



CIVIL ENGINEERING			
PROGR AMME: CIVIL ENGIN EERING G	DEGRE E: UG	REGULATION: R18	SEMESTER: I&II
S.No	Year/ Sem	Course Name	Course Outcomes
			(Student can able to understand)
1	II- I	Surveying and Geomatics (CE301PC)	CO1: Apply the knowledge to calculate angles, distances and levels
			CO2: Identify data collection methods and prepare field notes
			CO3: Understand the working principles of survey instruments, measurement errors and corrective measures
			CO4: Relate the knowledge to the modern equipment and methodologies
			CO5: Estimate measurement errors and apply corrections, levels by different type of equipment
2	II- I	Engineering Geology (CE302PC)	CO1: Site characterization and how to collect, analyze, and report geologic data using standards in engineering practice
			CO2: To study and identify different types natural materials like rocks, minerals and soil
			CO3: The fundamentals of the engineering properties of Earth materials and fluids.
			CO4: To know the physical properties of rocks and minerals
			CO5: Rock mass characterization and the mechanics of planar rock slides and topples
3	II- I	Strength of Materials - I (CE303PC)	CO1: Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, related to the strength of structured and mechanical components.
			CO2: Recognize various types loads applied on structural components of simple framing geometries and understand the nature of internal stresses that will develop within the components.
			CO3: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading
			CO4: Analyze various situations involving structural members subjected to plane stresses by application of Mohr's circle of stress;





			CO5: Frame an idea to design a system, component, or process
4	II- I	Probability and Statistics (MA304BS)	CO1: Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
			CO2: Formulate theorems about the concept of probability
			CO3: Calculate probabilities using conditional probability
			CO4: Rule of total probability and bayes theorem
			CO5: Explain the concept of a random variable and the probability distributions
5	II-I	Fluid Mechanics (CE305PC)	CO1: Understand the broad principles of fluid statics, kinematics and dynamics
			CO2: Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow
			CO3: Understand classifications of fluid flow
			CO4: Be able to apply the continuity, momentum and energy principles
			CO5: Describe the physical properties of a fluid
6	II-I	Surveying Lab (CE306PC)	CO1: Appreciate the need for accurate and thorough note taking in field work to serve as a legal record
			CO2: Gain the ability to use modern survey equipment to measure angles and distances
			CO3: Gain a basic understanding of the principles and operation of the Global Positioning System
			CO4: Gain the ability to measure differences in elevation, draw and utilize contour plots, and calculate volumes for earthwork
			CO5: Improve ability to function as a member of a survey party in completing the assigned field work
7	II-I	Strength of materials lab(CE307PC)	CO1: Configure & Operate a data acquisition system using various testing machines of solid materials
			CO2: Compute and Analyze engineering values (e.g. stress or strain) from laboratory measurements.
			CO3: Write a technical laboratory report
			CO4: Determine hardness of metals
			CO5: Conduct tension test on Materials like steel etc.
8	II-I	Engineering geology lab(CE308PC)	CO1: Understands the method and ways of investigations required for Civil Engg projects
			CO2: Identify the various rocks, minerals depending on geological classifications
			CO3: Will able to learn to couple geologic expertise with the engineering properties of rock and





			unconsolidated materials CO4: In the characterization of geologic sites for civil work projects and the quantification of processes such as rock slides and settlement. CO5: Write a technical laboratory report
9	II-I	Constitution of India (MC309)	CO1: Understand the emergence and evolution of Indian constitution. CO2: Understand the structure and composition of Indian constitution. CO3: Understand and analyse federalism in the Indian context. CO4: Understand and analyse the three organs of the state in the contemporary scenario. CO5: Understand and evaluate the Indian political scenario amidst the emerging challenges.
9	III-I	Structural Analysis-II (CE501)	CO1: Analyze the two hinged arches. CO2: Solve statically indeterminate beams and portal frames using classical methods CO3: Sketch the shear force and bending moment diagrams for indeterminate structures. CO4: Formulate the stiffness matrix and analyze the beams by matrix methods CO5: to impart the principles of elastic structural analysis and behaviour of indeterminate structures
10	III-I	Geotechnical Engineering (CE502PC)	CO1: Characterize and classify the soils CO2: Able to estimate seepage, stresses under various loading conditions and compaction characteristics CO3: Able to analyse the compressibility of the soils CO4: Able to understand the strength of soils under various drainage conditions CO5: problems of liquefaction and soil improvement
11	III-I	Structural Engineering –I (RCC) (CE503PC)	CO1: Compare and Design the singly reinforced, doubly reinforced and flanged sections. CO2: Design the axially loaded, uniaxial and biaxial bending columns. CO3: Classify the footings and Design the isolated square, rectangular and circular footings CO4: Distinguish and Design the one-way and two-way slabs. CO5: Identify and calculate the design loads and distribution
12	III-I	Transportation Engineering (CE504PC)	CO1: An ability to apply the knowledge of mathematics, science and engineering in the areas of traffic engineering, highway development and maintenance





