.2	To calculate deflections of beams and pin jointed frame trusses using classical methods like strain energy and unit load method Ability to analyse three hinged arch structures and to solve normal thrust and radial shear
C213.3	To analyse statically indeterminate structures like propped cantilever using SFD and BMD.
C213.4	To analyse statically indeterminate structures like fixed beams using SFD and

	BMD.
C213.5	To evaluate slope deflection and moment distribution method to find moments in the continuous beams.
C213.6	To explain the effect of moving loads on structures using influence lines.

Course Name : EG **Course Code :**CV404ES

C214.1	Evaluate the student's understanding towards engineering geology, petrology and structural geology
C214.2	Be able to identify and classify rocks and minerals using basic geological classification system.
C214.3	To discuss the structural geology, ground water exploration and landslides.
C214.4	Analyse civil engineering structure is considerably increased if the geological feature like faults, joints, bedding planes, folding solution channels etc in the rock beds are properly located and suitably treat.
C214.5	Have knowledge of investigation methods, primarily geophysical methods, for determining the rock mass properties underground, their strengths and weaknesses.
C214.6	Demonstrate conditions under which excessive over break occurs in tunnels and its economic importance.

Course Name :FM LAB**Course Code :**CE406ES

C217.1	Determine coefficient of discharge for orifice
C217.2	Determine coefficient of discharge for mouthpiece
C217.3	Calibrate notches venturimeter
C217.4	Calibrate notches and orifice meters
C217.5	Verification of Bernoulli's equation
C217.6	Determine miner losses in pipes

Course Name: SURVEYING LAB-II **Course Code :**CE408ES

C218.1	Apply the knowledge of Theodolite in different operations in civil engineering projects
C218.2	Formulate the setting out of curve by linear and angular methods
C218.3	Use total station in the field of civil engineering land survey
C218.4	Summarize the basic principles of GPS and GIS in civil engineering
C218.5	Manage the suggested or identified constructional problems, solve in teams, in order to improve future problem solving ability and able to present it
C218.6	Estimate measurement errors and apply corrections

Course Name: EG LAB **Course Code :**CV407ES

C219.1	physical properties of minerals - study of the rock forming minerals and their properties - Fundamentals of process of formation of ore minerals - Coal and Petroleum
C219.2	Sub surface investigations in rocks and engineering characteristics or rocks masses; Structural geology of rocks. Classification of rocks,
C219.3	The fundamentals of the engineering properties of Earth materials and fluids.
C219.4	Required geological consideration for selecting dam and reservoir site. Failure of Reservoir. Favourable & unfavourable conditions in different types of rocks in presence of various structural features,
C219.5	Apply the factor of safety equation to solve planar rock slide and toppling problems
C219.6	Rock mass characterization and the mechanics of planar rock slides and topples.

III Year I SEMESTER(R-16) Course Outcomes

Course Name: CONCRETE TECHNOLOGY **Course Code :**CE501PC

C301.1	Understand the properties of the constituent materials of concrete
C301.2	Analyze the behavior of fresh concrete and test the workability of fresh concrete
C301.3	Recognize the water cement ratio of concrete, describe and carry out tests relevant to the use of hardened concrete on site
C301.4	Explain factors affecting strength of concrete
C301.5	Understand the factors influencing concrete mix & know the BIS method of mix design
C301.6	Define special concretes, their application for practical purpose.

Course Name : DRCS **Course Code :**CE502PC

C302.1	Design of RC Structural elements
C302.2	Design of RC beams using Limit state Design
C302.3	Design of RC slabs
C302.4	Design of RC Columns and Footings
C302.5	Design of Structures for Serviceability
C302.6	Design of Staircase and Canopy

Course Name: WRE **Course Code:**CE503PC

C303.1	Analyze hydro-meteorological data
C303.2	Estimate abstractions from precipitation
C303.3	Compute yield from surface and subsurface basin

C303.4	Develop rainfall-runoff models
C303.5	Formulate and solve hydrologic flood routing models
C303.6	Estimate runoff, design discharge from catchment

Course Name: CT LAB **Course Code:**CE505PC

C305.1	Conduct Quality Control tests on concrete making materials
C305.2	Conduct Quality Control tests on fresh & hardened concrete
C305.3	Design and test concrete mix.
C305.4	Conduct Non-destructive tests on concrete.
C305.5	Design and test special concretes.
C305.6	Understand the properties of the constituent materials of concrete.

Course Name: GIS LAB **Course Code :**CE506PC

C306.1	Explain basic concepts of using GIS in mapping the earth in spatial terms and populating the GIS's system to access data.
C306.2	Develop and print maps with industry standard legends.
C306.3	Capture positional and attribute information with correct and accurate geographic referencing.
C306.4	Convert geographic information among several coordinate systems.
C306.5	Create and access data in the GIS's system using an appropriate software Package.
C306.6	Acquire GIS's system information from databases, existing maps, and the Internet.

Course Name: HHM LAB **Course code:**CE507PC

C307.1	Describe the basic measurement techniques of fluid mechanics and its appropriate application.
C307.2	Interpret the results obtained in the laboratory for various experiments
C307.3	Discover the practical working of Hydraulic machines
C307.4	Discover the practical applications of different types of Turbines, Pumps
C307.5	Discover the practical working of Hydraulic machines and other miscellaneous hydraulics machines.
C307.6	Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows.

