R. V. S. College of Engineering and Technology
Jamshedpur

Programme Outcomes (POs) of B. Tech. Graduate Engineer

After completion of course the Graduate Engineer will be able to

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

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

PO3 - Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 - Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 - Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6 - The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 - Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental context, and demonstrate the knowledge of, and need for sustainable development.

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

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

PO10 - Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 - Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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PO12 - Life-Long learning: Recognize the need for, and have the preparation and able to engage in independent and life-long learning in the broadest context of technological change.

Programme Outcomes (POs) of B. Tech. Graduate Engineer

CIVIL ENGINEERING			
3rd. Semester Civil Engineering (CE)			
Course Name / Course Code	**COs**	**Course Outcomes (COs)**	**Attainment of POs**
Civil Engineering Materials and Constructions / CE 301	CO1	Able to explain the manufacturing process, physical and chemical properties and uses of various building materials.	PO1, PO4, PO7
	CO2	Able to analyze the suitability of different building materials and significance in using those materials in relation with building's function.	PO1, PO5, P11
	CO3	Able to perform quality control tests on different construction materials.	PO1, PO2, PO3
	CO4	Able to plan and execute construction of various components of substructure and superstructure.	PO2, PO3, PO4, PO11
Surveying and Geometrics I / CE 302	CO1	Perform chain, compass, and plane table survey.	PO1, PO2, PO3
	CO2	Carry out levelling, measurement of angles with theodolite.	PO1, PO2, PO8
	CO3	Set different types of curves in the field.	PO1, PO2, PO3
	CO4	Perform triangulation survey, and geodetic levelling.	PO1, PO2, PO3
	CO5	Handle modern instruments like Total station, Auto level, GPS and explain basic astronomical terms.	PO1, PO4, PO5
Strength of Materials / ME 303	CO1	Determine different stress & strain in materials under various loading conditions	PO1, PO2, PO3
	CO2	Determine critical load of compression members for different support conditions	PO3, PO12
	CO3	Determine different stress & strain in cylinders & shells	PO1, PO2, PO6
	CO4	Select appropriate method to locate failure planes in materials for different loading conditions	PO1, PO2, PO3
Engineering Geology / BSC 303	CO1	Acquire the knowledge of the most important rocks and minerals	PO1, PO2, PO3
	CO2	Understand the relationship between rocks and engineering	PO7, PO12
	CO3	Understand weathering as they influence civil engineering works	PO7, PO12
	CO4	Understand mass movement as they influence civil engineering works	PO7, PO12
	CO5	Understand the role of geology in the design and construction process of underground opening in rocks.	PO1, PO2, PO3

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	CO6	Apply geology concepts and approaches on rock engineering projects	PO2, PO3, PO6
	CO7	Identify and classify soil and rock using basic geological classification system	PO1, PO7
Environmental Science / BSC302	CO1	Able to explain the structure and function of ecosystems and their importance in the environment. (K1,K2).	PO7, PO12
	CO2	Able to identify the sources, causes, impacts and control of air pollution. (K1,K2)	PO7, PO8, PO12
	CO3	Able to distinguish the various types of water pollution happening in the environment understand about their effects and potential control mechanisms. (K1,K2)	PO7, PO12
	CO4	Able to judge the importance of soil, causes of contamination and need of solid waste management. (K1,K2)	PO1 PO7
	CO5	Able to predict the sources of radiation hazards and pros and cons of noise pollution. (K1,K2)	PO7, PO8, PO12
4th. Semester Civil Engg.			
Surveying and Geometrics II / CE 401	CO1	Prepare a layout plan using Total station instrument. Calculate area of traverse by using different methods such as triangulation, aerial photogrammetry.	PO1, PO2, PO3
	CO2	Calculate area of traverse by using different methods such as triangulation, aerial photogrammetry.	PO1, PO4
	CO3	Use RS & GIS to prepare a map of a certain area.	PO1, PO5, PO6
Fluid Mechanics and Fluid Machines / CE 402	CO1	Examine and interpret the behaviour of fluids using its properties. (K1, K2).	PO1, PO2
	CO2	Solve the engineering problems using principles of fluid static s and kinematics. (K3, K4, K5)	PO1, PO2, PO3
	CO3	Understand and analyse the dynamic behaviour of fluids using concepts of fluid dynamics. (K2, K3, K4)	PO1, PO2, PO3
	CO4	Apply the principles of fluid mechanics to investigate open channel flows. (K2, K3, K4, K5)	PO1, PO2, PO4
	CO5	Analyse and design hydraulic pumps and turbines. (K3, K4, K5)	PO3, PO4
Structural Analysis – I / CE 403	CO1	Evaluate the stability and determinacy of a given structure. (K1, K2, K3)	PO1, PO3, PO4
	CO2	Evaluate safety of a proposed determinate structure before construction and manufacturing. (K4)	PO1, PO3, PO4
	CO3	Evaluate the behavior of determinate structures under the action of complex static loads. (K1, K2, K3, K4)	PO1, PO3, PO4
	CO4	Evaluate the behavior of determinate structures under the action of moving loads. (K1, K2, K3, K4)	PO1, PO3, PO4
	CO5	Evaluate deflections in a given determinate structure. (K3, K4)	PO1, PO3, PO4
Concrete Structure – I / CE 404	CO1	Apply the usage of IS codes in design of reinforced concrete structures	PO1, PO3, PO4
	CO2	Identify the types and design of beams and slabs	PO1, PO3, PO4, PO11

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	CO3	Design the uniaxial and biaxial bending of column.	PO1, PO3, PO4, PO10,PO11
	CO4	Design the simple footings and combined footings	PO1, PO3, PO4, PO10, PO11
Electronics and Instrumentation Engineering / EC 404	CO1	Identify function of electronics component, digital multimeter, cathode ray oscilloscope, LDR and integrated circuits.	PO1, PO2, PO3, PO4, PO10, PO12
	CO2	Familiar with semiconductor devices which are capable to use abstraction in order to analyse and design simple electronic circuit.	PO1, PO2, PO3, PO4, PO5, PO10, PO11, PO12
	CO3	Acquire knowledge about switching theory, Boolean algebra and different minimization techniques.	PO1, PO2, PO3, PO4, PO5, PO6, PO9, PO10, PO11, PO12
	CO4	To provide ideas about the static and dynamic characteristics of an instrument. The course emphasizes on understanding the practical applications and implementations of the electronic instruments with the help of theoretical concepts.	PO1, PO2, PO3, PO4, PO7, PO10,PO12
	CO5	To understand the fundamental concepts of communication systems and compare different analog modulation and frequency modulation schemes.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO10, PO11, PO12
Disaster Preparedness & Planning / CE405	CO1	Explain disaster management theory (cycle, phases, risk, crisis, emergency, disasters, resilience)	PO6, PO7, PO8, PO12
	CO2	Compare hazards, disasters and associated natural phenomena and their interrelationships, causes and their effects - developing humanitarian Assistance before and after disaster	PO6, PO7, PO8, PO12
	CO3	Compare anthropogenic hazards, disasters and associated activities and their interrelationships of the subsystems - Green House Effect, Global warming, Causes and their effects and development of humanitarian assistance before and after disaster	PO6, PO7, PO8, PO12
	CO4	Apply knowledge about existing global frameworks and existing agreements and role of community in successful Disaster Risk Reduction	PO6, PO7, PO8, PO11, PO12
	CO5	Evaluate DM study including data search, analysis and presentation as a case study.	PO2, PO4, PO6,PO7,PO8, PO10
	CO6	Create Technological innovations in Disaster Risk Reduction: Advantages and problems	PO6,PO7
5th. Semester Civil Engg.			
Steel Structure and Design / CE 501	CO1	Understand different rolled steel structural members and their connections	PO1
	CO2	Design different types of connections (bolted & welded) as per Limit state design	PO1, PO3, PO4

	CO3	Design different types of rolled steel structural members for axial and bending load as per Limit state design	PO1, PO3, PO4
	CO4	Design plate girders as per Limit state design.	PO1, PO3, PO4
	CO5	Design beam-column and appropriate column bases for steel columns as per Limit state design.	PO1, PO3, PO4, PO10
Geo Technical Engineering / CEC 502	CO1	Classify soil from its index properties.	PO1, PO7
	CO2	Solve practical problems related to permeability and seepage, evaluate settlement problems due to consolidation and appreciate the importance of soil water interaction.	PO2, PO3, PO4
	CO3	Compute soil shear strength parameters for different field conditions	PO2,PO3,PO4
	CO4	Estimate bearing capacity of foundations.	PO2,PO3,PO4
	CO5	Select suitable foundation types as per requirement & perform basic analysis for foundation systems including understanding their limitations together with proportioning different shallow foundations & estimate pile load carrying capacity.	PO1,PO2,PO3, PO4
Environment Engineering / CEC 503	CO1	Examine and explain various sources of water, water quality and quantity estimation.	PO1,PO7,PO12
	CO2	Analyse appropriate water treatment technology	PO2
	CO3	Interpret the concepts of water supply systems designing and management	PO3,PO11, PO12
	CO4	Understand and explain the fundamentals of wastewater generation, conveyance system, wastewater quality and different discharge standards	PO2,PO7,PO8
	CO5	Explain and illustrate various methods of wastewater and sewage sludge treatment	PO2,PO7,PO8
Water Resources Engineering / CEP 504	CO1	Check the consistency of rainfall data and calculate the probability of rainfall over a given return period.	PO1,PO2,PO7, PO12
	CO2	Determine the evaporation, evapo-transpiration and rate of infiltration	PO3,PO4
	CO3	Apply the concept of various stream flow measurement methods and derive unit hydrograph, synthetic and instantaneous unit hydrograph.	PO3, PO4, PO7, PO12
	CO4	Describe irrigation types and methods and determine water requirement of crops.	PO3
	CO5	Classify the canals, design irrigation channels and apply the concept of Kennedy and Lacey theory, design Canal Fall & Cross Drainage Work.	PO3, PO11
	CO5	Analyse and design structural elements used in pre-cast construction including fabrication, erection and installation	PO3, PO11
Environmental Impact Assessment / CEP 511	CO1	Explicate the concept of EIA	PO6, PO7, PO8, PO12
	CO2	Identify the objectives and scope of EIA	PO6, PO7, PO8, PO12
	CO3	Illustrate the necessity of public participation in EIA studies	PO6, PO7, PO8, PO12