			<p>CO2: An ability to design, conduct experiments to assess the suitability of the highway materials like soil, bitumen, aggregates and a variety of bituminous mixtures. Also the students will develop the ability to interpret the results and assess the suitability of these materials for construction of highways.</p> <p>CO3: An ability to design flexible and rigid highway pavements for varying traffic compositions as well as soil subgrade and environmental conditions using the standards stipulated by Indian Roads Congress.</p> <p>CO4: An ability to evaluate the structural and functional conditions of in-service highway pavements and provide solution in the form of routine maintenance measures or designed overlays using Indian Roads congress guidelines.</p> <p>CO5: An ability to assess the issues related to road traffic and provide engineering solutions supported with an understanding of road user psychological and behavioural patterns.</p>
13	III-I	Concrete Technology (Professional Elective-I) (CE511PE)	<p>CO1: Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the rheology and early age properties of concrete on its long-term behavior.</p> <p>CO2: Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties</p> <p>CO3: Use advanced laboratory techniques to characterize cement-based materials.</p> <p>CO4: Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fibre reinforced concrete.</p> <p>CO5: Recognize the effects of the rheology and early age properties of concrete on its long-term behavior.</p>
14	III-I	Engineering Economics and Accountancy (SM505MS)	<p>CO1: To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF Methods</p> <p>CO2: To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.</p> <p>CO3: Understand the market structures and integration concepts</p> <p>CO4: Apply the concepts of financial management for project appraisal</p> <p>CO5: Evaluate the economic theories, cost concepts and pricing policies</p>
15	III-I	Highway Engineering & Concrete technology	<p>CO1: Categorize the test on materials used Civil Engineering Building & Pavement constructions</p>





		Lab (CE506PC)	CO2: To perform the tests on concrete for it characterization CO3: To Design Concrete Mix Proportioning by Using Indian Standard Method. CO4: Examine the tests performed for Bitumen mixes CO5: To prepare a laboratory report
16	III-I	Advance Communication Skills Lab (EN508HS)	CO1: Communicate efficiently in the work place up professional context CO2: Accomplishment of sound vocabulary and its proper use contextually. CO3: Flair in Writing and felicity in written expression. CO4: Enhanced job prospects. CO5: Effective Speaking Abilities
17	III-I	Geotechnical Engineering Lab(CE507PC)	CO1: Carry out soil mechanics fundamental experiments according to IS standards CO2: Collect, analyze and interpret experimental data CO3: Design soil mechanics experiments and determine which test is needed. CO4: Designing civil engineering projects CO5: Use communication skills to transfer their findings in a formal report format
18	III-I	Intellectual Property Rights(*MC509)	CO1: Distinguish and explain various forms of IPRs. CO2: Identify criterias to fit ones own intellectual work in particular form of IPRs. CO3: Apply statutory provisions to protect particular form of IPRs. CO4: Develop skill of making search using modern tools and technics CO5: Identify procedure to protect different forms of IPRs national and international level.
19	IV- I	Estimation, Costing and Project Management(CE701PC)	CO1: Understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure. CO2: Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure. CO3: Understand how competitive bidding works and how to submit a competitive bid proposal. CO4: An idea of how to optimize construction projects based on costs. CO5: An idea how construction projects are administered with respect to contract structures and issues.





