Course Outcomes (COS) -VR20

COURSE CODE	COURSE NAME	COS	OURSE OUTCOMES
I SEMESTER			
20BS1101	MATRICES AND DIFFERENTIAL CALCULUS COMMON TO ALL BRANCHES	CO1	Determine Eigen values, Eigen vectors of a matrix.
		CO2	Estimate Maxima and Minima of Multivariable functions.
		CO3	Solve the Linear differential equations with constant coefficients.
		CO4	Solve the Linear differential equations with variable coefficients.
20BS1102 / 20BS2102	ENGINEEERING CHEMISTRY	CO1	Analyze various water treatment methods and boiler troubles.
		CO2	Apply the concept of phase equilibrium to different materials and the knowledge of working of electrodes and batteries in various technological fields.
		CO3	Evaluate corrosion processes as well as protection methods.
		CO4	Apply the knowledge of conventional fuels and mechanistic aspects of conducting polymers for their effective and efficient utilization.
20ES1103	Programming for Problem Solving	CO1	Understand the different types of problem solving approaches
		CO2	Apply the selections, loops, arrays, and string concepts in C to solve problems
		CO3	Apply functions and pointer concepts in C to solve problems.
		CO4	Solve problems using enum, structures, unions, and file handling functions
20ES1104	BASICS OF ELECTRICAL ENGINEERING	CO1	Analyze Electric Circuit fundamentals.
		CO2	Understand the basic concepts of Alternating Quantities and Magnetic Circuits.
		CO3	Analyze the basic concepts of Electric Machines
		CO4	Understand Measuring Instruments & Solar Photo Voltaic System concepts
20ES1104A	INTRODUCTION TO CIVIL ENGINEERING	CO1	Understand the classification of structures and buildings
		CO2	Know the classification of stones, bricks and tiles
		CO3	Recognize the physical properties of cement and aggregates
		CO4	Know the classification of timber, types of steel and types of paints

20ES1104B	MECHANICS FOR ENGINEERS	CO1	Apply equilibrium equations to analyze planar concurrent and parallel forces
		CO2	Analyze coplanar general case of force systems.
		CO3	Evaluate centroids and determine Area moment of inertia of plane figures
		CO4	Evaluate the moment of inertia of material bodies and analyze the fixed axis rotation of rigid bodies.
20ES1104C	ENGINEERING MECHANICS-I	CO1	Analyze coplanar concurrent forces
		CO2	Analyze coplanar parallel forces and evaluate centroid and moment of inertia for plane figures.
		CO3	Analyze coplanar general case of force systems
		CO4	Analyze spatial concurrent and parallel forces
20ES1105 / 20ES2105	ENGINEERING GRAPHICS	CO1	Understand the Scales and conics.
		CO2	Draw Orthographic projections of points, Lines and Planes.
		CO3	Draw Orthographic projections of Solid sand to understand basics of Auto CAD.
		CO4	Understand the sections, Developments of solids and draw isometric views using Auto CAD.
20HS1105/20HS2105	TECHNICAL ENGLISH AND COMMUNICATION SKILLS	CO1	Develop administrative and professional compilations with felicity of expression
		CO2	Demonstrate Proficiency in advanced reading and context oriented writing
		CO3	Apply the elements of functional English with sustained understanding for authentic use of language in any given academic and/or professional environment
		CO4	Execute tasks in Technical communication with competence
20MC1106	TECHNOLOGY AND SOCIETY	CO1	Understand the origins of technology and its role in the history of human progress.
		CO2	Know the Industrial Revolution and its impact on Society
		CO3	Interpret the developments in various fields of technology till Twentieth Century
		CO4	Distinguish the impacts of Technology on the Environment and achievements of great scientists
20BS1151A / 20BS2151A	ENGINEERING PHYSICS LAB	CO1	Test optical components using principles of interference and diffraction of light
		CO2	Use spectrometer, travelling microscope and function generator in various experiments
		CO3	Determine the V-I characteristics of photo cells

