TSSM's

PadmabhooshanVasantdadaPatil Institute of Technology, Bavdhan, Pune-21

Course Outcomes

Department of First Year Engineering:

Semester –I

CO of the Course "Engineering Mathematics-I"	
CO1	Explain the solution of system of linear equations by matrix method, orthogonality of linear transformation and Eigen values, Eigen vectors, essential in various engineering problems
CO2	Explain the solution of algebraic equation by De-Movires theorem and separate functions of complex variable into real and imaginary parts.
CO3	Explain convergence and divergence of an infinite series and find nth derivative of product of functions by Leibnitz's theorem.
CO4	Find Taylor's and Maclaurian series expansion of differentiable functions and evaluate the limit of indeterminate forms using L'Hospital Rule
CO5	Find Partial and Total derivative of functions of several variables
CO6	Apply the concept of Partial and Total derivative to find stationary values, error and approximate values of function. Also, examine functional dependency by Jacobian.
CO of the Course "Engineering Physics"	
CO1	To Explain the basic concept to resolve many engineering and technological problem
CO2	To utilize different methodologies to analyze problems in engineering
CO3	To Utilize different techniques for measurement, calculation, control and analysis of engineering problems.
CO4	To apply knowledge of physics for recent trends and advances in technological development.
CO5	To explain physical properties of different materials over micro and nanoscale level.
CO6	To apply basic knowledge of physics for developing mathematical and analytical abilities to solve engineering problems with high precision.
CO of the Course "Engineering Chemistry"	
CO1	Student will be able to apply different methodologies for analysis of water, techniques for softening of water and concept of green chemistry in synthesis of various chemical compounds
CO2	Student will be able to utilize analytical methods for analysis of various chemical compounds.
CO3	Student will be able to identify different types of polymer, their preparation methods, properties and applications in various fields.
CO4	Student will be able to analyze quality of fossil and derived fuels on the basis of their composition.
CO5	Student will be able to explain the importance of carbon and hydrogen compounds in the development of modern technologies.
CO6	Student will be able to explain causes for corrosion and its preventive methods
CO of the Course "Basic Civil and Environmental Engineering"	
CO1	To understand role of civil engineers in different areas of civil engineering with interdisciplinary approach.
CO2	To study different construction materials and components of a structure
CO3	To study different types of maps and modern surveying tools and techniques.
CO4	To understand concept of environment and the role of civil engineers in sustainable development
CO5	To study various principles of building planning and concept of green building
CO6	To classify energy and environmental pollution
CO of the Course "Basic Electronics Engineering"	

CO1	Describe electronic circuits like rectifier, filter, voltage regulator,clipper,clamper.
CO2	Explain the concept of biasing, configuration and application of BJT.
CO3	Summarize parameters and applications of operational amplifier.
CO4	Discuss logic gates and its applications
CO5	Describe and differentiate various power devices and transducers
CO6	Discuss importance of electronic communication system with different transmission media and modulation techniques such as AM and FM
CO of the Course "Basic Electrical Engineering"	
CO1	Demonstrate and measurement of resistance with the variation of temperature, importance of insulation resistance, classification and evaluation of energy consumption through energy conversion
CO2	Summarize the fundamentals of electromagnetism, compare electrical and magnetic circuit, and make use of magnetic circuit concepts to solve the numerical
CO3	Apply the concepts of electromagnetic induction to analyze the principle of transformer and summarize the concepts of electrostatics.
CO4	Extend the concept of electromagnetic induction for generation of ac and its representation for practical analysis of ac circuits
CO5	Illustrate the concepts of single and three phase ac circuits along with the phasor diagrams
CO6	Simplify the networks and provide the solution by applying Kirchhoff's laws and theorems
CO of the Course "Engineering Graphics"	
CO1	Identify reference, principal, auxiliary planes and utilize fundamentals of engineering drawing to draw and interpret projection of lines
CO2	Apply concept of reference and auxiliary plane method for projection of different shapes of planes.
CO3	Apply concepts of projections to draw the projections of solids resting on horizontal planes
CO4	Apply basics of engineering drawing to draw various types of engineering curves and development of lateral surfaces of solids
CO5	Identify and draw orthographic views of given pictorial view.
CO6	Perceive two dimensional engineering drawings for imagining and constructing three dimensional engineering drawing.
CO of the Course "Fundamentals of Programming Language-I"	
CO1	Explain Fundamentals of computer, open source operating system, software development life cycle and use of different program planning tools
CO2	Illustrate basics of C programming language
CO3	Design and develop programs using control structures and pointers.
CO4	Design and develop program using advanced 'C' concepts.
Department of First Year Engineering:	
Semester –II	
CO of the Course "Engineering Mathematics-II"	
CO1	Understand the concept of differential equation and various methods of solution of first order first degree Differential equation
CO2	Modeling and evaluation of various physical system: Newton's law of cooling, Electrical circuits, rectilinear motion, mass spring system, heat transfer etc
CO3	To find Fourier series of continuous and discrete system and to evaluate integrals using advanced techniques such as reduction formulae.
CO4	To evaluate integrals using advanced techniques such as Beta-Gamma function and Error function and trace the approximate shape of curves and measure the arc length of various Curves
CO5	Find equation of sphere, cone and Cylinder
CO6	Find area, volume, mean and RMS values, mass, moment of inertia and centre of gravity using multiple integrals
CO of the Course "Engineering Mechanics"	
CO1	Able to classify & analyze the force system.
CO2	Able to find the position of C.G. & centroid of various geometrical figures
CO3	Able to analyze rectilinear & curvilinear motions with constant & variable acceleration & its applications

CO4	Able to apply equilibrium equations for co-planar & non-coplanar forces
CO5	Able to analyze various two force members & to apply coulombs law of friction to various engineering problems
CO of the Course "Fundamentals of Programming Language-II"	
CO1	Design program involving structure and union
CO2	Apply the concept of OOPs in data structure
CO3	Built webpage using HTML
CO4	Use modern engineering tool to develop Android app
CO5	Develop skill to program for embedded system
CO of the Course "Basic Mechanical Engineering"	
CO1	To acquire the knowledge of mechanical engineering.
CO2	Identify the scope of mechanical engineering with multi disciplinary industries
CO3	Identify the common machine elements with their functions and applications
CO4	To evaluate the concept of design and steps involved in design process
CO5	To identify different manufacturing processes
CO6	To specify conventional machine tools and identify basic operations on the machines
CO7	To know the basic concepts of thermodynamics applied to industrial applications
CO8	To know laying principles of energy conservation and conversion of energy
CO9	To identify different power producing devices and power consuming devices
Department of Mechanical Engineering	
Semester –I	
CO of the Course "Engineering Mathematics-III"	
CO1	Solve higher order linear differential equations and its applications to modeling of mass spring systems with free and forced Damped and Un-damped systems
CO2	Use Laplace Transform and Fourier transform techniques to solve differential equations involved in vibration theory, heat transfer and related engineering applications
CO3	Apply statistical methods and regression analysis in analyzing and interpreting experimental data, testing of hypothesis and probability distributions
CO4	Apply concept of vector differential calculus to fluid mechanics and various engineering applications.
CO5	Apply knowledge of vector integral calculus to fluid mechanics and various engineering applications
CO6	Solve various partial differential equations like one dimensional diffusion and wave equations, one and two dimensional heat equations
CO of the Course"Strength of Material"	
CO1	Apply knowledge of mathematics, science for engineering applications
CO2	Design and conduct experiments, as well as to analyze and interpret data
CO3	Design a component to meet desired needs within realistic constraints of health and Safety
CO4	Identify, formulate, and solve engineering problems
CO5	Practice professional and ethical responsibility
CO6	Use the techniques, skills, and modern engineering tools necessary for engineering Practice
CO of the Course "Material Science"	
CO1	Explain the mechanism of plastic deformation
CO2	Understand the basic concepts and properties of Material, material fundamental and processing
CO3	Define the mechanical properties of materials and conduct destructive and non destructive tests to evaluate and test the properties of materials