	CO4	Summarize the importance of Environmental Attributes	PO6, PO7, PO8, PO12
	CO5	Explain the phenomena of Impacts on environment	PO6, PO7, PO8, PO12
	CO6	Quantify impacts for various developmental projects	PO6, PO7, PO8, PO12
6th Semester Civil Engg.			
Concrete Structures – II / CEC 601	CO1	To develop basic understanding of reinforced concrete as a construction material.	PO1, PO3, PO4, PO11
	CO2	To develop understanding of various design philosophies and their differences.	PO1, PO3, PO4, PO11
	CO3	To understand behaviour of RCC beams.	PO1, PO3, PO4, PO11
	CO4	To understand behaviour of RCC members under flexural shear.	PO1, PO3, PO4, PO11
	CO5	To understand behaviour of compression members.	PO1, PO3, PO4, PO11
	CO6	To understand behaviour of two-way slabs using moment coefficient	PO1, PO3, PO4, PO11
Structural Analysis - II / CEC 602	CO1	To understand analysis of indeterminate structures and adopt an appropriate structural analysis technique	PO1, PO3, PO4
	CO2	Determine response of structures by classical, iterative and matrix methods	PO1, PO3, PO4
Highway Engineering / CEC 603	CO1	To design roads and highway alignment.	PO1,PO3,PO4, PO5
	CO2	To develop geometric design of highways.	PO1,PO3,PO4, PO5
	CO3	To design pavements.	PO1,PO3,PO4, PO5
	CO4	To test properties of road aggregates and bituminous material.	PO1,PO3,PO4, PO5,PO7
	CO5	To select materials for cement concrete roads.	PO1,PO7,PO12
	CO6	To perform pavement management.	PO11
Water Resources Engineering - II / CEC 604	CO1	To perform multiple analysis on precipitation data. resources planning and management.	PO1,PO2,PO7, PO12
	CO2	To estimate various components of hydrological cycle such as stream flow, runoff, evapotranspiration and infiltration.	PO1,PO2,PO7, PO12
	CO3	To measure components of hydrological water balance in field.	PO1,PO2,PO7, PO12
	CO4	To perform hydrograph analysis and estimate magnitude of flood.	PO1,PO2,PO7
	CO5	To determine reservoir capacity and sedimentation.	PO1,PO2,PO7
	CO6	To perform steady state analysis of groundwater movement.	PO1,PO2,PO6
	CO7	To determine the technical, social and economic aspects of water	PO1,PO2,PO6, PO7,PO8

Industrial Waste Treatment / CEC 610	CO1	Distinguish between the quality of domestic and industrial water requirements and Wastewater quantity generation.	PO6,PO7,PO8
	CO2	Understand the industrial process, water utilization and waste water generation.	PO6,PO7,PO8
	CO3	Acquire the knowledge on operational problems of common effluent treatment plants.	PO2,PO4,PO7
	CO4	Impart knowledge on selection of treatment methods for industrial wastewater.	PO2,PO7,PO8
	CO5	Specify design criteria for physical, chemical, and biological unit operations.	PO3,PO7,PO11
7th. Semester Civil Engg.			
Advanced Steel Design / CEC 701	CO1	Apply energy principles for the analysis of determinate/indeterminate structures.	PO1
	CO2	Analyze structures comprising axial elements, Beams, Grids, Plane and space frames using matrix methods.	PO1,PO2
	CO3	Analyse continuous beams and grids by flexibility and stiffness matrix methods.	PO1,PO2,PO4, PO5
	CO4	Apply matrix methods for elastic instability and second order effects including plane frames and space frames.	PO3,PO4,PO5
Pre-stressed Concrete / CEP 704	CO1	Understand the concepts of pre-stressing in concrete structures and identify the materials for pre-stressing.	PO1
	CO2	Analyse a Pre-stressed Concrete section and Estimate losses of pre-stressing	PO1,PO2
	CO3	Design pre-tensioned and post tensioned girders for flexure and shear.	PO3,PO4
Industrial Waste Treatment / CEP 708	CO1	Ability to plan minimization of industrial wastes.	PO2,PO7,PO8
	CO2	Ability to design facilities for the processing and reclamation of industrial wastewater.	PO2,PO7,PO8
Railway Engineering / CEP 711	CO1	Explain Components of Railway Track, different Railway Gauges and design track Gradients as per given requirements.	PO1, PO2,PO3
	CO2	Discuss various Types of Track Turnouts and describe purposes and facilities at Railway Stations.	PO1
	CO3	Explain Interlocking and modern signal system and describe Surface defects on Railway Track and Their Remedial Measures	PO1,PO3
Geographical Information System / CEP 713	CO1	Describe the functional basis of a GIS AND appreciate the potential uses of GIS in ICM.	PO1,PO5
	CO2	Consider the benefits and shortcomings of using GIS for ICM.	PO5, PO12
	CO3	Outline the key data quality issues involved in using GIS AND develop a strategy to implement an effective GIS.	PO5, PO11, PO12
8th Semester Civil Engineering			
No Theory Courses, only Project			

Electrical and Electronics Engineering (EEE)			
3rd Semester EEE			
Course Name / Corse Code	**COs**	**Course Outcomes (COs)**	**Attainment of POs**
1st, Semester Common for all branches			
Basic Electrical Engineering / ESC101 (All Branches)	CO1	Understand the basic elements encountered in electric networks.	PO1, PO2, PO3, PO8, PO10, PO12
	CO2	Solve various kinds of problems involving magnetic circuits	PO1, PO2, PO3, PO8, PO10, PO12
	CO3	Perform mathematical analysis of AC electric circuits and its power measurement	PO1, PO2, PO3, PO8, PO10, PO12
	CO4	Demonstrate a basic understanding of phasors and phasor diagrams for AC circuit analysis	PO1, PO2, PO3, PO4, PO8, PO10, PO12
	CO5	To study the working principles of electrical machines and power converters	PO1, PO2, PO3, PO4, PO8, PO10, PO12
3rd. Semester (EEE)			
Electrical Machine – I / EE 301	CO1	Analyze the various principles & concepts involved in Electromechanical Energy conversion.	PO1, PO2
	CO2	Demonstrate the constructional details of DC machines as well as transformers, andprinciple of operation of brushless DC motor, Stepper and DC Servo motors.	PO1, PO2, PO3, PO4
	CO2	Evaluate the performance and characteristics of DC Machine as motor and as well asgenerator.	PO1, PO2, PO3
	CO4	Evaluate the performance of transformers, individually and in parallel operation.	PO1, PO2, PO3, PO4
	CO5	Demonstrate and perform various connections of three phase transformers.	PO1, PO2, PO3, PO4
Network Theory / EE 302	CO1	Apply the knowledge of basic circuital law, nodal and mesh methods of circuit analysis andsimplify the network using Graph Theory approach.	PO1, PO2, PO3
	CO2	Analyze the AC and DC circuits using Kirchhoff's law and Network simplificationtheorems.	PO1, PO2, PO3
	CO3	Analyze steady-state responses and transient response of DC and AC circuits usingclassical and Laplace transform methods	PO1, PO2, PO3
	CO4	Demonstrate the concept of complex frequency and analyze the structure and function ofone and two port network. Also evaluate and analysis two-port network parameters.	PO1, PO2, PO3
	CO5	Synthesize one port network and analyze different filters.	PO1, PO2, PO3
Electromagnetic Field Theory	CO1	Apply different coordinate systems and their application in electromagnetic field theoryand establish a relation between any two systems and also understand the vector calculus.	PO1, PO2, PO3, PO4
	CO2	Understand the concept of static electric field. Understand the	PO1, PO2, PO3,

/ EE 303		concept of current andproperties of conductors. Establish boundary conditions and to calculate capacitances of differenttypes of capacitors.	PO4
	CO3	Understand the concept of static magnetic field, magnetic scalar and vector potential.	PO1, PO2, PO3, PO4
	CO4	Understand the forces due to magnetic field, magnetization, magnetic boundary conditionsand inductors.	PO1, PO2, PO3, PO4
	CO5	Understand displacement current, time varying fields, propagation and reflection of EMwaves and transmission lines.	PO1, PO2, PO3, PO4
Basic Electronics / EC 301	CO1	Understand the concept of PN junction and special purpose diodes.	PO1, PO7. PO10. PO12
	CO2	Study the application of conventional diode and semiconductor diode.	PO1, PO2, PO3, PO11, PO12
	CO3	Analyze the I-V characteristics of BJT and FET.	PO1, PO7, PO11
	CO4	Analyze the applications of Op-Amp as amplifiers, integrator, and differentiator.	PO1, PO3, PO7, PO11, PO12
	CO5	Understand the concept of digital storage oscilloscope and compare DSO with analogoscilloscope.	PO1, PO4, PO7, PO11
Environment Science / BSC 302	CO1	Concept and scope of Environment science, environmentalsegment and their importance.	PO6, PO7
	CO2	Ecosystem and its characteristics features, structure and function of forest ecosystem.	PO6, PO7
	CO3	Atmospheric composition, energy balance, climate, weather, depletion of ozone layer and greenhouse effect.	PO6, PO7
	CO4	Air and water pollution monitoring and control.	PO6, PO7, PO8
	CO5	Concept of Land pollution origin and its effects. Also to understand Noise pollution; Noise classification and its sources.	PO6, PO7
4th Semester EEE			
Power Systems / EE 401	CO1	Understand the operation of conventional generating stations as well as renewable sources of electrical power.	PO1, PO6, PO8, PO11, PO12
	CO2	Determine the electrical circuit parameters of overhead transmission lines.	PO1, PO2
	CO3	Analyze the mechanical design of insulators and cables of power system.	PO1, PO2, PO6, PO8
	CO4	Solve power distribution system problem.	PO1, PO2, PO6, PO7, PO8, PO12
	CO5	Illustrate different types of tariffs and analyze power factor improvement methods.	PO1, PO2, PO6, PO7, PO8, PO11, PO12
Measurement & Instrumentation / EE 402	CO1	Evaluate errors in measurement as well as identify and use different types of instrumentsfor the measurement of voltage, current, power and energy.	PO1, PO2, PO4, PO11
	CO2	Display the knowledge of measurement of electrical quantities resistance, inductance andcapacitance with the help of bridges.	PO1, PO2, PO4, PO11
	CO3	Demonstrate the working of instrument transformers as well as calculate the errorsincurrent and potential transformers.	PO1, PO2, PO4, PO11
	CO4	Manifest the working of electronic instruments like voltmeter, multi-meter, frequencymeter and CRO.	PO1, PO2, PO4, PO11

	CO5	Display the knowledge of transducers, their classifications and their applications forthemeasurement of physical quantities like motion, force, pressure, temperature, flow and liquidlevel.	PO1, PO2, PO4, PO11
Analog Electronics and Circuits / EC 401	CO1	Able to understand various types of Current Mirrors using BJT and MOSFETs, Large andSmall Signal Analysis of various stages of an op-amp IC741C.	PO1, PO2
	CO2	Able to understand ideal and non-ideal linear applications of op-amp based Circuits,Generalized Impedance Converter Circuit and inductor simulation, First and second order filterrealizations, State-Variable and Biquad Filters	PO1, PO2
	CO3	Able to understand CMOS implementation of various Logic Gates, Boolean functions and Flip-Flops, Clocked SR and D Flip-flop Circuits.	PO1, PO2
	CO4	Able to understand different Non-Linear applications of IC Op-amps and variouswaveform generation circuits.	PO1, PO2, PO3
	CO5	Able to understand the operation and working of some special ICs like timer IC 555 andPLL 565, Analog-to-Digital and Digital-to-Analog Converters.	PO1, PO2, PO3
Digital Electronics and Logic Design / EC 403	CO1	Design and analyze combinational logic circuits.	PO1, PO2
	CO2	Design and analyze modular combinational circuits with MUX / DEMUX, Decoder &Encoder.	PO1, PO2
	CO3	Design & analyze synchronous sequential logic circuits.	PO1, PO2
	CO4	Analyze various logic families.	PO1, PO2, PO5
	CO5	Design and analyze combinational logic circuits. Design ADC and DAC and implement in amplifier, integrator, etc	PO1, PO2, PO5
Data Structure and Algorithm / CS 301	CO1	Understand and analyze the time and space complexity of an algorithm.	PO1, PO2, PO3, PO4, PO12
	CO2	Understand and implement fundamental algorithms (including sorting algorithms, graphalgorithms, and dynamic programming)	PO1, PO2, PO3, PO4, PO5, PO12
	CO3	Discuss various algorithm design techniques for developing algorithms.	PO1, PO2, PO3, PO4, PO5, PO12
	CO4	Discuss various searching, sorting and graph traversal algorithms.	PO1, PO2, PO3, PO4, PO5, PO12
	CO5	Understand operation on Queue, Priority Queue, and D-Queue	PO1, PO2, PO5, PO12
Engineering Economics / EN 401	CO1	Introduce the basic knowledge of basic concepts of economic, demand theory, elasticity's, indifference curve and various techniques of Managerial Economics.	PO3, PO7, PO10
	CO2	Identify and model various type of demand forecasting that act on the production system and introduce the concept of supply analysis with reference to consumer requirement.	PO3, PO7, PO12
	CO3	Introduce the basic theories of production and cost and their application applicable to the industries.	PO3, PO7, PO10, PO12
	CO4	Introduce the basic concept and laws of various market conditions and competition theory.	PO3, PO7, PO10, PO12
	CO5	Explain the basic concepts of national income, GDP and business cycles.	PO1,PO3, PO7, PO10, PO12