20	IV-I	Ground Improvement Techniques(CE712PE)(PE-III)	CO1: Know the necessity of ground improvement.
			CO2: Understand the various ground improvement techniques available.
			CO3: Select & design suitable ground improvement technique for existing soil conditions in the field.
			CO4: To conduct different soil tests.
			CO5: Realtime case studies on soil stabilization.
21	IV-I	Ground Water Hydrology (Professional Elective - IV) (CE723PE)	CO1: Identify different fundamental equations and concepts as applied in the Groundwater studies.
			CO2: Discuss and derive differential equation governing groundwater flow in three dimensions.
			CO3: To solve groundwater mathematical equations.
			CO4: Distinguish and understand the saline water intrusion problem in costal aquifers.
			CO5: Analyze pumping tests in steady and non steady flow cases.
22	IV-I	Basics of Aeronautical Engineering (OE-II)	CO1: Basic aerodynamic mechanics
			CO2: Effect of flow over wings
			CO3: Aerodynamics forces and moments on aerofoil
			CO4: Subdivision of aerodynamic flow
			CO5: Shape of an aerofoil section
23	IV-I	Professional Practice law & Ethics(SM702MS)	CO1: Understand the importance of professional practice, Law and ethics in their personal lives and professional careers.
			CO2: Learn the rights and responsibilities as an employee, team member and a global citizen.
			CO3: Law relating to intellectual property
			CO4: Engagement of labour and labour & other constructed- related laws, role of labour in civil engg.
			CO5: Dispute resolution boards, Lok adalats
24	II-II	Basic Electrical and Electronics Engineering(EE401ES)	CO1: To analyze and solve electrical circuits using network laws and theorems
			CO2: To understand and analyze basic Electric and Magnetic circuits
			CO3: To study the working principles of Electrical Machines
			CO4: To introduce components of Low Voltage Electrical Installations.
			CO5: To identify and characterize diodes and various types of transistors.





25	II-II	Basic Mechanical Engineering for Civil Engineers (CE402ES)	CO1: To understand the mechanical equipment for the usage at civil engineering systems,
			CO2: To familiarize with the general principles and requirement for refrigeration, manufacturing,
			CO3: To realize the techniques employed to construct civil engineering systems.
			CO4: The knowledge of construction equipments practices and techniques to be used in the field
			CO5: Be able to apply theoretical and practical aspects of project management techniques to achieve project goals
26	II-II	Building Materials, Construction and Planning (CE403PC)	CO1: Define the Basic terminology that is used in the industry
			CO2: Categorize different building materials, properties and their uses
			CO3: Understand the Prevention of damage measures and good workmanship
			CO4: Explain different building services
			CO5: Study the prevalent building by laws
27	II-II	Strength of Materials - II (CE404PC)	CO1: Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of structures and mechanical components in particular to torsion and direct compression;
			CO2: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading
			CO3: Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses;
			CO4: Understand and evaluate the shear center and unsymmetrical bending.
			CO5: Frame an idea to design a system, component, or process
28	II-II	Hydraulics and Hydraulic Machinery (CE405PC)	CO1: Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.
			CO2: Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
			CO3: Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.
			CO4: Get the knowledge on different hydraulic machinery devices and its principles.
			CO5: That will be utilized in hydropower development and for other practical usages.





29	II-II	Structural Analysis - I (CE406PC)	CO1: Differentiate the statically determinate and indeterminate structures.
			CO2: To understand the nature of stresses developed in perfect frames and three hinged arches for various types of simple loads
			CO3: Analyse the statically indeterminate members such as fixed bars, continuous beams and for various types of loading.
			CO4: Understand the energy methods used to derive the equations to solve engineering problems
			CO5: Evaluate the Influence on a beam for different static & moving loading positions
30	II-II	Computer aided Civil Engineering Drawing(CE407PC)	CO1: Use the Autocad commands for drawing 2D & 3D building drawings required for different civil engg applications.
			CO2: Plan and draw Civil Engineering Buildings as per aspect and orientation.
			CO3: Presenting drawings as per user requirements and preparation of technical report
			CO4: Introduction to computer aided drafting, Software for CAD – Introduction to different softwares, Practice exercises on CAD software
			CO5: Drawing of plans of buildings using software a) Single storied buildings b) multi storied buildings
31	II-II	Hydraulics and Hydraulic Machinery Lab (CE409PC)	CO1: Describe the basic measurement techniques of fluid mechanics and its appropriate application.
			CO2: Interpret the results obtained in the laboratory for various experiments.
			CO3: Discover the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
			CO4: Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.
			CO5: Ability to select hydraulic turbines for hydropower plants.
32	II-II	Basic Electrical and Electronics Engineering Lab(EE409ES)	CO1: To analyze and solve electrical circuits using network laws and theorems.
			CO2: To understand and analyze basic Electric and Magnetic circuits
			CO3: To study the working principles of Electrical Machines.
			CO4: To introduce components of Low Voltage Electrical Installations
			CO5: To identify and characterize diodes and various types of transistors.





