3.1 Establish the correlation between the courses and the POs & PSOs

3.1.1. Course Outcomes

Anna University, Chennai Regulation R-2021

Batch 2021-2025

Course Code & Title : HS 3151 Professional English I **Year / Semester : I Year/I Semester** **Course Index : C101**	
C101.1	Communicate clearly both in written and oral forms using appropriate vocabulary and comprehend written text to make inferences.
C101.2	Speak persuasively in academic/work contexts and write biographical details and technical documents cohesively, coherently, and flawlessly using appropriate words.
C101.3	Read, write and speak effectively in a variety of professional and social settings.
C101.4	Comprehend descriptive, narrative, expository and interpretive texts and write using creative, critical, analytical, and evaluative methods.
C101.5	Understand and respond to different spoken and written discourses/excerpts in different accents and write different genres of text adopting various writing strategies.
Course Code & Title : MA3151 Matrices and Calculus **Year / Semester : I Year/I Semester** **Course Index : C102**	
C102.1	Use the matrix algebra methods for solving practical problems.
C102.2	Apply differential calculus tools in solving various application problems.
C102.3	Use differential calculus ideas on several variable functions.
C102.4	Apply different methods of integration in solving practical problems.
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.
C102.6	Use MATLAB for finding eigenvalues of a Matrix, derivative and integration of functions.
Course Code & Title : PH3151 Engineering Physics **Year / Semester : I Year/I Semester** **Course Index : C103**	
C103.1	Understand the importance of mechanics.
C103.2	Express their knowledge in electromagnetic waves.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.
Course Code & Title : CY 3151 & Engineering Chemistry **Year / Semester : I Year/I Semester**	

Course Index : C104	
C104.1	Illustrate the importance of water quality parameters, water treatment methods and boiler troubles.
C104.2	Explain the types of nanomaterials, synthesis and its applications.
C104.3	Apply the use of phase rule in metallurgy, basics of composites & its applications.
C104.4	Articulate the fuel types, synthesis and its combustion characteristics.
C104.5	Examine the working principle of alternate energy resources and energy storage devices.
C104.6	Analyze the water quality parameters of water samples collected in and around the native area.
Course Code & Title : GE3151 Problem Solving and Python Programming **Year / Semester : I Year/I Semester** **Course Index : C105**	
C105.1	Develop algorithimic solutions to simple computational problems
C105.2	Demonstrate simple Python Program
C105.3	Apply Control stuctures, functions and string to wirte simple program for solving problems
C105.4	Implement compound data using Python list,tuples, dictionaries etc.
C105.5	Illustrate read and write data from/to files in Python programs
C105.6	Build an application by applying various Python concepts
Course Code & Title : GE3171 Problem Solving and Python Programming Laboratory **Year / Semester : I Year/I Semester** **Course Index : C107**	
C107.1	Develop diagrammatic solutions to simple computational solutions
Course Code & Title : BS3171 Physics and Chemistry Laboratory **Year / Semester : I Year/I Semester** **Course Index : C108**	
C108.1	Understand the functioning of various physics laboratory equipment.
C108.2	Use graphical models to analyze laboratory data.
C108.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
C108.4	Access, process and analyze scientific information.
C108.5	Solve problems individually and collaboratively.
C108.6	Analyze the quality of the water samples like hardness, alkalinity, chloride and dissolved oxygen content
C108.7	Quantitatively examine the impurities present in solutions by electro-analytical techniques
C108.8	Practice the synthesis of nano particles
Course Code & Title : GE3172 English Laboratory **Year / Semester : I Year/I Semester**	