5th Semester EEE			
Power System – II / EEC 501	CO1	Illustrate power system components using single line diagram and usage of per unit system.	PO1, PO2
	CO2	Calculate symmetrical components and Examine different types of faults (both symmetrical and unsymmetrical).	PO1, PO4, PO5
	CO3	Formulate nodal admittance (Y-bus) matrix, and develop load flow equations and find its solution.	PO1, PO4, PO5
	CO4	Illustrate the concept of stability, power angle curve, and swing equation and di4gnose steady-state and transient stability of the power system.	PO1, PO4, PO5
	CO5	Apply different types of active, reactive and voltage control techniques.	PO1, PO2, PO5
Control System / EEC 502	CO1	Able to understand the basic components of a control system, block diagram reduction and signal flow graphs, DC Motors in Control Systems.	PO1, PO2, PO5
	CO2	Able to understand State-Variable Analysis, Similarity transformation, Concept of Controllability and Observability	PO1, PO2, PO4, PO5
	CO3	Able to understand time-domain analysis of control systems and transient response of a prototype second order system.	PO1, PO2, PO4, PO5
	CO4	Able to understand the concept of stability of linear control systems using Routh-Hurwitz criterion and Root-Locus technique.	PO1, PO2, PO4, PO5
	CO5	Able to understand frequency-domain analysis using Nyquist stability criterion and the Bode plot.	PO1, PO2, PO3, PO4, PO5
Electrical Machine – II / EEC 503	CO1	Understand the construction and principle of operation of synchronous machines.	PO1, PO2
	CO2	Analyze the effects of excitation and mechanical input on the operation of synchronous Machine.	PO1, PO2, PO3
	CO3	Understand the operation principles of Reluctance motor, shaded pole, Hysteresis motor, and Universal motor, PMBLDC, tachometer, synchro and identify the suitable applications.	PO1, PO2, PO3
	CO4	Analyze single phase induction motors and identify the suitable methods of starting.	PO1, PO2, PO3
Non-Conventional Energy System / EEP 505	CO1	Identify different non-conventional energy system and explain the principle of thermo-electrical and thermionic conversions.	PO1, PO2
	CO2	Analyze the performance and limitations of the solar and wind energy conversion system.	PO1, PO2, PO5
	CO3	Illustrate the concept of geothermal energy.	PO1, PO2, PO4
	CO4	Outline the basics of fuel cells.	PO1, PO2, PO4
	CO5	Understand the principles behind the bio-mass, ocean thermal and wave energy conversions.	PO1, PO2, PO4
Communication and Networks / ECO 501	CO1	Analyze and compare different Analog modulation schemes for their efficiency and bandwidth.	PO1, PO2, PO3
	CO2	Analyze the behavior of a communication system in presence of noise.	PO1, PO2, PO3
	CO3	Investigate pulsed modulation system and analyze their system performance.	PO1, PO2, PO3

6th Semester EEE			
Power Electronics / EEC 601	CO1	To understand different power semiconductor devices and their switching characteristics.	PO1, PO2, PO5
	CO2	To understand the operation, characteristics and performance parameters of AC to DC Converters.	PO3, PO4, PO7
	CO3	To study the operation, switching techniques and basic topologies of DC-DC Converters.	PO3, PO4, PO1
	CO4	To learn the different modulation techniques of PWM inverters and to understand commutation techniques.	PO1, PO2, PO3
	CO5	To study the operation of AC voltage controller and various configurations	PO1, PO2, PO3
Signals and Systems / EEC 602	CO1	Understand the concepts of continuous time and discrete time systems.	PO1, PO2, PO3
	CO2	Analyze systems in complex frequency domain.	PO1, PO2, PO3
	CO3	Understand sampling theorem and its implications.	PO1, PO2, PO3
Digital Control Systems / EEP 606	CO1	Evaluate the output of a digital system for a given input.	PO1, PO7
	CO2	Describe the dynamics of a Linear, Time Invariant systems through difference equations.	PO1, PO7
	CO3	Analyze digital systems using the Z-transformation, state space methods.	PO1, PO7
	CO4	Design digital controllers for physical systems.	PO1, PO7
Power Plant Engineering / EEO 607	CO1	Describe and analyses different types of sources and mathematical expressions related to thermodynamics and various terms and factors involved with power plant operation.	PO2, PO3, PO4
	CO2	Analyze the working and layout of thermal power plants and the different systems comprising the plant and discuss about its economic and safety impacts.	PO4, PO2, PO3
	CO3	To define the working principle of diesel power plant, its layout, safety principles and compare it with plants of other types.	PO1, PO3, PO4
	CO4	Discuss and analyses the mathematical and working principles of different electrical equipment involved in the generation of power and to understand co-generation.	PO1, PO2, PO3
7th Semester EEE			
Protection of Power Apparatus System / ELC 701	CO1	Analyze the need of power system protection and classify the different types of relay and their operating principle.	PO1, PO2, PO4, PO12
	CO2	Distinguish the difference between the distribution line protection and transmission line protection.	PO1, PO2, PO4, PO12
	CO3	Explain the protection of generator, bus bar and transformer and its limitations.	PO1, PO2, PO4, PO12
	CO4	Select the different kind of circuit breaker based on their application.	PO1, PO2, PO4, PO12
	CO5	Choose different type of protective devices against overvoltage as well as for earthing purpose.	PO1, PO2, PO4, PO5, PO12
	CO1	Classify electric drives and their specific application in industry.	PO1, PO2, PO3,

Utilization of Electrical Power / ELP 703			PO4, PO5, PO12
	CO2	Explain the operation of electric traction, energy consumption and its advantages.	PO1, PO2, PO3, PO7, PO12
	CO3	Make use of el electric heating based on induction principle.	PO1, PO2, PO3, PO5, PO12
	CO4	List different light sources and illumination parameters.	PO1, PO2, PO3, PO5, PO12
	CO5	Demonstrate el electrolytic process and design motor control circuit.	PO1, PO2, PO3, PO4, PO5, PO12
Smart Grid Technology / ELP 708	CO1	Understand features of Smart Grid in the context of Indian Grid.	PO1, PO2, PO3, PO4, PO6
	CO2	Assess the role of automation in Transmission/Distribution.	PO1, PO2, PO3, PO4, PO6, PO9
	CO3	Apply Evolutionary Algorithms for the Smart Grid/Distribution Generation.	PO1, PO2, PO3, PO4, PO6, PO9
	CO4	Understand operation and importance of PMUs, PDCs, WAMS, Voltage and Frequency control in Micro Grids.	PO1, PO2, PO3, PO4, PO6, PO9
Soft Optimization Techniques / ELO 710	CO1	Understand the concepts of population based optimization techniques.	PO1, PO2, PO3, PO4, PO5, PO6, PO12
	CO2	Evaluate the importance of parameters in heuristic optimization techniques.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	CO3	Apply for the solution of multi-objective optimization.	PO1, PO2, PO3, PO4, PO5, PO8, PO11, PO12
Digital Signal Processing / ELO 713	CO1	Understand the concepts of continuous time and discrete time systems.	PO1, PO2, PO3, PO4
	CO2	Understand the concepts of different discrete transforms.	PO1, PO2, PO3, PO4
	CO3	Analyze systems in complex frequency domain.	PO1, PO2, PO3, PO4
	CO4	Design of different types of filters.	PO1, PO2, PO3, PO4

8th Semester EEE

No Theory Courses, only Project.

ELECTRICAL AND COMMUNICATION ENGINEERING (ECE)

3rd Semester (ECE)

Course/Course Code	COs	Course Outcomes (Cos)	Attainment of POs
Basic Electronics / EC301	CO 1	Familiar with semiconductor devices which are capable to use abstraction in order to analyze and design simple electronic circuit.	PO1, PO2, PO3
	CO 2	Become adept to formulate and solve the equation of complex and nonlinear device of circuit.	PO4, PO5, PO6, PO7
	CO 3	The capability to design and construct a circuit in terms of its optimal performance and comparison with predicted circuit models.	PO5, PO6, PO10, PO11
	CO 4	Identify function of digital multimeter, cathode ray oscilloscope	PO5, PO11

		and transducers in the measurement of physical variables.	
Digital Electronics and Logic Design / EC 302	CO 1	Acquire knowledge about switching theory, Boolean algebra and different minimization techniques.	PO1, PO3
	CO 2	Acquired knowledge about internal circuitry, design and logic behind any combinational and various synchronous asynchronous sequential circuits.	PO1, PO2, PO3
	CO 3	Acquired knowledge about to design ASM and FSM.	PO1, PO2, PO3
	CO 4	Learn about fault tolerance and diagnosis techniques.	PO1, PO3
	CO5	Ability to understand the PLD's structure.	PO6, PO7
	CO6	Acquire knowledge and ability to analyze threshold gates and their synthesis.	PO5, PO7, PO8, PO9, PO10, PO11, PO12
Network Theory / EE 302	CO 1	Be able to solve the fundamental knowledge of instrumental characteristics for solving engineering problems and will learn to relate schematic diagrams to their physical circuit counterparts.	PO1, PO2
	CO 2	Learner will be able to design analog filters and attenuators theoretically and practically.	PO3, PO4
	CO 3	A student will get complete and adequate knowledge regarding the ability to identify issues related to transmission of signals, analyze different RLC networks.	PO5
	CO 4	Learner will be able to design analog filters based on which they can further apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters.	PO11, PO12
Electromagnetics Field Theory / EE 303	CO 1	To learn basic coordinate system, significance of divergence, gradient, curl and its applications to EM fields and also the boundary conditions for different materials /surfaces.	PO1, PO2, PO3, PO4, PO5, PO6, PO7
	CO2	Learners can acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical fundamental to be able in the future to design emission, propagation and reception of electromagnetic wave systems.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
	CO3	To identify, formulate and solve fields and electromagnetic wave propagation problems in multidisciplinary frame individually or as a member of a group.	PO4, PO6, PO9, PO10, PO11, PO12
	CO4	To provide the students with a solid foundation in engineering fundamentals required to solve problems and also to pursue higher studies.	PO6, PO7, PO8, PO9, PO10, PO11, PO12
4th. Semester (ECE)			
Analog Electronics and Circuits / EC 401	CO 1	This subject introduces the theoretical & circuit aspect of Op-amp, which is the backbone for the basics of Linear integrated circuits.	PO1, PO2, PO3, PO4
	CO 2	Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.	PO4, PO5
	CO 3	Elucidate and design the linear and non-linear applications of opamp and special application ICs.	PO6, PO7, PO8, PO9, PO10
	CO 4	Learn about the working of multi-vibrators using special applications IC 555, Switched capacitor filters and various	PO3, PO11, PO12