CO4	Select proper metal, alloys, nonmetal and powder metallurgical component for specific requirement
CO5	Detect the defects in crystal and its effect on crystal properties. Evaluate the different properties of material by studying different test
CO6	Recognize how metals can be strengthened by cold-working and hot working
CO7	Draw and explain equilibrium diagrams for various alloy systems
CO8	Understand various strengthening mechanisms
CO9	Describe various pyrometers with a neat sketch and explain their working and application
CO10	Understand corrosion and suggest various means to prevent corrosion
CO11	Explain various aspects of powder metallurgy
CO of the Course "Engineering Thermodynamics"	
CO1	Apply various laws of thermodynamics to various processes and real systems
CO2	Apply the concept of Entropy, Calculate heat, work and other important thermodynamic properties for various ideal gas processes
CO3	Estimate performance of various Thermodynamic gas power cycles and gas refrigeration cycle and availability in each case
CO4	Estimate the condition of steam and performance of vapour power cycle and vapour compression cycle.
CO5	Estimate Stoichiometric air required for combustion, performance of steam generators and natural draught requirements in boiler plants.
CO6	Use Psychromertic charts and estimate various essential properties related to Psychrometry and processes
CO of the Course "Manufacturing Process-I"	
CO1	Understand and analyze foundry practices like pattern making, mold making, Core making and Inspection of defects
CO2	Understand and analyze Hot and Cold Working, Rolling, Forging, Extrusion and Drawing Processes
CO3	Understand different plastic molding processes, Extrusion of Plastic and Thermoforming
CO4	Understand different Welding and joining processes and its defects
CO5	Understand, Design and Analyze different sheet metal working processes
CO6	Understand the constructional details and Working of Centre Lathe
CO of the Course "Theory of Machine-II"	
CO1	Explain spur gear theory which will be prerequisite for gear design.
CO2	Find center distance, virtual no. of teeth, efficiency, tooth force, torque transmitted by helical, bevel, worm & worm gear.
CO3	Find torque transmitting capacity in gear trains which will be the prerequisite for gearbox design
CO4	Compare cam profile for different follower motion
CO5	Explain synthesis of the mechanism.
CO6	Explain Step less regulation and mechanism for system control - Gyroscope
CO of the Course "Metrology and Quality Control"	
CO1	Understand the methods of measurement, selection of measuring instruments / standards of measurement, carryout data collection and its analysis.
CO2	Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design
CO3	Understand and use/apply Quality Control Techniques/ Statistical Tools appropriately
CO4	Develop an ability of problem solving and decision making by identifying and analyzing the cause for variation and recommend suitable corrective actions for quality improvement.
CO of the Course "Heat Transfer"	
CO 1	Analyze the various modes of heat transfer and implement the basic heat conduction equations for steady one dimensional thermal system.
CO 2	Implement the general heat conduction equation to thermal systems with and without internal heat generation and transient heat conduction.
CO 3	Analyze the heat transfer rate in natural and forced convection and evaluate through experimentation investigation.
CO 4	Interpret heat transfer by radiation between objects with simple geometries.

CO 5	Analyze the heat transfer equipment and investigate the performance.
CO of the Course "Design of Machine Element-I"	
CO 1	Ability to analyze the stress-strain, of Machine Elements to understand, identify, quantify the failure modes.
CO 2	Ability to Design Power Screw for Various Applications.
CO 3	Ability to design fasteners and welded joints subjected to different loading conditions.
CO 4	Ability to design various Springs for strength and stiffness.
CO 5	Select standard data and components by using Design Data Books, Codes and Standards for avoiding failure of machine components.
CO of the Course "Turbo Machinery"	
CO1	Classify turbo machines along with its applications and discuss impulse momentum principle to evaluate performance parameters for flat, inclined plate, curved vane and series of vanes.
CO2	Analyze impulse water turbine with design aspects, selection criteria, performance parameters and characteristics for its use in hydroelectric power plant
CO3	Differentiate reaction water turbines, draft tube types, governing mechanism, with design aspects, selection criteria and determine performance parameters and characteristics
CO4	Discuss steam nozzle, impulse, and reaction steam turbine with governing mechanism, selection criteria, losses and evaluate performance parameters for its use in thermal power plant.
CO5	application.
CO6	Discuss the construction and working of centrifugal and axial flow compressor with its analysis.
CO of the Course "Dynamic of Machinery"	
CO1	Implement balancing technique to complete balancing of rotating & reciprocating masses in multi cylinder inline & radial engines.
CO2	Express the fundamentals of vibrations and estimate natural frequencies for single DOF un-damped and damped free vibratory systems.
CO3	Formulate analytical competency to judge the response to forced vibrations due to harmonic excitation, base excitation and excitation due to reciprocating and rotary unbalance
CO4	Formulate mathematical model and estimate natural frequencies, mode shapes (Eigen values and Eigen vectors) for DOF undamped free longitudinal and transverse vibratory systems.
CO5	Choose suitable vibration measuring instrument for industrial / real life applications and select suitable method for vibration control
CO6	Interpret noise, its measurement and reduction techniques for industry and day to day life problems
CO of the Course "CADCAM and Automation"	
CO1	Discuss Concept of computer graphics and find the transformations for 2 dimensional elements.
CO2	Explain Analytically different types of curves, surfaces and solids and modeling the same for 2D/3D conditions.
CO3	Analyze conditional safety of given component using FEA.
CO4	Select CNC machine and develop CNC Part program for given work piece.
CO5	Explain the Rapid Prototyping as advancement in manufacturing and its relation with software's and CAD modeling.
CO6	Explain industrial automation in view of Robotic system, CIM, CAPP.
CO of the Course "Operation Research"	
CO1	Illustrate the need to optimally utilize the resources in various types of industries
CO2	Apply and analyze mathematical optimization functions to various applications
CO3	Demonstrate cost effective strategies in various applications in industry
CO4	Analyze the Dynamic and integer programming and apply them for arriving at optimal decisions
CO of the Course "Refrigeration and Air Conditioning"	
CO1	Demonstrate the fundamental Principles of Thermodynamics and working principal of R.A.C. methods
CO2	Analyze the performance of the different Refrigeration cycle using P-h chart & property table & select appropriate for application.
CO3	Select the appropriate refrigerant with respect to properties, application & environmental issues by comparative study.

CO4	Analyze & Design appropriate air-conditioning system for any application
CO5	Illustrate and analyze the principles and working of various equipment & safety controls & select in RAC system
CO6	Demonstrate duct system design methods by solving simple numerical.
CO of the Course "Energy Audit and Management"	
CO1	Carry out Energy Audit of the residence / society / college where they are studying
CO2	Carry out electrical tariff calculation and accurately predict the electricity bill required for the installation.
CO3	Suggest various methods to reduce energy consumption of the equipment / office / premises
CO of the Course "Advanced Manufacturing Process"	
CO 1	Selection of appropriate manufacturing process for advance components
CO 2	Characterization of work pieces
CO 3	Selection of appropriate measurement techniques in micromachining
CO of the Course "Product Design and Development"	
CO1	Design a sustainable product.
CO2	Develop commercial Product
CO3	Master in new techniques PLM and PDM
Department of Mechanical Engineering	
Semester –II	
CO of the Course "Theory of Machine-I"	
CO1	Identify mechanisms in real life applications.
CO2	Perform kinematic analysis of simple mechanisms.
CO3	Perform static and dynamic force analysis of slider crank mechanism.
CO4	Determine moment of inertia of rigid bodies experimentally.
CO5	Analyze velocity and acceleration of mechanisms by vector and graphical methods.
CO of the Course "Engineering Metallurgy"	
CO1	Describe how metals and alloys formed and how properties change due to microstructure
CO2	Apply core concepts of Engineering Metallurgy to solve engineering problems
CO3	Conduct experiments as well as to analyze and interpret data
CO4	Possess the skills and techniques necessary for modern materials engineering practice
CO5	Recognize how metals can be strengthen by alloying, cold-working, and heat treatment
CO of the Course "Fluid Mechanics"	
CO1	Describe and determine various properties of fluid for operating conditions encountered in fluid engineering problems
CO2	Determine total pressure and couple exerted by static fluid on plane and curved surfaces encountered in dam structures and stability of floating objects.
CO3	Describe various types of flows and their physics and determine velocity, acceleration, stream function and velocity potential at any point in a flow field to recognize conditions of possibility of fluid flows.
CO4	Discuss physics and the governing equations associated with laminar and turbulent flows to analyse and design flow measuring devices and pipe flow system.