Course Index : C109	
C109.1	Listen and comprehend complex academic texts
C109.2	Speak fluently and accurately in formal and informal communicative contexts
C109.3	Respond to and express opinions effectively in Oral mediums of communication such as debates, Group Discussions, classroom discussions.
C109.4	Differentiate among various types of listening and adopt various speaking strategies to present on different topics or excerpts.
C109.5	Identify paralinguistic cues such as postures, gestures, facial expressions, and eye contact and speak effectively in debates and discussions.
Course Code & Title : HS3251 Professional English II **Year / Semester : I Year/II Semester** **Course Index : C110**	
C110.1	Communicate effectively in written and spoken formats in professional settings using suitable contextual word and compare and contrast products and ideas in technical texts.
C110.2	Identify cause and effects in events, describe industrial processes through technical texts and respond to questions using appropriate vocabulary.
C110.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.
C110.4	Report events and the processes of technical and industrial nature in written and oral forms.
C110.5	Present opinions in a planned and logical manner, and draft effective resumes in context of job search.
Course Code & Title : MA3251 Statistics and Numerical Methods **Year / Semester : I Year/II Semester** **Course Index : C111**	
C111.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
C111.2	Apply the basic concepts of classifications of design of experiments in the field of designing engineering problems.
C111.3	Apply the numerical techniques for solving algebraic, transcendental equations, system of linear equations and eigenvalue problems.
C111.4	Make use the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
C111.5	Apply the knowledge of various techniques and methods for solving first order ordinary differential equations with initial and boundary conditions in engineering problems.
C111.6	Demonstrate the usage of MATLAB Software for solving algebraic and transcendental equations and Numerical Integration.
Course Code & Title : PH3201 Physics for Civil Engineering **Year / Semester : I Year/II Semester**	

Course Index : C112	
C112.1	Understand the principles of heat transfer through different materials, thermal performance of building and thermal insulation
C112.2	Extend the knowledge on ventilation and air conditioning of buildings
C112.3	Understand the concepts of sound absorption, noise insulation and lighting designs
C112.4	Elaborate the processing and applications of composites, metallic glasses, shape memory alloys and ceramics
C112.5	Adapt the knowledge on natural disasters such as earthquake, cyclone, fire and safety measures
Course Code & Title : BE3252 Basic Electrical, Electronics and Instrumentation Engineering **Year / Semester : I Year/II Semester** **Course Index : C113**	
C113.1	Determine the current through the circuit and voltage across the particular component by using a suitable method.
C113.2	Describe the parameters of magnetic circuits and various types of wiring.
C113.3	Explain the construction and working principle of Electrical machines.
C113.4	Choose a semiconductor device for a particular application based on their characteristics.
C113.5	Compare the various types of transducers based on their working principle.
C113.6	Design a simple electronic circuit using a suitable semiconductor device.
Course Code & Title : GE3251 Engineering Graphics **Year / Semester : I Year/II Semester** **Course Index : C113**	
C114.1	Construct the conic sectional curves, cycloidal and involute curves.
C114.2	Solve practical problems involving projection of lines.
C114.3	Construct the projection of simple solids and free hand sketches of multiple views from pictorial views of objects.
C114.4	Sketch the Section of Solids and Development of lateral Surfaces of solids.
C114.5	Illustrate the isometric and perspective projections of simple solids.
Course Code & Title : GE3271 Engineering Practices Laboratory **Year / Semester : I Year/II Semester** **Course Index : C116**	
C116.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household woodwork.
C116.2	Construct various electrical joints in common household electrical wire work.
C116.3	Perform welding various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble

	simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
C116.4	Perform soldering and test simple electronic circuits; Assemble and test simple electronic components on PCB.
C116.5	Demonstrate assemble and dismantle of LED TV and computer/ laptop components.
C116.6	Model a circuit design using passive and active components in a virtual lab.
Course Code & Title : BE3272 Basic Electrical, Electronics and Instrumentation Engineering Laboratory **Year / Semester : I Year/II Semester** **Course Index : C117**	
C117.1	Use experimental methods to verify the Ohms law and Kirchhoff's law.
C117.2	Measure the power in a three phase Circuit
C117.3	Calculate the efficiency of given the electrical machine by conducting load test on it.
C117.4	Sketch the characteristics of the semiconductor devices by doing experiments.
C117.5	Measure the displacement of LVDT.
Course Code & Title : GE3272 Communication Laboratory **Year / Semester : I Year/II Semester** **Course Index : C118**	
C118.1	Speak effectively in group discussions held in a formal / semi-formal context
C118.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
C118.3	Write emails, letters and effective job applications
C118.4	Write critical reports to convey data and information with clarity and precision
C118.5	Give appropriate instructions and recommendations for safe execution of tasks
Course Code & Title : ME3351 Engineering Mechanics **Year / Semester : II Year/III Semester** **Course Index : C202**	
C202.1	Illustrate the vector and scalar representation of forces and moments.
C202.2	Examine the rigid body in equilibrium condition.
C202.3	Determine the properties of distributed forces.
C202.4	Estimate the friction and the effects by the laws of friction.
C202.5	Calculate dynamic forces exerted in rigid bodies.
C202.6	Construct a building component and mark the center of gravity on it.
Course Code & Title : CE3301 Fluid Mechanics **Year / Semester : II Year/III Semester** **Course Index : C203**	
C203.1	Explain the basic properties of fluids and apply the concepts of fluid statics.