			and appreciate the accuracy in measurements
20BS1151A	ENGINEERING PHYSICS LABORATORY(	CO1	Use function generator, spectrometer and travelling microscope in various experiments
		CO2	Test optical components using principles of interference and diffraction of light
		CO3	Determinethe V-I characteristicsof solar cell and photo celland appreciate the accuracy in measurements
20BS1151B/ 20BS2151B	ENGINEERING CHEMISTRY LABORATORY	CO1	Analyze ores, commercial samples, quality parameters of water samples from different sources
		CO2	Perform quantitative analysis using instrumental methods.
		CO3	Apply the knowledge of preparation of polymers, separation of ions, mechanism of corrosion and photochemical reactions.
20ES1152	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	CO1	Implement the use of programming constructs in a structural programming language.
		CO2	Apply the selections, loops, arrays, and string concepts in C to solve problems.
		CO3	Apply functions, pointer, and Enum concepts in C to solve problems.
		CO4	Solve problems using structures, Unions, and file handling functions.
20HS1153 / 20HS2153	TECHNICAL ENGLISH AND COMMUNICATION SKILLS LABORATORY	CO1	Develop active and authentic listening comprehension skills relevant for the professional world.
		CO2	Execute web related(On-line) communication with felicity of expression
		CO3	Apply relevant speech patterns including standard pronunciation
		CO4	Demonstrate Proficiency in Interpersonal Communication with fluency and accuracy
20ES1153 / 20ES2153	ENGINEERING WORKSHOP	CO1	Understand the basic joints using wood and familiarize with various fundamental aspects of house wiring.
		CO2	Prepare basic models using sheet metal and practice joining of metals using arc welding technique.
		CO3	Familiarize with various manufacturing processes such as injection moulding and 3D printing
		CO4	Understand the preparation of PCB
		CO5	Understand simple IOT Applications using Arduino

20ES1154/20ES2154	COMPUTING AND PERIPHERALS LABORATORY	CO1	Able to assemble a PC and install operating system and other software
		CO2	Able to trouble shoot hardware and software issues
		CO3	Able to configure network settings to connect to internet
		CO4	Able to create documents, presentations and spread sheets using office productivity tools.
II SEMESTER			
20BS2101	LAPLACE TRANSFORMS AND INTEGRAL CALCULUS COMMON TO ALL BRANCHES	CO1	Solve the Linear differential equations using Laplace Transforms.
		CO2	Evaluate areas and volumes using Double, Triple Integrals.
		CO3	Evaluate Grad, Div & Curl of scalar and vector point functions.
		CO4	Convert Line Integrals to Area Integrals and Surface Integrals to Volume Integrals.
20BS2102B	PHYSICS FOR ENGINEERS	CO1	Analyse and understand various types of crystal structures and their characterization.
		CO2	Understand various concepts of acoustics and production & detection of Ultrasonics
		CO3	Understand the classification, properties, preparation and applications of various engineering materials
		CO4	Understand the fabrication of nanomaterials and carbon Nano tubes.
20ES2103B	PYTHON PROGRAMMING	CO1	Interpret the python syntax and semantics of control flow statements
		CO2	Apply functions and modules in Python to solve a problem
		CO3	Apply 3rd party packages for developing solutions for real time problems.
		CO4	Implement the problems in terms of real world objects using OOPs concept.
20ES2104D	ENGINEERING MECHANICS (CE)	CO1	Analyze coplanar concurrent and parallel forces
		CO2	Determine centroids for plane figures and evaluate the moment of inertia of areas and material bodies.
		CO3	Explore coplanar general case of force systems and understand the friction concepts and applications
		CO4	Study and analyze the rectilinear motion of particles and rigid bodies
20MC2106	PROFESSIONAL ETHICS &	CO1	Know the moral autonomy and uses of ethical