IIIYear II SEMESTER(R-16) Course Outcomes

Course Name: DSS **Course Code:**CE601PC

C311.1	Design tension and compression members
C311.2	Design beams and beam columns
C311.3	Design bolt and weld connections
C311.4	Design built up members and Column base
C311.5	Design of Lacing and battening systems
C311.6	Design of plate girders and Roof Trusses

Course Name: EE **Course code:**CE602PC

C312.1	Analyze characteristics of water and wastewater
C312.2	Estimate the quantity of drinking water and domestic wastewater generated
C312.3	Design components of water supply systems
C312.4	Design sewerage system
C312.5	Ability to analyze, examine the different physical, chemical and biological properties of water
C312.6	Ability to analysis a distribution system

Course Name: SM **Course code:**CE603PC

C313.1	Understand the basic properties of soil formation and structure.
C313.2	Understand the index properties of soils.
C313.3	Analyse the properties and factors of permeability.
C313.4	Analyse the effective stress and seepage through soils
C313.5	Demonstrate the properties of flow nets and uses.

C313.6	Understand different types of tests on shear strength of soil.

Course Name: GWD&M **Course code:**CE613PE

C314.1	Understand Ground Water occurrence, Ground Water Movement Well construction
C314.2	Able to determine aquifer parameters.
C314.3	Apply Geographical information system and remote sensing knowledge in ground water.
C314.4	Derive necessary 3 or 2 dimensional equations for ground water motion.
C314.5	Understand the porous medium properties that control groundwater flow and transport, including porosity, hydraulic conductivity, and compressibility
C314.6	Able to determine saline water intrusion

Course Name: SM LAB **Course code:**CE604PC

C315.1	Determine the liquid limit and plastic limit of fine grained soils & plot flow curve for a given soil.
C315.2	Determine California bearing ratio of the soil
C315.3	Determine maximum dry density and optimum moisture content of the soil by standard proctor test.
C315.4	Determine the shear strength parameters of soil by direct shear test
C315.5	Determine the drained shear strength parameters of soil by tri-axial shear test
C315.6	Determine the un-drained shear strength parameters of soil by tri-axial shear test

Course Name: CAD-II LAB **Course code:**CE604PC

C316.1	Drafting Reinforcement of RC Beams, Columns

C316.2	Drafting Reinforcement of RC Slabs, Footings
C316.3	Drafting of Steel Bolted and Welded connections
C316.4	Drafting of Steel Compression and Tension members
C316.5	Drafting of Steel Plate girder
C316.6	Drafting of Steel roof truss

IV Year I SEMESTER(R-16) Course Outcomes

Course Name: TE **Course code:**CE701PC

C401.1	Understand the basic concepts and importance of highway development, road classification of roads in India.
C401.2	Impart knowledge regarding highway cross section elements
C401.3	Design various geometric elements like sight distance, super elevation, horizontal curves, gradients etc
C401.4	Interpret the various traffic parameters, regulations and methods of traffic data collection.
C401.5	Analyze traffic signal designs, the importance of intersection designs, grade intersections and rotaries
C401.6	Explain about highway construction, maintenance and their importance

Course Name: EQS&V **Course code:**CE701PC

C402.1	Prepare an Abstract and detailed Estimate for a residential building
C402.2	Prepare earth work quantity for roads and canals.
C402.3	Analyze rates for various items of work. .
C402.4	To Prepare Bar bending schedule for reinforcement works
C402.5	Able to prepare a Notice inviting tender document for bidding
C402.6	Able to prepare a Specification report and valuate a building

Course Name: CT&M **Course code:**CE613PE

C403.1	Create a construction project safety plan.
C403.2	analyze professional decisions based on ethical principles
C403.3	analyze methods, materials, and equipment used to construct projects
C403.4	understand construction accounting and cost control
C403.5	understand the legal implications of contract, common, and regulatory law to manage a construction project
C403.6	understand the basic principles of structural behavior

Course Name: WSM **Course code:** CE731PE

C404.1	Will learn concept of watershed and need of watershed management.
C404.2	Will gain knowledge on soil erosion its types and control methods.
C404.3	Will learn rain water harvesting and methods of harvesting.
C404.4	Will learn design of harvesting structure
C404.5	Will gain knowledge on artificial recharge of ground water and methods of artificialrecharge.
C404.6	Will gain knowledge on soil reclamation methods, micro farming and biomass.

Course Name: I&HS **Course code:** CE744PE

C405.1	Understand different terminology Related to water resources engineering
C405.2	Identify various types of reservoirs and their design aspects various channel system
C405.3	Design of cross drainage works
C405.4	Design of dams

C405.5	Design headregulators and cross regulators structures
C405.6	Mathematical application in the field of water resources engineering

Course Name: TE LAB **Course code:**CE703PC

C406.1	Characterize the pavement materials
C406.2	Perform quality control tests on pavements and pavement materials
C406.3	Estimate earth work from longitudinal and cross-section details
C406.4	Design grade intersections
C406.5	Conduct traffic studies for estimating traffic flow characteristics
C406.6	Conduct speed studies for pavement safety

Course Name: EE LAB **Course code:**CE704PC

C407.1	The laboratory provides knowledge of estimating various parameters like PH, Chlorides.
C407.2	Estimation parameters likeSulphates and Nitrates in water.
C407.3	Estimation parameters like Electrical conductivity and total dissolved solids.
C407.4	Estimation DO of drinking water.
C407.5	Estimation of optimum dosage of coagulant and chlorine demand.
C407.6	Estimation of BOD and COD.

