Course Outcomes: Students should be able to

First Year (FE) Mechanical Engineering (Curriculum 2019 Pattern)

Semester-I

Subject	**Engineering Mathematics -I**
Subject Code	**ME 101 (107001)**
Course Outcome (COs)	
ME 101.1	Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
ME 101.2	The Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems
ME 101.3	To deal withderivative of functions of several variables that are essential in various branches of Engineering.
ME 101.4	To apply the concept of Jacobian to find partial derivative of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function
ME 101.5	The essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and orthogonal transformations, Eigen values and Eigen vectors applicable to engineering problems

Subject	**Engineering Physics**
Subject Code	**ME102 (107002)**
Course Outcome (COs)	
ME102.1	Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.
ME102.2	Learn basics of lasers and optical fibers and their use in some applications.
ME102.3	Understand concepts and principles in quantum mechanics. Relate them to some applications.
ME102.4	Understand theory of semiconductors and their applications in some semiconductor devices
ME102.5	Summarize basics of magnetism and superconductivity. Explore few of their technological applications.
ME102.6	Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterials and their application.

Subject	**System of Mechanical Engineering**
Subject Code	**ME 103(102003)**
Course Outcome (COs)	
ME 103.1	Describe and compare the conversion of energy from renewable and non-renewable energy sources
ME 103.2	Explain basic laws of thermodynamics, heat transfer and their applications
ME 103.3	List down the types of road vehicles and their specifications
ME 103.4	Illustrate various basic parts and transmission system of a road vehicle
ME 103.5	Discuss several manufacturing processes and identify the suitable process
ME 103.6	Explain various types of mechanism and its application

Subject	Basic Electrical Engineering
Subject Code	ME 104(103004)
Course Outcome (COs)	
ME104.1	Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect
ME104.2	Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic
ME104.3	Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.
ME104.4	Relate phase and line electrical quantities in polyphase networks, demonstrate the operation of single phase transformer and calculate efficiency and regulation at different loading conditions
ME104.5	Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.
ME104.6	Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge.

Subject	Programing and problem solving
Subject Code	ME 105(110005)
Course Outcome (COs)	
ME105.1	Inculcate and apply various skills in problem solving.
ME105.2	Choose most appropriate programming constructs and features to solve the problems in diversified domains.
ME105.3	Exhibit the programming skills for the problems those require the writing of welldocumented programs including use of the logical constructs of language, Python.
ME105.4	Demonstrate significant experience with the Python program development environment

Subject	Workshop Practices
Subject Code	ME 106(111006)
Course Outcome (COs)	
ME106.1	Familiar with safety norms to prevent any mishap in workshop.
ME106.2	Able to handle appropriate hand tool, cutting tool and machine tools to manufacture a job
ME106.3	Able to understand the construction, working and functions of machine tools and their parts.
ME106.4	Able to know simple operations (Turning and Facing) on a centre lathe.

Subject	Environmental Studies-I
Subject Code	ME 107(101007)
Course Outcome (COs)	
ME107.1	Demonstrate an integrative approach to environmental issues with a focus on sustainability.
ME107.2	Explain and identify the role of the organism in energy transfers in different ecosystems.
ME107.3	Distinguish between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources
ME107.4	Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.

SEMESTER -II

Subject	**Engineering Mathematics II**
Subject Code	**ME 108(107008)**
Course Outcome (COs)	
ME108.1	The effective mathematical tools for solutions of first order differential equations that model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
ME108.2	Advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions needed in evaluating multiple integrals and their applications.
ME108.3	To trace the curve for a given equation and measure arc length of various curves.
ME108.4	The concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.
ME108.5	Evaluation of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.

Subject	**Engineering Chemistry**
Subject Code	**ME 109(107009)**
Course Outcome (COs)	
ME 109.1	Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity
ME 109.2	Select appropriate electro-technique and method of material analysis
ME 109.3	Demonstrate the knowledge of advanced engineering materials for various engineering applications.
ME 109.4	Analyze fuel and suggest use of alternative fuels
ME 109.5	Identify chemical compounds based on their structure.
ME 109.6	Explain causes of corrosion and methods for minimizing corrosion

Subject	**Basic Electronics Engineering**
Subject Code	**ME 110(104010)**
Course Outcome (COs)	
ME110.1	Explain the working of P-N junction diode and its circuits.
ME110.2	Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET
ME110.3	Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
ME110.4	Use different electronics measuring instruments to measure various electrical parameters
ME 110.5	Select sensors for specific applications.
ME 110.6	Describe basic principles of communication systems.

Subject	**Engineering Mechanics**
Subject Code	**ME 111(101011)**
Course Outcome (COs)	
ME111.1	Determine resultant of various force systems
ME111.2	Determine centroid, moment of inertia and solve problems related to friction
ME111.3	Determine reactions of beams, calculate forces in cables using principles of equilibrium
ME111.4	Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space
ME111.5	Calculate position, velocity and acceleration of particle using principles of kinematics
ME111.6	Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy

Subject	Engineering Graphics
Subject Code	**ME 112(102012)**
Course Outcome (COs)	
ME 112.1	Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.
ME 112.2	Construct the various engineering curves using the drawing instruments.
ME 112.3	Apply the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
ME 112.4	Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.
ME 112.5	Draw the development of lateral surfaces for cut section of geometrical solids.
ME 112.6	Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.

Subject	Project Based Learning
Subject Code	**ME 113(110013)**
Course Outcome (COs)	
ME113.1	Project based learning will increase their capacity and learning through shared cognition.
ME113.2	Students able to draw on lessons from several disciplines and apply them in practical way
ME113.3	Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.

Subject	Environmental Studies-II
Subject Code	**ME 114(101014)**
Course Outcome (COs)	
ME114.1	Have an understanding of environmental pollution and the science behind those problems and potential solutions.
ME114.2	Assess the impact of ever increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.
ME114.3	Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.
ME114.4	Learn skills required to research and analyze environmental issues scientifically and learn how to use those skills in applied situations such as careers that may involve environmental problems and/or issues.

Course Outcomes: Students should be able to

Second Year (SE) Mechanical Engineering (Curriculum 2019 Pattern)

Semester-I

Subject	Solid Mechanics
Subject Code	**ME 202041**
Course Outcome (COs)	
ME 101.1	DEFINE various types of stresses and strain developed on determinate and indeterminate members.
ME 101.2	DRAW Shear force and bending moment diagram for various types of transverse loading and support.
ME 101.3	COMPUTE the slope & deflection, bending stresses and shear stresses on a beam. CO4.
ME 101.4	CALCULATE torsional shear stress in shaft and buckling on the column.
ME 101.5	APPLY the concept of principal stresses and theories of failure to determine stresses on a 2-D element.
ME 101.6	UTILIZE the concepts of SFD & BMD, torsion and principal stresses to solve combined loading application based problems.

Subject	Solid Modeling and Drafting
Subject Code	**ME 202042**
Course Outcome (COs)	
ME 101.1	UNDERSTAND basic concepts of CAD system, need and scope in Product Lifecycle Management
ME 101.2	UTILIZE knowledge of curves and surfacing features and methods to create complex solid geometry
ME 101.3	CONSTRUCT solid models, assemblies using various modeling techniques & PERFORM mass property analysis, including creating and using a coordinate system
ME 101.4	APPLY geometric transformations to simple 2D geometries
ME 101.5	USE CAD model data for various CAD based engineering applications viz. production drawings, 3D printing, FEA, CFD, MBD, CAE, CAM, etc.
ME 101.6	USE PMI & MBD approach for communication

Subject	Engineering Thermodynamics
Subject Code	**ME 202043**
Course Outcome (COs)	
ME 101.1	DESCRIBE the basics of thermodynamics with heat and work interactions.
ME 101.2	APPLY laws of thermodynamics to steady flow and non-flow processes.
ME 101.3	APPLY entropy, available and non available energy for an Open and Closed System,
ME 101.4	DETERMINE the properties of steam and their effect on performance of vapour power cycle. CO5.
ME 101.5	ANALYSE the fuel combustion process and products of combustion.
ME 101.6	SELECT various instrumentations required for safe and efficient operation of steam generator.

Subject	Engineering Materials and Metallurgy
Subject Code	**ME 202044**
Course Outcome (COs)	
ME 101.1	COMPARE crystal structures and ASSESS different lattice parameters.
ME 101.2	CORRELATE crystal structures and imperfections in crystals with mechanical behaviour of materials.
ME 101.3	DIFFERENTIATE and DETERMINE mechanical properties using destructive and non- destructive testing of materials.
ME 101.4	IDENTIFY & ESTIMATE different parameters of the system viz., phases, variables, component, grains, grain boundary, and degree of freedom. etc.
ME 101.5	ANALYSE effect of alloying element & heat treatment on properties of ferrous & nonferrous alloy.
ME 101.6	SELECT appropriate materials for various applications.

Subject	Electrical and Electronics Engineering
Subject Code	**ME 203156**
Course Outcome (COs)	
ME 101.1	APPLY programming concepts to UNDERSTAND role of Microprocessor and Microcontroller in embedded systems
ME 101.2	DEVELOP interfacing of different types of sensors and other hardware devices with Atmega328 based Arduino Board
ME 101.3	UNDERSTAND the operation of DC motor, its speed control methods and braking
ME 101.4	CO4. DISTINGUISH between types of three phase induction motor and its characteristic features modular subsystems CO6. CHOOSE energy storage devices and electrical drives for EVs
ME 101.5	EXPLAIN about emerging technology of Electric Vehicle (EV) and its
ME 101.6	CHOOSE energy storage devices and electrical drives

Subject	Geometric Dimensioning and Tolerancing Lab
Subject Code	**ME 204045**
Course Outcome (COs)	
ME 101.1	SELECT appropriate IS and ASME standards for drawing CO2.
ME 101.2	READ & ANALYSE variety of industrial drawings
ME 101.3	APPLY geometric and dimensional tolerance, surface finish symbols in drawing CO4.
ME 101.4	EVALUATE dimensional tolerance based on type of fit, etc.
ME 101.5	SELECT an appropriate manufacturing process using DFM, DFA, etc.