	PRACTICE		theories.
		CO2	Understand Engineering as Experimentation
		CO3	Understand about safety, risk and professional rights.
		CO4	Know the ethics regarding Global issues related to Environment, Computers and weapon'sdevelopment. Understand general principles of contracting.
III SEMESTER			
20BS3101A	MECHANICS OF SOLIDS	CO1	Understand the concepts of stresses, strains and principles stresses and strains.
		CO2	Determine the shear forces and bending moments
		CO3	Determine the bending stresses and deflection at any point subjected to loads.
		CO4	Determine the shear stress in beams, torsion in shafts, strain energy.
20ES3102A	ENGINEERING GEOLOGY	CO5	Determine the compound stresses and behavior of columns.
		CO2	Apply quantitative skills and frame work for solving basic engineering geology problems related to geological features and geological hazards
		CO3	Understand the importance of geo physical methods making engineering decisions specially site selection of engineering projects.
		CO4	Evaluate geological problems for a meaningful solution in the context of major civil engineering projects and their environmental impact
20CE3303	SURVEYING & GEOMETICS	CO1	Understand the basic principles of surveying and linear measurements
		CO2	Evaluate the reduced levels and plot contours
		CO3	Understand angular measurements and setting out simple curves
		CO4	Evaluate areas and volumes of various sections
		CO5	Understand various modern field equipments
20CE3304	FLUID MECHANICS	CO1	Evaluate the pressure of the flowing fluid.
		CO2	Understand the kinematic and dynamic behavior of flow
		CO3	Apply the principles to measure the flow of fluid through pipes and Orifices/ Mouthpieces
		CO4	Analyze the flow through pipes
20CE3305	CONCRETE TECHNOLOGY	CO1	Understand the manufacturing process of cement, types of cements and chemical

			composition of cement.
		CO2	Apply properties of the constituent materials in concrete
		CO3	Analyze and Compare the Properties of fresh and hardened concrete.
		CO4	Understand effects of various chemical actions on concrete.
		CO5	Evaluate various special concretes and concreting methods based on the scenario.
		CO6	Evaluate an appropriate concrete mixdeign using Indian Standard.
20ES3151A	DESIGN THINKING AND CIVIL ENGINEERING WORKSHOP	CO1	Analyze complex civil engineering problems innovatively with the use of different construction materials and structural elements.
		CO2	Apply various power tools for construction.
20CE3352	SURVEYING LAB - 1	CO1	Evaluate distances, areas by using chain survey.
		CO2	Apply principles of compass survey to plot a traverse and determine the bearings.
		CO3	Evaluate the horizontal and vertical angles using the odolite survey.
		CO4	Apply leveling methods to determine the elevations and plot contours.
20CE3353	COMPUTER AIDED CIVIL ENGINEERING DRAWING	CO1	Apply the knowledge of Various measurements and dimensions of a building components
		CO2	Understand principles of planning, principles of architecture and building Bye-laws.
		CO3	Apply the principles of planning to secure building plans as per Building bye-laws
		CO4	Analyze the requirements of user to draw the plan, elevation, sectional view of the building as per principles of planning and NBC
20TP3106	LOGIC AND REASONING	CO1	Think reason logically in any critical situation
		CO2	Analyze given information to find correct solution
		CO3	To reduce the mistakes in day to day activities in practical life.
		CO4	Develop time management skills by approaching different shortcut methods
		CO5	Use mathematical based reasoning to make decisions
		CO6	Apply logical thinking to solve problems and puzzles in qualifying exams

			forcompanies and inother competitive exams
20MC3107B	INDIAN CONSTITUTION	CO1	Know the fundamental law of the land.
		CO2	Identify how fundamental rights are protected
		CO3	Perceive the structure and formation of the Indian GovernmentSystem
		CO4	Enumerate when and how an emergency can be imposed andwhat are theconsequences.
IV SEMESTER			
20BS4101	PROBABILITY AND STATISTICS FOR ENGINEERS	CO1	Find probabilities using axioms and understand random variables.
		CO2	Estimate Probability density functions.
		CO3	Apply random phenomena of sample to estimate errors
		CO4	Analyze correlation, regression and quality improvement , control charts.
20CE4302	STRUCTURAL ANALYSIS	CO1	Understand, draw and interpret influence line diagrams.
		CO2	Apply energy methods for analysis of indeterminate beams and frames.
		CO3	Analyze statically indeterminate structures using force and displacement methods.
		CO4	Evaluate multistory frames for vertical and horizontal loads by approximate methods
20CE4303	GEOTECHNICAL ENGINEERING	CO1	Understand the origin of soil and basic inter-relationships of soil components.
		CO2	Apply the index properties of soil to classify the soil.
		CO3	Analyze the Soil-Water Interaction.
		CO4	Evaluate compressibility and shear characteristics of soil.
20CE 4304	HYDRAULICS & HYDRAULIC MACHINES	CO1	Evaluate the most economical dimensions of different channel sections.
		CO2	Analyze the flow through an open channel.
		CO3	Evaluate an equation for a phenomenon using dimensional analysis.
		CO4	Analyze and select suitable type of turbine / Pump.
20HS4105	UNIVERSAL HUMAN VALUES	CO1	Familiarize themselves and their surroundings (family, societyand nature
		CO2	Handle problems with sustainable solutions, while keepinghuman relationships and human naturein mind
		CO3	Exhibit critical ability and become sensitive to their commitment towards their understanding human values, human