IVYear II SEMESTER(R-16) Course Outcomes

Course Name: WM **Course code:**CE851PE

C412.1	Will learn concept of quality of water requirement for boilers and cooling towers and treatment of water from boilers and cooling towers
C412.2	Will gain knowledge on strength and volume reduction of wastewater and neutralization, equalization and proportioning of wastewater
C412.3	Will learn use of municipal wastewater in industries.
C412.4	Will learn Manufacture and design of wastewater from different industries like paper pulp, tannery etc
C412.5	Will learn Manufacture and design of wastewater from different industries like sugar mill, steel plants etc
C412.6	Will gain knowledge on common effluent treatment plant

Course Name: IWWT **Course code:**CE864PE

C413.1	Will learn wastewater characteristics and strategies of treatment of wastewater.
C413.2	Will learn design of preliminary and primary treatment units.
C413.3	Will gain knowledge on kinetics of plug flow and completely mixed systems
C413.4	Will learn operation and design of Trickling filters and Rotating biological reactors.
C413.5	Will gain knowledge on Activated sludge process and oxidation ponds.
C413.6	Will learn Sludge treatment and disposal.

Year – I Sem (R-18) ECE Course Outcomes

Course Name: Mathematics-I **Course code:**MA101BS

C111.1	Able to write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
C111.2	Able to find the Eigen values and Eigen vectors which come across under linear transformations
C111.3	Able to test the convergence and divergence of positive term series.
C111.4	Able to test for convergence of alternating series and testing for absolute and conditional convergence
C111.5	Able to find surface area and volume using integration. Able to solve improper integrals.
C111.6	Able to apply partial differentiation and able to calculate maximum and minimum.

Course Name: Applied Physics**Course code:**AP102BS

C112.1	Students will be able to demonstrate competency and understanding of the concepts found in Mechanics
C112.2	Students will be able to and understanding of the concepts found in Harmonic Oscillations
C112.3	Students gains a strong foundation on the different kinds of characters of several materials
C112.4	This chapter pave a way for them to use in at various technical and engineering applications
C112.5	Student can apply their knowledge of interference and diffractions in varies engineering fields
C112.6	Student can apply their knowledge of principles of lasers and fiber optics in varies engineering fields

Course Name: Programming for problem solving**Course code:**CS103ES

C113.1	Understand various steps in Program development and basic concepts in C Programming Language.
C113.2	Understand arrays, strings, pointers and apply them for sorting, searching techniques and Differentiate structures and union concepts.
C113.3	Ability to make use of preprocessor directives for file inclusion, macro definition conditional compilation.
C113.4	Able to create, read and write to and from simple text and binary files.
C113.5	Able to develop structured programs using functions and able to implement the concept of dynamic memory allocations.
C113.6	Able to analyze the problem and their requirement for writing the algorithms.

Course Name: Engineering Graphics**Course code:**ME104ES

C114.1	Apply simple geometrical construction methods to construct various engineering curves and scales using the methods described in literature.
C114.2	Apply principles of orthographic projections to draw two dimensional views of points, lines and planes considered in any angle.
C114.3	Construct two dimensional views of prism and cylindrical solids considered in any position with respect to reference planes.
C114.4	Construct two dimensional views of pyramid and cone considered in any position with respect to reference planes.
C114.5	Sketch sectional views and development of surface of sectioned solids that are cut by various positions of section planes.
C114.6	Outline various features of solid by viewing them from front, top & sides and also apply principles of isometric projections to draw three dimensional view of solids

Course Name: Applied Physics Lab**Course code:**AP105BS

C115.1	Students will get the knowledge about the dispersion, interference and

	diffraction and related experimental skills
C115.2	Students will perform the experiments related to the optical fiber communication system
C115.3	Students will perform experiments related to semiconductor devices
C115.4	Students will get the knowledge about the elastic nature of matter and energy and their experimental verification
C115.5	Once the students perform the experiments they can apply the knowledge in the real life
C115.6	By studying the resonance phenomenon in LCR circuits the student will get the idea about the impedance matching and voltage magnification

Course Name: Programming for problem solving lab **Course code:**CS106ES

C116.1	Able to formulate the algorithms for simple problems.
C116.2	Able to translate given algorithms to a working and correct program.
C116.3	Able to correct syntax errors as reported by the compilers and identify and correct logical errors encountered during execution.
C116.4	Able to represent and manipulate data with arrays, strings and structures.
C116.5	Able to demonstrate the use of pointers of different types and able to create, read and write to and from simple text and binary files.
C116.6	Able to write the code to implement functions.

I YEAR - II SEM (R18 ECE)

Course Name: Mathematics- II**Course code:**MA201BS

C101.1	Able to identify whether the given differential equation of first order is exact or notAnd solve higher differential equation and apply the concept of differential equation to real world problems
C101.2	Able to find solution of second and higher order differential equations
C101.3	Able to evaluate double and triple integrals
C101.4	Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped
C101.5	Able to Understand the concepts of vector function, vector field, scalar field, gradient, divergence and curl
C101.6	Able solve linear and non linear partial differential equation.