C203.2	Apply continuity equation and energy equation in solving problems on flow through conduits
C203.3	Discuss the concepts about dimensional and model analysis
C203.4	Illustrate the types of flows and losses of flow in pipes
C203.5	Describe the boundary layer concepts and solve typical numerical problems
C203.6	Measure velocity and fluid flow rates using flow measuring devices
Course Code & Title : CE3303 Water and WasteWater Engineering **Year / Semester : II Year/III Semester** **Course Index : C205**	
C205.1	Explain the components of the water supply scheme, water quality characteristics, and intake structures.
C205.2	Employ the design principles of various functional units of water treatment and illustrate the concepts of advanced water treatment units.
C205.3	Establish a suitable distribution network by analyzing the pipe networks.
C205.4	Summarize the characteristics of the sewage, estimate the quantity of wastewater and storm runoff & calculate the dimensions of the sewer.
C205.5	Describe the design principles and criteria of attached and suspended growth processes like activated sludge process & extended aeration systems, trickling filters, sequencing batch reactors, membrane–bioreactors, waste stabilization ponds, and other recent advanced treatment units
Course Code & Title : CE3351 Surveying and Levelling **Year / Semester : II Year/III Semester** **Course Index : C206**	
C206.1	Introduce the rudiments of various surveying and its principles.
C206.2	Imparts knowledge in computation of levels of terrain and ground features
C206.3	Imparts concepts of Theodolite Surveying for complex surveying operations
C206.4	Understand the procedure for establishing horizontal and vertical control
C206.5	Imparts the knowledge on modern surveying instruments
Course Code & Title : CE3311 - Water and WasteWater Engineering Laboratory **Year / Semester : II Year/III Semester** **Course Index : C208**	
C208.1	Explain the sampling and preservation methods of water and wastewater.
C208.2	Conduct experiments to find optimum coagulant dosage for turbidity removal from surface water samples
C208.3	Fix the chlorine dosage needed for the effective disinfection of water
C208.4	Fix the chemical characteristics of Water from different sources
C208.5	Fix the chemical characteristics of Waste Water from different sources
Course Code & Title : CE3401 Applied Hydraulics Engineering	

Year / Semester : II Year/IV Semester **Course Index : C210**	
C210.1	Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application.
C210.2	Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades.
C210.3	Derive the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.
C210.4	Compare the performance of different types of turbines
C210.5	Explain the working principle with characteristic curves and design centrifugal and reciprocating pumps.
C210.6	Assemble the centrifugal pump and demonstrate its working
Course Code & Title : CE3402 Strength of Materials **Year / Semester : II Year/IV Semester** **Course Index : C211**	
C211.1	Understand the concepts of stress and strain, principal stresses and principal planes.
C211.2	Determine Shear force and bending moment in beams and understand the concept of theory of simple bending.
C211.3	Calculate the deflection of beams by different methods and selection of methods for determining slope or deflection.
C211.4	Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
C211.5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure.
C211.6	Computing the deflection of determinate beams by using modern tools (STAAD Pro) also validates with manual calculation.
Course Code & Title : CE3403 Concrete Technology **Year / Semester : II Year/IV Semester** **Course Index : C212**	
C212.1	Understand the requirements of cement, aggregates and water for concrete
C212.2	Interpret the effect of admixtures on properties of concrete
C212.3	Design concrete mixes as per IS method of mix design
C212.4	Determine the properties of concrete at fresh and hardened state
C212.5	Explain the importance of special concretes for specific requirements
C212.6	Select the suitable type of special concrete for real time applications
Course Code & Title : CE3404 Soil Mechanics **Year / Semester : II Year/IV Semester** **Course Index : C213**	