			relationship and human society.
		CO4	Apply what they have learnt to their own self in different day-to-day settings in real life.
20CE4351	STRENGTH MATERIALS LAB	CO1	Understand the properties of wood, steel and other building materials as per IS code provisions.
		CO2	Analyse the behaviour in stress-strain, deflection, flexure/bending and torsion, of building components
20CE4352	FLUID MECHANICS AND HYDRAULIC MACHINES LAB	CO1	Evaluate the flow through pipes and open channels
		CO2	Analyze the performance of various Hydraulic machines
20CE4353	GEOTECHNICAL ENGINEERING LAB	CO1	Evaluate Index properties of soils
		CO2	Evaluate Engineering properties of soils
20TP4106	ENGLISH FOR PROFESSIONALS	CO1	Howconve rsations are made
		CO2	Usage of grammar
		CO3	Etiquettes and manners
		CO4	Speaking Skills
20CE4607	AUTODESK REVIT AND EXCEL FOR ENGINEERS	CO1	Analyze 3D Structural elements using Autodesk Revit and develop drawings with the necessary details for construction
		CO2	Apply spreadsheet techniques to solve different engineering problems
20MC4108A	ENVIRONMENTAL STUDIES	CO1	Identify various factors causing degradation of natural resourceand control measures
		CO2	Identify various ecosystems and need for biodiversity
		CO3	Interpret the problems related to environmental pollution and itsManagement
		CO4	Apply the information and technology to analyze social issues
V SEMESTER			
20CE5301	WATER RESOURCES ENGINEERING	CO1	Evaluate various irrigation methods and Irrigation management practices in the field.
		CO2	Analyze the Run-off and estimate the ground water yield.
		CO3	Apply the design principles of various Channel sections.
		CO4	Evaluate reservoir capacity and summarize

			various types of hydraulic structures
20CE5302	ENVIRONMENTAL ENGINEERING	CO1	Evaluate the source of water for water supply scheme with reference to quantity and quality of water.
		CO2	Apply and design the treatment units for purification of water and to understand the components of distribution systems and its analysis.
		CO3	Understand the methods of collection, conveyance, quality and estimate the quantity of sewage.
		CO4	Apply appropriate treatment and disposal methods of sewage.
20CE5303	DESIGN OF CONCRETE STRUCTURES	CO1	Analyze for a section for R.C. beams
		CO2	Evaluate a section for R.C. flanged beam &R.C slabs
		CO3	Aalyze for a safe section for R.C columns
		CO4	Evaluate a section for Footings cutting tool materials, and tool life.
20CE5404/A	ADVANCED STRUCTURAL ANALYSIS	CO1	Analyze arches and cables
		CO2	Evaluate statically indeterminate beams using flexibility matrix method
		CO3	Evaluate statically indeterminate beams and frames by stiffness matrix method
		CO4	Apply the basic concepts of plastic analysis and finite element method
20CE5404/B	TOWN PLANNING & ARCHITECTURE	CO1	Apply the principles of urban design
		CO2	Apply the techniques used in Planning of urban infrastructure systems.
		CO3	Analyze the principles of architecture by understanding history
		CO4	Evaluate the concept of sustainable development
20CE5404/C	AIRPOLLUTION AND CONTROL	CO1	Evaluate various types of air pollution and their effects
		CO2	Apply the dispersion phenomenon of air pollutants with regard to meteorological parameters
		CO3	Analyze the samples, pollutants from chimney stacks and ambient atmosphere
		CO4	Apply as necessary, various types of equipment to control air pollution
20CE5404/D	ENVIRONMENTAL GEOTECHNOLOGY	CO1	Apply the principles of environmental geotechnology
		CO2	Apply the concepts in evolving various components of waste containment facility