Subject	- Engineering Mathematics - III
Subject Code	**ME 207002**
Course Outcome (COs)	
ME 101.1	SOLVE higher order linear differential equations and its applications to model and analyze mass spring systems.
ME 101.2	APPLY Integral transform techniques such as Laplace transform and Fourier transform to solve differential equations involved in vibration theory, heat transfer and related mechanical engineering applications.
ME 101.3	APPLY Statistical methods like correlation, regression in analyzing and interpreting experimental data applicable to reliability engineering and probability theory in testing and quality control.
ME 101.4	PERFORM Vector differentiation & integration, analyze the vector fields and APPLY to fluid flow problems.
ME 101.5	SOLVE Partial differential equations such as wave equation, one and two dimensional heat flow equations.

Subject	Kinematics of Machinery
Subject Code	**ME 202047**
Course Outcome (COs)	
ME 101.1	APPLY kinematic analysis to simple mechanisms
ME 101.2	ANALYZE velocity and acceleration in mechanisms by vector and graphical method CO3.
ME 101.3	SYNTHESIZE a four bar mechanism with analytical and graphical methods
ME 101.4	APPLY fundamentals of gear theory as a prerequisite for gear design CO5.
ME 101.5	CONSTRUCT cam profile for given follower motion

Subject	Applied Thermodynamics
Subject Code	**ME**
Course Outcome (COs)	
ME 101.1	DETERMINE COP of refrigeration system and ANALYZE psychrometric processes.
ME 101.2	DISCUSS basics of engine terminology,air standard, fuel air and actual cycles.
ME 101.3	IDENTIFY factors affecting the combustion performance of SI and CI engines. CO4.
ME 101.4	DETERMINE performance parameters of IC Engines and emission control.
ME 101.5	EXPLAIN working of various IC Engine systems and use of alternative fuels.
ME 101.6	CALCULATE performance of single and multi stage reciprocating compressors and DISCUSS rotary positive displacement compressors

Subject	Fluid Mechanics
Subject Code	**ME 202049**
Course Outcome (COs)	
ME 101.1	DETERMINE various properties of fluid

ME 101.2	APPLY the laws of fluid statics and concepts of buoyancy
ME 101.3	IDENTIFY types of fluid flow and terms associated in fluid kinematics CO4.
ME 101.4	APPLY principles of fluid dynamics to laminar flow
ME 101.5	ESTIMATE friction and minor losses in internal flows and DETERMINE boundary layer formation over an external surface
ME 101.6	CONSTRUCT mathematical correlation considering dimensionless parameters, also ABLE to predict the performance of prototype using model laws

Subject	**Manufacturing Processes**
Subject Code	**ME 202050**
Course Outcome (COs)	
ME 101.1	SELECT appropriate moulding, core making and melting practice and estimate pouring time, solidification rate and DESIGN riser size and location for sand casting process
ME 101.2	UNDERSTAND mechanism of metal forming techniques and CALCULATE load required for flat rolling
ME 101.3	DEMONSTRATE press working operations and APPLY the basic principles to DESIGN dies and tools for forming and shearing operations
ME 101.4	CLASSIFY and EXPLAIN different welding processes and EVALUATE welding characteristics
ME 101.5	DIFFERENTIATE thermoplastics and thermosetting and EXPLAIN polymer processing techniques
ME 101.6	UNDERSTAND the principle of manufacturing of fibre-reinforce composites and metal matrix composites

Subject	**Machine Shop**
Subject Code	**ME 202051**
Course Outcome (COs)	
ME 101.1	PERFORM welding using TIG/ MIG/ Resistance/Gas welding technique
ME 101.2	MAKE Fibre-reinforced Composites by hand lay-up process or spray lay-up techniques CO3.
ME 101.3	PERFORM cylindrical/surface grinding operation and CALCULATE its machining time
ME 101.4	DETERMINE number of indexing movements required and acquire skills to PRODUCE a spur gear on a horizontal milling machine
ME 101.5	PREPARE industry visit report
ME 101.6	UNDERSTAND procedure of plastic processing

Subject	**Project Based Learning - II**
Subject Code	**ME 202052**
Course Outcome (COs)	
ME 101.1	IDENTIFY the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives.
ME 101.2	ANALYZE the results and arrive at valid conclusions.
ME 101.3	PROPOSE a suitable solution based on the fundamentals of mechanical engineering by possibly integration of previously acquired knowledge.
ME 101.4	CONTRIBUTE to society through proposed solutions by strictly following professional ethics and safety measures.
ME 101.5	USE of technology in proposed work and demonstrate learning in oral and written form. CO6.
ME 101.6	DEVELOP ability to work as an individual and as a team member.

Course Outcomes: Students should be able to

Third Year (TE) Mechanical Engineering (Curriculum 2019 Pattern)

Semester-I

Subject	**Numerical &Statistical Methods**
Subject Code	**ME 302041**
Course Outcome (COs)	
ME 101.1	CO1: **Solve** system of equations using direct and iterative numerical methods
ME 101.2	CO2: **Evaluate** solutions for differential equations using numerical techniques
ME 101.3	CO3: **Perform** numerical integration for engineering applications
ME 101.4	CO4: **Design** and **Model** real life applications using curve fitting and regression models
ME 101.5	CO5: **Estimate** statistical measures for quantitative data
ME 101.6	CO6: **Design** and **Demonstrate** the data, using concept of probability and linear algebra

Subject	**Heat & Mass Transfer**
Subject Code	**ME 302042**
Course Outcome (COs)	
ME 101.1	CO1. **Analyze** the different modes of heat transfer and implement the basic heat conduction equations for steady state one-dimensional thermal system in Cartesian, cylindrical and Polar coordinates
ME 101.2	CO2. **Analyze** the heat transfer through extended surfaces (fins) and implement the general heat conduction equation to thermal systems in transient heat conduction and able to select proper thermal insulation.
ME 101.3	CO3. **Analyze** the heat transfer rate in natural and forced convection and evaluate through experimentation investigation.
ME 101.4	CO4. **Interpret** heat transfer rate by radiation between objects with simple geometries, for black and grey surfaces.
ME 101.5	CO5. **Ability** to analyze the rate of mass transfer using Fick's Law of Diffusion and understands mass diffusion in different coordinate systems.
ME 101.6	CO6**.Design and analysis** of heat transfer equipment and investigation of performance.

Subject	**Design of Machine Elements**
Subject Code	**ME 302043**
Course Outcome (COs)	
ME 101.1	CO1. **Design and analyze** the cotter and knuckle Joints, levers and components subjected to eccentric loading.
ME 101.2	CO2. **Design** shafts, keys and couplings under static loading conditions.
ME 101.3	CO3. **Analyze** different stresses in power screws and apply its knowledge to design screw jack.
ME 101.4	CO4. **Evaluate** dimensions of machine components under fluctuate loading conditions.
ME 101.5	CO5. **Understand** different welded and threaded joints structure and apply its knowledge to analyze its strength.
ME 101.6	CO6**.Apply** the design and development procedure for different types of springs.

Subject	**Mechatronics**
Subject Code	**ME 302044**
Course Outcome (COs)	
ME 101.1	CO1. **Define** key elements of mechatronics, principle of sensor and its characteristics

ME 101.2	CO2. **Utilize c**oncept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O
ME 101.3	CO3. **Compute** the transfer function by using block diagram reduction technique.
ME 101.4	CO4. **Calculate** Poles and Zero ,frequency domain parameter for mathematical modeling for mechanical system
ME 101.5	CO5. **Apply** the concept of different controller modes to a industrial application
ME 101.6	CO6**.Develop** the ladder programming for industrial application

Subject	**Elective I-Advanced Forming and Joining Processes**
Subject Code	**ME 302045-A**
Course Outcome (COs)	
ME 101.1	CO1. ANALYSE the effect of friction in metal forming deep drawing and IDENTIFICATION of surface defects and their remedies in deep drawing operations
ME 101.2	CO2. ASSESS the parameters for special forming operation and SELECT appropriate special forming operation for particular applications
ME 101.3	CO3. ANALYSE the effect of HAZ on microstructure and mechanical properties of materials
ME 101.4	CO4. CLASSIFY various solid state welding process and SELECT suitable welding processes for particular applications
ME 101.5	CO5. CLASSIFY various advanced welding process and SELECT suitable welding processes for particular applications.
ME 101.6	CO6.DERSTAND the principles of sustainable manufacturing and its role in manufacturing industry

Subject	**Elective I- Machining Science and Technology**
Subject Code	**ME 302045-B**
Course Outcome (COs)	
ME 101.1	CO1. **Understand** metal cutting principles and mechanics of metal cutting and tool life.
ME 101.2	CO2. **Describe** features ofgear and thread manufacturing processes.
ME 101.3	CO3. **Select** appropriate grinding wheel and demonstrate the various surface finishing processes.
ME 101.4	CO4. **Select** appropriate jigs/fixtures and to draw the process plan for a given component.
ME 101.5	CO5. **Select and evaluate** various parameters of process planning.
ME 101.6	**Generate** CNC program for Turning / Milling processes and generate tool path using CAM software

Subject	**Digital Manufacturing Laboratory**
Subject Code	**ME 302046**
Course Outcome (COs)	
ME 101.1	CO1. CREATE a given component using conventional machines, CNC machines and Additive Manufacturing Techniques.
ME 101.2	CO2. ANALYZE cutting tool parameters for machining given job.
ME 101.3	CO3. UNDERSTAND simulation of manufacturing process using Digital Manufacturing Tools.
ME 101.4	CO4. SELECT and DESIGN jigs and Fixtures for any given component.
ME 101.5	CO5. CREATE program for selection of cutting parameters.
ME 101.6	UNDERSTAND parameters for CNC retrofitting and reconditioning.

Subject	**Skill Development**
Subject Code	**ME 302047**
Course Outcome (COs)	
ME 101.1	CO1. Apply and analyze the knowledge for assembly & disassembly of various machines.
ME 101.2	CO2. Design and development of machine parts or any new product.

ME 101.3	CO3. Evaluation of fault & diagnosis of machine tool, engine and transmission of different automotive and home appliances.
ME 101.4	CO4. Develop a programming code required for design of m/c components.
ME 101.5	Identify and understand the various activities performed in an industry.