		amplifiers using general purpose opamp.	
Analog Communication / EC 402	CO 1	This course enables to understand the principles of PLL circuits and its applications and to design PLL synthesizers optimized for a given application.	P02,P03
	CO 2	To understand the fundamental concepts of communication systems and compare different analog modulation and frequency modulation schemes.	P01,P02,P010
	CO 3	It introduces advanced technologies of frequency synthesis used in modern communication devices.	P02,P04
	CO 4	To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver.	P03,P04,P07
Signals and System / EE 403	CO 1	Define signals and systems, classify the signals and apply different operations on signal.	PO1, PO2, PO3
	CO 2	Determine Fourier series coefficient and Fourier transforms for different types of signals.	PO1,PO3, PO5
	CO 3	Determine Laplace transforms with their properties by using the concept of ROC	PO1,PO3, PO5
	CO 4	Determine Z transforms with their properties by using the concept of ROC and relate with Laplace transform.	PO3, PO5, PO6
Microprocessor and Interfacing / EE 404	CO1	Understand the internal design of 8051 microcontroller along with the features and their programming.	PO1,PO3, PO5
	CO2	Design different interfacing applications using microcontrollers and peripherals.	PO1, PO2, PO3
	CO3	Demonstrate the limitations and strengths of different types of microcontrollers and their comparison.	PO1,PO3, PO5
	CO4	Build systems using microcontrollers for real-time applications.	PO3, PO5, PO6
Data Structure & Algorithm / CS 301	CO 1	Understand the fundamentals of data structures and their applications essential for programming/problem-solving.	PO1,PO12
	CO 2	Apply linear Data Structures: Stack, Queues and Recursion.	PO1, PO2, PO3, PO4, PO12
	CO 3	Apply linear data structures: Linked lists.	PO1, PO2, PO3, PO4, PO12
	CO 4	Apply Non-linear data structures: Trees and Graphs.	PO1, PO2, PO3, PO4, PO12
	CO 5	Understand the concepts of Hashing, Files and their organization and sorting algorithms.	PO1,PO12
Engineering Economics / EN401			
	CO1	The course enables students to acquire the ability to use modern and classical engineering methodologies pertaining to cost analysis, break-even point calculation, engineering economic analysis, cost-effectiveness analysis, sensitivity analysis, and financial planning.	PO2, PO6, PO11
	CO2	The course enables students to acquire the ability to conduct an analysis of different alternatives and make appropriate recommendations.	PO4, PO6, PO11
	CO3	The course enables students to acquire the ability to work	PO6, PO11

		individually and on multi-disciplinary teams to identify, formulate and analyze financial problems.	
Digital Signal Processing / EC621N	CO4	Develop and analyze information on investment planning and cost controls, and conduct cost/benefit analysis	PO2, PO4, PO11
	CO1	Describe discrete time signals & systems and represent in frequency domain	PO3, PO5, PO6
	CO2	Compute dft using fft algorithms and derive dft properties	PO1, PO2, PO3
	CO3	Design iir digital filters using various techniques	PO1,PO3, PO5
		5th. Semester ECE	
Digital Communication / EC 503 N	CO 1	The fundamentals of Communication system and the advantages o digital communication over analog communication. Understandin the basic concepts of signals and systems - energy signals and pov signals, autocorrelation and cross correlation function, energy spectral density and power spectral density.	PO 1, PO2
	CO 1	The fundamentals of Communication system and the advantages o digital communication over analog communication. Understandin the basic concepts of signals and systems - energy signals and pov signals, autocorrelation and cross correlation function, energy spectral density and power spectral density.	PO 1, PO2
	CO 2	Conversion of analog to digital signals by sampling and quantization, analyze quantization error, and compare uniform and non-uniform quantization.	PO3
	CO 3	Have full knowledge of basic analog and digital modulation schemes such as – AM, FM, PM, QAM, ASK, BPSK, QPSK, FSK, operating principle of differential encoding/ detection and non-coherent receivers, design optimum receivers based on matched filtering and optimum decision rules, base band data transmission along with the various line codes, PCM and Delta modulation, effect of ISI, channel equalizer.	PO3, PO5, PO12
	CO4	Basic knowledge of information theory. The measure of information, information content and the entropy of message	PO1, PO2,PO3
Microcontroller and Embedded System / EC 515 N	CO 1	The purpose of this course is to teach the students the fundamentals of microprocessor and microcontroller systems.	P02,P03
	CO 2	The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a microprocessor/controller implementation.	P01,P02,P010
	CO 3	Students will comprehend the basic requirements and layout for building a microcomputer and applying those concepts to achieve a dedicated "embedded" controller as a component of a larger system.	P02,P04
	CO4	Real world control problems will be solved as applications of embedded controllers.	P03,P04,P07
Linear Control System / EC 505 N			
	CO 1	Understand the fundamentals of transfer function of the systems, especially in time domain and frequency domain	P02,P03
	CO 2	Describe and analyze the mathematical techniques to find the transfer function, mathematical modeling of translational and rotational system.	P01,P02,P010

	CO 3	Describe and analyze the stability of linear system using time domain and frequency domain.	P02,P04
	CO4	Analyze the stability of the linear system in time domain and frequency domain.	P03,P04,P07
Data Base Management System / IT 501			
	CO 1	Demonstrate the basic elements of a relational database management system.	P02,P03
	CO 2	Identify the data models for relevant problems.	P01,P02,P010
	CO 3	Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data.	P02,P04
	CO 4	Demonstrate their understanding of key notions of query evaluation and optimization techniques.	P03,P04,P07
6th. Semester ECE			
Microwave Engineering / ECE 601	CO 1	To have fundamental understanding of microwave components and circuits in terms of scattering parameters and also understand the basics of microwave amplifiers based on stability, bandwidth, gain and noise figure criteria, generating layouts and measurement of these devices.	PO1, PO2, PO3, PO4, PO5
	CO 1	To have fundamental understanding of microwave components and circuits in terms of scattering parameters and also understand the basics of microwave amplifiers based on stability, bandwidth, gain and noise figure criteria, generating layouts and measurement of these devices.	PO1, PO2, PO3, PO4, PO5
	CO 2	The main objective of this course is to study the behavior of some semiconductor devices like IMPATT, TRAPATT, GUNN-DIODE, LED etc.	PO5, PO6, PO7, PO10, PO11
	CO 3	Gain knowledge and understanding of microwave analysis methods in their industry throughout their lifetime. This will help them in design and implementation of microwave circuit.	PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
	CO4	Know how to model and determine the performance characteristics of a microwave circuit or system. This will lead for the development of the society. Have knowledge of basic communication link design, signal power budget, noise evaluation and link carrier to noise ratio.	PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
VLSI / ECE 602			
	CO 1	Understand the static and dynamic behavior of MOSFET and secondary effect of MOS transistor model.	P01,P04
	CO 2	To be aware about the trends in semiconductor technology and how it impacts scaling and its effect on device density, speed and power consumption.	P01, P02, P03,PO4
	CO 3	Able to learn layout, stick diagram, fabrication steps.	P01,P05,P012
	CO 4	Understand the concept behind Application Specific Integrated Circuit Design and different implementation approaches used in industry.	P01,P03

Internet Of Things / ECE 603			
	CO 1	Design a portable IoT using Arduino/ equivalent boards and relevant protocols.	P01,P05,P012
	CO 2	Develop web services to access/control IoT devices.	P01, P02, P03, P04, P05,P06, P09, P010,P011, P012
	CO 3	Deploy an IoT application and connect to the cloud.	P01, P02, P03, P04, P05,P06, P09, P010,P011, P012
	CO 4	Analyze applications of IoT in real time scenario.	P01, P02, P03, P04, P05,P06, P09, P010,P011, P012
Computer Network / CS 601			
	CO 1	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.	P01, P02, P03,
	CO 2	Have a basic knowledge of the use of cryptography and network security.	P01, P02, P03,
	CO 3	Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols.	P01, P02, P03,
	CO 4	Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure	P01, P02, P03,
	CO 5	Have a working knowledge of datagram and internet socket programming.	P01, P02, P03,
Electronics Measurement and Instrumentation / ECE 605			
	CO 1	To provide ideas about the static and dynamic characteristics of an instrument.	P01, P02, P03, P04, P07, P010,P012
	CO 2	The course emphasizes on understanding the practical applications and implementations of the electronic instruments with the help of theoretical concepts.	P01, P02, P03, P04, P07, P010,P012
	CO 3	Understanding of professional and ethical responsibility to function in multi-disciplinary teams. The goal of the course is to provide techniques, skills, and modern engineering tools necessary for engineering practice.	P01, P02, P03, P04, P07, P010,P012
7th. Semester ECE			
Optical Fiber Communication / ECC 701	CO 1	Identify and Develop the basic knowledge of different components of an Optical Fiber Communication theory.	
	CO 1	Identify and Develop the basic knowledge of different components of an Optical Fiber Communication theory.	P01, P02, P03, P010,P012
	CO 2	Analyze the problems related to optical source, Fiber and Detector operational parameters.	P01, P02, P03, P04, P010,P012

	CO 3	Design and Investigate the complex problems related to high speed links, MUX, DEMUX, and different optical fiber link design parameters.	P01, P02, P03, P04, P07, P010,P012
	CO 4	Use Modern Tool to analyze the concepts of WDM, Optical Amplifiers, Optical Switching and networking technology.	P01, P02, P03, P04, P010,P012
Mobile Communication / ECP 702			
	CO 1	Understand WLANs and their architecture	P01, P02, P03, P04, P05,P06 P07, P08
	CO 2	Design WAP pages using Wireless Mark Up language	P01, P02, P03, P04, P05,P06 P07, P08, P010,P012
	CO 3	Classify and distinguish different mobile communication generations and their architecture	P01, P02, P03, P04, P05,P012
	CO 4	A To gain knowledge of different mobile transport layers	P01, P02, P03, P04
	CO 5	Scale up the production Nano particles for Electronics and Chemical industries.	P01, P02, P03, P04, P07, P08, P010,P012
Antenna and Wave Propagation / ECP 705			
	CO 1	Understand the concept to fradiationthrough mathematical formulation	P01, P02, P03, P04, P06, P010
	CO 2	Plot the characteristics of wire and aperture antennas	P01, P03, P04, P06, P010
	CO 3	Develop the performance characteristics of array antennas	P01, P02, P03, P04
	CO 4	Measure the antenna parameters	P01, P010
	CO 5	Apply the concept of antenna in mobile communication	P01, P02,P06, P010
Soft Computing And Technique / ECO 708			
	CO 1	Understand the concepts of population based optimization techniques	P01, P02, P03, P04, P05,P06 P07, P08, P09, P011,P012
	CO 2	Examine the importance of exploration and exploitation in heuristic optimization techniques to attain near-global optimal solution	P01, P02, P03, P04, P05,P06 P07, P09, P011,P012
	CO 3	Evaluate the importance of parameters in heuristic optimization techniques	P01, P02, P03, P04, P05,P06 P07, P09, P011,P012
	CO 4	Apply for the solution of multi-objective optimization	P01, P02, P03, P04, P05,P06 P07, P09, P011,P012
MEMS Technology /			
	CO 1	Understanding of MEMS and Micro fabrication.	P01, P010
	CO 2	Understanding of MEMS materials.	P01, P010
	CO 3	Application of Sensing and Actuation.	P01,P05, P010