		CO3	Evaluate containment areas and remediate them.
		CO4	Analyze geotechnical re-use of waste
20CE5404/E	FORENSICSIN CIVILENGINEERING	CO1	Apply forensic engineering to demonstrate structural and geotechnical failures
		CO2	Understand reinforced concrete Structures and steel structure failures through case studies
		CO3	Evaluate different geotechnical failures through case studies
		CO4	Analyze reasons for geo-environmental and fluid and hydraulic failures
20CE5205/A	GEOSPATIAL TECHNOLOGIES	CO1	Apply the recent advances GIS technology in various fields of Engineering.
		CO2	Evaluate the opportunities and available methods for integrating GIS in various engineering applications.
		CO3	Apply cartography technique using GIS.
		CO4	Analysis of vector maps by digitization.
20CE5205/B	BUILDING SERVICES ENGINEERING	CO1	Evaluate the types, basic planning and specifications of buildings.
		CO2	Apply ventilation and thermal insulation in structures
		CO3	Apply the plumbing and electrical fixtures in structures
		CO4	Analyze the considerations for fire prevention and fighting and termite prevention in buildings.
20CE5351	COMPUTER APPLICATIONS IN CIVIL ENGINEERING LAB-1	CO1	Evaluate cross sectional/ reinforcement required and prepare structural drawings for various structural elements by using AUTOCAD.
		CO2	Apply Microsoft Excel/Mat Lab to execute design problems
20CE5352	ENVIRONMENTAL ENGINEERING LAB	CO1	Analyze the various parameters and understand their significance and application.
		CO2	Evaluate the suitability of water for various applications by knowing water quality standards.
20CE5353	ADVANCED SURVEYING LAB	CO1	Apply the surveying principles for setting boundaries, computing area and elevation using a total station
		CO2	Apply setting out for buildings and curves using various instruments
		CO3	Evaluate the contours for any given area
		CO4	Apply advanced instruments for surveying
20TP5106	PERSONALITY DEVELOPMENT	CO1	Analyze the corporate etiquette.
		CO2	Apply presentation techniques effectively with appropriate body language
		CO3	Apply positive attitude

		CO4	Apply the core competencies to succeed in professional and personal lif
20CE5354	ENGINEERING PROJECT IN COMMUNITY SERVICES (EPICS)	CO1	Evaluate the societal problem from the villages or towns or local communities with well defined objectives.
		CO2	Analyze and solve the problems by applying modern tools and materials for appropriate solution.
		CO3	Apply team work, communication and presentation skills
		CO4	Ealuate the context of the problem and prepare a technical report as per the specified guidelines
20CE5607	BUILDING INFORMATION MODELING (BIM)	CO1	Apply their knowledge to model the structure with Architectural, Structural and MEP components
		CO2	Apply the software commands to create industry standard architectural drawings.
20MC5108B	INNOVATION, IPR AND ENTREPRENEURSHIP	CO1	Understanding the concept of innovation and its importance in organizations.
		CO2	Apply innovation management strategy in new product development.
		CO3	Understanding the Intellectual Property Rights and the key legal aspects
		CO4	Analyze the concept of entrepreneurship and skills
VI SEMESTER			
20CE6301	DESIGN OF STEEL STRUCTURES	CO1	Analyze the adequacy of bolted& welded connections
		CO2	Analyze the adequacy of bolted & welded connections in tension and compression members.
		CO3	Evaluate the adequacy of laterally supported and unsupported steel beams
		CO4	Evaluate the adequacy of steel column bases
20CE6302	TRANSPORTATION ENGINEERING	CO1	Analyze the best alternative route for highways
		CO2	Apply the studies to regulate traffic control and management
		CO3	Evaluate geometrics and pavement crust
		CO4	Analyze the Construction and Maintenance of Highways
20HS6103	ENGINEERING ECONOMICS AND MANAGEMENT	CO1	Understand the principles of economics, income and goods and service tax.
		CO2	Apply the concepts of management and demand forecasting.
		CO3	Evaluate time value of money and various forms