CO5	Discuss physics of laminar and turbulent flows in external flow to determine drag and lift forces on surfaces of stationary and moving objects.
CO6	Develop mathematical correlation for complex flow phenomenon in terms of dimensionless parameters.
CO of the Course "Applied Thermodynamics"	
CO1	Classify I.C engines construction and materials used, working principle and explain losses encountered in fuel air and actual cycle.
CO2	Analyze requirements of carburation, stages of combustion in SI engines, theory of abnormal combustion and combustion chambers for SI engine.
CO3	Evaluate fuel injection system, stages of combustion in CI engines, theory of abnormal combustion and combustion chambers for CI engine.
CO4	Evaluate performance of IC engines and results of the tests.
CO5	Explain systems necessary for efficient operation of IC engines and get familiar with emissions, norms and controlling techniques.
CO6	Explain the classification and working of air compressors and evaluate the performance of reciprocating air compressor.
CO of the Course "Elements of Electrical Engineering"	
CO1	Develop the capability to identify and select suitable DC motor / induction motor / special purpose motor and its speed control method for given industrial application.
CO2	Program Arduino IDE using conditional statements
CO3	Interfacing sensors with Arduino IDE
CO of the Course "Manufacturing Process-II"	
CO1	Student should be able to apply the knowledge of various manufacturing processes.
CO2	Student should be able to identify various process parameters and their effect on processes.
CO3	Student should be able to figure out application of modern machining.
CO4	Students should get the knowledge of Jigs and Fixtures for variety of operations
CO of the Course "Design of Machine Element-II"	
CO1	To understand and apply principles of gear design to spur gears and industrial spur gear boxes.
CO2	To become proficient in Design of Helical and Bevel Gear.
CO3	To develop capability to analyze Rolling contact bearing and its selection from manufacturer's Catalogue.
CO4	To learn a skill to design worm gear box for various industrial applications.
CO5	To inculcate an ability to design belt drives and selection of belt, rope and chain drives.
CO6	To achieve an expertise in design of Sliding contact bearing in industrial applications.
CO of the Course "Refrigeration and Air Conditioning"	
CO1	Demonstrate the fundamental Principles of Thermodynamics and working principal of R.A.C. methods
CO2	Analyze the performance of the different Refrigeration cycle using P-h chart & property table & select appropriate for application.
CO3	Select the appropriate refrigerant with respect to properties, application & environmental issues by comparative study.
CO4	Analyze & Design appropriate air-conditioning system for any application
CO5	Illustrate and analyze the principles and working of various equipment & safety controls & select in RAC system
CO6	Demonstrate duct system design methods by solving simple numerical.
CO of the Course "Mechatronics"	
CO1	Identification of key elements of mechatronics system and its representation in terms of block diagram
CO2	Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O
CO3	Interfacing of Sensors, Actuators using appropriate DAQ micro-controller
CO4	Time and Frequency domain analysis of system model (for control application)

CO5	PID control implementation on real time systems
CO6	Development of PLC ladder programming and implementation of real life system.
CO of the Course "Numerical Methods and Optimization"	
CO1	Evaluate the roots of equations and simultaneous equations in engineering applications using iterative approach with minimized error.
CO2	Apply graphical, simplex and Newton's optimization method to solve constrained and unconstrained problems.
CO3	Apply Lagrange's, Newton's forward interpolation method for solving engineering problems, and fit different curves by least square technique.
CO4	Identify significance of numerical integration in engineering problems, and evaluate integration of functions using single and double integration techniques.
CO5	Apply methods encountered in engineering practices to solve ordinary differential equations (ODE) and partial differential equations (PDE).
CO6	Develop programming logic for solving engineering problem using numerical methods.
CO of the Course "Mechanical System Design"	
CO1	The student will understand the difference between component level design and system level design.
CO2	Ability to design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. for the specifications stated/formulated.
CO3	Ability to learn optimum design principles and apply it to mechanical components.
CO4	Ability to handle system level projects from concept to product.
CO of the Course "Power Plant Engineering"	
CO1	Understand global energy scenario, present status and future scope of power generation in India "estimate various costs and performances incorporated with different types of power generation system".
CO2	Explain and analyze thermal power plant system and cogeneration power plant.
CO3	Analyze theoretical aspects, geological considerations and different component of hydroelectric and nuclear power plant with economic consideration.
CO4	Elaborate modern and energy intensive power plant with their typical configuration viz. Diesel and gas turbine power plant.
CO5	Illustrate different types of Non-conventional power plant and their commercialization.
CO6	Explain different electrical instruments used in power plant and describe different environment issues, social aspects and global protocol of pollution control caused due to the advent of power plants.
CO of the Course "Industrial Engineering"	
CO1	Describe different aspect of industrial engineering and productivity improvement techniques.
CO2	Apply different concepts of method study to improve the work content
CO3	describe and analyze techniques of work measurement and time study
CO4	Illustrate different aspect of work system design and production planning control
CO5	Identify various cost accounting and financial management practices applicable in different industries
CO6	Apply concept of engineering economy, ergonomics and industrial safety practices.
CO of the Course "Finite Element Analysis"	
CO1	To explain the fundamentals of FEA pertaining to structural and heat transfer domain.
CO2	To formulate and solve 1D element structural problems involving bars, beams, trusses, frames and steady state heat transfer problems.
CO3	To construct and solve 2D element problems involving triangular, quadrilateral, axi-symmetric, Iso-parametric & higher order elements.
CO4	To evaluate appropriate FEA technique to solve dynamic vibrational problems.
CO5	To demonstrate the use of FEA software applied to solve structural and heat transfer problems.
Department of Civil Engineering	
Semester –I	
CO of the Course "Building Technology and Materials"	

CO1	Students will be able to identify the type of building as per NBC and choose appropriate foundation, DPC, Masonry and scaffolding from the available resources.
CO2	Students will be able to choose and demonstrate the use of new construction techniques as per requirement.
CO3	Students will be able to differentiate all the types of flooring and roofing materials and techniques.
CO4	Students will be able to choose suitable type of door, window , Arches and lintel as per functional requirements of a building.
CO5	Students will be able to demonstrate the construction details of vertical circulation means and protective coating
CO6	Students will be able to identify suitable modern & eco-friendly materials for particular application
CO of the Course "Surveying "	
CO1	Operate and use surveying equipment.
CO2	Draw plan or map of the existing permanent features on the ground.
CO3	Classify the ground features from the map or plan.
CO4	Analyze temporary adjustments and check permanent adjustments of the Theodolite.
CO of the Course "Engineering Mathematics III"	
CO1	Solve higher order linear differential equation using appropriate techniques for analyzing electrical circuits.
CO2	Solve problems related to Numeriacal Methods processing to solve linear equations
CO3	Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data.
CO4	Perform vector differentiation and integration to analyze the vector fields.
CO5	Apply knowledge of vector integral calculus to fluid mechanics and various engineering applications.
CO6	Solve various partial differential equations like one dimensional diffusion and wave equations, one and two dimensional heat equations.
CO of the Course "Strength of Materials"	
CO1	Able to describe the concepts, constituents laws of solid mechanics and Engineering properties of materials.
CO2	Evaluate stresses & strains in a member under axial loading, lateral loading and torsional moments.
CO3	Able to explain concept of strain energy & evaluate stresses and strain developed due to gradual, sudden and impact load.
CO4	Analysis of state of stress & strain at a point in a material and apply theories of failure under combined loading.
CO5	Able toExplain concept of internal forces under lateral load and able to draw SFD & BMD.
CO6	Apply Euler's and Rankine's theory of buckling load to long column and analyze the member subjected to eccentric loading.
CO of the Course "Geotechnical Engineering"	
CO1	Differentiate the different types of soil and their engineering properties and classify them.
CO2	Determine the soil properties in laboratory and develop a proficiency in handling experimental data.
CO3	Understand of the concept of effective stress and its influence on soil behavior.
CO4	Develop an understanding of the influence of water flow on the engineering behaviour of soils.
CO5	Analyze engineering properties like compaction, permeability and soil shear strength.
CO6	Classify soil slopes and identify their modes of failure.
CO of the Course "Hydrology and water resource engineering"	
CO1	Able to describe the hydrologic cycle and analyze the precipitation data.
CO2	Able to explain the stream gauging.
CO3	Able to explain the methods of irrigation and assess the canal revenue.
CO4	Able to describe the ground water hydrology.
CO5	Able to analyze the flood frequency and runoff hydrograph.