C213.1	Classify the soil based on physical, index properties, and choose the appropriate field compaction method based on soil condition.
C213.2	Calculate the effective stress and permeability of soil and carry out seepage analysis through flow net.
C213.3	Estimate stress distribution under various loading conditions and to compute the settlement of soil due to consolidation.
C213.4	Determine the shear strength of cohesive and non-cohesive soil.
C213.5	Identify the stability of both finite and infinite slopes.
C213.6	Perform tests on stabilization of soil
Course Code & Title : CE3405 Highway and Railway Engineering **Year / Semester : II Year/IV Semester** **Course Index : C214**	
C214.1	Explain the highway planning according to the principles and standards adopted in various institutions in India.
C214.2	Interpret and design the geometric features of the road network and components of pavement.
C214.3	Analyze and test the highway materials, and construction practices & know their properties and be able to perform pavement evaluation and management.
C214.4	Describe the methods of route alignment and design elements in Railway Planning and Construction.
C214.5	Explain the construction techniques and maintenance of track laying and railway stations
C214.6	Perform the control measures for ensuring the quality of highway construction materials
Course Code & Title : GE3451 Environmental Sciences and Sustainability **Year / Semester : II Year/IV Semester** **Course Index : C215**	
C215.1	Illustrate the importance of environment, biodiversity and its impact on human life.
C215.2	Correlate the causes, effect and control measures of various types of pollution and its case studies.
C215.3	Educate the availability of renewable energy resources and scientific concepts/principles behind them.
C215.4	Articulate the concept of sustainability and management
C215.5	Gain knowledge on sustainability practices and socio-economical change.
C215.6	Analyze the integrated themes of biodiversity, pollution control, waste management, energy resources, and sustainable approaches.
Course Code & Title : CE3411 Hydraulic Engineering Laboratory **Year / Semester : II Year/IV Semester**	

Course Index : C216	
C216.1	Measure the discharge of fluid flow in a pipe by using different flow measurement devices
C216.2	Conduct experiments to verify the Bernoulli's energy equation
C216.3	Measure friction factor in pipes and compare with Moody diagram
C216.4	Examine and understand pump working characteristics under given constraints
C216.5	Predict the efficiency of impulse and reaction turbine in various load conditions.
Course Code & Title : CE3412 Materials Testing Laboratory **Year / Semester : II Year/IV Semester** **Course Index : C217**	
C217.1	Determine the mechanical properties of steel.
C217.2	Determine the physical properties of cement
C217.3	Determine the physical properties of fine and coarse aggregate.
C217.4	Determine the workability and compressive strength of concrete.
C217.5	Determine the strength of brick and wood.
Course Code & Title : CE3501 Design of Reinforced Concrete Structural Elements **Year / Semester : III Year/V Semester** **Course Index : C301**	
C301.1	Identify the various design methodologies for the design of RC elements.
C301.2	Analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.
C301.3	Design the various types of slabs and staircase by limit state method
C301.4	Design columns for axial, uniaxial and biaxial eccentric loadings.
C301.5	Enable to design the footing by limit state method.
Course Code & Title : CE3502 Structural Analysis I **Year / Semester : III Year/V Semester** **Course Index : C302**	
C302.1	Analyze the determinate and Indeterminate trusses and space frames
C302.2	Inspect the continuous beams and rigid frames by slope deflection method.
C302.3	Access the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.
C302.4	Evaluate the indeterminate pin jointed plane frames, continuous beams and rigid frames using matrix flexibility method.
C302.5	Resolve the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames
C302.6	Figure out the structure using STAAD PRO software.
Course Code & Title : CE3503 Foundation Engineering **Year / Semester : III Year/V Semester** **Course Index : C303**	