			of decision making.
		CO4	Apply the concept of financial importance in projects and budgeting process.
20CE6404/A	ADVANCED DESIGN OF CONCRETE STRUCTURES	CO1	Evaluate sectional details for staircase and flat slab.
		CO2	Analyse foundations and retaining walls for safety.
		CO3	Evaluate safe section for water tanks
		CO4	Analyze for safe composite structures.
20CE6404/B	FOUNDATION ENGINEERING	CO1	Evaluate sub soil properties through geotechnical investigations; understand distribution of stresses below footing level due to geostatic loads.
		CO2	Aalyse the earth pressures behind retaining walls and analyse soil slopes
		CO3	Evaluate the capacity of shallow foundations and estimate settlements
		CO4	Analyze the capacity of various types of deep foundations.
20CE6404/C	ADVANCED ENVIRONMENTAL ENGINEERING	CO1	Evaluate the p r o t e c t i o n of water bodies against contamination on disposal of waste water.
		CO2	Apply new concepts of waste water treatment and choose a selection of low cost treatment units.
		CO3	Evaluate suitable treatment process for selected industrial effluents.
		CO4	Analyze the effects of air pollutants and acquaint devices to Control particulate matter, Levels of and effects of Noise Pollution.
20CE6404/D	RAILWAY AND TUNNEL ENGINEERING	CO1	Evaluate the components of the railway track
		CO2	Analyze the geometric section of railway track and control movement of locomotive
		CO3	Analyze the stages in tunnel construction
		CO4	Understand tunnelling method
20CE6404/E	IRRIGATION STRUCTURES	CO1	Analyze the basics of diversion head works and canal regulation
		CO2	Apply the design principles of various cross drainage works
		CO3	Evaluate various types of dams and principles of Aurthur cotton technology
		CO4	Evaluate various types of spill ways.
20CE6205/A	GREEN BUILDINGS AND SUSTAINABILITY	CO1	Understand Green building & sustainable design concepts
		CO2	Evaluate sustainable materials and factors influencing the design of green buildings
		CO3	Analyze construction process and maintenance of green buildings

		CO4	Apply the requirements of IGBC certification.
20CE6205/B	ADVANCED CONSTRUCTION MATERIALS	CO1	Evaluate different types of modern materials, Paints, Enamels and Varnishes that are used in construction.
		CO2	Analyze the importance of special concretes and glass materials used in Building Construction
		CO3	Understand the classification and usage of materials like plastics, bitumen and sound absorbent materials
		CO4	Evaluate building material like gypsum and various adhesives
20CE6205/C	QUALITY CONTROL AND QUALITY ASSURANCE	CO1	Understand meaning of quality, TQM and Quality Circles
		CO2	Apply quality monitoring procedures
		CO3	Apply statistical QC techniques and quality assurance techniques
		CO4	Analyze bad quality of work and contents of quality manual
20CE6351	TRANSPORTATION ENGINEERING LABORATORY	CO1	Analyze the suitability of aggregates and bitumen in pavement construction.
		CO2	Understand the importance of traffic studies at mid block section
20CE6352	COMPUTER APPLICATIONS IN CIVIL ENGINEERING LAB-2	CO1	Analysis for cross section and requirement of reinforcements of various structural elements by using STAAD.Pro/ ETABS.
		CO2	Analyse for rates and quantities and prepare rate analysis for various works in construction of a building using Spread Sheets
20HS6153	ENGLISH COMMUNICATIONS SKILL LAB	CO1	Be proficient in pronunciation of speech sounds includingaccentuation
		CO2	Enhance the awareness of the elements of listeningcomprehension
		CO3	Develop the abilities of rational argumentation and skills of public speaking
		CO4	Be aware of the elements of professional communication
		CO5	Be exposed to the items of various competitive exams
20TP6106	QUANTITATIVE APTITUDE	CO1	Effectively organize, summarize and present information inquantitative forms including tables
		CO2	Be able to use mathematical based reasoning and be able toevaluate alternatives and make decisions
		CO3	Be able to think and reason logically and