Course Name: Chemistry**Course code:**CH202BS

C102.1	Able to understand LCAO of diatomic and organic molecules along with the reason behind crystal field splitting and its applications in conductance of materials
C102.2	Able to apply the various techniques for prevention of boiler troubles, potable water, disinfection and water treatment methods.
C102.3	Able to apply the concepts and applications of electrochemistry, different electrodes and battery technology in the engineering fields.
C102.4	Able to adapt the various techniques used to prevent corrosion of different materials used in many engineering fields.
C102.5	Able to understand different types of organic reactions, mechanisms and their applications
C102.6	Able to understand different principles, selection rules and applications of different types of spectroscopy

Course Name:BEE **Course code:**EE203ES

C103.1	To analyze and solve DC circuits using network laws and theorems.
C103.2	To analyze basic AC single phase & three phase circuits
C103.3	To analyze the performance of Single-phase Transformers.
C103.4	To learn the in-depth knowledge on DC machines & its applications
C103.5	To analyze the working principles of AC Machines & its applications
C103.6	To introduce components of Low Voltage Electrical Installations

Course Name:EW**Course code:**ME205ES

C104.1	The ability to use the basic tools
C104.2	The ability to apply suitable tools for different manufacturing operations such as materials removal carpentry, fitting ,tin – smithy,
C104.3	To develop the right attitude and team work
C104.4	The ability to connect electrical wirings between input and output source
C104.5	The ability to Apply Different weldings to prepare joints
C104.6	The ability to prepare the Different Castings and black smithy

Course Name: English**Course code:**EN205HS

C105.1	Relate listening skills for effective communication, comprehend literary text and enrich vocabulary.
C105.2	Comprehend technical correspondence, learn reading techniques and use grammar structures appropriately.
C105.3	Revise and apply the right format of formal letter writing, drafting resumes.

	and know the contextual knowledge of vocabulary used.
C105.4	Compose the literary text, basic grammatical aspects and learning the etymology of words.
C105.5	Employ information transfer intelligibly and express effectively in spoken and written communication.
C105.6	Appraise the linguistic and communication competencies and demonstrate professional and managerial communication.

Course Name:EC LAB**Course code:**CH206BS

C106.1	Able to estimate the hardness of water using EDTA.
C106.2	Able to evaluate the strength of strength of acids using conductometry and potentiometer.
C106.3	Able to measure the concentration of iron in cement sample using photo colorimeter.
C106.4	To estimate the viscosity of a given liquid using Ostwald Viscometer.
C106.5	Able to measure the concentration of copper by iodometry.
C106.6	Able to understand the synthesis method of synthetic polymers.

Course Name:ELCS LAB**Course code:**EN207HS

C107.1	Students will be able to employ the nuances of English speech sounds, word accent, intonation and rhythm.(TL3)
C107.2	Students will be able to differentiate the influence of their mother tongue while speaking English.(TL4)
C107.3	Students will be able to construct required dialogues in Role Plays,debates and GDs. (TL6)
C107.4	Students will be able to comprehend any literary material. (TL2)
C107.5	Students will be able to appraise English (LSRW) skills for acquiring

	Employability.(TL5)
C107.6	Students will be able to remember the usage of intensive listening.(TL1)

Course Name: BEE LAB**Course code:**EE208ES

C108.1	Understand and remember the technical's involved in functioning and operations of instruments, power supplies and tools identification of components and values of devices
C108.2	The student will analyze the concept of ohm's law , Kirchhoff's laws and resonance circuits
C108.3	Observe the transient response of first order RL,RC,RLC network for D.C. excitation
C108.4	Understand and performance of single phase transformer and its characteristics
C108.5	To understand the operating principles and characteristics of D.C machine
C108.6	To understand the operating principles and characteristics of A.C machine

I Year – I Sem (R-18) CSE Course Outcomes

Course Name: Mathematics-I **Course code:**MA101BS

C111.1	Able to write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
C111.2	Able to find the Eigen values and Eigen vectors which come across under linear transformations
C111.3	Able to test the convergence and divergence of positive term series.
C111.4	Able to test for convergence of alternating series and testing for absolute and conditional convergence
C111.5	Able to find surface area and volume using integration. Able to solve improper integrals.
C111.6	Able to apply partial differentiation and able to calculate maximum and minimum.