C303.1	To prepare a detailed site investigation to select geotechnical design parameters and type of foundation
C303.2	To design shallow foundations, its component or process as per the needs and specifications
C303.3	To design combined footings and raft foundations, its component or process as per the needs and specifications.
C303.4	To design deep foundations, its component or process as per the needs and specifications
C303.5	To design retaining walls, its component or process as per the needs and specifications.
Course Code & Title : CCE331-Air and Noise Pollution Control Engineering **Year / Semester : III Year/V Semester** **Course Index : C304**	
C304.1	To know about Air quality criteria, emission standards and National ambient air quality standards.
C304.2	Identify the sources of air pollution, impacts of these pollutants on environment and human health.
C304.3	Correlate the significance of meteorological factors in pollutants dispersion and to predict the pollutant concentration.
C304.4	To learn the working principle of equipment to preventive and control particulate and gaseous contaminants to meet applicable standards.
C304.5	Illustrate the sources of noise and it's understand impacts on human being.
C304.6	Recommend different noise controls apply measures.
Course Code & Title : CCE333 Environmental Impact Assessment **Year / Semester : III Year/V Semester** **Course Index : C305**	
C305.1	Explain the origins and development of EIA and describe the legal provisions of EIA in India
C305.2	Determine the appropriate impact identification and prediction methodologies for the project.
C305.3	Judge the importance of Social Impact Assessments and public participation in the EIA process
C305.4	Prepare environmental management plan and risk mitigation plan by considering environmental aspects, impacts and potential hazards respectively for any project
C305.5	Explain EIA case studies pertaining to infrastructure projects.
C305.6	Practical exercises to provide students with the knowledge and skills necessary to enable them to undertake environmental impact assessment
Course Code & Title : CE3005 Rehabilitation/Heritage Restoration **Year / Semester : III Year/V Semester** **Course Index : C306**	
C306.1	Understand the importance of inspection and maintenance
C306.2	Study the Impacts of cracks, corrosion and climate on structures
C306.3	Acquire the knowledge on various special concretes
C306.4	Understand the testing techniques and various protection measures

C306.5	Know the Repair of structures and Restoration of Heritage structures
C306.6	Diagnose distress in concrete structures, suggest suitable maintenance, and repair strategies.
Course Code & Title : MX3084 Disaster Risk Reduction and Management **Year / Semester : III Year/V Semester** **Course Index : C307**	
C307.1	Illustrate the types of disasters, causes and their impact on environment and society
C307.2	Demonstrate the procedure to assess vulnerability and provide DRR
C307.3	Explain institutional processes for disaster response and Disaster management phases
C307.4	Discover disaster response skills by adopting relevant tools and technology
C307.5	Develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity
C307.6	Construct the vulnerability assessment of various disasters
Course Code & Title : CE3511 Highway Engineering Laboratory **Year / Semester : III Year/V Semester** **Course Index : C308**	
C308.1	Ensure quality control while testing/ sampling and acceptance criteria.
C308.2	Apply the principles and procedures of testing highway materials.
C308.3	Estimate the properties of coarse aggregate.
C308.4	Predict the properties of Bitumen experimentally.
C308.5	Examine the properties of bituminous mixes according to the required specifications.
Course Code & Title : CE3512 Survey Camp **Year / Semester : III Year/V Semester** **Course Index : C309**	
C309.1	Acquire practical knowledge on handling survey instruments like theodolite, tacheometry, total station and have adequate knowledge to carryout triangulation and trilateration including general field marking for various engineering projects
Course Code & Title : CE3010-Sustainable Construction and Lean Construction **Year / Semester : III Year/V Semester** **Course Index : C310**	
C310.1	Describe the various sustainable materials used in construction
C310.2	Explain the method of estimating the amount of energy required for building
C310.3	Describe the features of LEED, TERI-GRIHA ratings of buildings
C310.4	Explain the core concepts of lean construction tools and techniques and their importance in achieving better productivity
C310.5	Apply lean tools & techniques to achieve sustainability in construction projects