			critically in anygiven situation
		CO4	Application of logical thinking to solve problems and puzzlesin qualifying exams for companies and in other competitive exams
20ME6554	MINI PROJECT -1	CO1	Identify the problem, define objectives and scope of the projectwork
		CO2	Carryout Team work.
		CO3	Prepare and present a comprehensive report of the projectwork.
		CO4	Apply the principles of Thermal Engineering to solveproblems .
		CO5	Solve Engineering problems using the concept of design andmanufacturing.
20MC6107 B	BIOLOGY FOR ENGINEERS	CO1	Explain the fundamental principles of Biology that lead tomajor discoveries
		CO2	Identify the functions of different types in bio-molecules
		CO3	Explain mechanisms underlying the working of molecularbiological processes including
		CO4	Understand metabolism to analyze biological processes
VII SEMESTER			
20CE7301	ESTIMATION AND COSTING	CO1	Understand the Structural Drawings, Procedures and various Estimating methods of Buildings.
		CO2	Apply suitable procedures to estimate R.C.C Beam, Roads and Canal works.
		CO3	Apply specifications for determining rate analysis for civil engineering works
		CO4	Eealuate value of buildings based on rental method and understand PWD procedures
20CE7402A	EARTHQUAKE RESISTANT DESIGN	CO1	Understand the basics of Engineering Seismology and understand the elements of Earthquake Engineering
		CO2	Apply the single and multi-degree of freedom systems subjected to vibration including earthquake and understand the concepts of seismic-resistant building architecture.
		CO3	Analyze the earthquake design forces using appropriate methods as per IS 1893-2002(Part-I)and apply the concept of ductile detailing in earthquake resistant design
		CO4	Analyze and design a single storey and single bay RCC plane framed building subjected to an

			Earthquake
20CE7402B	SOLID WASTE MANAGEMENT	CO1	Understand the sources and composition of Municipal Solid Waste.
		CO2	Aalyze methods of collection, transport and disposal of Municipal Solid Waste
		CO3	Apply methods of separation and recycling of Municipal Solid Waste..
		CO4	Understand handling of Bio-medical, plastic and e-waste.
20CE7402C	GROUND IMPROVEMENT TECHNIQUES	CO1	Understand need and methods of ground improvement techniques
		CO2	Apply suitable ground improvement technique for a given site
		CO3	Apply different grouting techniques, geotextiles and their functions
		CO4	Evaluate the expansivity of soils and types of foundations for expansive soils and suggest soil stabilization techniques based on field conditions
20CE7402E	OPEN CHANNEL FLOW AND RIVER ENGINEERING	CO1	Apply energy principles for Uniform flow.
		CO2	Evaluate various surface profiles in an open channel flow.
		CO3	Understand the behavior of flow through non-prismatic channels.
		CO4	Analyze river flow hydraulics.
20CE7402F	ANALYSIS AND DESIGN OF HIGH RISE BUILDINGS	CO1	Understand structural systems of HighRise buildings.
		CO2	Apply the latest construction practices and processes for various structural systems.
		CO3	Evaluate the wind & seismic effects on behavior of high rise buildings
		CO4	Analyze and design of high rise buildings
20CE7402D	PAVEMENT DESIGN AND CONSTRUCTION	CO1	Understand the factors affecting pavement design and analyze layer system
		CO2	Evaluate the thickness of flexible and rigid pavements
		CO3	Understand different materials and methods used in construction of pavements
		CO4	Analyze and design pavement overlays
20CE7403A	PREFAB STRUCTURES	CO1	Understand the plant prefabricated and production
		CO2	Analyse the prefabricated