SEMESTER-II

Subject	**Artificial Intelligence and Machine Learning**
Subject Code	**ME 302049**
Course Outcome (COs)	
ME 101.1	CO1. **Demonstrate** fundamentals of artificial intelligence and machine learning
ME 101.2	CO2. **Apply** feature extraction and selection techniques
ME 101.3	CO3. **Implement** machine learning algorithms for classification and regression problems
ME 101.4	CO4. **Devise and develop** a machine learning model using various steps
ME 101.5	CO5. **Explain** concepts of reinforced and deep learning
ME 101.6	**Simulate** machine learning model in mechanical engineering problems

Subject	**Computer Aided Engineering**
Subject Code	**ME 302050**
Course Outcome (COs)	
ME 101.1	UNDERSTAND the use of CAE tools and DESCRIBE the significance of shape functions in finite element formulations.
ME 101.2	CO2: UNDERSTAND various meshing techniques for better EVALUATION of approximate results.
ME 101.3	CO3: APPLY material properties and boundary condition to SOLVE 1-D and 2-D element stiffness matrices to obtain nodal or elemental solution.
ME 101.4	CO4: ANALYZE the results obtained by the USE of numerical method for different types of analysis.
ME 101.5	CO5: EVALUATE the results obtained by analytical and computational method to SOLVE non-linear and dynamic analysis problems.
ME 101.6	CO6: FORMULATE the results in the form of contour plot by the USE of CAE tools.

Subject	**Design of Transmission Systems**
Subject Code	**ME 302051**
Course Outcome (COs)	
ME 101.1	CO1. ANALYSE the terms of gears from the perspective of materials, modes of failure for various forces considering loading condition according to various standards.
ME 101.2	CO2. EVALUATE the performance of various types of bearing on the basis of different criteria, application of load and choose the appropriate from the manufacturer's catalogue.
ME 101.3	CO3. Design various mechanical systems like Machine Tool Gear box, Clutches, Brakes, conveyor systems etc.
ME 101.4	ELABORATE on types, modes of operation, degree of hybridization and allied terms associated with hybrid electric vehicles

Subject	**Elective II-Composite Materials**
Subject Code	**ME 302052-A**
Course Outcome (COs)	
ME 101.1	CO1. **COMPARE** composites with traditional materials.
ME 101.2	CO2. **IDENTIFY & ESTIMATE** different parameters of the Polymer Matrix Composite
ME 101.3	CO3. **CATEGORISE** and **APPLY** Metal Matrix Process from possessions landscape.

ME 101.4	CO4. **DETERMINE** volume/weight fraction and strengthof Composites.
ME 101.5	CO5. **SELECT** appropriate testing and inspection method for composite materials.
ME 101.6	**SELECT** composites materials for various applications.

Subject	**Elective II-Surface Engineering**
Subject Code	**ME302052-B**
Course Outcome (COs)	
ME 101.1	CO1. Get **exposure** to the basic's principle & mechanism of surface degradation.
ME 101.2	CO2. Student will able to **choose** correct corrosion prevention techniques for a different service conditions.
ME 101.3	CO3. Students will be **aware** of the role of surface engineering of materials to modify/improve the surface properties.
ME 101.4	CO4. Student will able to **select** the surface heat treatments to improve surface material.
ME 101.5	CO5. **Propose / Select** the surface modification technique to modify surface properties
ME 101.6	CO6.**Analysis** various coating defects and **evaluation** of surface properties using testing/characterization method

Subject	**Measurement Laboratory**
Subject Code	**ME 302053**
Course Outcome (COs)	
ME 101.1	CO1. Evaluate causes of errors in vernier calipers, micrometers by performing experiments in standard metrological conditions, noting deviations at actual and by plotting cause and effect diagram, to reduce uncertainty in measurement.
ME 101.2	CO2. Analyze strain measurement parameters by taking modulus of elasticity in consideration to acknowledge its usage in failure detection and force variations.
ME 101.3	CO3. Examine surface Textures, surface finish using equipment's like Talysurf and analyze surface finish requirements of metrological equipment's like gauges, jaws of vernier calipers, micrometers, magnifying glasses of height gauge and more, to optimize surface finish accuracy requirements and cost of measurement.
ME 101.4	CO4. Weigh dimensional accuracy using Comparator and limit gauges and appraise their usage in actual measurement or comparison with standards set to reduce measurement lead time.
ME 101.5	CO5. Test Flow rate, speed and temperature measurements and their effect on performance in machines and mechanisms like hydraulic or pneumatic trainers, lathe machine etc to increase repeatability and reproducibility.
ME 101.6	CO6.Author industry visit report to report opportunities of entrepreneurships/business in various sectors of metrology like calibrations, testing, coordinate and laser metrology etc

Subject	**Fluid Power & Control Laboratory**
Subject Code	**ME 302054**
Course Outcome (COs)	
ME 101.1	CO1. Understand working principle of components used in hydraulic and pneumatic systems
ME 101.2	CO2. Identify various applications of hydraulic and pneumatic systems
ME 101.3	CO3. Selection of appropriate components required for hydraulic and pneumatic systems using manufactures' catalogues
ME 101.4	CO4. Analyses and simulate hydraulic and pneumatic systems for industrial/mobile applications
ME 101.5	CO5. Design a system according to the requirements
ME 101.6	Develop and apply knowledge to various applications

Subject	Internship/Mini project *
Subject Code	ME 302055
Course Outcome (COs)	
ME 101.1	CO1. To demonstrate professional competence through industry internship.
ME 101.2	CO2. To apply knowledge gained through internships to complete academic activities in a professional manner.
ME 101.3	CO3. To choose appropriate technology and tools to solve given problem.
ME 101.4	CO4. To demonstrate abilities of a responsible professional and use ethical practices in day to day life.
ME 101.5	CO5. Creating network and social circle, and developing relationships with industry people.
ME 101.6	CO6.To analyze various career opportunities and decide carrier goals.

Course Outcomes: Students should be able to

Final Year (BE) Mechanical Engineering (Curriculum 2019 Pattern)

Semester-I

Subject	Hydraulics and Pneumatics
Subject Code	ME 402041
Course Outcome (COs)	
ME 101.1	Understand working principle of components used in hydraulic & pneumatic systems
ME 101.2	Identify various applications of hydraulic & pneumatic systems
ME 101.3	Selection of appropriate components required for hydraulic and pneumatic systems
ME 101.4	Analyse hydraulic and pneumatic systems for industrial/mobile applications
ME 101.5	Design a system according to the requirements
ME 101.6	Develop and apply knowledge to various applications

Subject	CAD Cam Automation
Subject Code	ME 402042
Course Outcome (COs)	
ME 101.1	Apply homogeneous transformation matrix for geometrical transformations of 2D CAD entities for basic geometric transformations.
ME 101.2	Use analytical and synthetic curves and surfaces in part modeling.
ME 101.3	Do real times analysis of simple mechanical elements like beams, trusses, etc. and comment on safety of engineering components using analysis software
ME 101.4	Generate CNC program for Turning / Milling and generate tool path using CAM software.
ME 101.5	Demonstrate understanding of various rapid manufacturing techniques and develop
ME 101.6	Understand the robot systems and their applications in manufacturing industries.

Subject	Dynamics of Machinery
Subject Code	ME 402043
Course Outcome (COs)	
ME 101.1	Solutions to balancing problems of machines
ME 101.2	Ability to understand the fundamentals of vibration and Noise.
ME 101.3	Ability to develop analytical competency in solving vibration problems.
ME 101.4	Ability to understand measurement and control of vibration and noise.
ME 101.5	Ability to calculate natural frequencies, Eigen values & Eigen vectors.
ME 101.6	Ability to measure vibrations, vibration characteristics and understand various methods for vibration control for real life problem.

Subject	Energy Audit Management (Elective-III)
Subject Code	**ME404A (402044A)**
Course Outcome (COs)	
ME 404A.1	Carry out Energy Audit of there residence / society / college where they are studying.
ME 404A.2	Carry out electrical tariff calculation and accurately predict the electricity bill required for the installation.
ME 404A.3	Suggest various methods to reduce energy consumption of the equipment / office / premises

Subject	OPERATION RESEARCH (Elective – II)
Subject Code	**ME 405C (402045 C)**
Course Outcome (COs)	
ME 405C.1	Illustrate the need to optimally utilize the resources in various types of industries.
ME 405C.2	Apply and analyze mathematical optimization functions to various applications.
ME 405C.3	Demonstrate cost effective strategies in various applications in industry.

Subject	Project –I
Subject Code	ME 406(402046)
Course Outcome (COs)	
ME 406.1	Identify, formulate and solve problems related to mechanical engineering.
ME 406.2	Work in a group as a part of multidisciplinary team with professional responsibility
ME406.3	Design a system, component or process to meet desired needs within realistic constraints.
ME406.4	Review literature and finalize problem statement.
ME406.5	Plan activity schedule and implementation in a given time span.
ME406.6	Prepare and present technical report.
ME406.7	Apply modern design and analysis tools.

Semester-II

Subject	Power Plant Engineering
Subject Code	ME407 (402047)
Course Outcome (COs)	
ME 407.1	Ability to have adequacy with Design, erection and development of energy conversion plants.
ME407.2	Optimization of Energy Conversion plant with respect to the available resources.
ME407.3	Scope of alternative erection of optimized, suitable plant at the location depending upon geographical conditions.

Subject	Mechanical System Design
Subject Code	408(402048)
Course Outcome (COs)	
ME408.1	The student will understand the difference between component level design and system level design.
ME408.2	handling systems, etc. for the specifications stated/formulated.
ME408.3	Ability to learn optimum design principles and apply it to mechanical components

ME408.4	Ability to to handle system level projects from concept to product.

Subject	**Industrial Engineering(Elective- III)**
Subject Code	ME406C(402049 C)
	Course Outcome (COs)
ME409C .1	Apply the Industrial Engineering concept in the industrial environment
ME409C.2	Manage and implement different concepts involved in methods study and understanding of work content in different situations.
ME409C.3	Undertake project work based on the course content
ME409C.4	Describe different aspects of work system design and facilities design pertinent to manufacturing industries
ME409C.5	Identify various cost accounting and financial management practices widely applied in industries
ME409C.6	conceptualization and manufacturing stage of various products.