ECO713	CO 4	Understanding of Micromachining.	P02,P05,P09, P010
	CO 5	Understanding of Optical MEMS.	
8th Semester ECE			
No Theoretical Course, only Project			
COMPUTER SCIENCE AND ENGINEERING			
Course / Course Code	**COs**	**Course Outcomes (COs)**	**Attainment of POs**
2nd Semester All Branches			
Programming for Problem Solving / ESC103	CO1	To formulate simple algorithms for arithmetic and logical problems.	PO-1
	CO2	To translate the algorithms to programs (in C language).	PO-3
	CO3	To test and execute the programs and correct syntax and logical errors	PO-4
	CO4	To implement conditional branching, iteration and recursion.	PO-3, PO-4
	CO5	To decompose a problem into functions and synthesize a complete program using divide and conquer approach	PO-3, PO-4
	CO6	To use arrays, pointers and structures to formulate algorithms and programs	PO-3, PO-4
	CO7	To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.	PO-3, PO-4
	CO8	To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration	PO-12
Data Structures and Algorithms /CS 301	CO1	Understand the concept of ADT	PO-3,PO-5
	CO2	Identify data structures suitable to solve problems	PO-2
	CO3	Develop and analyse algorithms for stacks, queues	PO-3
	CO4	Develop algorithms for binary trees and graphs	PO-3, PO-5
	CO5	Implement sorting and searching algorithms	PO-3
Object Oriented Programming /IT 301	CO1	To be able to apply an object-oriented approach to programming and identify potential benefits of object-oriented programming over the approaches.	PO-1
	CO2	To be able to reuse the code and write the classes which work like built in types.	PO-2, PO-3
	CO3	To be able to design applications which are easier to debug, maintain and extend.	PO-4
	CO4	To be able to apply object-oriented concepts in real world applications.	PO-7
	CO5	To be able to develop applications using multi-threading.	PO-9
	CO6	To be able to handle exceptions in any applications.	PO-10
4th Semester Computer Science & Engineering			

Operating System /CS 401	CO1	Outline various concepts and features of Operating systems.	PO-1
	CO2	Compare various operating systems with respect to characteristics and features.	PO-4
	CO3	Implement algorithm of CPU Scheduling, Memory Management and disk scheduling.	PO-5
	CO4	Make changes in the OS configurations as per need.	PO-7
Design and Analysis of Algorithms /CS 402	CO1	Ability to analyze the performance of algorithms.	PO-2
	CO2	Ability to choose appropriate algorithm design techniques for solving problems.	PO-4
	CO3	Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.	PO-1
Formal Languages and Automata Theory / CS 403	CO1	Understand the equivalence non deterministic finite automata and deterministic finite Automata.	PO-2
	CO2	Understand the equivalence between context free grammars and non-deterministic push down automata.	PO-3
	CO3	Appreciate the power of the Turing machine as an abstract automaton that describes	PO-7
Database Management Systems /IT 401	CO1	Understand the basic principles of database management systems.	PO-1, PO-2
	CO2	Draw Entity-Relationship diagrams to represent simple database application	PO-3
	CO3	Scenarios write SQL queries for a given context in relational database.	PO-3, PO-4
	CO4	Discuss normalization techniques with simple examples.	PO-5, PO-6
	CO5	Describe transaction processing and concurrency control concepts.	PO-7, PO-11
Cyber Security / IT 402	CO1	Protect and defend computer systems and networks from cyber security attacks.	PO-1, PO-6
	CO2	Characterize privacy, legal and ethical issues of information security.	PO-3, PO-8
	CO3	Diagnose and investigate cyber security events or crimes related to computer systems and digital evidence.	PO-6
	CO4	Effectively communicate in a professional setting to address information security issues.	PO-7, PO-11
5th Semester Computer Science & Engineering			
Computer Organization and Architecture / CSC 501	CO1	Ability to describe the organization of computer and machine instructions and programs	PO-2
	CO2	Ability to analyze Input / Output Organization	PO-1, PO-3, PO-4, PO-5
	CO3	Analyze the working of the memory system and basic processing unit.	PO-5, PO-12
	CO4	Ability to solve problems of multi cores, multiprocessors and clusters.	PO-1, PO-2, PO-3
	CO5	Choose optical storage media suitable for multimedia	PO-4, PO-12

		applications.	
Compiler Design Subject Code / CSC 502	CO1	Identify the issue that arises in the design and construction of translator for programming language.	PO-2, PO-3, PO-4, PO-10
	CO2	Analyze RE and CFG to specify the lexical and syntactic structure of programming language	PO-2, PO-4
	CO3	Design different parsers from given specification.	PO-3, PO-4, PO-10
	CO4	Assess the various program transformations.	PO-2, PO-4
	CO5	Design a compiler for a programming language.	PO-3, PO-4, PO-10
Computer Graphics / CSC 503	CO1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.	PO-3
	CO2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.	PO-5
	CO3	Use of geometric transformations on graphics objects and their application in composite form.	PO-4
	CO4	Extract scene with different clipping methods and its transformation to graphics display device.	PO-9
	CO5	Render projected objects to naturalize the scene in 2D view and use of illumination models for this.	PO-11
Web Technology / ITP 501	CO1	Describe various web technology and application development issues and trends.	PO-1
	CO2	Design static and dynamic web pages using HTML, CSS and Java Script.	PO-3, PO-5
	CO3	Design and implement web services from the server and client side.	PO-3
	CO4	Build interactive Web applications using JSP and Servlet.	PO-11
	CO5	Identify the engineering structural design of XML and parse construction tree model.	PO-2
- **Data Communication / ITO 502**	CO1	Identify and list the various issues present in the design of a data communication system.	PO-3
	CO2	Apply the time domain and frequency domain concepts of signals in data communication.	PO-4
	CO3	Compare and select transmission media based on transmission impairments and channel capacity.	PO-1
	CO4	Select and use appropriate signal encoding techniques and multiplexing techniques for a given scenario.	PO-3
	CO5	Design suitable error detection and error correction algorithms to achieve error free data communication and explain different switching techniques.	PO-5
6th Semester Computer Science & Engineering			
Computer Networks	CO1	Describe and analyze the importance of data communications and the layered protocol model.	PO-3
	CO2	Describe, analyze and evaluate a number of data link, network, and transport layer protocols and network devices.	PO-3, PO-4

/CSC 601	CO3	Have a basic knowledge of the use of cryptography and network security;	PO-8
	CO4	Explain concepts and theories of networking and apply them to various situations, classifying networks, analyzing performance and implementing new technologies.	PO-2
Data Science /CSC 602	CO1	To enable students with data analytics skill.	PO-6, PO-11
	CO2	To develop knowledge of fundamentals of data science.	PO-1, PO-3
	CO3	To empower students with hands-on for data science.	PO-5
	CO4	To make students experience with theoretical data science and programming.	PO-2
Image Processing / CSC 603	CO1	To study the image fundamentals and image transforms necessary for image processing	PO-3
	CO2	To study the image enhancement techniques.	PO-6
	CO3	To study the image restoration procedures and segmentation tools.	PO-5
	CO4	To study the wavelet tools and the image compression procedures.	PO-2
Software Engineering /CSP 608	CO1	Identify the principles of large scale software systems, and the processes that are used to build them.	PO-1
	CO2	Able to use tools and techniques for producing application software solutions from informal and semi -formal problem specifications.	PO-2
	CO3	Develop an appreciation of the cost, quality, and management issues involved in software construction.	PO-10
	CO4	Implement design and communicate ideas about software system solutions at different levels.	PO-3
	CO5	Establish the relation with other people in a team, communicating computing ideas effectively in speech and in writing	PO-11
Information Retrieval / ITO 601	CO1	The understanding of different Information retrieval models.	PO-1
	CO2	To know about evaluation methods of the information retrieval model.	PO-2, PO-3
	CO3	Exposures of implementing retrieval models on text data.	PO-5,
	CO4	To know about text categorization and its implementation.	PO-6, PO-7
	CO5	To know the challenges associated with each topic on new domain of retrieval and classification.	PO-12
7th Semester Computer Science & Engineering			
Artificial Intelligence / CSC 701	CO1	Discuss basic concepts of Artificial Intelligence, AI(Artificial Intelligence) principles, AITask domains and application.	PO-1, PO-3
	CO2	Explain various searching techniques, constraint satisfaction problem, game playing techniques and Apply these techniques in applications which involve perception, reasoning and learning.	PO-2, PO-5
	CO3	Explain various searching techniques, constraint satisfaction problem, game playing techniques and Apply these techniques	PO-7

		in applications which involve perception, reasoning and learning.	
	CO4	Explain working of uncertainty management, decision making and learning methods.	PO-8
	CO5	Apply different knowledge representation, reasoning, and learning techniques to real-world problems.	PO-10
Machine Learning / CSP 702	CO1	Differentiate various learning approaches, and to interpret the concepts of different learning.	PO-5
	CO2	Illustrate and apply clustering algorithms and identify its applicability in real life problems.	PO-11
	CO3	Discuss basics of neural network and its different model.	PO-6
	CO4	Describe different optimizations algorithm.	PO-11
	CO5	Discuss fundamental of machine learning, design and its application.	PO-5
Information Security /ITP 706	CO1	Recognize propensity of errors and remedies in processes involving information technology.	PO-2
	CO2	Consummate knowledge of risk and controls in IT operation in industry	PO-2, PO-3
	CO3	Determine IT security guidelines for various type of industries	PO-12
	CO4	Evaluate asset safeguarding, data integrity, system effectiveness and system efficiency.	PO-4
	CO5	Understand software security auditing including database security audit, network audit and micro-computer security audit.	PO-12
Values and Ethics in Profession /CSO 709	CO1	Identify the effects of technological growth on the society and the limited natural resources.	PO-3, PO-6, PO-7
	CO2	Identify the essence of sustainable development, and will be able to apply approaches to handle energy crisis and environment protection.	PO-3, PO-7
	CO3	Analyze the impact of technology transfer and the problems of man machine interaction for the human operators in engineering projects and industries.	PO-3, PO-5, PO-7, PO-8
	CO4	Apply industrial standards, code of ethics and role of professional ethics in engineering field.	PO-3, PO-5, PO-6, PO-8
	CO5	Assess the possible values crisis at different levels and the way out with the help of the constitution and moral, and ethical values.	PO-3, PO-5, PO-6, PO-8
Cryptography / CSO 712	CO1	Explain the basics of network security and compare various encryption techniques.	PO-1
	CO2	Summarize the functionality of public key cryptography.	PO-3
	CO3	Apply various message authentication functions and secure algorithms.	PO-12
	CO4	Demonstrate different types of security systems and describe different levels of security and services.	PO-7
8th Semester CSE			