CO6	Able to characterize the various terms related to reservoir planning.
CO7	Able to explain the lift irrigation schemes and process of water logging.
CO of the Course "Infrastructure Engineering and Construction Techniques"	
CO1	Identify role of infrastructure engineering in national and global development.
CO2	Explain the different elements of Railways.
CO3	Elucidate different types of construction techniques.
CO4	Illustrate different types of tunneling methods.
CO5	Explain the importance of docks and harbors.
CO6	Describe different types of Earth moving equipments.
CO of the Course "Structural Design-I"	
CO1	Able to explain various philosophy, classify structural steel section, analyze and design of tension member.
CO2	Able to analyze and design compression members along with design of base.
CO3	Able to find flexural strength of steel beams and to design the beams for give loading.
CO4	Able to analyze the loads and their effects on connection and plate girder and design of the plate.
CO5	Able to analyze the loads and their effects on gantry girder and design of the gantry girder.
CO6	Able to design an industrial steel building using I.S. 800:2007
CO of the Course "Structural Analysis-II"	
CO1	Able to explain the basics of configuration, classification and fundamental concepts of structural analysis.
CO2	Able to determine slope and deflection of beams, frames and trusses by applying appropriate method.
CO3	Able to analyse inderminate structure using energy methods, compatibility method.
CO4	Able to draw Influence line diagram for determinate beams, trusses and applications of ILD
CO5	Able to analyse arches for external and internal forces.
CO6	Able to identify plastic behavior of material and perform plastic analysis of indeterminate beams and frames
CO of the Course "Fluid Mechanics II"	
CO1	Able to analyze the basics of flow around submerged bodies, and fundamental concepts of unsteady flow in Fluid Mechanics.
CO2	Able to analyze the basics of flow around submerged bodies, and fundamental concepts of unsteady flow in Fluid Mechanics.
CO3	Able to explain types of flow based on energy depth relationship.
CO4	Able to analyze uniform flow formula and characteristics of hydraulic jump with applications to civil engineering problems.
CO5	Able to explain the impact of jets and working of centrifugal pump.
CO6	Able to explain components of hydropower plants and performance of hydraulic turbines.
CO7	Able to differentiate the GVF profile and its computations in open channel.
CO of the Course "Environmental Engineering II "	
CO1	Able to explain sources, collection, effects, measurements of sewage and storm water and stream self cleaning system.
CO2	Able to explain component of wastewater treatment plant units.
CO3	Able to describe and design unit operation and unit process in wastewater treatment plant and design activated sludge process and trickling filter.
CO4	Able to describe and design low cost treatment methods like oxidation pond, aerated lagoons.
CO5	Able to describe onsite wastewater treatments methods, and anaerobic digester.
CO6	Able to describe industrial wastewater treatment methods.
CO7	Able to draft reports concerned with testing of Wastewater samples and design of various components of wastewater treatment plant including use of software's.

CO of the Course "Transportation Engineering "	
CO1	To discuss historical development, classification and planning of roads in India.
CO2	To understand basic requirements and mechanisms for highway maintenance, drainage, economic, and environment.
CO3	To perform analysis and design of flexible and rigid pavements.
CO4	Understand the various components of airports, planning concepts and air traffic controls.
CO5	Understand the various terms in bridge engineering and its classification.
CO of the Course "Structural Design and Drawing III "	
CO1	Able to describe various systems of prestressing and analyze member strength.
CO2	Able to design Prestressed member for flexure and shear.
CO3	Able to do load calculations and load transfer Phenomenon of structures.
CO4	Able to analyze the frame structure for different load Combinations.
CO5	Able to design and detailing of floor beam in a frame.
CO6	Able to design and detailing of different elements of special structures like retaining walls, liquid retaining structures, combined footings and their behavior under load.
CO of the Course "Architecture and Town Planning"	
CO1	Able to understand the principles, elements and qualities of architecture.
CO2	Able to study objectives , principles of landscaping and sustainable architecture.
CO3	Able to understand necessity of town planning, principles of planning, principles of Architecture and byelaws.
CO4	Able to study development plan, neighborhood plan & Intelligent transport system.
CO5	Able to understand legislative mechanism for preparation of DP and MRTP.
CO6	Able to understand the concept of special township,GIS,GPS with respect to planning.
CO of the Course "TQM & MIS in Civil Engineering"	
CO1	Able to explain the various definition of quality and its interpretations, important of quality in construction.
CO2	Able to explain concept of Quality Manual and Total Quality Management.
CO3	Able to identify Supply chain management and bench marking process.
CO4	Able to explain Management Information Systems (MIS) and decision support system.
CO5	Able o explain Management information system structure based on management and various types of planning.
CO6	Able to explain Concepts of information, planning and control, information based system.
Department of Civil Engineering	
Semester –II	
CO of the Course" Fluid Mechanics I"	
CO1	Able to describe properties of Fluids and perform the dimensional analysis
CO2	Able to analyze the forces applied by fluids at rest, measurement of and apply the principles of floatation and buoyancy to check stability of floating bodies
CO3	Able to describe and analyze the kinematic motion of fluids
CO4	Able to explain fluids dynamics and demonstrate the applications of Bernoulli's Equation
CO5	Able to describe laminar flow and boundary layer theory
CO6	Able to characterize the various properties of Turbulent flow & enlist various attributes of fluid flow through Pipes
CO7	Able to apply fundamental principles of fluid mechanics for the solution of practical civil engineering problems of water conveyance in pipes, pipe networks