C310.6	Measure the embodied energy of materials used for the construction of building
Course Code & Title : CE3601 Design of Steel Structural Elements **Year / Semester : III Year/VI Semester** **Course Index : C311**	
C311.1	Identify the different failure modes of bolted connections for tension or compression members and determine the design strength of such connections.
C311.2	Design the Tension and compression members
C311.3	Design the beam members
C311.4	Select the most suitable section shape and size for a steel member for Indstrial Structures.
C311.5	Design the continues beams and portal frames using plastic desing approach
C311.6	Design the structural systems such as roof trusses, side coverings and gantry girders as per provisions of current code (IS 800-2007)
Course Code & Title : CE3602 Structural Analysis II **Year / Semester : III Year/VI Semester** **Course Index : C312**	
C312.1	Analyze the method of drawing influence lines for statically determinate structures.
C312.2	Analyze the Muller Breslau principle and draw the influence lines for statically indeterminate beams.
C312.3	Analyse three hinged, two hinged and fixed arches
C312.4	Analyse the suspension bridges with stiffening girders
C312.5	Analyse the rigid frames by approximate methods for gravity and horizontal loads
C312.6	Figure out the structure using STAAD PRO software.
Course Code & Title : AG3601 Engineering Geology **Year / Semester : III Year/VI Semester** **Course Index : C313**	
C313.1	Illustrates the internal structure of earth and its relation to earthquakes. Landforms created by various geological agents and their importance in civil engineering.
C313.2	Interpret the various minerals and rocks that can be used as construction materials and road aggregates. In addition, testing the suitability of rocks for foundation purposes.
C313.3	Determine the various geological structures and their impact in engineering constructions. Further, learning the geomechanical properties of rocks and their significance in engineering projects.
C313.4	Summarize the Gaining knowledge on the role of geological mapping, remote sensing and geophysics for surface and subsurface investigations. In addition, students will also gain knowledge on borehole logging techniques and their applications in civil engineering.

C313.5	Assess the geological knowledge for designing and constructing major civil engineering structures, and also mitigating various geological hazards such as earthquakes, landslides and tsunamis.
C313.6	Develop spatial awareness and interpret geological structures from two-dimensional representations.
Course Code & Title : CE3004 Prestressed Concrete Structures **Year / Semester : III Year/VI Semester** **Course Index : C314**	
C314.1	Design a prestressed concrete beam accounting for losses.
C314.2	Design for flexure and shear
C314.3	Design the anchorage zone for post-tensioned members and estimate the deflection in beams.
C314.4	Design composite members and continuous beams.
C314.5	Design water tanks, pipes, poles and sleepers.
Course Code & Title : CE3025 Airports and Harbours **Year / Semester : III Year/VI Semester** **Course Index : C315**	
C315.1	Review the insights on planning and site selection of airport planning and design
C315.2	Explain the various components of airport and its design
C315.3	Analyze and design the elements for orientation of runways and passenger facility systems
C315.4	Describe the various features in harbours and Ports, their construction and terminal facilities
C315.5	Summarize the knowledge about various environmental regulations and acts to be adopted
C315.6	Sketch the layout of the airport located in their residing area
Course Code & Title : CCE332 Environmental Health & Safety **Year / Semester : III Year/VI Semester** **Course Index : C316**	
C316.1	Explain the need for EHS in industries and related Indian regulations
C316.2	Discuss the various types of Health hazards, effect, assessment and control methods
C316.3	Elaborate the various safety systems in working environments
C316.4	Prepare the methodology for Emergency Plans and Accident investigation
C316.5	Detail the EHS Management System and its elements
Course Code & Title : MX3089 Industrial Safety **Year / Semester : III Year/VI Semester** **Course Index : C317**	
C317.1	Explain and implement the basic concepts of safety.
C317.2	Discuss the statutory regulations and standards.
C317.3	Elaborate the safety activities of the working place.
C317.4	Analyze the impact of occupational exposures and their remedies.

C317.5	Detail the risk assessment techniques.
Course Code & Title : CE3611 Building Drawing and Detailing Laboratory **Year / Semester : III Year/VI Semester** **Course Index : C318**	
C318.1	Perform the planning and orientations of buildings
C318.2	Do the building drawing such as plan, section and Elevation
C318.3	Design the building using building information modelling
C318.4	Apply theoretical design concepts to design RCC members
C318.5	Attain sufficient knowledge on the design of Steel structural elements
Course Code & Title : CE3016-Ground Improvement Techniques **Year / Semester : III Year/VI Semester** **Course Index : C319**	
C319.1	Evaluate the deficiencies in the deposits of the given project area and improve its characteristics by hydraulic modifications
C319.2	Improve the ground characteristics by mechanical modifications using various method and design the system
C319.3	Enhance the ground characteristics by physical modifications using various method and design the system
C319.4	Develop the characteristics of soils by various reinforcement techniques and design
C319.5	Analyse the ground and decide the suitable chemical method for improving its characteristics.
Course Code & Title : CE3701 Estimation, Costing and Valuation Engineering **Year / Semester : IV Year/ VII Semester** **Course Index : C401**	
C401.1	Estimate the quantities for buildings
C401.2	Prepare the Rate Analysis for all Building works, canals, Roads and Cost Estimate
C401.3	Prepare the specifications, estimate report and tender documents
C401.4	Draft the contract documents based on standard bidding documents
C401.5	Evaluate valuation for building and land
Course Code & Title : AI3404 Hydrology and Water Resources Engineering **Year / Semester : IV Year/ VII Semester** **Course Index : C402**	
C402.1	Generalize about the types and forms of precipitation and analyze standard estimation methods. Illustrate hydrological processes such as evaporation and infiltration and analyze the process
C402.2	Discuss the catchment types and characteristics; estimate runoff, analyze hydrograph in particular instantaneous unit hydrograph
C402.3	Describe flood and drought extremes in addition to types of droughts and analyze the droughts and floods
C402.4	Explain the reservoirs and illustrate their operation and maintenance