Course Name: Chemistry**Course code:**CH102BS

C112.1	Able to understand LCAO of diatomic and organic molecules along with the reason behind crystal field splitting and its applications in conductance of materials
C112.2	Able to apply the various techniques for prevention of boiler troubles, potable water, disinfection and water treatment methods.
C112.3	Able to apply the concepts and applications of electrochemistry, different electrodes and battery technology in the engineering fields.
C112.4	Able to adapt the various techniques used to prevent corrosion of different materials used in many engineering fields.
C112.5	Able to understand different types of organic reactions, mechanisms and their applications
C112.6	Able to understand different principles, selection rules and applications of different types of spectroscopy

Course Name:BEE **Course code:**EE103ES

C113.1	To analyze and solve DC circuits using network laws and theorems.
C113.2	To analyze basic AC single phase & three phase circuits
C113.3	To analyze the performance of Single-phase Transformers.
C113.4	To learn the in-depth knowledge on DC machines & its applications
C113.5	To analyze the working principles of AC Machines & its applications
C113.6	To introduce components of Low Voltage Electrical Installations

Course Name:EW**Course code:**ME105ES

C114.1	The ability to use the basic tools
C114.2	The ability to apply suitable tools for different manufacturing operations such as materials removal carpentry, fitting ,tin – smithy,
C114.3	To develop the right attitude and team work
C114.4	The ability to connect electrical wirings between input and output source
C114.5	The ability to Apply Different weldings to prepare joints
C114.6	The ability to prepare the Different Castings and black smithy

Course Name: English**Course code:**EN105HS

C115.1	Relate listening skills for effective communication, comprehend literary text and enrich vocabulary.
C115.2	Comprehend technical correspondence, learn reading techniques and use grammar structures appropriately.
C115.3	Revise and apply the right format of formal letter writing, drafting Resumes' and know the contextual knowledge of vocabulary used.
C115.4	Compose the literary text, basic grammatical aspects and learning the etymology of

	words.
C115.5	Employ information transfer intelligibly and express effectively in spoken and written communication.
C115.6	Appraise the linguistic and communication competencies and demonstrate professional and managerial communication.

Course Name:EC LAB**Course code:**CH106BS

C116.1	Able to estimate the hardness of water using EDTA.
C116.2	Able to evaluate the strength of strength of acids using conductometry and potentiometer.
C116.3	Able to measure the concentration of iron in cement sample using photo colorimeter.
C116.4	To estimate the viscosity of a given liquid using Ostwald Viscometer.
C116.5	Able to measure the concentration of copper by iodometry.
C116.6	Able to understand the synthesis method of synthetic polymers.

Course Name:ELCS LAB**Course code:**EN107HS

C117.1	Students will be able to employ the nuances of English speech sounds, word accent, intonation and rhythm.(TL3)
C117.2	Students will be able to differentiate the influence of their mother tongue while speaking English.(TL4)
C117.3	Students will be able to construct required dialogues in Role Plays, debates and GDs. (TL6)
C117.4	Students will be able to comprehend any literary material. (TL2)
C117.5	Students will be able to appraise English (LSRW) skills for acquiring Employability.(TL5)
C117.6	Students will be able to remember the usage of intensive listening (TL1)

Course Name:BEE Lab Course code:EE108ES

C118.1	Understand and remember the technical's involved in functioning and operations of instruments,power supplies and tools identification of components and values of devices
C118.2	The student will analyze the concept of ohm's law , Kirchhoff's laws and resonance circuits
C118.3	Observe the transient response of first order RL,RC,RLC network for D.C. excitation
C118.4	Understand and performance of single phase transformer and its characteristics
C118.5	To understand the operating principles and characteristics of D.C machine
C118.6	To understand the operating principles and characteristics of A.C machine

I YEAR - II SEM (CSE) R18

Course Name: Mathematics- II**Course code:**MA201BS

C101.1	Able to identify whether the given differential equation of first order is exact or not And solve higher differential equation and apply the concept of differential equation to real world problems
C101.2	Able to find solution of second and higher order differential equations
C101.3	Able to evaluate double and triple integrals
C101.4	Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped
C101.5	Able to Understand the concepts of vector function, vector field, scalar field, gradient, divergence and curl
C101.6	Able solve linear and non linear partial differential equation.

Course Name: Applied Physics**Course code:**AP202BS

C102.1	Students will be able to demonstrate competency and understanding of the concepts found in Mechanics
C102.2	Students will be able to and understanding of the concepts found in Harmonic Oscillations
C102.3	Students gains a strong foundation on the different kinds of characters of several materials
C102.4	This chapter pave a way for them to use in at various technical and engineering applications
C102.5	Student can apply their knowledge of interference and diffractions in varies engineering fields
C102.6	Student can apply their knowledge of principles of lasers and fiber optics in varies engineering fields

Course Name: Programming for problem solving**Course code:**CS203ES

C103.1	Understand various steps in Program development and basic concepts in C Programming Language.
C103.2	Understand arrays, strings, pointers and apply them for sorting, searching techniques and Differentiate structures and union concepts.
C103.3	Ability to make use of preprocessor directives for file inclusion, macro definition conditional compilation.
C103.4	Able to create, read and write to and from simple text and binary files.
C103.5	Able to develop structured programs using functions and able to implement the concept of dynamic memory allocations.
C103.6	Able to analyze the problem and their requirement for writing the algorithms.