			load carrying members
		CO3	Analyze the production technology of prefabrication
		CO4	Evaluate and detailing of precast UNIT for factories with single storey simple frame
20CE7403B	CONSTRUCTION EQUIPMENT AND AUTOMATION	CO1	Analyze the feasibility of specific equipment by understanding their working principles to be used in different construction activities
		CO2	Uunderstand the procedures of concrete production and procedure of dewatering and grouting
		CO3	Apply the concept and procedure of automation in construction sector
		CO4	Apply the latest techniques of automation in construction sector
20 CE 7403C	GROUND WATER HYDROLOGY	CO1	Understand components, fluctuations, flow rate and measurement of velocity of ground water.
		CO2	Evaluate the storage capacity, ground water potential and the methods for assessment of ground water.
		CO3	Apply the design principles of wells and assessment of ground water quality.
		CO4	Understand sea water intrusion and artificial ground water recharge.
20CE7403E	AIRPORT PLANNING AND HARBOUR PLANNING	CO1	Understand airport and aircraft characteristics
		CO2	Analyse various obstructions at airport.
		CO3	Evaluate airport runway pavement.
		CO4	Understand components of docks and harbors.
20CE7403F	DESIGN AND DRAFTING USING REVIT	CO1	Understand the Revit Software and its user interface.
		CO2	apply the process of drafting, designing, and modelling the building using Revit
		CO3	evaluate a project using Revit Software that will cater to the industrial Requirements
		CO4	Understand the preparation of construction drawings in detail.
20CE7404A	DESIGN OF PRESTRESSED CONCRETE	CO1	Understand Basic concept of prestressing and Systems of Prestressed concrete
		CO2	Apply the various Losses in Prestressed concrete
		CO3	Analyse the resultant stresses, moments and shear forces in members and design by using

			appropriate methods.
		CO4	Analyze the Deflections for various support conditions
		CO5	evaluate the stresses at end zone and Design of End block as per IS method
20CE7404B	REPAIR AND REHABILITATION OF STRUCTURES	CO1	Understand the mechanisms of deterioration of structures and diagnosis of failure
		CO2	Understand the damages occurred in reinforced concrete building and knowing the remedies for damages
		CO3	Apply different types of strengthening techniques used for existing structures
		CO4	Apply different types of strengthening techniques used for existing structures
20CE7404C	DISASTER PREPARDENESS AND PLANNING MANAGEMENT	CO1	Analyze various stages in transport Planning Process
		CO2	pply various methods for data collection
		CO3	Apply and finalize the route choice and network design
		CO4	Evaluate transport projects with the help of various methods
20CE7404D	URBAN TRANSPORT PLANNING	CO1	Analyze various stages in transport Planning Process
		CO2	Apply various methods for data collection
		CO3	Apply and finalize the route choice and network design
		CO4	Evaluate transport projects with the help of various methods
20CE7404E	RURAL WATER SUPPLY AND SANITATION	CO1	Understand various rural water supply programs in India.
		CO2	Apply various low cost sanitation methods in India.
		CO3	Understand the methods used for wastewater treatment.
		CO4	Apply the methods of low cost sanitation.
20CE7404F	ANALYSIS AND DESIGN OF INDUSTRIAL STRUCTURES	CO1	Understand the functional requirements for industrial structures
		CO2	Evaluate various elements of gantry girders and roof trusses
		CO3	Apply the concepts in design bunkers and silos
		CO4	Evaluate the design principles of industrial floorings
20CE7607	COMPUTER AIDED CONSTRUCTION	CO1	Understand the planning and scheduling. networking methods,

	MANAGEMENT		resource optimization techniques in various construction projects
		CO2	Apply EPS in a project and Create a Work Breakdown Structure (WBS)
		CO3	Analyse Network Diagram with the identification of activities and their underlying relationships
		CO4	Apply various resources like labor,non-labor,material
		CO5	Analyse critical path, forward/backward pass, resource leveling and base lining.
		CO6	Analyse the project plan and measure variances and report performances
20CE7551	MINI PROJECT II	CO1	Review the research literature, identify the problem, to solve the problems using the necessary fundamentals of engineering.
		CO2	Illustrate the concepts, methods, techniques and using modern tools to address the problems of the society and suggest a feasible solution.
		CO3	Prepare a technical report ethically - as per guidelines.
		CO4	Demonstrate team work, communication and presentation skills.
VIII SEMESTER			
20CE8551	MAJOR PROJECT AND INTERNSHIP	CO1	Conduct a comprehensive analysis of the problem through an in-depth review of relevant literature.
		CO2	Apply appropriate concepts, methods, techniques, and tools to address the problem and propose a viable solution.
		CO3	Develop a well-structured technical report in alignment with established guidelines.
		CO4	Demonstrate teamwork, effective communication, and strong presentation skills.