Subject	**Finite Element Analysis(Elective- IV)**
Subject Code	402050(B)
	Course Outcome (COs)
ME 410B.1	Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods to solve for displacements and stresses.
ME 410B.2	reasonableness of finite element results.
ME 410B.3	analysis.
ME 410B.4	(physics assumptions) errors, discretization (mesh density and refinement toward convergence) errors, and

Subject	**DPBC(Elective- IV)**
Subject Code	ME 410C (402050 C)
	Course Outcome (COs)
ME 410 C.1	Select suitable Pump, Blower, fan or compressor for a given application.
ME 410 C.2	Design Pump, Blower, fan or compressor for a given application

Subject	**Project – II**
Subject Code	ME 411 (402051)
	Course Outcome (COs)
ME 411.1	Identify, formulate and solve problems related to mechanical engineering.
ME411.2	Work in a group as a part of multidisciplinary team with professional responsibility
ME411.3	Design a system, component or process to meet desired needs within realistic constraints.
ME411.4	Review literature and finalize problem statement.
ME411.5	Plan activity schedule and implementation in a given time span.
ME411.6	Prepare and present technical report.
ME411.7	Apply modern design and analysis tools.

Course Outcomes:

First Year (FE) Civil Engineering (Curriculum 2019 Pattern)

Semester I

Subject	**Engineering Mathematics-I**
Subject Code	**CE 101 (107001)**
Course Outcome (COs)	
CE 101.1	Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
CE 101.2	The Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.
CE 101.3	To deal with derivative of functions of several variables that are essential in various branches of Engineering
CE 101.4	To apply the concept of Jacobean to find partial derivative of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function.
CE 101.5	The essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and orthogonal transformations, Eigen values and Eigen vectors applicable to engineering problems

Subject	**Engineering Physics**
Subject Code	**CE102 (107002)**
Course Outcome (COs)	
CE102.1	Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.
CE102.2	Learn basics of lasers and optical fibers and their use in some applications.
CE102.3	Understand concepts & principles in quantum mechanics. Relate them to some applications.
CE102.4	Understand theory of semiconductors and their applications in some semiconductor devices.
CE102.5	Summarize basics of magnetism and superconductivity. Explore few of their technological applications.
CE102.6	Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterial and their application.

Subject	**Systems in Mechanical Engineering**
Subject Code	**CE 103 (102003)**
Course Outcome (COs)	
CE 103.1	Describe and compare conversion of energy from renewable & non-renewable energy sources
CE 103.2	Explain basic laws of thermodynamics, heat transfer and their applications
CE 103.3	List down the types of road vehicles and their specifications
CE 103.4	Illustrate various basic parts and transmission system of a road vehicle
CE 103.5	Discuss several manufacturing processes and identify the suitable process
CE 103.6	Explain various types of mechanism and its application

Subject	Basic Electrical Engineering
Subject Code	CE 104(103004)
Course Outcome (COs)	
CE104.1	Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.
CE104.2	Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phase arithmetic
CE104.3	Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phase diagram.
CE104.4	Relate phase and line electrical quantities in polyphone networks, demonstrate the operation of single phase transformer and calculate efficiency and regulation at different loading conditions
CE104.5	Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.
CE104.6	Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge.

Subject	Programming and Problem Solving
Subject Code	CE105 (110005)
Course Outcome (COs)	
CE105.1	Inculcate and apply various skills in problem solving.
CE105.2	Choose most appropriate programming constructs and features to solve the problems in diversified domains
CE105.3	Exhibit the programming skills for the problems those require the writing of welldocumented programs including use of the logical constructs of language, Python.
CE105.4	Demonstrate significant experience with the Python program development environment.

Subject	Workshop Practice
Subject Code	CE106 (111006)
Course Outcome (COs)	
CE 106.1	Familiar with safety norms to prevent any mishap in workshop.
CE 106.2	Able to handle appropriate hand tool, cutting tool and machine tools to manufacture a job.
CE 106.3	Able to understand the construction, working and functions of machine tools and their parts.
CE 106.4	Able to know simple operations (Turning and Facing) on a center lathe

Subject	Environmental Studies-I
Subject Code	CE107 (101007)
Course Outcome (COs)	
CE107.1	Demonstrate an integrative approach to environmental issues with a focus on sustainability.
CE 107.2	Explain and identify the role of the organism in energy transfers in different ecosystems.
CE 107.3	Distinguish between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources.
CE 107.4	Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.

Semester-II

Subject	**Engineering Mathematics II**
Subject Code	**CE 108(107008)**
Course Outcome (COs)	
CE108.1	The effective mathematical tools for solutions of first order differential equations that model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
CE108.2	Advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions needed in evaluating multiple integrals and their applications
CE108.3	To trace the curve for a given equation and measure arc length of various curves.
CE108.4	The concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.
CE108.5	Evaluation of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia

Subject	**Engineering Chemistry**
Subject Code	**CE 109(107009)**
Course Outcome (COs)	
CE 109.1	Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
CE 109.2	Select appropriate electro-technique and method of material analysis.
CE 109.3	Demonstrate the knowledge of advanced engineering materials for various engineering applications.
CE 109.4	Analyze fuel and suggest use of alternative fuels.
CE 109.5	Identify chemical compounds based on their structure.
CE 109.6	Explain causes of corrosion and methods for minimizing corrosion.

Subject	**Basic Electronics Engineering**
Subject Code	**CE110 (104010)**
Course Outcome (COs)	
CE110.1	Explain the working of P-N junction diode and its circuits.
CE110.2	Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
CE110.3	Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
CE110.4	Use different electronics measuring instruments to measure various electrical parameters.
CE 110.5	Select sensors for specific applications.
CE 110.6	Describe basic principles of communication systems.

Subject	**Engineering Mechanics**
Subject Code	**CE 111(101011)**
Course Outcome (COs)	
CE111.1	Determine resultant of various force systems
CE111.2	Determine centroid, moment of inertia and solve problems related to friction
CE111.3	Determine reactions of beams, calculate forces in cables using principles of equilibrium

CE111.4	Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space
CE111.5	Calculate position, velocity and acceleration of particle using principles of kinematics
CE111.6	Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy

Subject	**Engineering Graphics**
Subject Code	**CE 112 (102012)**
Course Outcome (COs)	
CE 112.1	Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.
CE 112.2	Construct the various engineering curves using the drawing instruments.
CE 112.3	Apply the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
CE 112.4	Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.
CE 112.5	Draw the development of lateral surfaces for cut section of geometrical solids.
CE 112.6	Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.

Subject	**Project Based Learning**
Subject Code	**CE 113 (110013)**
Course Outcome (COs)	
CE113.1	Project based learning will increase their capacity and learning through shared cognition
CE113.2	Students able to draw on lessons from several disciplines and apply them in practical way.
CE113.3	Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning

Subject	**Environmental Studies-II**
Subject Code	**CE 114 (101014)**
Course Outcome (COs)	
CE114.1	Have an understanding of environmental pollution and the science behind those problems and potential solutions.
CE114.2	Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.
CE114.3	Assess the impact of ever increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.
CE114.4	Learn skills required to research and analyze environmental issues scientifically and learn how to use those skills in applied situations such as careers that may involve environmental problems and/or issues.

Course Outcomes:

Second Year (SE) Civil Engineering (Curriculum 2019 Pattern)

Semester I

Subject	Building Technology and Architectural Planning
Subject Code	CE 201 (201001)
Course Outcome (COs)	
CE201.01	Identify types of building and basic requirements of building components
CE201.02	Make use of Architectural Principles and Building byelaws for building construction
CE201.03	Plan effectively various types of Residential Building forms according to their utility, Functions with reference to National Building Code.
CE201.04	Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code.
CE201.05	Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects.
CE201.06	Understand different services and safety aspects

Subject	Mechanics of structure
Subject Code	CE 202 (201002)
Course Outcome (COs)	
CE202.01	Understand concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.
CE202.02	Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.
CE202.03	Explain the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.
CE202.04	Use theory of torsion to determine the stresses in circular shaft and understand concept of Principal stresses and strains.
CE202.05	Analyze axially loaded and eccentrically loaded column
CE202.06	Determine the slopes and deflection of determinate beams and trusses

Subject	Fluid Mechanics
Subject Code	CE 203 (201003)
Course Outcome (COs)	
CE203.01	Understand the use of Fluid Properties, concept of Fluid statics, basic equation of Hydrostatics, measurement of fluid pressure, buoyancy & floatation and its application for solving practical problems.
CE203.02	Understand the concept of fluid kinematics with reference to Continuity equation and fluid dynamics with reference to Modified Bernoulli's equation and its application to practical problems of fluid flow
CE203.03	Understand the concept of Dimensional analysis using Buckingham's π theorem, Similarity & Model Laws and boundary layer theory and apply it for solving practical problems of fluid flow.
CE203.04	Understand the concept of laminar and turbulent flow and flow through pipes and its application to determine major and minor losses and analyze pipe network using Hardy Cross method.
CE203.05	Understand the concept of open channel flow, uniform flow and depth-Energy relationships in open channel flow and make the use of Chezy's and Manning's formulae for uniform flow Computation and design of most economical channel section.
CE203.06	Understand the concept of gradually varied flow in open channel and fluid flow around Submerged objects, compute GVF profile and calculate drag and lift force on fully submerged body.

Subject	Engineering Mathematics III
Subject Code	CE 204 (207001)
Course Outcome (COs)	
CE204.01	Solve Higher order linear differential equations and its applications to modelling and analysing Civil engineering problems such as bending of beams, whirling of shafts and mass spring systems.
CE204.02	Solve System of linear equations using direct & iterative numerical techniques and develop solutions for ordinary differential equations using single step & multistep methods applied to hydraulics, geotechnics and structural systems.
CE204.03	Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering.
CE204.04	Perform Vector differentiation &integration, analyze the vector fields and apply to fluid flow problems.
CE204.05	Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations

Subject	Engineering Geology
Subject Code	CE 205 (207003)
Course Outcome (COs)	
CE205.01	Explain about the basic concepts of engineering geology, various rocks, and minerals both in lab and on the fields and their inherent characteristics and their uses in civil engineering constructions.
CE205.02	Exploring the importance of mass wasting processes and various tectonic processes that hampers the design of civil engineering projects and its implications on environment and Sustainability.
CE205.03	Recognize effect of plate tectonics, structural geology and their significance and utility in civil engineering activities.
CE205.04	Incorporate the various methods of survey, to evaluate and interpret geological nature of the rocks present at the foundations of the dams, percolation tanks, tunnels and to infer site / alignment/ level free from geological defects.
CE205.05	Assess the Importance of geological nature of the site, precautions and treatments to improve the site conditions for dams, reservoirs, and tunnels.
CE205.06	Explain geological hazards and importance of ground water and uses of common building stones.