CO of the Course "Architectural Planning and Design of Buildings"	
CO1	Able to relate various amenities and services including safety and land use zoning with respect to town planning
CO2	Able to describe the various legal aspects and documentation for township from commencement to completion of project
CO3	Able to apply the principles of architectural planning and design considering features of green building
CO4	Able to recognize safety aspects and components of earthquake resistant structure
CO5	Able to describe different building services and applying knowledge to actual situation.
CO6	Able to draw the architectural drawings by applying building rules and byelaws
CO7	Able to compile ideas and plan residential buildings
CO8	Able to compile ideas and plan public buildings
CO of the Course" Structural Analysis I"	
CO1	Able to explain the basics of configuration, classification and fundamental concepts of structural analysis
CO2	Able to determine slope and deflection of beams, frames and trusses by applying appropriate method
CO3	Able to analyze indeterminate structure using energy methods, compatibility method.
CO4	Able to draw Influence line diagram for determinate beams, trusses and applications of ILD
CO5	Able to analyze arches for external and internal forces
CO6	Able to identify plastic behavior of material and perform plastic analysis of indeterminate beams and frames.
CO of the Course " Engineering Geology"	
CO1	Able to identify the different types of minerals and rocks found on the earth's surface and their modes of formation
CO2	Able to identify various structural features out in the field and explain the theories postulated behind the formation of folded mountains
CO3	Able to explain the historical aspect of geology and the Way Rivers and oceans modify the geomorphology of an area.
CO4	Able to explain various types of surveys, role of remote sensing and GIS in civil engineering
CO5	Able to judge the feasibility of a site as suitable for building dams, reservoirs and tunnels
CO6	Able to explain the effects of various natural disasters such as volcanoes, earthquakes and landslides while working in the field as a civil engineer and judge the feasibility of a stone as a good building stone
CO of the Course" Soft Skills"	
CO1	Able to identify their own goals, strengths and weaknesses and thus their opportunities
CO2	Able to Speak confidently with the correct pronunciation and accurate language, listen to the speaker with utmost attention, write a structured report of the project at hand & write applications and effective resumes
CO3	Able to dress up professionally for any occasion to make a lasting impression
CO4	Able to demonstrate the art of speaking effectively and make others speak, get others involved, work together and reach the conclusion to the problem at hand faster
CO5	Able to work effectively as an associate and not a BOSS
CO of the Course" Concrete Technology"	
CO 1	Able to describe the general perspective ingredients of concrete
CO 2	Able to explain fresh and hardened properties of concrete
CO 3	Able to describe tests of hardened concrete and special types of concrete
CO 4	Able to explain special concreting techniques , equipment and application of Ferro cement in construction industry
CO 5	Able to design concrete mix of various concrete grades
CO 6	Able to describe the behavior and repair of concrete structures under adverse conditions.

CO of the Course" Advanced Surveying"	
CO 1	Able to carry out field geodetic survey and apply triangulation adjustment with modern equipment's
CO 2	Able to perform Geodetic trigonometric leveling
CO 3	Able to perform hydrographic survey and get solution for problems related to it
CO 4	Able to describe aerial photography and applications in civil engineering
CO 5	Able to explain Remote sensing and GIS and its application in civil engineering field
CO of the Course " Project Management and Engineering Economics"	
CO 1	Able to explain the importance, objective, and functions of project management
CO 2	Able to analyze the network for planning and scheduling of project
CO 3	Able to apply project monitoring, resource allocation using project management software's
CO 4	Able to apply a engineering economics in construction industry.
CO 5	Able to apply concept of material management and implement safety norms
CO 6	Able to evaluate project appraisal and prepare project feasibility report and Detailed Project report
CO of the Course " Structural Design II"	
CO1	Able to distinguish different design philosophies of design of R.C structures and analyze the limitations and advantages of each
CO2	Able to apply different limit states for singly and doubly reinforced, balanced beam section and to design one way slabs
CO3	Able to design two way slabs and staircases
CO4	Able to design flexural members.
CO5	Able to design flexural members for shear, bond, torsion and design continuous beam with concept of redistribution of moments
CO6	Discuss the construction and working of centrifugal and axial flow compressor with its analysis.
CO of the Course " Environmental Engineering I"	
CO1	Able to describe sources and effects of noise and air pollution, evaluate its quality as per BIS
CO2	Able to identify a suitable water intake structure, describe water supply scheme and define water demand for a community
CO3	Able to design Aeration and Sedimentation processes with due importance to quality of water as per BIS
CO4	Able to design Coagulation, Flocculation and Filtration processes used for raw water treatment
CO5	Able to describe disinfection, water softening methods, demineralization, adsorption along with fluoridation and defluoridation techniques
CO6	Able to describe Rain water harvesting, packaged Water treatment plant and determine the capacity of ESR.
CO of the Course" Foundation Engineering "	
CO1	Able to execute soil exploration
CO2	Ability to calculate bearing capacity of all type of foundations with respect to soil conditions
CO3	Proficient to analyze consolidation and time rate settlements and able to recognize basic consolidation theory
CO4	Able to classify piles and their uses, and calculate the load carrying capacity
CO5	Able to describe sheet piles and problems associated with BC soil
CO6	Able to evaluate liquefaction potential and explain Geosynthetics and its application
CO of the Course" Dams and Hydraulics Structures"	
CO1	Able to analyze and ,design gravity dam ,earthen dam and check its stability
CO2	Able to explain generalized information regarding dams
CO3	Able to design hydraulic structures

CO4	Able to explain river training methods and design of guide bund
CO5	Able to explain hydropower engineering with respect to its components and functions
CO of the Course" Quantity Surveying, Contracts and Tenders"	
CO1	Able to describe types of estimates and importance of approximate estimate
CO2	Able prepare detailed estimate for Civil Engineering Structures
CO3	Able to draft suitable specifications to meet expectations of client and prepare the rate analysis
CO4	Able to choose suitable method of valuation of property and implement it
CO5	Able to explain execution of works in PWD and tendering.
CO6	Able to illustrate meaning, validity, the conditions and laws of contract
CO of the Course" Construction Management"	
CO1	Able to explain the basics construction management
CO2	Able to implement construction scheduling and illustrate work study and its measurement
CO3	Able to describe labor laws and financial aspects of construction projects
CO4	Able to identify and analyze the risks involved in projects and perform value analysis.
CO5	Able to explain material and human resource management in construction
CO6	Able to explain basic terminologies and applications of artificial intelligence in civil engineering
CO of the Course" Advanced Transportation Engineering"	
CO1	To understand transportation planning and analysis, evaluating transportation alternatives and public transport system.
CO2	To understand concepts of traffic engineering including traffic control, control aids, regulations, highway capacity, and design of intersections
CO3	To understand fundamentals of pavement design and perform design of rigid and flexible pavements using various methods
CO4	To know various road specifications and procedure for mix design
CO5	To understand overlay design and construction
CO6	To understand various construction methods for soil stabilized roads
CO of the Course" Hydropower Engineering"	
CO1	Able to explain various energy resources and analyze hydropower potential
CO2	Able to design components of hydro power plants
CO3	Able to explain various types of turbines and design them
CO4	Able to determine electrical terms and regulations related to hydro power
Department of Electronics and Telecommunication Engineering	
Semester –I	
CO of the Course "Signals and Systems"	
CO1	Understand mathematical description and representation of continuous and discrete time signals and systems.
CO2	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
CO3	Understand and resolve the signals in frequency domain using Fourier series.
CO4	Understand and resolve the signals in frequency domain using Fourier transforms.
CO5	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s- domain.
CO6	Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event