33	II-II	Gender Sensitization Lab(*MC409)	CO1: Students will have developed a better understanding of important issues related to gender in contemporary India.
			CO2: Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
			CO3: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
			CO4: Students will acquire insight into the gendered division of labour and its relation to politics and economics.
			CO5: Men and women students and professionals will be better equipped to work and live together as equals.
34	III-II	Hydrology & Water Resources Engineering (CE601PC)	CO1: Understand the different concepts and terms used in engineering hydrology
			CO2: To identify and explain various formulae used in estimation of surface and Ground water hydrology components
			CO3: Demonstrate their knowledge to connect hydrology to the field requirement
			CO4: Analyze the design of canals by using different methods
			CO5: Learn the concept of ground water and its occurrence
35	III-II	Environmental Engineering (CE602PC)	CO1: Assess characteristics of water and wastewater and their impacts
			CO2: Estimate quantities of water and waste water and plan conveyance components
			CO3: Design components of water and waste water treatment plants
			CO4: Be conversant with issues of air pollution and control
			CO5: Design sewerage system
36	III-II	Foundation Engineering (CE603PC)	CO1: understand the principles and methods of Geotechnical Exploration
			CO2: decide the suitability of soils and check the stability of slopes
			CO3: calculate lateral earth pressures and check the stability of retaining walls
			CO4: analyse and design the shallow and deep foundations
			CO5: Understand soil exploration methods





37	III-II	Structural Engineering –II (Steel) (CE604PC)	CO1: Analyze the tension members, compression members.
			CO2: Design the tension members, compression members and column bases and joints and connections
			CO3: Analyze and Design the beams including built-up sections and beam and connections
			CO4: Identify and Design the various components of welded plate girder including stiffeners
			CO5: Design bolt and weld connections
38	III-II	Prestressed Concrete Structures (Professional Elective –II) (CE611PE)	CO1: Acquire the knowledge of evolution of process of prestressing
			CO2: Acquire the knowledge of various prestressing techniques.
			CO3: Develop skills in analysis design of prestressed structural elements as per the IS codal provisions
			CO4: Estimate losses of pre stressing
			CO5: Analyse a pre stressed concrete section
39	III-II	Renewable Energy Sources (Open Elective –I) (EE601OE)	CO1: Understand the principals of wind power
			CO2: Assess the cost of generation for conventional and renewable energy plants.
			CO3: Design suitable power controller for wind and solar applications.
			CO4: Analyze the issues involed in the integration of renewable energy sources to the grid.
			CO5: Understand the solar photovoltaic power generation, fuel cells.
40	III-II	ENVIRONMENTAL ENGINEERING LAB (CE605PC)	CO1: Understand about the equipment used to conduct the test procedures
			CO2: Perform the experiments in the lab
			CO3: Examine and Estimate water, waste water, air and soil Quality
			CO4: Compare the water, air quality standards with prescribed standards set by the local governments
			CO5: Develop a report on the quality aspect of the environment
41	III-II	COMPUTER AIDED DESIGN LAB (CE606PC)	CO1: Model the geometry of real-world structure Represent the physical model of structural element/structure
			CO2: Perform analysis
			CO3: Interpret from the Post processing results
			CO4: Design the structural elements and a system as per IS Codes
			CO5: Apply basic concepts to develop construction (drawing) techniques and Ability to manipulate drawings through editing and plotting techniques





42	III-II	ENVIRONMENTAL SCIENCE (MC609)	CO1: Based on this course, the Engineering graduate will understand /evaluate
			CO2: Develop technologies on the basis of ecological principles.
			CO3: Environmental regulations which in turn helps in sustainable development
			CO4: Sustainable developmental activities
			CO5: Environmental policies and regulations, awareness.
43	IV-II	Environmental Impact Assessment (PE –V) (CE812PE)	CO1: Identify the environmental attributes to be considered for the EIA study
			CO2: Formulate objectives of the EIA studies
			CO3: Identify the methodology to prepare rapid EIA
			CO4: Prepare EIA reports and environmental management plans.
			CO5: Guidelines for control of noise, loss of biodiversity, solid and Hazardous waste management rules.
44	IV-II	Urban Transportation Planning(PE-VI)(CE822PE)	CO1: Identify urban transportation problems
			CO2: Estimate urban travel demand
			CO3: Plan urban transport networks
			CO4: Identify urban transport corridors
			CO5: Prepare urban transportation plans
45	IV-II	Non-Conventional Sources of Energy(OE – III) (ME800OE)	CO1: Identify renewable energy and their utilization.
			CO2: Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems.
			CO3: Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas and hydrogen.
			CO4: Understand the concept and applications of fuel cells, thermoelectric converter and MHD generator.
			CO5: Identify methods of energy storage for specific applications.