Subject	Audit Course 1 Awareness to Civil Engineering Practices
Subject Code	CE 206 (201007)
Course Outcome (COs)	
CE206.01	Describe functioning/working of different types of industries/sectors in Civil Engineering.
CE206.02	Describe drawings and documents required and used in different Civil Engineering works
CE206.03	Understand the importance of Code of Ethics to be practiced by a Civil Engineer and also Understand the duties and responsibilities as a Civil Engineer.
CE206.04	Understand different health and safety practices on the site.

Semester – II

Subject	Geotechnical Engineering
Subject Code	CE 207 (201008)
Course Outcome (COs)	
CE207.01	Identify and classify the soil based on the index properties and its formation process
CE207.02	Explain permeability and seepage analysis of soil by construction of flow net.
CE207.03	Illustrate the effect of compaction on soil and understand the basics of stress distribution.
CE207.04	Express shear strength of soil and its measurement under various drainage conditions.
CE207.05	Evaluate the earth pressure due to backfill on retaining structures by using different theories.
CE207.06	Analysis of stability of slopes for different types of soils.

Subject	Surveying
Subject Code	CE 208 (201009)
Course Outcome (COs)	
CE208.01	Define and Explain basics of plane surveying and differentiate the instruments used for it.
CE208.02	Express proficiency in handling surveying equipment and analyse the surveying data from these equipment.
CE208.03	Describe different methods of surveying and find relative positions of points on the surface of earth.
CE208.04	Execute curve setting for civil engineering projects such as roads, railways etc
CE208.05	Articulate advancements in surveying such as space based positioning systems
CE208.06	Differentiate map and aerial photographs, also interpret aerial photographs.

Subject	Concrete Technology
Subject Code	CE 209 (201010)
Course Outcome (COs)	
CE209.01	Able to select the various ingredients of concrete and its suitable proportion to achieved desired strength.
CE209.02	Able to check the properties of concrete in fresh and hardened state.
CE209.03	Get acquainted to concreting equipment's, techniques and different types of special concrete.
CE209.04	Able to predict deteriorations in concrete and get acquainted to various repairing methods and techniques.

Subject	Structural Analysis
Subject Code	CE 210 (201011)
Course Outcome (COs)	
CE210.01	Understand the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams.
CE210.02	Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames.
CE210.03	Implement application of the slope deflection method to beams and portal frames.
CE210.04	Analyze beams and portal frames using moment distribution method.
CE210.05	Determine response of beams and portal frames using structure approach of stiffness matrix method.
CE210.06	Apply the concepts of plastic analysis in the analysis of steel structures.

Subject	Project Management
Subject Code	CE 211 (201012)
Course Outcome (COs)	
CE211.01	Describe project life cycle and the domains of Project Management.
CE211.02	Explain networking methods and their applications in planning and management
CE211.03	Categorize the materials as per their annual usage and also Calculate production rate of construction equipment
CE211.04	Demonstrates resource allocation techniques and apply it for manpower planning.
CE211.05	Understand economical terms and different laws associated with project management
CE211.06	Understand economical terms and different laws associated with project management

Subject	Project Based Learning
Subject Code	CE 212 (201017)
Course Outcome (COs)	
CE 212.01	Identify the community/ practical/ societal needs and convert the idea into a product/ process/ service.
CE 212.02	Analyze and design the physical/ mathematical/ ICT model in order to solve identified problem/project.
CE 212.03	Create, work in team and applying the solution in practical way to specific problem.

Course Outcomes:

Third Year (TE) Civil Engineering (Curriculum 2019 Pattern)

Semester I

Subject	Hydrology and water resource engineering.
Subject Code	CE 301 (301001)
Course Outcome (COs)	
CE 301.01	Understand government organizations, apply & analyze precipitation & its abstractions
CE 301.02	Understand, apply & analyze runoff, runoff hydrographs and gauging of streams.
CE 301.03	Understand, apply & analyze floods, hydrologic routing & Q-GIS software in hydrology.
CE 301.04	Understand, apply & analyze reservoir planning, capacity of reservoir & reservoir economics.
CE 301.05	Understand water logging & water management, apply & analyze ground water hydrology
CE 301.06	Understand irrigation, piped distribution network and canal revenue, apply and analyze crop water requirement.

Subject	Water Supply Engineering
Subject Code	CE 302 (301002)
Course Outcome (COs)	
CE 302.01	Define identify, describe reliability of water sources, estimate water requirement for various sectors
CE 302.02	Ascertain and interpret water treatment method required to be adopted with respect to

	source and raw water characteristics
CE 302.03	Design various components of water treatment plant and distribution system.
CE 302.04	Understand and compare contemporary issues and advanced treatment operations and process available in the market, including packaged water treatment plants.
CE 302.05	Design elevated service reservoir capacity and understand the rainwater harvesting.
CE 302.06	Understand the requirement of water treatment plant for infrastructure and Government scheme.

Subject	**Design of Steel Structures**
Subject Code	CE 303 (301003)
Course Outcome (COs)	
CE 303.01	Demonstrate knowledge about the types of steel structures, steel code provisions and design of the adequate steel section subjected to tensile force.
CE 303.02	Determine the adequate steel section subjected to compression load and design of built up columns along with lacing and battening.
CE 303.03	Design eccentrically loaded column for section strength and column bases for axial load and uniaxial bending.
CE 303.04	Design of laterally restrained and unrestrained beam with and without flange plate using rolled steel section.
CE 303.05	Analyze the industrial truss for dead, live and wind load and design of gantry girder for moving load.
CE 303.06	Understand the role of components of welded plate girder and design cross section for welded plate girder including stiffeners and its connections.

Subject	**Engineering Economics and Financial Management**
Subject Code	CE 304 (301004)
Course Outcome (COs)	
CE 304.01	Understand basics of construction economics.
CE 304.02	Develop an understanding of financial management in civil engineering projects.
CE 304.03	Prepare and analyze the contract account.
CE 304.04	Decide on right source of fund for construction projects.
CE 304.05	Understand working capital and its estimation for civil engineering projects.
CE 304.06	Illustrate the importance of tax planning & understand role of financial regulatory bodies

Subject	**Advanced Concrete Technology**
Subject Code	CE 305 (301005)
Course Outcome (COs)	
CE 305.01	Understand the chemistry of cement and its effect on properties of concrete
CE 305.02	Apply the knowledge of supplementary cementations materials to produce sustainable concretes
CE 305.03	Understand the mechanism of working of admixtures and their effect on properties of concrete
CE 305.04	Evaluate the characteristic properties of fiber reinforced concrete
CE 305.05	Understand the durability properties of concrete
CE 305.06	Interpret the properties of concrete through advance testing methods

Subject	Audit Courses - Sustainable Energy Systems
Subject Code	CE 306 (301011)
Course Outcome (COs)	
CE 306.01	To demonstrate an overview of the main sources of renewable energy.
CE 306.02	To understand benefits of renewable and sustainable energy systems.

Semester - II

Subject	Waste Water Engineering
Subject Code	CE 307 (301012)
Course Outcome (COs)	
CE 307.01	Recall sanitation infrastructure, quantification and characterization of wastewater, natural purification of streams
CE 307.02	Design preliminary and primary unit operations in waste water treatment plant
CE 307.03	Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process
CE 307.04	Understand and design suspended and attached growth wastewater treatment systems
CE 307.05	Explain and apply concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems
CE 307.06	Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment

Subject	Design of RCC Strucrutes
Subject Code	CE 308 (301013)
Course Outcome (COs)	
CE 308.01	Apply relevant IS provisions to ensure safety and serviceability of structures, understand the design philosophies and behavior of materials: steel & concrete.
CE 308.02	Recognize mode of failure as per LSM and evaluate moment of resistance for singly, doubly rectangular, and flanged sections.
CE 308.03	Design & detailing of rectangular one way and two-way slab with different boundary conditions
CE 308.04	Design & detailing of dog legged and open well staircase
CE 308.05	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.
CE 308.06	Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending and their footings.

Subject	Remote Sensing and GIS
Subject Code	CE 309 (301014)
Course Outcome (COs)	
CE 309.01	Articulate fundamentals and principles of RS techniques.
CE 309.02	Demonstrate the knowledge of remote sensing and sensor characteristics.
CE 309.03	Distinguish working of various spaces-based positioning systems.
CE 309.04	Analyze the RS data and image processing to utilize in civil engineering
CE 309.05	Explain fundamentals and applications of RS and GIS
CE 309.06	Acquire skills of data processing and its applications using GIS

Subject	**Architecture and Town Planning**
Subject Code	**CE 310 (301015)**
Course Outcome (COs)	
CE 310.01	Apply the principles of architectural planning and landscaping for improving quality of life
CE 310.02	Understand the confronting issues of the area and apply the acts.
CE 310.03	Evaluate and defend the proposals.
CE 310.04	Appraise the existing condition and to develop the area for betterment

Subject	**Internship**
Subject Code	**CE 311 (301016)**
Course Outcome (COs)	
CE 311.01	To develop professional competence through industry internship
CE 311.02	To apply academic knowledge in a personal and professional environment
CE 311.03	To build the professional network and expose students to future employees
CE 311.04	Apply professional and societal ethics in their day to day life
CE 311.05	To become a responsible professional having social, economic and administrative considerations
CE 311.06	To make own career goals and personal aspirations

Subject	**Audit Course - Leadership and Personality Development**
Subject Code	**CE 312 (301021)**
Course Outcome (COs)	
CE 312.01	Enhanced holistic development of students and improve their employability skills

Course Outcomes:

Final Year (BE) Civil Engineering (Curriculum 2015 Pattern)

Semester I

Subject	Environmental Engineering II
Subject Code	CE401(401 001)
Course Outcome (COs)	
CE 401.01	Determine the sewage characteristics and comprehend the quality and quantity of sewage.
CE 401.02	Understand the process and component parts of waste water treatment. Also students can design screen chambers, grit chambers and primary settling tank.
CE 401.03	Design secondary treatment units along with activated sludge process and trickling filters.
CE 401.04	Comprehend the need, working principle and design of low cost treatment methods.
CE 401.05	Understand the importance, merits and demerits of onsite sanitation and packaged sewage treatment units.
CE 401.06	Carry out risk assessment of waste water generated by Industries such as sugar, distillery etc and treatment technologies adopted by such industries.