No Theoretical Course, only Project			
1st Semester M C A			
Course Name / Course Code	**COs**	**Course Outcomes (COs)**	**Attainment of POs**
Programming and Data Structures / IT 11	CO1	Identify various data structures and their usages.	PO-2
	CO2	Apply data structures in the modelling of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design.	PO-3
	CO3	Demonstrate the usage of optimal trees, heaps and priority queues.	PO-4
	CO4	Implement sorting algorithms.	PO-4
	CO5	Apply data structures in the modelling of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design	PO-5
Database Management Systems / IT 12	CO1	Explain the basic concepts and the applications of database systems.	PO-1
	CO2	Utilize the knowledge of basics of SQL and construct queries using SQL.	PO-2
	CO3	Explain&usedesignprinciplesforlogicaldesignofdatabases,includingtheE-Rmethodand normalization approach.	PO-7
	CO4	Demonstrate the basics of query evaluation and apply query optimization techniques.	PO-8
	CO5	Explain the basic concepts and the applications of database systems.	PO-6
Python Programming / IT 13	CO1	Design real life situational problems and think creatively about solutions of them.	PO-3
	CO2	Apply a solution clearly and accurately in a program using Python.	PO-5
	CO3	Apply the best features of Python to program real life problems	PO-7
Computer Organization and architecture /IT 14	CO1	Describe the merits and pitfalls in computer performance measurements and analyze the impact of instruction set architecture on cost-performance of computer design	PO-2
	CO2	Explain Digital Logic Circuits, Data Representation, Register and Processor level Design and Instruction Set architecture	PO-1, PO-3, PO-4, PO-5
	CO3	Solve problems related to computer arithmetic and determine which hardware blocks andcontrol lines are used for specific instructions	PO-5, PO-12
	CO4	Design a pipeline for consistent execution of instructions with minimum hazards	PO-1, PO-2, PO-3
	CO5	Explain memory organization, I/O organization and its impact	PO-4, PO-12

		on computer cost/performance	
Mathematical Foundations /SH 11	CO1	Gain intense foundational introduction to fundamental concepts in discrete mathematics.	PO-1
	CO2	Interpret, identify, and apply the language associated with logical structure, sets, relations and functions.	PO-2
	CO3	Applying mathematical approach in real life problem through combinatory.	PO-6
	CO4	Understand Graph Terminologies and their representation, Connected & Disconnected graphs.	PO-12
	CO5	Special cases of graph theory like, trees to search the minimal spanning trees	PO-7, PO-12
Business Communication /SH 12	CO1	Analyse the matter and demonstrate it at required platform.	PO-2
	CO2	Comprehend the issue and select appropriate medium of presentation	PO-10
	CO3	Become able to appropriately apply the mode of expression.	PO-6,PO-10
	CO4	Make effective participation in professional affairs.	PO-3,PO-10
	CO5	Develop the ability to give written or oral presentation	PO-10
2nd Semester M C A			
Object Oriented Programming using JAVA / IT 21	CO1	The Students will learn to create Classes and their Objects	PO-1
	CO2	Learn and implement principles and concepts of Object Orientation such as Abstraction, Data Hiding, and polymorphism.	PO-3
	CO3	Develop programs by using inbuilt libraries and importing Packages.	PO-4
	CO4	The student will learn to create and handle threads, interfaces and applets	PO-3, PO-4
Computer Communication Networks / IT 22	CO1	Build an understanding of the fundamental concepts of computer networking.	PO-1
	CO2	Familiarize the student with the basic taxonomy and terminology of the computer networkingarea.	PO-5
	CO3	Introduce the student to advanced networking concepts, preparing the student for entry in Advanced courses in computer networking.	PO-7
	CO4	Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.	PO-10
	CO5	Build an understanding of the fundamental concepts of computer networking.	PO-12
	CO1	Describe the important computer system resources and the role of operating system in the IT management policies and	PO-1

Operating Systems / IT 23		algorithms.	
	CO2	Understand the process management policies and scheduling of processes by CPU	PO-4
	CO3	Evaluate the requirement for process synchronization and coordination handled by operating System	PO-5
	CO4	Describe and analyze the memory management and its allocation policies.	PO-7
	CO5	Identify use and evaluate the storage management policies with respect to different storage management technologies.	PO-12
	CO6	Identify the need to create the special purpose operating system.	PO-3
Theory of Computation / IT 24	CO1	Classify machines by their power to recognize languages.	PO-2, PO-4
	CO2	Understand differentiate regular, context-free and recursively enumerable languages.	PO-2
	CO3	Demonstrate the usage of grammars to produce strings from a specific language.	PO-1, PO-3
	CO4	Apply acquire concepts relating to the theory of computation and computational models including decidability and intractability.	PO-6, PO-4, PO-1
Statistical & Numerical Computation / SH 21	CO1	Mathematical statistics open doors in engineering, business, finance, computing, data sciences, health sciences, environmental sciences and public policy	PO-1
	CO2	Recent discoveries in the statistical methods have played an essential role in internet search algorithms, disease control, communications technology, climate modelling and much more.	PO-6, PO-7
	CO3	These methods are among the most important disciplines in today's complex world, in part because they serve as the common language of science.	PO-3
	CO4	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.	PO-1, PO-4
	CO5	It Analyze and evaluate the accuracy of common numerical methods	PO-2
Computer Graphics and Multimedia / EC-13	CO1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.	PO-3
	CO2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.	PO-6
	CO3	Use of geometric transformations on graphics objects and their application in composite form.	PO-5
	CO4	Extract scene with different clipping methods and its transformation to graphics display device.	PO-2
	CO5	Render projected objects to naturalize the scene in 2D view and use of illumination models for this	PO-9

3rd Semester M C A			
Internet and Web Technology. / IT 31	CO1	Identify about the technologies used in internet.	PO-1
	CO2	students would have capability to make own web site and host their own web site on internet.	PO-7, PO-9
Software Engineering / IT 32	CO1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	PO-2
	CO2	An ability to apply engineering design to produce solutions that meet specified needs withconsideration of public health, safety, and welfare, as well as global, cultural, social,environmental, and economic factors	PO-3
	CO3	An ability to communicate effectively with a range of audiences	PO-10
	CO4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	PO-8
	CO5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	PO-10
WSN & Internet of Things / IT 33	CO1	Describe the OSI Model for the IoT/M2M Systems.	PO-1
	CO2	Understand the architecture and design principles for IoT	PO-2
	CO3	Learn the programming for IoT Applications.	PO-3
	CO4	Identify the communication protocols which best suits the WSNs	PO-5, PO-10
Data Mining / IT 34	CO1	Understand the functionality of the various data mining and data warehousing component.	PO-1
	CO2	Learn the strengths and limitations of various data mining and data warehousingModels.	PO-2
	CO3	Explain the analyzing techniques of various data.	PO-3
	CO4	Describe different methodologies used in data mining and data ware housing.	PO-6
	CO5	Compare different approaches of data ware housing and data mining with variousTechnologies	PO-5
Machine Learning / EC-21	CO1	Distinguish between, supervised, unsupervised and semi-supervised learning.	PO-3, PO-4
	CO2	Apply the apt machine learning strategy for any given problem	PO-1, PO-2
	CO3	Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem.	PO-5
	CO4	Design systems that use the appropriate graph models of machine learning	PO-4

	CO5	Modify existing machine learning algorithms to improve classification efficiency.	PO-12
Cyber Security / EC 35	CO1	Develop and improve the analytical skills.	PO-1, PO-6
	CO2	Establish the security in computer, network and applications.	PO-3, PO-8
	CO3	Improve the innovation or creativity skills.	PO-6
	CO4	Develop problem solving techniques.	PO-7, PO-11
	CO5	Help to protect from cyber-Crime.	PO-7, PO-8

M. Tech Computer Science Engineering

1st Semester M. Tech. (CSE)

Advanced Data Structure and Algorithm / CSE1101	CO1	Ability to select the data structures that efficiently model the information in a problem.	PO-2
	CO2	Ability to understand how the choice of data structures impact the performance of programs.	PO-1
	CO3	Can Design programs using a variety of data structures, including hash tables, search structures and digital search structures.	PO-5
Mathematics Foundation of Computer Science / CSE1102	CO1	Ability to understand and construct precise mathematical proofs.	PO-1
	CO2	Ability to use logic and set theory to formulate precise statements.	PO-1
	CO3	Ability to analyze and solve counting problems on finite and discrete structures.	PO-1, PO-2
	CO4	Ability to describe and manipulate sequences.	PO-1, PO-2
	CO5	Ability to apply graph theory in solving computing problems.	PO-3, PO-5
Soft Computing / CSE 1104	CO1	Develop application on different soft computing techniques like Fuzzy, GA and Neural network.	PO-3
	CO2	Student should be able to understand and apply the concept of artificial neural network.	PO-5
	CO3	Implement Neuro -Fuzzy and Neuro-Fuzz-GA expert system.	PO-5
Data Mining / CSE 1107	CO1	Understand the functionality of the various data mining and data warehousing component.	PO-1
	CO2	Learn the strengths and limitations of various data mining and data warehousingModels.	PO-2
	CO3	Explain the analyzing techniques of various data.	PO-2, PO-3
	CO4	Describe different methodologies used in data mining and data ware housing.	PO-5, PO-6
	CO5	Compare different approaches of data ware housing and data mining with variousTechnologies	PO-4, PO-5

Multimedia System & Security CSE 1109	CO1	Demonstrate how quality of service can be ensured in multimedia applications.	PO-5
	CO2	Apply different synchronization techniques on multimedia.	PO-6
	CO3	Ensure security of multimedia applications.	PO-7
2nd. Semester M. Tech (CSE)			
Design of Computer Network CSE 2101	CO1	ummarize the basics of Computer Networks and its types.	PO-1,PO-3
	CO2	Acquire the skills of routing algorithms.	PO-3
	CO3	Identify error detection and correction in data link layer.	PO-2, PO-4
	CO4	Understand to the protocols of computer networks, Design & implement networking protocol.	PO-3,PO-5
	CO5	Identify core networking and infrastructure components, and the roles they serve.	PO-3, PO-4
Block chain Technology & Application CSE 2102	CO1	Understand the types, benefits and limitation of block chain.	PO-5
	CO2	Explore the block chain decentralization and cryptography concepts.	PO-7
	CO3	Enumerate the Bit coin features and its alternative options.	PO-5
	CO4	An ability to formulate models, design and conduct experiments, as well as to analyze	PO-4, PO-6
	CO5	Describe and deploy the smart contracts	PO-6
	CO6	Knowledge of emerging technologies and current trends.	PO-5
Cloud Computing CSE2104	CO1	Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.	PO-5
	CO2	Identify the architecture and infrastructure of cloud computing including SaaS, PaaS, laas, public cloud, private cloud, hybrid cloud, etc.	PO-6
	CO3	Explain the core issues of cloud computing such as security, privacy, and interoperability.	PO-3, PO-7
	CO4	Provide the appropriate cloud computing solutions and recommendations.	PO-5, PO-3
	CO5	Collaboratively research and write a research paper, and present the research online.	PO-10
Internet of Thing CSE 2107	CO1	Understand the new computing technologies.	PO-5
	CO2	Able to apply the latest computing technologies like cloud computing technology and Big Data.	PO-5, PO-7
	CO3	Ability to introduce the concept of M2M (machine to machine) with necessary protocols.	PO-6, PO-9
	CO4	Get the skill to program using python scripting language which is used in many loT devices.	PO-3, PO-6
Real time Operating Systems CSE 2109	CO1	After completing the course students will understand the fundamental concepts of RTOS.	PO-5, PO-7