CO of the Course "Electronics Devices & Circuits"	
CO1	Toanalyze and design configuration of JFET circuit and calculate the small signal performance parameters.
CO2	Analyze and implement FET circuits to test the performance.
CO3	Analyze and model MOSFET for small signal at low frequency.
CO4	Understand the concept of MOSFET circuits and CMOS technology.
CO5	Understand and apply concept of feedback to improve stability of circuits.
CO6	Design an adjustable voltage regulator circuits.
CO of the Course "Data Structures and Algorithms"	
CO1	Discuss the computational efficiency of the principal algorithms such as sorting &Searching.
CO2	Write and understand the programs that use arrays & pointers in C
CO3	Describe how arrays, records, linked structures are represented in memory and Use them in algorithms
CO4	Implement stacks & queues for various applications
CO5	Understand various terminologies and traversals of trees and use them for various Applications
CO6	Understand various terminologies and traversals of graphs and use them for Various applications
CO of the Course "Electrical Circuits and Machines"	
CO1	Analyze basic AC & DC circuit for voltage, current and power by using KVL,KCL, and network theorems
CO2	Design and analyze transformers.
CO3	Explain the working principle of different electrical machines.
CO4	To understand & develop the capability to identify and select suitable DC motor /generator &its speed control method for given industrial application.
CO5	To understand & develop the capability to identify and select suitable 3 phase induction motor and its speed control method for given industrial application.
CO6	To understand & develop the capability to identify and select suitable special purpose motor and its speed control method for given industrial application
CO of the Course "Digital Electronics"	
CO1	Use the basic logic gates and various reduction techniques of digital logic circuit in detail
CO2	The ability to analyze understands and designs various combinational and sequential circuits
CO3	To introduce the concept of memories, programmable logic devices and digital ICs
CO4	Understand the architecture and use of microcontrollers for basic operations and Simulate using simulation software
CO of the Course "Microcontrollers"	
CO 1	Recall the basic concepts of microcontroller. Understand architecture, features and instructions of typical 8 bit microcontroller Intel 8051.
CO 2	Apply knowledge of microcontrollers to interface and program simple devices.Understand the application of software and hardware tools.
CO 3	Adapt the concepts of microcontroller to design and develop real world application
CO4	Learn the architecture and features of PIC microcontroller
CO5	Apply knowledge of embedded c programming, interfacing devices and make use of these concepts to develop real world applications.
CO6	Apply knowledge of embedded c programming, interfacing devices and make use of various communication protocols to interface real world devices.
CO of the Course "Digital Communication"	
CO 1	Understand working of waveform coding techniques and analyze their performance.
CO 2	Discriminate & select line code in terms of B W. & bit rate and able to apply concept of synchronization , scrambler & ISI in application
CO 3	Discriminate different random processes and apply its knowledge for designing digital communication system.

CO 4	Describe coherent detection and evaluate error performance of a digital receiver in presence of noise and other interferences.
CO 5	Design & analyze different coherent & non coherent pass band transmission system in terms of probability of error & power spectrum
CO6	Describe the concept of spread spectrum techniques & apply direct sequence spread spectrum & frequency hop spread spectrum in communication system
CO of the Course "Digital Signal Processing"	
CO 1	Understand analysis and processing of digital signal
CO 2	Understand the fast computation of DFT and appreciate the FFT processing
CO 3	Perform time, frequency and Z -transform analysis on signals and systems.
CO 4	Design a digital filter for a given specification of analog filter with warping effect and finite length word effects
CO 5	Design the digital filter from given specification of digital filter using significance of various filter structures
CO 6	Understand the real-world signal processing applications.
CO of the Course "Electromagnetics"	
CO1	Apply and understand the basic mathematical concepts related to electromagnetic vector fields.
CO2	To understand principles of electrostatics to the solutions of problems relating to dielectrics, electric field, boundary conditions and electric energy density.
CO3	Apply principles of magnetostatics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.
CO4	To understand the concepts related to Faraday's law and Maxwell's equations.
CO5	Analyze the transmission line problem, use smith chart for impedance matching
CO6	Discuss the construction and working of centrifugal and axial flow compressor with its analysis.
CO of the Course "Mechatronics"	
CO1	Identification of key elements of mechatronics system and its representation in terms of block diagram.
CO2	Understanding basic principal of Sensors and Transducer.
CO3	Understand concept of actuator
CO4	Able to prepare case study of the system given.
CO of the Course "VLSI Design"	
CO1	Apply Basic knowledge of digital electronics to construct and demonstrate digital system design modules using VHDL coding.
CO2	Recognizing the development of the custom IC using EDA tool and Identify the implementation of reconfigurable computing system using FPGA/CPLD.
CO3	Explain and identify clock distribution and power distribution problem in chip design.Interconnect issues with chip interfacing.
CO4	Design CMOS circuits for specific digital applications.
CO5	Apply knowledge to design Analog CMOS structures to compute area , power and speed.This can be recognizing in mixed signal logic.
CO6	Experiment timing issues to avail certain function execution. To demonstrate different types of testing in IC design and exploring the testing results with standard platform.
CO of the Course "Microwave Engineering"	
CO1	Identify & analyze Microwave l components used for system design.
CO2	Estimate and analyze various parameters of Microwave devices r to solve complex engineering problems.
CO3	Select appropriate measurement devices for efficient measurements of parameters
CO4	Identify and analyze various Microwave Tubes and principle mechanisms to generate microwave signals
CO5	Identify various stripe lines to meet microwave communication
CO6	Design and analyze Scattering Matrixfor Microwave Components
CO of the Course "Digital Image Processing"	

CO1	Explain the concept of digital image processing and perform the basic operations on image
CO2	Compare, analyze and interpret the different image enhancement, filtering and restoration techniques in spatial domain and frequency domain.
CO3	Describe the different image coding and compression techniques.
CO4	Illustrate and imply different image segmentation and morphological techniques.
CO5	Represent and describe images with various descriptors
CO6	Interpret feature and patterns for the descriptors and apply various image analysis methods for image processing applications
CO of the Course "Computer Networks"	
CO1	Understand state-of-the-art in network protocols, architectures, and applications.
CO2	To provide students with a theoretical and practical base in computer networks issues.
CO3	Define the basic terminology of computer networks and Outline the basic network configurations
CO4	Recognize the individual components of the big picture of computer networks
CO5	List the layers of the TCP/IP and OSI model and describe the duties of each layer
CO6	Understand the transmission methods underlying LAN and WAN technologies
CO of the Course "Electronics Product Design"	
CO 1	Understand various stages of hardware, software and PCB design.
CO 2	Importance of product test & test specifications.
CO 3	Special design considerations and importance of documentation
Department of Electronics and Telecommunication Engineering	
Semester –II	
CO of the Course "Control Systems"	
CO1	Model a physical and electrical system and express its input output relationships by means of block diagrams and Signal flow graph.
CO2	Analyze a linear control system in time and frequency domain using graphical methods for stability.
CO3	Model and analyze the control system using state space analysis.
CO4	Introduce the concept of PLC and PID controllers and analyze digital control system using transfer function
CO of the Course "Mathematics"	
CO1	Apply knowledge of higher order linear differential equations to LCR circuits.
CO2	Find Fourier Transform , Inverse Fourier Transform . Find Z transform and Inverse Z transform and apply them to solve difference equations in Linear time invariant system.
CO3	Analyze the data to fit an interpolating polynomial and evaluate numerical integration and differentiation .Find numerical solutions to differential equations.
CO4	Apply concept of vector differential calculus to fluid mechanics and various engineering applications.
CO5	Apply knowledge of vector integral calculus in fluid mechanics and various engineering applications.
CO6	Apply knowledge of Cauchy's Integral Formula to evaluate complex line integrals and to evaluate real integrals by Residue Theorem.
CO of the Course "Analog communication"	
CO1	Explain various components of electronic communication system and describe the various amplitude modulation techniques.
CO2	Analyze the AM radio receiver and evaluate the radio receiver performance parameters.
CO3	Describe the mathematical analysis of FM with frequency spectrum.
CO4	Demonstrate the FM radio receiver and describe the FM detection techniques.