Course Name: Engineering Graphics**Course code:**ME204ES

C104.1	Apply simple geometrical construction methods to construct various engineering curves and scales using the methods described in literature.
C104.2	Apply principles of orthographic projections to draw two dimensional views of points, lines and planes considered in any angle.
C104.3	Construct two dimensional views of prism and cylindrical solids considered in any position with respect to reference planes.
C104.4	Construct two dimensional views of pyramid and cone considered in any position with respect to reference planes.
C104.5	Sketch sectional views and development of surface of sectioned solids that are cut by various positions of section planes.
C104.6	Outline various features of solid by viewing them from front, top & sides and also apply principles of isometric projections to draw three dimensional view.

	of solids

Course Name: Applied Physics Lab**Course code:**AP205BS

C105.1	Students will get the knowledge about the dispersion, interference and diffraction and related experimental skills
C105.2	Students will perform the experiments related to the optical fiber communication system
C105.3	Students will perform experiments related to semiconductor devices
C105.4	Students will get the knowledge about the elastic nature of matter and energy and their experimental verification
C105.5	Once the students perform the experiments they can apply the knowledge in the real life
C105.6	By studying the resonance phenomenon in LCR circuits the student will get the idea about the impedance matching and voltage magnification

Course Name: Programming for problem solving lab**Course code:** CS206ES

C106.1	Able to formulate the algorithms for simple problems.
C106.2	Able to translate given algorithms to a working and correct program.
C106.3	Able to correct syntax errors as reported by the compilers and identify and correct logical errors encountered during execution.
C106.4	Able to represent and manipulate data with arrays, strings and structures.
C106.5	Able to demonstrate the use of pointers of different types and able to create, read and write to and from simple text and binary files.
C106.6	Able to write the code to implement functions.

I Year – I Sem (R-18) CIVIL and MECH Course Outcomes

Course Name: Mathematics-I **Course code:**MA101BS

C111.1	Able to write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
C111.2	Able to find the Eigen values and Eigen vectors which come across under linear transformations
C111.3	Able to test the convergence and divergence of positive term series.
C111.4	Able to test for convergence of alternating series and testing for absolute and conditional convergence
C111.5	Able to find surface area and volume using integration. Able to solve improper integrals.
C111.6	Able to apply partial differentiation and able to calculate maximum and minimum.

Course Name: Engineering Physics**Course code:**PH102BS

C112.1	Students will be able to demonstrate competency and understanding of the concepts found in Mechanics
C112.2	Students will be able to and understanding of the concepts found in Harmonic Oscillations
C112.3	Students gains a strong foundation on the different kinds of characters of several materials
C112.4	This chapter pave a way for them to use in at various technical and engineering applications
C112.5	Student can apply their knowledge of interference and diffractions in varies engineering fields
C112.6	Student can apply their knowledge of principles of lasers and fiber optics in varies engineering fields

Course Name: Programming for problem solving**Course code:**CS103ES

C113.1	Understand various steps in Program development and basic concepts in C Programming Language.
C113.2	Understand arrays, strings, pointers and apply them for sorting, searching techniques and Differentiate structures and union concepts.
C113.3	Ability to make use of preprocessor directives for file inclusion, macro definition conditional compilation.
C113.4	Able to create, read and write to and from simple text and binary files.
C113.5	Able to develop structured programs using functions and able to implement the concept of dynamic memory allocations.
C113.6	Able to analyze the problem and their requirement for writing the algorithms.

Course Name: Engineering Graphics**Course code:**ME104ES

C114.1	Apply simple geometrical construction methods to construct various engineering curves and scales using the methods described in literature.
C114.2	Apply principles of orthographic projections to draw two dimensional views of points, lines and planes considered in any angle.
C114.3	Construct two dimensional views of prism and cylindrical solids considered in any position with respect to reference planes.
C114.4	Construct two dimensional views of pyramid and cone considered in any position with respect to reference planes.
C114.5	Sketch sectional views and development of surface of sectioned solids that are cut by various positions of section planes.
C114.6	Outline various features of solid by viewing them from front, top & sides and also apply principles of isometric projections to draw three dimensional view of solids

Course Name: Engineering Physics Lab**Course code**:PH105BS

C115.1	Students will get the knowledge about the dispersion, interference and diffraction and related experimental skills
C115.2	Students will perform the experiments related to the optical fiber communication system
C115.3	Students will perform experiments related to semiconductor devices
C115.4	Students will get the knowledge about the elastic nature of matter and energy and their experimental verification
C115.5	Once the students perform the experiments they can apply the knowledge in the real life
C115.6	By studying the resonance phenomenon in LCR circuits the student will get the idea about the impedance matching and voltage magnification

Course Name: Programming for problem solving lab**Course code:**CS106ES

C116.1	Able to formulate the algorithms for simple problems.
C116.2	Able to translate given algorithms to a working and correct program.
C116.3	Able to correct syntax errors as reported by the compilers and identify and correct logical errors encountered during execution.
C116.4	Able to represent and manipulate data with arrays, strings and structures.
C116.5	Able to demonstrate the use of pointers of different types and able to create, read and write to and from simple text and binary files.
C116.6	Able to write the code to implement functions.

I YEAR - II SEM

Course Name: Mathematics- II**Course code:**MA201BS

C101.1	Able to identify whether the given differential equation of first order is exact or not and solve higher differential equation and apply the concept of differential equation to real world problems
C101.2	Able to find solution of second and higher order differential equations
C101.3	Able to evaluate double and triple integrals
C101.4	Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped
C101.5	Able to Understand the concepts of vector function, vector field, scalar field, gradient, divergence and curl
C101.6	Able solve linear and non linear partial differential equation.