Mechanical Engineering (ME)			
Course Name / Course Code	COs	**Course Outcomes (COs)**	**Attainment of POs**
3rd Semester ME			
Thermodynamics / ME 301	CO1	Apply energy balance to systems and control volumes, in situations involving heat and workinteractions.	PO1, PO2
	CO2	Evaluate changes in thermodynamic properties ofsubstances.	PO2, PO4
	CO3	Evaluate the performance of energy conversiondevices.	PO2, PO4
	CO4	Able to differentiate between high grade and low grade energies.	PO2
Fluid Mechanics / ME 302	CO1	Understand statics, dynamics and various approaches to fluid mechanics.	PO1, PO2
	CO2	Understand fundamentals of flow throughpipes.	PO1
	CO3	Understand basics of compressible flow.	PO1
	CO4	Correlate fundamentals of fluid mechanics with various mechanical systems.	PO2, PO5
Strength of Materials / ME 303	CO1	Understand the nature of stresses developed in simple geometries such as bars, cantilevers, beams,shafts cylinders and spheres for various types of simpleloads.	PO1
	CO2	Calculate the elastic deformation occurring in various simple geometries for different types ofloading.	PO2, PO3
	CO3	Able to recognize various type of load applied on machine components of simple geometry and understand the nature of internal stresses that will develop within thecomponents.	PO1, PO2, PO12
	CO4	Able to evaluate the strains and deformation that will results due to the elastic stresses develop within the material for simple type ofloading.	PO2, PO3, PO4
Engineering Materials / MT 301	CO1	Develop the basic knowledge of metals, polymers composites and ceramics other than conventional metals and alloys to apply them to advance engineering applications.	PO1, PO4, PO7
	CO2	Select different materials other than conventional metals and alloys for specific engineeringapplications.	PO1, PO2, PO3
	CO3	To solve the materials problems associated with the weight reduction through the appropriate choice of metals, polymers, ceramics andcomposites.	PO2, PO3
	CO4	Selection criterion for polymersand composites for variousengineering applications.	PO1, PO7

Environmental Science / BSC 302	CO1	Understand the concept and scope of Environment science, environmentalsegment and their importance.	PO1, PO7
	CO2	Understand Ecosystem and its characteristics features, structure and function of forest ecosystem.	PO1, PO7, PO12
	CO3	Understand and analyze Atmospheric composition, energy balance, climate, weather, depletion of ozone layer and greenhouse effect.	PO2, PO7, PO12
	CO4	Learn Air and water pollution monitoring and control.	PO7, PO6
	CO5	Understand the concept of Land pollution origin and its effects. Also to understand Noise pollution; Noise classification and its sources.	PO1, PO7, PO12
4th Semester ME			
Theory of Machine / ME 401	CO1	Design various types oflinkage mechanism for obtaining specific motion and analyze them foroptimal functioning.	PO3
	CO2	Understand the kinematics and rigid-body dynamics of kinematicallydriven machine components	PO1
	CO3	Understand the motion of linked mechanism in terms of the displacement,velocity and acceleration at any point in a rigid link	PO1, PO2
	CO4	Understand the kinematics of gear trains	PO1
Applied Thermodynamics / ME 402	CO1	Understanding of various practical power cycles and eat pumpcycles.	PO1
	CO2	Analyze energy conversion in various thermal devices such as combustors, air coolers, nozzles, diffusers, steam turbines and reciprocating compressors.	PO2, PO7
	CO3	Able to understand phenomena occurring in high speed compressibleflows.	PO1
Manufacturing Process – I / PE 401	CO1	Select and apply appropriate manufacturing techniques, processes, resources and tools to produce simple and complex components with an understanding of the limitations of techniques/processes.	PO5
	CO2	Understand the impact of manufacturing processes on society and environment and demonstrate the engineering knowledge to design processes to reduce the harmful impact on society and environment.	PO7, PO6
	CO3	Demonstrate knowledge and understanding of engineering and manufacturing science processes and apply these processes to one's own work as a member and leader in a team to manage processes.	PO11
	CO4	Develop the ability to apply manufacturing science and engineering and develop the interest for life- long learning in the context of changing technology.	P12
	CO5	Understand the different conventional and unconventional manufacturing methods employed for making different products Objectives.	PO7, PO11
Electronics	CO1	Identify function of electronics component, digital multimeter, cathode ray oscilloscope, LDR and integrated circuits.	PO1, PO2, PO3, PO4, PO10, PO12

and Instrumentation Engineering / EC 404	CO2	Familiar with semiconductor devices which are capable to use abstraction in order to analyse and design simple electronic circuit.	PO1, PO2, PO3, PO4, PO5, PO10, PO11, PO12
	CO3	Acquire knowledge about switching theory, Boolean algebra and different minimization techniques.	PO1, PO2, PO3, PO4, PO5, PO6, PO9, PO10, PO11, PO12
	CO4	To provide ideas about the static and dynamic characteristics of an instrument. The course emphasizes on understanding the practical applications and implementations of the electronic instruments with the help of theoretical concepts.	PO1, PO2, PO3, PO4, PO7, PO10,PO12
	CO5	To understand the fundamental concepts of communication systems and compare different analog modulation and frequency modulation schemes.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO10, PO11, PO12
Engineering Economics EN 401	CO1	Understanding of concepts and principles of engineering economy and to develop proficiency with methods for making rational decisions regarding problems	PO1, PO3
	CO2	Understand and analyse various costs occurring in an organization.	PO1, PO2
	CO3	Understand various pricing policies of the products of the industry.	PO1
	CO4	Aware of the meaning, merits and demerits of privatization and globalization ofIndian economy.	PO1, PO12
	CO5	Understand the elementary concept of VAT,GATT, WTO and TRIP	PO12
5th Semester ME			
Heat Transfer / MEC 501	CO1	Able to formulate and analyze aHeat transfer problem involving any of the three modes of heat transfer.	PO1, PO2
	CO2	Obtain exact solutions for the temperature variationusing analytical methods where possible or employ approximate methods orempirical correlations to evaluate the rate of heat transfer	PO3, PO4
	CO3	Able to design devices such as heat exchangers and also estimate Theinsulation needed to reduce heat losses where necessary	PO3, PO7
Design of Machine Elements / MEC 502	CO1	Get an overview of the design methodologiesemployed for the design of various machine components.	PO1, PO4
	CO2	Develop strong background in mechanics of materials based failure criteria underpinning thesafety-critical design of machine components.	PO2, PO7
	CO3	Understanding of the origins, nature and applicability of empirical design principles,based on safety considerations.	PO1, PO7
	CO4	Appreciate the relationships between component level design and overallmachine system design and performance.	PO1, PO2
	CO1	Understand the basics of IC Engines and familiarize with the	PO1, PO12

Internal Combustion Engines / MEC 503		terminology associated with them.	
	CO2	Understand Combustion and various parameters and variables affecting it in varioustypes of IC Engines.	PO1, PO2
	CO3	Learn about various systems used in IC Engine required for various applications.	PO1, PO2
	CO4	Have knowledge of different parameters influence the operation characteristics of IC engines.	PO1, PO2
	CO5	Understanding the function of fuel combustion of IC Engines.	PO1
	CO6	Develop knowledge of designing and modifying the OIC Engines.	PO3
Industrial Robotics / MEC 504	CO1	Understand the basic components working methodology of Robotics and Automation.	PO1, PO5
	CO2	Write the program for Robot for various applications to perform tasks in industrial applications.	PO2, PO5
	CO3	Differentiate types of Robots and Robot grippers.	PO1
	CO4	Analyse forces in links and joints of a Robot.	PO2
	CO5	Design intelligent robots using sensors.	PO3
Project Management / MEC 507	CO1	Understand the importance of projects and its phases, principles and processes.	PO1, PO11
	CO2	Analyze projects from marketing, operational and financial perspectives.	PO2, PO11
	CO3	Evaluate projects based on discount and non-discount methods.	PO2, PO11,PO12
	CO4	Develop network diagrams for planning and execution of a given project.	PO1, PO3, PO9, PO11
	CO5	Apply crashing procedures for time and cost optimization.	PO1, PO11
6th Semester ME			
Solid Mechanics / ME 601	CO1	Understand the mathematical and physical principles of Solids.	PO1, PO2
	CO2	Understand the linear continuum behavior of solids.	PO1, PO4
	CO3	Understandthefunctionofeachautomobilecomponent andalsohaveaclearideaabouttheoverallvehicleperformance.	PO1, PO4
Automobile Engineering / ME 602	CO1	Explain and compare the construction, working, feature, relative merits and application of different types of chassis, bodies, frames, clutches and brakes of automobile and use suitable diagram to support their description.	PO1, PO5, PO6
	CO2	Explain construction, working and features of different elements of power transmission in automobile namely gear boxes, fluid coupling, hydraulic torque convertor, overdrive, front and rear wheel drive, propeller shaft, differential, power transmission through rear and front axle and automatic transmission system.	PO1, PO5, PO6, PO7
	CO3	Explain the concept of steering geometry including camber/ caster, king pin inclination, toe in/Toe out, tyre threads and	PO1, PO5, PO6, PO7

		retreading, causes of tyre wear and tear, construction and features of different types of tyres, wheels, steering mechanism and suspension systems with neat sketches as required.	
	CO4	Explain the construction, features and working of automotive electrical and electronics systemof an automobile and their different parts, namely battery, alternator, starter, ignition systems, Electric wiring, head lamps and electric horn	PO1, PO5, PO6, PO7
Design of Transmission System / ME 603	CO1	Learn about the design procedures for mechanical power transmissioncomponents.	PO1, PO3
	CO2	Able to design transmission systems for engines and machines.	PO2, PO3
Computer Aided Design / ME 604	CO1	Use computer and CAD software for modeling mechanicalcomponents.	PO1, PO5
	CO2	Draw different types of curves in2D.	PO1, PO2, PO5
	CO3	Draw different types ofsurface.	PO1, PO2, PO5
	CO4	Draw solidmodeling.	PO1, PO2, PO5
	CO5	Assemble different partmodeling.	PO1, PO2, PO5
Machine Tool Design / MEO 609	CO1	Understand the basic motions involved in a Machine Tool.	PO1
		Design machine Tool structures.	PO3
		Design and analyse systems for specified speeds and feeds.	PO2, PO3, PO6
		Select subsystem for achieving high accuracy in machining.	PO1, PO3, PO6
		Understand Control strategies for machine tool operations.	PO1
7th Semester / ME 701			
Automation in Manufacturing / MEC 701	CO1	Understand the importance of automation in the of field machine tool based in manufacturing.	PO1, PO5
	CO2	Get the knowledge of various elements of manufacturing automation – CAD/CAM,sensors, pneumatics, hydraulics and CNC.	PO1, PO2, PO5
	CO3	Understand the basics of product design and the role of manufacturing automation	PO2, PO3
Refrigeration and Air conditioning / MEP 702	CO1	Have knowledge and familiarize with the terminology associated with refrigeration systems and air conditioning.	PO1, PO2
	CO2	Have a good understanding of the working principles ofrefrigeration and air-conditioning systems and processes.	PO1, PO2
	CO3	Understand the basics of psychrometry and practice of applied psychometrics.	PO1, PO2
	CO4	Acquire the skills required to model, analyse and design	PO1, PO2,

		different refrigeration as well as airconditioning processes and components.	PO3
Power Plant Engineering / MEP 705	CO1	Understand power plants and the associated energy conversion issues.	PO1, PO7, PO12
	CO2	Understand the principles of operation for different power plants and their economics.	PO1, PO7, PO11
Mechanical Vibration / MEO 708	CO1	Understand the causes and effects of vibration in mechanical systems.	PO1, P2
	CO2	Develop schematic models for physical systems and formulate governing equations ofmotion.	PO2, PO3
	CO3	Understand the role of damping, stiffness and inertia in mechanical systems.	PO1
	CO4	Analyze rotating and reciprocating systems and compute critical speeds.	PO2
	CO5	Analyze and design machine supporting structures, vibration isolators and absorbers.	PO2, PO3
Technology Management / MEP 715	CO1	Use technology to design and develop products and Servicesthat maximize customer satisfaction on the one hand, while maximizing corporateproductivity,profitability and competitiveness on the other.	PO1, PO3, PO9
	CO2	Addresses challenging questions of what technologies do we need and when?	PO1, PO5
	CO3	Able to analyse and decide whether to procure the technology or develop with our own research capabilities	PO2, PO3
8th Semester ME			
No Theoretical Course, only Project			

Programme Outcomes (POs) of Science & Humanities

After the completion of the course the students will be able to

PO1 - Apply the knowledge of basic sciences such as mathematics, physics, and chemistry to understand the fundamentals of engineering and to solve complex engineering problems.