Subject	Transportation Engineering
Subject Code	CE402(401 002)
Course Outcome (COs)	
CE 402.01	Understand the types of roads, various engineering surveys and traffic studies carried out for data collection for design of roads.
CE 402.02	Design the geometric elements of roads
CE 402.03	Acquire knowledge about the various road construction materials, their quality testing and design & construction of pavements
CE 402.04	Understand the various concepts and terms related to Air Transportation System.
CE 402.05	Acquire knowledge about components of bridges, data collection and design loads on Bridges.
CE 402.06	Acquire knowledge about classification, construction and maintenance of Bridges

Subject	Structural Design and Drawing III
Subject Code	CE403(401 003)
Course Outcome (COs)	
CE 403.01	Analyse a prestressed concrete beam accounting for losses also design the anchorage zone for post tensioned members
CE 403.02	Analyse & design of vertical & horizontal shear in post tensioned prestressed concrete for flange section and the design of post tensioned slab.
CE 403.03	Identify various methods of analysis and design for frame type structure under lateral and vertical loading condition.
CE 403.04	Develop an appreciation of the design philosophy for deep excavation and retaining wall projects.
CE 403.05	Design combined reinforced concrete foundation using both conventional approaches and elastic methods.
CE 403.06	Design structural elements of a water retaining structure (Water tanks) for serviceability limit state of crack control and ultimate limit state

Subject	Elective I- Architecture and Town Planning
Subject Code	CE404(401 004)
Course Outcome (COs)	
CE 404.01	Understand concepts, theories, and practices of the discipline of architecture
CE 404.02	Acquire knowledge of urban quality of life with importance of sustainable planning with case study analysis
CE 404.03	Acquire knowledge of different levels of town planning with detailed components of planning
CE 404.04	Acquire knowledge of different civic services and role of planning agencies for various planning levels
CE 404.05	Understand legislative mechanism of town planning
CE 404.06	Acquire knowledge of technological applications in town planning

Subject	Elective II -TQM & MIS in Civil Engineering
Subject Code	CE405(401 005)
Course Outcome (COs)	
CE 405.01	Understand the concept of quality in construction and its importance
CE 405.02	Understand the concept of MIS in construction and necessary support systems and resources
CE 405.03	Understand the concept of Six Sigma in construction and its use to minimize the defects in construction
CE 405.04	Understand the terminology of quality systems and documentation of QMS

CE 405.05	Understand various MIS structures and cost of quality
CE 405.06	Acquire knowledge of ERP software, GIS, GPS, Android subsystems for documentation and monitoring of construction projects

Subject	Project –I
Subject Code	CE 406(401006)
Course Outcome (COs)	
CE 406.01	Identify, formulate and solve problems related to civil engineering.
CE 406.02	Work in a group as a part of multidisciplinary team with professional responsibility
CE 406.03	Analysis and design of structure to meet desired needs within realistic constraints.
CE 406.04	Review literature and finalize problem statement.
CE 406.05	Plan activity schedule and implementation in a given time span.
CE 406.06	Prepare and present technical report.
CE 406.07	Apply modern design and analysis tools.

Semester – II

Subject	Dams and Hydraulic Structures
Subject Code	CE 407(401007)
Course Outcome (COs)	
CE 407.01	Understand the various types of dams and select a particular type considering technical, economic, environmental, climatic, topographic and social factors
CE 407.02	Understand the importance of dam safety and instrumentation required to assess the health of dam.
CE 407.03	Understand the construction & maintenance of gravity dam, earth dam, arch dam, buttress dam and Carry out stability analysis of gravity dam, earth dam & weir.
CE 407.04	Acquire knowledge about components, classification, significance and selection of spillway, energy dissipating devices, spillway gates, diversion head works, canal, canal structures, cross drainage works and River training structures
CE 407.05	Design of Ogee spillway, weir on permeable foundation, lined canal, cross drainage works.
CE 407.06	Acquire knowledge about components, classification and layout of hydropower plants.

Subject	Quantity Surveying, Cotracts and Tenders
Subject Code	CE 408(401008)
Course Outcome (COs)	
CE 408.01	Workout approximate estimates and understand terminology of estimation
CE 408.02	Taking out quantities &Detailed estimate up to plinth
CE 408.03	Prepare detailed estimate for super structure, Understand the concept of Valuation and carryout valuation of real estate
CE 408.04	Draft specifications for various items of work and carry out rate analysis for those items
CE 408.05	Understand terminology of tendering and execution of works, draft tender notice for civil engineering works
CE 408.06	Acquire knowledge about Contracts and Arbitration, draft conditions of contract

Subject	Elective III- Air Pollution and control
Subject Code	CE 409(401009)
Course Outcome (COs)	
CE 409.01	Understand meteorological aspects governing the air pollution.
CE 409.02	Comprehend sampling and analysis of ambient air.

CE 409.03	Describe and understand causes, sources, effects, measurement methods and control measures of indoor air pollution.
CE 409.04	Understand various processes and equipments used for control of air pollution.
CE 409.05	Understand economics of air pollution control and legislations used for air pollution control.
CE 409.06	Comprehend methodology of environmental impact assessment and management and know environmental impacts of various industries.

Subject	Elective IV- Construction Management
Subject Code	CE 410 A(401 009)
Course Outcome (COs)	
CE 410A.01	Understand the importance, applications and scope of construction management.
CE 410A.02	Prepare the construction project schedule and apply the concept of work study.
CE 410A.03	Understand the need, importance and provisions of some important labour laws associated with construction sector and acquire knowledge of financial aspects of construction projects.
CE 410A.04	Analysis risk associated with construction project using some mathematical models, mitigation of project risks and understand concepts of value engineering.
CE 410A.05	Acquire knowledge of various techniques of materials management and human resource management.
CE 410A.06	Acquire knowledge about basic terminologies and applications of artificial intelligence technique in civil engineering

Subject	Elective IV - Statistical Analysis and Computational Methods in Civil Engineering
Subject Code	CE 410 B(401 010)
Course Outcome (COs)	
CE 410B.01	Apply some numerical methods for root finding.
CE 410B.02	Understand the various rules of numerical integration and apply Gauss Quadrature method.
CE 410B.03	Apply optimization techniques
CE 410B.04	Perform statistical analysis
CE 410B.05	Calculate probability and understand probability distributions
CE 410B.06	Perform correlation analysis and regression analysis

Subject	Project – II
Subject Code	CE 411(401 011)
Course Outcome (COs)	
CE 411.01	Identify, formulate and solve problems related to mechanical engineering.
CE 411.02	Work in a group as a part of multidisciplinary team with professional responsibility
CE 411.03	Analysis and design of structure to meet desired needs within realistic constraints.
CE 411.04	Review literature and finalize problem statement.
CE 411.05	Plan activity schedule and implementation in a given time span.
CE 411.06	Prepare and present technical report.
CE 411.07	Apply modern design and analysis tools.

Course Outcomes: Students should be able to

First Year (FE) Computer Engineering (Curriculum 2015 Pattern)

Semester-I

Subject	**Engineering Mathematics -I**
Subject Code	**CMP 101 (107001)**
Course Outcome (COs)	
CMP 101.1	Understand the concepts of matrics that serve as an essential basis for several computational techniques.
CMP 101.2	Understand and solve algebraic and transcendental equations.
CMP 101.3	Acquire the knowledge of infinite series, Taylor series & Malaren's series, Understand and determine the convergence of series
CMP 101.4	Apply the knowledge of series expansions of functions
CMP 101.5	Prove the results of partial differentiation. Apply partial differentiation for evaluating and proving the results.
CMP 101.6	Apply Jacobian for evaluating and proving the results based on Errors and approximations, Maxima and minima.

Subject	**Engineering Physics**
Subject Code	**CMP102 (107002)**
Course Outcome (COs)	
CMP102.1	Students are enabled to derive the diffraction grating formula.
CMP102.2	Students are capable to Calculate the reverberation time of a room and suggest how to design a room with optimal reverberation time
CMP102.3	Students will be able to explain working principle of lasers.
CMP102.4	Ability to estimate the charge carrier mobility and density in intrinsic & extrinsic Semiconductor, PN Junction diode
CMP102.5	Students are capable to calculate the wavelength of a particle as a function of its momentum.
CMP102.6	Ability to explain different methods of growth and synthesis of nana particles and its application in Engineering.

Subject	**Engineering Graphics I**
Subject Code	**CMP 103(102006)**
Course Outcome (COs)	
CMP 103.1	Students will be able to develop the manual drawing skill, drawing interpretation skill.
CMP 103.2	Students will be able to develop the physical realization of the dimension & views of the objects.

CMP 103.3	Student will be able to develop imagination of Physical Objects to be represented on paper for Engineering Communication.

Subject	**Basic Electrical Engineering**
Subject Code	**CMP 104(103004)**
Course Outcome (COs)	
CMP104.1	Relation between Voltage and Current
CMP104.2	Energy conversions
CMP104.3	Direction of Induced emf
CMP104.4	Transform of energy
CMP104.5	Understanding of a pure parameter
CMP104.6	Concept of three phase supply
CMP104.7	Response of element is identical with various sources

Subject	**Basic Civil & Environmental Engineering**
Subject Code	**CMP 105(101005)**
Course Outcome (COs)	
CMP105.1	Understand the scientific terminologies related to civil engineering
CMP105.2	Familiarize with different components, equipment and technical of civil engineering materials of construction
CMP105.3	Describe the structure and function of an ecosystem.
CMP105.4	Explains the concept of built environment and its importance
CMP105.5	Explain the causes, effects and control measures of various types of pollutions.