C402.5	Describe the types and properties of aquifer and analyze equations of groundwater flow – Explain about groundwater management through artificial recharge.
Course Code & Title : GE3791 Human Values and Ethics **Year / Semester : IV Year/ VII Semester** **Course Index : C403**	
C403.1	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life
C403.2	Practice democratic and scientific values in both their personal and professional life.
C403.3	Find rational solutions to social problems
C403.4	Behave in an ethical manner in society
C403.5	Practice critical thinking and the pursuit of truth.
Course Code & Title : GE3752 Total Quality Management **Year / Semester : IV Year/ VII Semester** **Course Index : C404**	
C404.1	Discuss the contributions of Quality Guru.
C404.2	Explain the principles of TQM such as 5S and Kaizen
C404.3	Apply the tools and techniques of quality management to manufacturing and service processes
C404.4	Describe Taguchi's Quality Loss Function, Performance Measures and apply Techniques like QFD, TPM, COQ and BPR
C404.5	Illustrate and apply QMS and EMS in any organization
Course Code & Title : CME365 Renewable Energy Technologies **Year / Semester : IV Year/ VII Semester** **Course Index : C405**	
C405.1	Describe the Indian and global energy scenario in various sectors
C405.2	Explain the various solar energy technologies and their applications
C405.3	Interpret the performance of various wind energy technologies
C405.4	Explore the operation of various bio-energy technologies
C405.5	Interpret the performance of ocean and geothermal technologies
Course Code & Title : CBM370 Wearable Devices **Year / Semester : IV Year/ VII Semester** **Course Index : C406**	
C406.1	Describe the concepts of wearable system
C406.2	Explain the signal processing and energy harvestings in wearable device
C406.3	Recognize the concepts of wireless monitoring system and BAN in health care
C406.4	Illustrate the concept of smart textile and fabrication techniques
C406.5	Explain the various applications of wearable devices in healthcare system
C406.6	Realize the use of wearable technologies, health and wellbeing of people
Course Code & Title : CE3003 Prefabricated Structures **Year / Semester : IV Year/ VII Semester** **Course Index : C407**	

C407.1	Apply principles of prefabrication, production, transportation, and erection in construction projects
C407.2	Explain the functions and applications of panel systems and prefabricated components in precast construction
C407.3	Design demountable precast concrete systems, addressing joint flexibility, deformation allowances and optimizing efficiency in material usage
C407.4	Illustrate various joint and connection types in precast construction to optimize structural integrity and assembly efficiency
C407.5	Design structures to mitigate progressive collapse and apply codal provisions for abnormal loads effectively.
Course Code & Title : CE3030 Pavement Engineering **Year / Semester : IV Year/ VII Semester** **Course Index : C408**	
C408.1	Explain the stresses and deflections in pavement layers under the action of wheel loads
C408.2	Evaluate the thickness of flexible pavements by different methods
C408.3	Evaluate the thickness of CC pavements by different methods
C408.4	Determine the suitable construction techniques and maintenance strategies for flexible and rigid pavement
C408.5	Explain the methods of stabilization of highway pavements and rural roads
C408.6	Construct a flexible pavement by mechanistic empirical design using PAVEXpress – A web based pavement design software