Course Name: Chemistry**Course code:**CH202BS

C102.1	Able to understand LCAO of diatomic and organic molecules along with the reason behind crystal field splitting and its applications in conductance of materials
C102.2	Able to apply the various techniques for prevention of boiler troubles, potable water, disinfection and water treatment methods.
C102.3	Able to apply the concepts and applications of electrochemistry, different electrodes and battery technology in the engineering fields.
C102.4	Able to adapt the various techniques used to prevent corrosion of different materials used in many engineering fields.
C102.5	Able to understand different types of organic reactions, mechanisms and their applications
C102.6	Able to understand different principles, selection rules and applications of different types of spectroscopy

Course Name: Engineering Mechanics**Course code:**ME203ES

C103.1	Understand definition of force,static,dynamics
C103.2	Analyze the free body diagram of various static object
C103.3	Define friction and understand the operation of srew jack ,how friction is involved in operation
C103.4	Determine the centroid of 2D geometrical object and Determine the center of gravity of basic geometrical object.
C103.5	Discuss the application of mass moment of inertia in engineering problem
C103.6	Analyze the work energy method for various components under various dynamic motion

Course Name:EW**Course code:**ME205ES

C104.1	The ability to use the basic tools
C104.2	The ability to apply suitable tools for different manufacturing operations such as materials removal carpentry, fitting ,tin – smithy,
C104.3	To develop the right attitude and team work
C104.4	The ability to connect electrical wirings between input and output source
C104.5	The ability to Apply Different weldings to prepare joints
C104.6	The ability to prepare the Different Castings and black smithy

Course Name:EnglishCourse code:EN205HS

C105.1	Relate listening skills for effective communication, comprehend literary text and enrich vocabulary.
C105.2	Comprehend technical correspondence, learn reading techniques and use grammar structures appropriately.
C105.3	Revise and apply the right format of formal letter writing, drafting Resumes' and know the contextual knowledge of vocabulary used.

C105.4	Compose the literary text, basic grammatical aspects and learning the etymology of words.
C105.5	Employ information transfer intelligibly and express effectively in spoken and written communication.
C105.6	Appraise the linguistic and communication competencies and demonstrate professional and managerial communication.

Course Name:EC LAB**Course code:**CH206BS

C106.1	Able to estimate the hardness of water using EDTA.
C106.2	Able to evaluate the strength of strength of acids using conductometry and potentiometer.
C106.3	Able to measure the concentration of iron in cement sample using photo colorimeter.
C106.4	To estimate the viscosity of a given liquid using Ostwald Viscometer.
C106.5	Able to measure the concentration of copper by iodometry.
C106.6	Able to understand the synthesis method of synthetic polymers.

Course Name:ELCS LAB**Course code:**EN207HS

C107.1	Students will be able to employ the nuances of English speech sounds, word accent, intonation and rhythm.(TL3)
C107.2	Students will be able to differentiate the influence of their mother tongue while speaking English.(TL4)
C107.3	Students will be able to construct required dialogues in Role Plays, debates and GDs. (TL6)
C107.4	Students will be able to comprehend any literary material. (TL2)
C107.5	Students will be able to appraise English (LSRW) skills for acquiring Employability.(TL5)
C107.6	Students will be able to remember the usage of intensive listening.(TL1)

M.TECH (R-17) EMBEDDED SYSTEMS

Course Name: Embedded C Course Code :5455AH

Sr. No.	OUTCOMES
1	Understand the design architecture of 8051 Microcontroller and Analyze the procedure to select for Embedded C.
2	Apply the knowledge of switches; evaluate the execution process of reading & writing the bits and bytes.
3	Create the header file for the given applications in Embedded C environments.
4	Create application specific hardware delay for fixed and portable environment and examine the loop timeout mechanism.
5	Design an intruder alarm system for a given application.

M.TECH (R-19) EMBEDDED SYSTEMS

Course Name: AI & Machine LeaningProfessional Elective - I

Sr. No.	OUTCOMES
1	Analyze and implement the procedure of various Supervised Learning Algorithms.
2	Analyze and implement the procedure of Unsupervised Learning Algorithms.
3	Evaluate and Analyze the procedure of Machine Learning Algorithms
4	Understand and Analyze the concept of Artificial Neural Network.
5	Understand and Analyze the concept of Fuzzy Neural Network and GA.

M Tech (R17) CSE

1. Computer Networking

COURSE NAME	COURSE OUTCOMES
	Understand and explore the basics of Computer Networks and Various Protocols.
	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.
	Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction.
	Apply various network layer techniques for designing subnets and super nets and analyze packet flow on basis of routing protocols.
	Estimate the congestion control mechanism to improve quality of service of networking application
	Understand and design application layer protocols and internet applications such as network security, Email and DNS,

2.Software Engineering

COURSE NAME	COURSE OUTCOMES
	Understanding software engineering principles and techniques
	Ability to understand and meet ethical standards and legal responsibilities.
	Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.
	Ability to work as an effective member or leader of software engineering teams.
	Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.
	To manage time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.