Subject	**Fundamental of programming language -I**
Subject Code	**CMP 106(110003)**
Course Outcome (COs)	
CMP106.1	To learn & acquire art of computer programming.
CMP106.2	To know about some popular programming language and how to choose a programming language for solving a problem using a computer.
CMP106.3	To learn basics of Programming in C

Semester-II

Subject	**Workshop Practice**
Subject Code	**CMP 107(102006)**
Course Outcome (COs)	

CMP107.1	Introduction to different material in engineering practices with respect to their workability, formability & machinability with hand tools & power & to develop skills through hands on experience.

Subject	**Engineering Mathematics II**
Subject Code	**CMP 108(107008)**
Course Outcome (COs)	
CMP108.1	Solve the differential equations by choosing proper method of solution.
CMP108.2	Solve the problems on orthogonal trajectories, simple electrical circuits, and heat flow by applying the mehods of Ordinary differential Equations.
CMP108.3	Apply the properties of special functions to evaluate integral.
CMP108.4	Apply the properties of special functions to evaluate integral. Sketch the curve with full justification.
CMP108.5	Demonstrate knowledge and understanding of plane and solid geometry & use geometrical skills to solve simple real-world problems
CMP108.6	Evaluate double integral and change the order of the integration. Evaluate area bounded between two curves, mass of Lamina, moment of inertia.

Subject	**Engineering Chemistry**
Subject Code	**CMP 109(107009)**
Course Outcome (COs)	
CMP 109.1	Technology involved in improving quality of water for its industrial use.
CMP 109.2	Basicconcepts of electro analytical techniques that facilitate rapid and reliable measurements.
CMP 109.3	Chemical structure of polymers and its effect on their various properties when used as engineering materials. To lay foundation for application the applications of polymers for specific applications and as composite materials.
CMP 109.4	Study of fossil fuel and derived fuels with its properties and applications.
CMP 109.5	An insight into carbon and hydrogen compounds with aspects of modern chemistry.
CMP 109.6	The principles of chemical and electrochemical reactions causing corrosion and methods used for minimizing the corrosion.

Subject	**Basic Mechanical Engineering**
Subject Code	**CMP 110(102013)**
Course Outcome (COs)	
CMP110.1	This Course will help the students to acquire knowledge of mechanical engineering.
CMP110.2	Describe the scope of mechanical engineering with multidisciplinary industries.

CMP110.3	Understand & identify common machine element with their functions & power transmission deviCMPs.
CMP110.4	Learn conventional machine tools & understand the concept of design in mechanical engineering.
CMP 110.5	Impart knowledge of basic concept of thermodynamics applied to industrial applications.
CMP 110.6	Understand lying principles of energy conversion system & power plant.

Subject	**Engineering Mechanics**
Subject Code	**CMP 111(101011)**
Course Outcome (COs)	
CMP111.1	Apply fundamental knowledge of mathematics, science, and engineering.
CMP111.2	Design and conduct mechanics experiments.
CMP111.3	Analyze and interpret experimental and computational mechanics data
CMP111.4	Design a system, component or process to meet desired needs by synergistically combining mechanics of materials, fluid mechanics, and dynamics, when necessary.
CMP111.5	Identify, formulate, and solve engineering problems involving mechanics of rigid bodies.
CMP111.6	Effectively function as a member of multi-disciplinary technical team and engage in life-long learning.

Subject	**Basic Electronics Engineering**
Subject Code	**CMP 112(104012)**
Course Outcome (COs)	
CMP 112.1	Get knowledge ofsome basic electronic components and circuits
CMP 112.2	Understand basics of diodes and transistor circuits
CMP 112.3	Understand working of some IC based circuits
CMP 112.4	Analyze the logic gates and their usage in digital circuits
CMP 112.5	Expose the students to working ofsome power electronics devices, transducers and application of transducers
CMP 112.6	Understand the basic aspect of electronic communication systems

Subject	**Fundamental of programming language -II**
Subject Code	**CMP 113(110010)**
Course Outcome (COs)	
CMP113.1	To learn & acquire art of computer programming.
CMP113.2	To know aboutsome popular programming language and how to choose a programming language for solving a problem using a computer.
CMP113.3	To learn basics of Programming in C , Advanced Programming.

Subject	**Engineering Graphics II**
Subject Code	**CMP 114(102006)**
Course Outcome (COs)	
CMP114.1	Students will be able to develop the computerized drawing skill, drawing interpretation skill.
CMP114.2	Students will be able to develop the physical realization of the dicension & views of the objects.

Subject	**Computer Graphics**
Subject Code: CMP212	
Course Outcome (COs)	
CMP212.1	Apply mathematics and logic to develop Computer programs for elementary graphic operations
CMP212.1	Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics Computer Vision and Virtual reality
CMP212.1	Develop the competency to understand the concepts related to
CMP212.1	Apply the logic to develop animation and gaming programs
CMP212.1	Be capable of using OpenGL to create interactive computer graphics.

Subject	**Discrete Mathematics(SE)**
Subject Code: CMP212	
Course Outcome (COs)	
CMP201.1	Solve real world problems logically using appropriate set, function,and relation models
CMP201.2	Interpret the associated operations and terminologies in context
CMP201.3	Analyze and synthesize the real world problems using discrete mathematics
CMP201.4	Demonstrate different traversal methods for trees and graphs
CMP201.5	Model problems in Computer Science using graphs and trees.
Subject	Advanced Data Structures
Subject Code:	CMP213
Course Outcome (COs)	
CMP213.1	To apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain.
CMP213.2	To design the algorithms to solve the programming problems
CMP213.3	To use effective and efficient data structures in solving various Computer Engineering domain problems
CMP213.4	To analyze the algorithmic solutions for resource requirements and optimization
CMP213.5	To use appropriate modern tools to understand and analyze the functionalities confined to the data structure usage.

Subject	**OOP**
Subject Code:	**CMP205**
Course Outcome (COs)	
CMP205.1	Ability to understand the principles of Object Oriented Programming
CMP205.2	Ability to understand object-oriented concepts such as data abstraction, encapsulation, inheritance, dynamic binding, and polymorphism
CMP205.3	Ability to understand virtual functions
CMP205.4	Ability to understand the basics of templates & exception handling
CMP205.5	Ability to understand file handling concept
CMP205.6	Ability to understand the standard template library

Subject	**PPL**
Subject Code:	**CMP215**
Course Outcome (COs)	
CMP215.1	To analyze the strengths and weaknesses of programming languages for effective and efficient program development.
CMP215.2	To inculcate the principles underlying the programming languages enabling to learn new programming languages
CMP215.3	To grasp different programming paradigms
CMP215.4	To use the programming paradigms effectively in application development.

Subject	**Computer Organization & Architecture (COA)**
Subject Code:	**CMP204**
Course Outcome (COs)	
CMP204.1	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os.
CMP204.2	Analyze the principles of computer architecture using examples drawn from commercially available computers.
CMP204.3	Evaluate various design alternatives in processor organization.
CMP204.4	Realize different machine instructions for machine computing.
CMP204.5	Design approach towards modern computer organization.

Subject	**Digital Electronics and Logic Design (DELD)**

Subject Code:	**CMP202**
Course Outcome (COs)	
CMP202.1	Realize and simplify Boolean Algebraic assignments for designing digital circuits using KMaps.
CMP202.2	Design and implement Sequential and Combinational digital circuits as per the specifications.
CMP202.3	Apply the knowledge to appropriate IC as per the design specifications.
CMP202.4	Design simple digital systems using VHDL.
CMP202.5	Develop simple embedded system for simple real world application.

Subject	**Microprocessor (MP)**
Subject Code:	CMP214
Course Outcome (COs)	
CMP214.1	To apply the assembly language programming to develop small real life embedded application.
CMP214.2	To understand the architecture of the advanced processor thoroughly to use the resources for programming.
CMP214.3	To understand the higher processor architectures descended from 80386 architecture.
CMP214.4	Understand co-processor mechanism and Implement Trigonometric and Transcendental operations using coprocessor instructions.
CMP214.5	To understand internal processing of Microprocessor.

Subject	**Data Structures and Algorithms (DSA)**
Subject Code:	CMP203
Course Outcome (COs)	
CMP203.1	To discriminate the usage of various structures in approaching the problem solution.
CMP203.2	To design the algorithms to solve the programming problems.
CMP203.3	To use effective and efficient data structures in solving various Computer Engineering domain problems.
CMP203.4	To analyze the problems to apply suitable algorithm and data structure
CMP203.5	To use appropriate algorithmic strategy for better efficiency

Subject	Engineering Mathematics-III
Subject Code:	CMP 211
Course Outcome (COs)	
CMP 211.1	Solve higher order linear differential equations and apply to modeling and analyzing electrical circuits.
CMP 211.2	Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing..

CMP 211.3	Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence.
CMP 211.4	Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals.
CMP 211.5	Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.

Third Year Computer Engineering (Curriculum 2015 Pattern)

Subject	**Embedded Systems & Internet of Things ES IoT**
Subject Code:	CMP312
Course Outcome (COs)	
CMP312.1	Implement an architectural design for IoT for specified requirement
CMP312.2	Solve the given societal challenge using IoT
CMP312.3	Choose between available technologies and devices for stated IoT challenge
Subject	**Design & Analysis of Algorithms (TE)**
Subject Code:	**CMP310**
Course Outcome (COs)	
CMP310.1	Formulate the problem
CMP310.2	Analyze the asymptotic performance of algorithms
CMP310.3	Decide and apply algorithmic strategies to solve given problem
CMP310.4	Find optimal solution by applying various methods

Subject	**Information Systems & Engineering Economics (ISEE)**
Subject Code:	CMP304
Course Outcome (COs)	
CMP304.1	Understand the need, usage and importance of an Information System to an organization.
CMP304.2	Understand the activities that are undertaken while managing, designing, planning, implementation, and deployment of computerized information system in an organization.
CMP304.3	Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.
CMP304.4	Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives
CMP304.5	Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.