CO5	Analyze performance analysis of analog communication systems in the presence of noise.
CO6	Describe analog pulse modulation and digital pulse modulation techniques.
CO of the Course "Object Oriented Programming"	
CO1	Describe the principles of object oriented programming.
CO2	Apply the concepts of data encapsulation, inheritance in C++.
CO3	Understand basic program constructs in Java
CO4	Apply the concepts of classes, methods and inheritance to write programs Java.
CO5	Use arrays, vectors and strings concepts and interfaces to write programs in Java.
CO6	Describe and use the concepts in Java to develop user friendly program,
CO of the Course "Integrated Circuits"	
CO1	Introduce basic building blocks of an operational Amplifier and identify closed loop configurations of an op-amp..
CO2	Analyze, Design and Implement linear and non-linear applications of an op-amp.
CO3	Distinguish, Formulate and Demonstrate various converters using op-amp.
CO4	Apply the functionalities of PLL to different applications and to memorize the concept of Oscillator.
CO of the Course "Advanced Processor "	
CO 1	Describe the ARM microprocessor architectures and its feature.
CO 2	Interface the advanced peripherals to ARM based microcontroller
CO 3	Design embedded system with available resources.
CO 4	Use of DSP Processors and resources for signal processing applications
CO of the Course "System Programming and Operating System"	
CO 1	Demonstrate the knowledge of Systems Programming and Operating Systems
CO 2	Formulate the Problem and develop the solution for same.
CO 3	Compare and analyze the different implementation approach of system programming operating system abstractions.
CO 4	Interpret various OS functions used in Linux / Ubuntu.
CO of the Course "business Management"	
CO 1	Describe fundamentals of Management thoughts, vital for understanding the conceptual frame work of Management as a discipline.
CO 2	Understand quality assessment tools for project development including analysis of impact of finance factors.
CO 3	Recognize the development, impact of manpower on internal and external environment to promote entrepreneurship.
CO 4	Know about modern ways of managing information for successful business.
CO of the Course "Power Electronics"	
CO1	Identify & analyze different power devices used in power Electronics .
CO2	Design & implement a triggering / gate drive circuit for a power device
CO3	Understand, perform & analyze different controlled converters.
CO4	Working & analysis of controlled rectifiers for different loads
CO5	Design & implement over voltage / over current protection circuit.
CO6	Discuss the construction and working of centrifugal and axial flow compressor with its analysis.

CO of the Course " Information Theory and Coding "	
CO1	Infer source coding theorem, employ source coding techniques in data compression and evaluate entropy, loss of information in channel.
CO2	Define channel capacity, identify error correcting and detecting capabilities and perform error correction using different block codes.
CO3	Describe Galois field and related basics, explain and evaluate cyclic codes and design encoder-decoder circuit.
CO4	Design multiple error correcting codes such as, BCH and RS, explain error control coding techniques and Construct Convolutional codes.
CO5	Understand and apply fundamental principles of data communication and networking.
CO6	Describe and analyze the hardware, software, components of a network and the interrelations. Apply flow and error control techniques in communication networks.
CO of the Course "Mobile communication"	
CO1	Explain and apply the concepts telecommunication switching, traffic and networks.
CO2	Analyze the telecommunication traffic.
CO3	Analyze radio channel and cellular capacity.
CO4	Explain and apply concepts of GSM and CDMA system.
CO of the Course "Broad Band communication"	
CO1	Identify & analyze optical components used for system component design.
CO2	Estimate and analyze various parameters of optical fiber to solve complex engineering problems.
CO3	Select appropriate multichannel system for efficient communication and problem statement design.
CO4	Identify and analyze various launching techniques and orbital mechanisms to get communication system as per engineering norms.
CO5	Identify various satellite subsystems to meet the socio economic challenges.
CO6	Design and analyze satellite link for sustainable satellite communication.
CO of the Course "Soft Computing"	
CO1	Use a new tool /tools to solve a wide variety of real world problems
CO2	Find an alternate solution, which may offer more adaptability, resilience and optimization
CO3	Apply the knowledge of Neural Network to research Problems
CO4	Apply the knowledge of Fuzzy Logic for the simplification of system design problems
CO5	Gain knowledge of soft computing domain which opens up a whole new career option.
CO6	Tackle real world research problems
CO of the Course "Wireless Networks"	
CO1	Keep himself updated on latest wireless technologies and trends in the communication field.
CO2	Understand the transmission of voice and data through various networks.
CO3	Understand the architectures of various access technologies such as 3G, 4G, WiFi etc.
CO4	Understand various protocols and services provided by next generation netwoks
Department of Computer Engineering	
Semester –I	
CO of the Course "Discrete Mathematics"	
CO1	Illustrate concept of set theory, proposition & mathematical induction.

CO2	Discuss the basic concepts associated with relation, functions and their applications.
CO3	Explaining possible outcomes of elementary combinatorial processes such as permutation and combination and calculating the probabilities.
CO4	Explain concept in graph theory &apply algorithm to solve various mathematical problems.
CO5	Illustrate basic terminology in trees & apply algorithms to find minimum spanning tree.
CO6	To identify and prove the properties of groups and rings.
CO of the Course "Digital Electronics and Logic Design"	
CO1	Realize and simplify Boolean Algebraic assignments for designing digital circuits using K-Maps.
CO2	Design and implement Sequential and Combinational digital circuits as per the specifications.
CO3	Apply the knowledge to appropriate IC as per the design specifications.
CO4	Design simple digital systems using VHDL.
CO5	Develop simple embedded system for simple real world application.
CO of the Course "Data Structures and Algorithms"	
CO1	To discriminate the usage of various structures in approaching the problem solution.
CO2	To design the algorithms to solve the programming problems.
CO3	To use effective and efficient data structures in solving various Computer Engineering domain problems.
CO4	To analyze the problems to apply suitable algorithm and data structure.
CO5	To use appropriate algorithmic strategy for better efficiency
CO of the Course "Computer Organization and Architecture"	
CO1	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os and Outline the structure, function and characteristics of Computer system
CO2	Recognize and observe various functional units and describe the components of digital computer and do case studies, documentation of Intel 8086 operation types.
CO3	Identify the elements of modern instruction sets and judge the impact on processor design
CO4	Identify memory hierarchy, its performance and compare different methods for computer I/O and examine Pentium IV
CO5	Compare simple computer architecture and organization based on established performance metrics and Evaluate various design alternatives in processor organization
CO of the Course "Object Oriented Programming"	
CO1	Analyzing the basic concepts of Object Oriented Programming.
CO2	Depicting the features of Object Oriented Programming
CO3	Studying the basic concept of Virtual Function and their use.
CO4	To understand the concept of Templates and Exception Handling
CO5	Study of Files and Streams.
CO6	Illustrate the Standard Template Library.
CO of the Course "Theory of Computation"	
CO1	Design, manipulate, and reason about formal computational models, such as automata and Turing machines
CO2	Identify relations between classes of computational problems, formal languages, and computational models
CO3	Apply mathematical knowledge and logic in solving problems
CO4	Illustrate various Turing machine and related hypotheses
CO5	Analyze deeper and broader concepts of grammar, parsing and push down automata.
CO6	Apply NP-completeness concepts to create proofs regarding the computational complexity of novel problems

CO of the Course "Database Management Systems"	
CO1	Identify structure of database system using data models and design E-R Model for given requirements and convert the same into database tables.
CO2	Describe database techniques such as SQL & PL/SQL.
CO3	Discuss relational model and database design.
CO4	Explain transaction Management in relational database System.
CO5	Describe different database architecture and analyses the use of appropriate architecture in real time environment.
CO6	Use advanced database Programming concepts Big Data – HADOOP
CO of the Course "Software Engineering and Project Management"	
CO1	Decide on a process model for a developing a software project
CO2	Classify software applications and Identify unique features of various domains
CO3	Design test cases of a software system.
CO4	Understand basics of IT Project management.
CO5	Plan, schedule and execute a project considering the risk management.
CO6	Apply quality attributes in software development life cycle.
CO of the Course "Information Systems & Engineering Economics"	
CO1	Understand the need, usage and importance of an Information System to an organization.
CO2	Understand the activities that are undertaken while managing, designing, planning, implementation, and deployment of computerized information system in an organization.
CO3	Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organizations
CO4	Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.
CO5	Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
CO6	Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
CO of the Course "Computer Network"	
CO1	Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies
CO2	Demonstrate design issues, flow control and error control
CO3	Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.
CO4	Demonstrate different routing and switching algorithms
CO5	Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols.
CO6	Illustrate Client-Server architectures and prototypes by the means of correct standards and technology.
CO of the Course "Design and Analysis of Algorithms"	
CO1	Describe the problem solving principles, analyze the asymptotic performance of algorithms and apply recurrence relation, divide and conquer algorithmic design techniques.
CO2	Apply and analyze greedy and dynamic programming algorithmic design techniques.
CO4	Describe computability theory, randomized and approximation algorithms.
CO5	Describe and analyze the parallel and concurrent algorithms.
CO6	Explain the distributed, embedded, Internet of things and algorithms in software.
CO of the Course "Principles of Modern Compiler Design"	
CO1	Explain basic concepts and issues of compiler design, Lexical analysis process and use the knowledge of LEX tool to design the scanner
CO2	Identify the role of parsing and semantic analysis in compiler design, distinguish between different types of parsers, and use YACC tool to design parser