3. NetworkProgramming

COURSE NAME	COURSE OUTCOMES
	understand the key protocols which support the Internet
	be familiar with several common programming interfaces for network communication
	describe major technologies and protocols used in network communications
	create applications using techniques such as multiplexing, forking, multithreading
	Learn advanced programming techniques such as IPv6 Socket Programming, Broadcasting, Multicasting
	apply knowledge of Unix/Linux operating systems to build robust client and server software for this environment;

4. DATAWAREHOUSING AND DATAMINING

COURSE NAME	COURSE OUTCOMES
	Understand the functionality of the various data mining and data warehousing component
	Appreciate the strengths and limitations of various data mining and data warehousing models
	evaluate the different models of OLAP and data preprocessing
	Explain the analyzing techniques of various data
	Describe different methodologies used in data mining and data ware housing.
	Compare different approaches of data ware housing and data mining with various technologies

5.SOFTWARE PROCESS AND PROJECT MANAGEMENT

COURSE NAME	COURSE OUTCOMES
	Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation
	Understanding of ethical and professional issues related to Software Project Delivery.
	Analyze the major and minor milestones, artifacts and metrics Understand from management and technical perspective
	Design and develop software product using conventional and Analyzing modern principles of software project management
	Formulate appropriate testing strategy for the given software system.
	Develop software projects based on current technology, by managing resources economically and keeping ethical values.

M Tech (R19) CSE

1. NETWORK SECURITY

COURSE NAME	COURSE OUTCOMES
	To understand basics of security and issues related to it.
	Understand the difference between various Public key cryptographic techniques and Private key Cryptographic Techniques.
	Learn mechanisms for transport and network security.
	Security issues in web and how to tackle them
	Understand the use of Digital signatures and be able to digitally sign emails and files
	Understanding of biometric techniques available and how they are used in today's world.

2.**Advanced Data Structures**

COURSE NAME	COURSE OUTCOMES
	Understand the implementation of symbol table using hashing techniques.
	Develop algorithms for text processing applications
	Identify suitable data structures and develop algorithms for computational geometry problems
	Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.
	Understand the necessary mathematical abstraction to solve problems.
	Design and analyze programming problem statements.

3. **MACHINE LEARNING**

COURSE NAME	COURSE OUTCOMES
	Gain knowledge about basic concepts of Machine Learning
	To mathematically analyse various machine learning approaches and paradigms.
	Understand the Types of Problems that machine learning algorithms can solve today
	Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.
	To compare and contrast pros and cons of various machine learning techniques and to get an insight of when to apply a particular machine learning approach.
	Extract features that can be used for a particular machine learning approach in various IOT applications

Course Name: Advanced CAD

Course Name	Course Outcomes
CO1	Understanding various CAD tools and softwares and basics of geometric modeling.
CO2	Explain CAD system and wire frame modeling techniques.
CO3	Distinguishes between the parametric representation, non-parametric and representation of Various Analytical and Synthetic curves, plane surfaces.
CO4	Compare Various Analytical and Synthetic curves, plane surfaces.
CO5	Discuss different solid modeling techniques and solid manipulations.
CO6	Appraise the collaborative engineering and translate different formats of CAD/CAM data exchange.

Course Name Additive Manufacturing Technologies

Course Name	Course Outcomes
CO1	Describe various CAD issues for 3D printing and rapid prototyping and related Operations for STL model manipulation.
CO2	Formulate and solve typical problems on reverse engineering for surface reconstruction from physical prototype models through digitizing and spline-based Surface fitting.
CO3	Formulate and solve typical problems on reverse engineering for surface reconstruction from digitized mesh models through topological modelling and Subdivision surface fitting.
CO4	Explain and summarize the principles and key characteristics of additive manufacturing technologies and commonly used 3D printing and additive Manufacturing systems.
CO5	Explain and summarize typical rapid tooling processes for quick batch production of plastic and metal parts.
CO6	Prepare STL Files and Print Parts

Course Name Research Methodology And IPR

CO	Course Outcomes
CO1	Understand the research problem and research process.

CO2	Understand research ethics.
CO3	Prepare a well-structured research paper and scientific presentations.
CO4	understand the importance of intellectual property rights.
CO5	Explore on various IPR components and process of filing
CO6	Understand the adequate knowledge on patent and rights.

Course Name: Advanced CAD

Course Name	Course Outcomes
CO1	Understanding various CAD tools and softwares and basics of geometric modeling.
CO2	Explain CAD system and wire frame modeling techniques.
CO3	Distinguishes between the parametric representation, non-parametric and representation of Various Analytical and Synthetic curves, plane surfaces.
CO4	Compare Various Analytical and Synthetic curves, plane surfaces.
CO5	Discuss different solid modeling techniques and solid manipulations.
CO6	Appraise the collaborative engineering and translate different formats of CAD/CAM data exchange.

Course Name Additive Manufacturing Technologies

Course Name	Course Outcomes
CO1	Describe various CAD issues for 3D printing and rapid prototyping and related Operations for STL model manipulation.
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Course Name Research Methodology And IPR

CO	Course Outcomes
CO1	Understand the research problem and research process.
CO2	Understand research ethics.
CO3	Prepare a well-structured research paper and scientific presentations.
CO4	understand the importance of intellectual property rights.
CO5	Explore on various IPR components and process of filing
CO6	Understand the adequate knowledge on patent and rights.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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 analyse 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.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Design, Analyze and develop modules and systems for applications in advanced electronics and communication systems.
PSO 2: Utilize modern tools for modeling and computational techniques in IC fabrication and RF technologies