Subject	**Theory of Computation (TE)**
Subject Code:	**CMP301**

Course Outcome (COs)	
CMP301.1	Design deterministic Turing machine for all inputs and all outputs
CMP301.2	Subdivide problem space based on input subdivision using constraints
CMP301.3	Apply linguistic theory
CMP301.4	Understand given problem falls under NP hard, NP- Complete

Subject	**Systems Programming & Operating System (SP&OS)**
Subject Code:	**CMP311**
Course Outcome (COs)	
CMP311.1	Analyze and synthesize system software
CMP311.2	Use tools like LEX & YACC.
CMP311.3	Understand and analyze assembler, compiler, linker, loader and macro terminology.
CMP311.4	Implement operating system functions.
CMP311.5	Operating System Design Approach

Subject	Computer Networks
Subject Code:	CMP305
Course Outcome (COs)	
CMP305.1	Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums and technologies.
CMP305.2	Demonstrate design issues, flow control and error control.
CMP305.3	Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols.
CMP305.4	Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.
CMP305.5	Illustrate Client-Server architectures and prototypes by the means of correct standards and technology.

Subject	Web Technology
Subject Code:	CMP314
Course Outcome (COs)	
CMP314.1	Analyze given assignment to select sustainable web development and design methodology
CMP314.2	Develop web based application using suitable client side and server side web technologies
CMP314.3	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
CMP314.4	Develop awareness about different architectures
CMP314.5	Student are able to develop web applications

Subject	Software Engineering & Project Management
Subject Code:	CMP303
Course Outcome (COs)	
CMP303.1	Decide on a process model for a developing a software project
CMP303.2	Classify software applications and Identify unique features of various domains
CMP303.3	Design test cases of a software system
CMP303.4	Understand basics of IT Project management.
CMP303.5	Plan, schedule and execute a project considering the risk management
CMP303.6	Apply quality attributes in software development life cycle.

Subject	Software Modeling & Design (TE)
Subject Code:	CMP313
Course Outcome (COs)	
CMP313.1	Analyze the problem statement (SRS) and choose proper design
	technique for designing web-based/ desktop application
CMP313.2	Design and analyze an application using UML modeling as
	fundamental tool
CMP313.3	Apply design patterns to understand reusability in OO design
CMP313.4	Decide and apply appropriate modern tool for designing and
	modeling
CMP313.5	Decide and apply appropriate modern testing tool for testing
	web-based/desktop application

Subject	Database Management Systems
Subject Code:	CMP302
Course Outcome (COs)	
CMP302.1	Design E-R Model for given requirements and convert the same into database tables
CMP302.2	se database techniques such as SQL & PL/SQL
CMP302.3	Use modern database techniques such as NOSQL
CMP302.4	Explain transaction Management in relational database System.
CMP302.5	Describe different database architecture and analyses the use of appropriate architecture in real time environment.
CMP302.6	Students will be able to use advanced database Programming concepts Big Data –HADOOP

Department : Computer Engineering
Final Year Computer Engineering (Curriculum 2012 Pattern)

Subject	Business Analytic and Intelligence (BAI)
Subject Code:	CMP421
Course Outcome (COs)	
CMP421.1	Get a basic understanding of what a Business Analytic and Intelligence
CMP421.2	Understand the value of Business Analysis in business
CMP421.3	Understand the difference between Business Analytic and Intelligence & related concepts
CMP421.4	Develop the ability to model business data using basic intelligence tools
CMP421.5	Use the basic intelligence tools for analysis & visualization
CMP421.6	Use the basic intelligence tools to take the business decisions

2. Name of the Course:
Course Code: Software Design Methodologies &Testing (SDMT)

Subject	
Subject Code:	CMP415
Course Outcome (COs)	
CMP415.1	To present a survey on design techniques for software system
CMP415.2	To present a design and model using UML for a given software system
CMP415.3	To present a design of test cases and implement automated testing for client server, Distributed, mobile applications
CMP415.4	Students are able to understand Software Requirement Specification (SRS)
CMP415.5	Students are able to collect all documents and apply suitable technique for software development

Subject	Principles of Modern Compiler Design (PMCD)
Subject Code:	CMP402
Course Outcome (COs)	
CMP402.1	To write symbol tables, different types of grammars to solve problem of parsing.
CMP402.2	To design and write simple compiler using FOSS tools.
CMP402.3	To practice compiler tools in basic, concurrent, distributed and embedded environments.
CMP402.4	To survey and use latest trends and advances in compilers
CMP402.5	Student get know working of compiler.

Subject	**High Performance Computing (HPC)**
Subject Code:	CMP416
Course Outcome (COs)	
CMP416.1	Transform algorithms in the computational area to efficient programming code for modern computer architectures
CMP416.2	Write, organize and handle programs for scientific computations
CMP416.3	Use tools for performance optimization and debugging
CMP416.4	Analyze code with respect to performance and suggest and implement performance improvements
CMP416.5	To solve problems for multi-core or distributed, Concurrent /Parallel environments

Subject	Data Mining Techniques (DMT)
Subject Code:	CMP407
Course Outcome (COs)	
CMP407.1	To present survey on different learning, classification and data mining foundations
CMP407.2	To write programs and methods for data Mining applications.
CMP407.3	To solve problems for multi-core or distributed, concurrent/Parallel environments
CMP407.4	To understand different web mining approaches.

Subject	**Smart System Design and Applications(SSDA)**
Subject Code:	CMP403
Course Outcome (COs)	
CMP403.1	Understand Learning aspects in artificial intelligence.
CMP403.2	Implement problem solving, optimization, search algorithm and game.
CMP403.3	Apply knowledge representation schemes, inference and planning.
CMP403.4	Handle uncertainty and apply knowledge of reasoning in decision theory.
CMP403.5	Understand machine learning and implement it for building smart system.
CMP403.6	Understand and implement applications of natural language processing ,image processing,

Subject	Design & Analysis of Algorithms
Subject Code:	CMP401
Course Outcome (COs)	
CMP401.1	Surveying algorithmic strategies give presentations using open source documentation tools like Latex and soft skill methodologies
CMP401.2	Writing mathematical modeling of algorithms for problem solving
CMP401.3	Developing SRS in the UG projects
CMP401.4	Solving problems for multi-core or distributed or concurrent/Parallel/Embedded environments

Subject	**Pervasive Computing**
Subject Code:	CMP409
Course Outcome (COs)	
CMP409.1	To present a survey on pervasive computing building blocks and their relation with Mobile Computing
CMP409.2	To understand Pervasive computing devices and environments
CMP409.3	To effectively use Human Computer Interaction for different types of systems
CMP409.4	To understand adaptive middleware and their usage for Pervasive systems
CMP409.5	To analyze security measures in Pervasive Systems
CMP409.6	To design multi core or distributed, concurrent/parallel environments for Pervasive systems

Subject	**Cyber Security**
Subject Code:	CMP420
Course Outcome (COs)	
CMP420.1	To develop problem solving abilities using Cyber Security
CMP420.2	To apply algorithmic strategies for cyber security
CMP420.3	To develop time and space efficient algorithms
CMP420.4	To study algorithmic examples in distributed, concurrent and parallel environments

Computer Engineering

Sr. No.	Subject Code	Name of Subject	Course Objectives	Course outcome
1	CMP401	High Performance Computing	1. To study parallel computing hardware and programming	1. Describe different parallel architectures, inter-connect networks, programming models.
			2. To be conversant with performance analysis and modeling of parallel programs.	2. Develop an efficient parallel algorithm to solve given proble
			3. To understand the options available to parallelize the programs.	3. Analyze and measure performance of modern parallel computing systems.
			4. To know the OS requirements to qualify in handling the parallelization.	4. Build the logic to parallelize the programming task.
2	CMP402	Artificial Intelligence and Robotic	To understand the concept of Artificial Intelligence (AI)	Identify and apply suitable Intelligent agents for various AI applications
			To learn various peculiar search strategies for AI	Design smart system using different informed search / uninformed search or heuristic approaches
			To acquaint with the fundamentals of mobile robotics	Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem
			To develop a mind to solve real world problems unconventi	Apply the suitable algorithms to AI problems
3	CMP403	Data Analytics	To develop problem solving abilities using Mathematic	Write case studies in Business Analytic and Intelligence using mathematical models
			To apply algorithmic strategies while solving problems	Present a survey on applications for Business Analytic and Intelligence
			To develop time and space efficient algorithms	Provide problem solutions for multi-core or distributed, concurrent/Parallel environments
			To study algorithmic examples in distributed, concurrent and parallel environments	
4	CMP405	Elective-I B Software Architecture and Design	1. To introduce basic concepts and principles about software design and software architecture	1. Express the analysis and design of an application
			2. To learn practical approaches and methods for creating and analyzing software architecture	2. Specify functional semantics of an application
			3. To acquaint with the interaction between quality attributes and software architecture	3. Evaluate software architectures
			4. To experience with examples in design pattern application and case studies in software architecture	4. Select and use appropriate architectural styles and software design patterns
5	CMP409	Elective-II B Software Testing and Quality Assurance	1. Introduce basic concepts of software testing.	1.Describe fundamental concepts in software testing such as manual
			2. Understand white box, block box, object oriented, web ba	2.Design and develop project test plan, design test cases, test data, and conduct test operations
			3. Know in details automation testing and tools used for aut	3.Apply recent automation tool for various software testing for testing software
			4. Understand the importance of software quality and assura	4. Apply different approaches of quality management, assurance, and quality standard to software system
				5. Apply and analyze effectiveness Software Quality Tools
6	CMP412	Laboratory Practice I	Practical hands on is the absolute necessity as far as employability of the learner	
			proposed assignments for three subjects like DA,HPC, AIR are to enhance the competency by undertaking the laboratory assignments of the core courses	
7	CMP413	Laboratory Practice II	Practical hands on is the absolute necessity as far as employability of the learner is concerned.	write System Requirements Specification and organize the problem domain area into broad subject areas and identify the boundaries of problem/system.
			The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses	Perform selective Black-box and White-box testing covering Unit and Integration test by using suitable Testing tools
			To Create a small/ web-based application by selecting relevant system environment / platform and programming languages	Identify the bugs using Selenium WebDriver and IDEand generate test reports