CO3	Describe syntax directed translation and apply the knowledge to develop intermediate code for language constructs.
CO4	Explain and apply knowledge of code generation and code optimization techniques.
CO5	Summarize the concept of language specific compilation and functional languages.
CO6	Experiment compiler tools in basic, concurrent, distributed and embedded environments
CO of the Course "Smart System Design and Applications"	
CO1	Describe fundamental concepts of AI and define rational agent
CO2	Compare the various searching algorithms and apply in game theory.
CO3	Illustrate and represent knowledge and explain various planning techniques
CO4	Compare and Analyze various probability models and summarize decision network.
CO5	Describe various machine learning techniques and develop smart system application.
CO6	Relate machine learning techniques to embedded systems
CO of the Course "Elective-I: Data Mining Techniques and Applications"	
CO1	Understand the basic concepts of Data mining
CO2	Ability to implement concept of frequent patterns and use of Association Rules.
CO3	Analyses different methods of classification.
CO4	Use of Various clustering techniques
CO5	Apply concept of text and web mining
CO6	Explain Reinforcement Learning and Big data mining
CO of the Course "Elective-II: Pervasive Computing"	
CO1	To present a survey on pervasive computing building blocks.
CO2	To create presentations using pervasive computing techniques and devices.
CO3	To solve problems for multi-core or distributed, concurrent/Parallel environments.
Department of Computer Engineering	
Semester –II	
CO of the Course "Software Design Methodologies and Testing"	
CO1	To understand and apply software design methods
CO2	To select and apply architectural design using UML for a given software system
CO3	To choose and apply design patterns
CO4	To understand and apply different software testing models
CO5	To analyzing and apply different software testing strategies
CO6	To design test cases and apply modern software testing tools for client server, Distributed, mobile applications.
CO of the Course "High Performance Computing"	
CO1	To transform algorithms in the computational area to efficient programming code for modern computer architectures
CO2	To write, organize and handle programs for scientific computations
CO3	To create presentation using tools for performance optimization and debugging.
CO4	To present analysis of code with respect to performance, suggest and implement performance improvements.
CO5	To present test cases to solve problems for multi-core or distributed, concurrent/Parallel environment.

CO of the Course "Cyber Security"	
CO1	Critical understanding of basic characteristics, components and policies of information security.
CO2	Analyze and select the appropriate encryption technique and security standard for addressing the problems.
CO3	Analyze public key cryptography, key management to design and implement authentication services
CO4	Able to analyze advanced security requirements, issues and technologies
CO5	Master the characteristic of intrusion detection system and firewall tools.
CO6	Be familiar with network security with the perspective of Hacking and countermeasures
CO of the Course "Business Analytic and Intelligence"	
CO1	Illustrate the technical concepts of Business Intelligence & the role of mathematical model in it.
CO2	Demonstrate Concepts, methodologies and technologies behind DSS
CO3	Summarize the model & technologies of Data Warehouse
CO4	Analyze, Design the Data Analytics Model &select the technique of BI processing
CO5	Design and Manage the BI systems with ethics using engineering practice
CO6	Dealing with Contemporary Tools for Business Analytics & Intelligence with applications indifferent domain
CO of the Course "Design & Analysis of Algorithms"	
CO1	Understand the fundamentals of algorithm designs.
CO2	Solve a problem using an algorithm and evaluate its correctness
CO3	Describe, apply and analyze the complexity of certain divide and conquer, greedy, and dynamic programming, backtracking and branch and bound algorithm techniques to solve problems
CO4	Develop Understand the concepts of time and space complexity, worst case, average case and best case complexities
CO5	Analyze the asymptotic performance of algorithms.
CO6	Describe the classes P, NP, and NP-Complete and be able to prove that a certain problem is NP-Complete.
CO7	Understand analysis techniques such as amortized analysis, probabilistic analysis, randomness and Minimax or Maximin optimality.
CO8	Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
CO of the Course "Systems Programming & Operating System"	
CO1	Analyze and synthesize of assembler
CO2	Analyze and synthesize macro Processor
CO3	Use tools like LEX & YACC.
CO4	Implement operating system functions
CO5	Implement memory management functions of OS.
CO6	Implement I/O management functions of OS.
CO of the Course "Embedded Systems & Internet of Things"	
CO1	Understand the basic concepts of Embedded System and IOT
CO2	Choose different design methodologies for embedded IoT
CO3	Implement an architectural design for IoT for specified requirements
CO4	Classify various IoT protocols and different security models.
CO5	Compare Web of Things and Cloud of Things
CO6	Choose between available technologies and devices for stated IoT challenge
CO of the Course "Software Modeling and Design "	

CO1	To analyze the problem statement (SRS) and choose proper design technique for designing web-based or desktop application
CO2	To design and analyze an application using UML modeling as fundamental tool.
CO3	To apply design patterns to understand reusability in OO design
CO4	To decide and apply appropriate modern tool for designing and modeling.
CO5	To decide and apply appropriate modern testing tool for testing web-based or desktop application.
CO of the Course "Web Technology"	
CO1	To understand web and technologies that makes the web pages.
CO2	To understand the use of JavaScript and jQuery
CO3	To learn the Installation of Tomcat Server and execution of programs on server side.
CO4	Analyze given assignment to select sustainable web development design methodology
CO5	Develop web based application using suitable client side and server-side web technologies
CO6	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management.
CO of the Course "Engineering Mathematics III"	
CO1	Apply knowledge of higher order linear differential equations to LCR circuits.
CO2	Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing.
CO3	Apply statistical methods like correlation, regression analysis, Curve Fitting for analysis to extract information from research data and data of applied to machine intelligence.
CO4	Apply probability theory for Estimation, predication and decision making to the real time data
CO5	Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals to solve problem related to fluid mechanics and various engineering applications.
CO6	Apply knowledge of Cauchy's Integral Formula to evaluate complex line integrals and to evaluate real definite integrals by Residue Theorem and also understand the concept of conformal mapping required in Image processing, Digital filters and Computer graphics
CO of the Course "Computer Graphics"	
CO1	Apply mathematics and logic to develop Computer programs for primitive graphic operations.
CO2	Implement polygon filling, windowing, clipping algorithm and interpret graphical transformations.
CO3	Illustrate the concepts related to Computer vision and virtual reality.
CO4	To summarize and demonstrate advanced animation and gaming techniques by using modern graphics tools.
CO of the Course "Advanced Data Structures"	
CO1	To apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain.
CO2	To design the algorithms to solve the programming problems
CO3	To use effective and efficient data structures in solving various Computer Engineering domain problems.
CO4	To analyze the algorithmic solutions for resource requirements and optimization
CO5	To use appropriate modern tools to understand and analyze the functionalities confined to the data structure usage.
CO of the Course "Microprocessor"	
CO1	To learn basic programming Model of Advanced microprocessor.
CO2	To learn the architecture and management of instructions in advanced microprocessor.
CO3	To understand the protection mechanism in advanced microprocessor
CO4	To identify interrupts, Exception in Input/output operations.

CO5	To understand debugging and testing techniques confined to 80386 DX
CO6	Implement parallel processing and math Co-processor
CO of the Course "Principles of Programming Languages"	
CO1	To learn the software development process and concept of syntax and semantics of language.
CO2	To classify the different data types and construct the structure of computation.
CO3	To infer different programming paradigms
CO4	To understand the basic of Object Oriented Programming Language.
CO5	To demonstrate the principles Object Oriented Programming using java.
CO6	To use the concept of exception handling and develop a program using applet.