PO2 -Communicate effectively on various topics and issues of engineering and technology with regard to the traditional and innovative outputs.

PO3 - Develop communication skills, e.g., listening, speaking, writing and reading with proper elegance.

PO4 -Write various kinds of write-ups: Business letter writing, Academic writing and administrative writing

PO5 - 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.

PO6 - Develop a positive attitude towards learning the subjects of study in depth.

PO7 - Apply the skills and knowledge in using appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusions.

PO8 - Learn how to investigate complex problems and use research-based knowledge to come to valid conclusions.

PO9 - Improve the quality of environment and maintain it by employing the cleaner technology to protect the environmental degradation.

PO10 - Have the skills needed to be able to function successfully in their respective field.

PO11 - Acquire analytical ability and skills to solve problems of their fields and develop more practical solutions to them.

PO-12 Develop the civic sense in order to evolve code of conduct in the social and professional life

Science and Humanity (Common for all Branches in 1st. Year)			
Course Name / Course Code	**COs**	**Course Outcomes (COs)**	**Attainment of POs**
Physics-I (All Branch) /BSC101	CO-1	Student to get familiarize with the knowledge harmonic oscillation and wave optics which is applicable all the Engineering background.	PO-1,PO-6, PO-8
	CO-2	To make students familiar with the basic concept of optics like; Interference, Diffraction and polarization and their uses in various technological aspects.	PO-1,PO-6, PO-8, PO-11
	CO-3	To get familiarized with the vector calculus this is applicable in all the Engineering fields.	PO-1, PO-11
	CO-4	Demonstrate Knowledge and understanding the basic of electrostatic, magnetism and electromagnetic field theory in free space as well as in material medium.	PO-1, PO-6, PO-8
	CO-5	Students will get confidence in the field of Advance communication system, transmission line, Optical fiber communication, and Satellite Communication etc.	PO-1, PO-6, PO-8, PO-10
Math-I (CSE) /BSC103	CO-1	**Successive differentiation** After undergoing this course the students will be able To find the derivatives of higher orders of a function of a single variable. Also to find the higher order derivatives of the product of two functions.	PO-6 PO-7
	CO-2	**Partial Differentiation:** To find partial derivatives of functions of two variables that is used to find extreme values of a function of two variables i.e., to estimate maxima and minima of multivariable functions. To expand a function of a single and two variables in Taylors and Maclaurin's Series.	PO-1, PO3, PO-6
	CO-3	**Integral calculus:** To learn the basics of integration and different kinds of integrals proper and improper. To use the idea of reduction formula in integration. To utilize the concept of integration in finding length, area and volume.	PO-1, PO7
	CO-4	**Vector spaces:** To understand the geometry and algebra of a system of linear equations. To study the abstract algebraic concepts intertwining geometric ideas and understand the fundamental notions of vector spaces such as linear dependence, basis and dimension and linear transformations on these spaces have to be studied thoroughly. To relate matrices and linear transformations with vector space To learn properties of inner product spaces and determine	PO-1, PO-8

		orthogonality in inner product spaces.	
	CO-5	**Matrices:** To solve problems of engineering domain in which system of equations occurs. Matrices and its properties are used to find the solution of a system of equations by using the concept of rank of a matrix and elementary transformations. To identify the special properties of a matrix such as the Eigen values, Eigen vectors, diagonal form. To use matrices as a tool of linear algebra and to apply the knowledge of consistency/inconsistency of a linear system.	PO-1, PO7, PO-8
Math-I (CE, ECE, ME & EEE) /BSC103	CO-1	**Successive differentiation** : To find the derivatives of higher orders of a function of a single variable. Also to find the higher order derivatives of the product of two functions.	PO-1, PO-6 PO-7, PO-11
	CO-2	**Partial Differentiation:** To find partial derivatives of functions of two variables that is used to find extreme values of a function of two variables i.e to estimate maxima and minima of multivariable functions. To expand a function of a single and two variables in Taylors and Maclaurin's Series.	PO-1, PO7, PO-6, PO-11
	CO-3	**Integral calculus:** To learn the basics of integration and different kinds of integrals proper and improper. To use the idea of reduction formula in integration. To utilize the concept of integration in finding length, area and volume.	PO-1, PO2, PO-7
	CO-4	**Matrices:** To solve problems of engineering domain in which system of equations occurs. Matrices and its properties are used to find the solution of a system of equations by using the concept of rank of a matrix and elementary transformations. To identify the special properties of a matrix such as the Eigen values, Eigen vectors, diagonal form. To use matrices as a tool of linear algebra and to apply the knowledge of consistency/inconsistency of a linear system	PO-1, PO2, PO-7, PO-8
	CO-5	**Ordinary Differential Equations:** To recognize differential equations that can be solved by each of the three methods – direct integration, separation of variables and integrating factor method – and use the appropriate method to solve differential equationsand exact differential equation. Toexplain the meaning of general solution of a differential equation and to solve first-order ordinary differential equations such as linear differential equation and Bernoulli differential. To study the abstract algebraic concepts intertwining geometric ideas. The fundamental notions of vector spaces viz linear dependence, basis and dimension and linear transformations on these spaces have to be studied thoroughly.	PO-1, PO2, PO-7, PO-8
	CO-6	**Infinite series: :** To know the meaning of sequence and series and their convergence. To learn different methods for knowing convergence and	PO-1, PO-6

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		divergence of some basic series.	
English (All branch) / HSMC101	CO-1	To make students familiar with the basic rules of English Grammar.	PO3, PO5, PO-10
	CO-2	To make students learn how to write coherent paragraph following the essentials of good paragraph writing.	PO4, PO-5
	CO-3	To enhance the communication skill in students so that they can communicate anywhere and in any situation.	PO-2, PO3. PO5, PO-12, PO-10
	CO-4	To make students equipped with various kind of writings including business letters and related composition.	PO4, PO-12, PO-10
	CO-5	To improve the vocabulary stock of the students consisting of antonyms and synonyms, prefixes and suffice etc.	PO4, PO-12, PO-10
Chemistry-I (All Branch) /BSC102	CO-1	The concept of Atoms and molecules enable the students to understand the basic and fundamental modalities of the Chemistry.	PO-1
	CO-2	The study of spectroscopic technique will equip the student for the analysis of the material (qualitative and quantitative).	PO-7 PO-11
	CO-3	Intermolecular forces and use of free energy demonstrate the complex material activities and enable the students to understand complex process of product formation in the industry.	PO-1 PO-7
	CO-4	Stereo chemistry of molecules signifies the chemical structure which will enhance the understanding of the concept for the formation of medicine.	PO-1, PO-8, PO-9
	CO-5	Polymer chemistry revels the formation of polymer plastic materials for its under usability in t he Industrial, Commercial and Domestic purpose.	PO-1, PO-11
Math-III Semester-III (CSE) / BSC301	CO-1	**Laplace Transform:** To understand the basic concepts of L.T and to find L.T of functions of exponential origin. To recall properties of Laplace transform and use them in finding transforms of given functions. To use Laplace transform method to solve ordinary and partial differential equations with initial.	PO-1,PO-6, PO-7,PO-11
	CO-2	**Numerical Methods:** To estimate the value of an unknown function and its derivatives from a tabulated data by various Methods such as interpolation, extrapolation. To solve some mathematical problems in engineering sciences with the best approximations. To fit a curve to the data by using different methods of interpolation as well as extrapolation.	PO-1,PO-6,PO-7, PO-8,
	CO-3	**Fourier Series &Fouier Transform:** To apply this to solve a p.d.e; so that they can use it in solving wave equations and various Engineering problems. To view signals in different domains. To break a waveform (function or signal) into an alternative	PO-1, PO-7, PO-8, PO-11,

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		representation in which Sine and Cosines are used.	
	CO-4	Z-Transform: To convert a time domain into frequency domain as it deals with discrete data sequences To apply it for the manipulation of discrete data sequences.	PO-1, PO-7, PO-11
	CO-5	Probability & Statistics: To investigate the relationship between two quantitative variables as per their strength and to express the relationship in the form of an equation. To approximate a larger population on characteristics relevance to the research question so as to make it convenient for inferences about the larger population. To draw graphical picture of data for the analysis of information contained in the data.	PO-7, PO-8, PO-11
Math-III Semester-III (ME, CE, EEE & ECE) /BSC301	CO-1	**Laplace Transform:** To understand the basic concepts of L.T and to find L.T of functions of exponential origin. To recall properties of Laplace transform and use them in finding transforms of given functions. To use Laplace transform method to solve ordinary and partial differential equations with initial.	PO-1,PO-6, PO-7, PO-11
	CO-2	**Fourier Transform:** To apply this to solve a p.d.e; so that they can use it in solving wave equations and various Engineering problems. To view signals in different domains. To break a waveform (function or signal) into an alternative representation in which Sine and Cosines are used.	PO-1,PO-6, PO-8, PO-11
	CO-3	**Z-Transform:** To convert a time domain into frequency domain as it deals with discrete data sequences To apply it for the manipulation of discrete data sequences.	PO-1,PO-7, PO-11
	CO-4	**Partial differential equations:** To explain the meaning of a solution of a p.d.e and determine the type of p.d.e. To solve IVP and BVP. Heat Equation (parabolic p.d.e), Wave Equation (Hyperbolic). Laplace Equation (Elliptic) To find the solution of a differential equation by Separation of variable method in the form of sum or product of functions.	PO-1, PO-7, PO-8, PO-11
	CO-5	**Numerical Methods:** To estimate the value of an unknown function and its derivatives from a tabulated data by various methods such as interpolation, extrapolation. To solve some mathematical problems in engineering sciences with the best approximations To fit a curve to the data by using different methods of interpolation as well as extrapolation.	PO-1, PO-7, PO-6, PO-8, PO-11

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