Course Outcomes (COs) for UG Programme

COs for III Semester Courses

CET201: Construction Materials	
CO1	Able to demonstrate knowledge of construction materials and their usages in building projects.
CO2	Able to apply learning to further research in advancement of civil engineering materials field.
CO3	Understand characteristics of conventional building materials like stone, brick, wood etc.
CO4	Learn new and composite materials and their value adding characteristic of being lightweight, energyefficient, speedy construction among others.
CET202: Fluid Mechanics	
CO1	Learn basic properties and characteristics of incompressible fluid.
CO2	Understand basic fundamental theorems governing fluid flows i.e., continuity, energy and momentum.
CO3	Learn measurement of different fluid properties using various type of equipment like measurement offlow, pressure velocity and head loss.
CO4	Learn the analysis of flow phenomenon through pipes and other systems.
CET203: Surveying	
CO1	Understand the basic skills of surveying work including distance and angle measurement
CO2	Able to finalise and select a particular type of survey and equipment suitable for a particular engineering application.
CO3	Able to use different type of surveying equipment like Compass, Theodolite, levels etc., for directionmeasurement, angle measurement, differential levelling and contouring
CO4	Able to prepare a surveying map using collected surveying data.
CET204: Mechanics of Solids	
CO1	Ability to estimate stresses and strains of different structural components.
CO2	Ability to determine forces in trusses using various methodologies for different boundary conditions.
CO3	Ability to analyse the structures and to draw shear force and bending moment diagrams.
CO4	Ability to determine deflection of beams using different methods.
CET205: Engineering Geology	
CO1	Understand the concepts of various geological materials and weathering processes.
CO2	Understand the properties, behaviour and engineering significance of different type of rocks and minerals.
CO3	Learn the interpretation skills of geological maps having different type of geological features.
CO4	Learn consideration and importance of geological aspects in civil engineering related infrastructureprojects.

COs for III Semester Courses (Continued)

MAT206: Mathematics III	
CO1	Understand different numerical methods which can be used for the solution of non-linear problems.
CO2	Understand different probability and statistical aspects used in different engineering problems.
CO3	Able to apply numerical methods and statistical concepts for solving different engineering problems.
CEP207: Construction Materials Lab	
CO1	Able to identify different type of construction materials.
CO2	Able to measure different engineering properties of building materials like strength, water absorption, abrasion impact etc.
CO3	Able to analyse and select different type of suitable material for construction projects.
CEP208: Fluid Mechanics Lab	
CO1	Able to demonstrate the basic properties and characteristics of incompressible fluid in laboratory.
CO2	Able to demonstrate fundamental theorems governing fluid flows i.e., continuity, energy and momentum in laboratory.
CO3	Able to measure different fluid properties using various type of equipment like measurement of flow, pressure velocity and head loss.
CEP209: Surveying Lab	
CO1	Understand working of different type of surveying equipment.
CO2	Able to use surveying equipment in field for measurement of distance, direction and elevation.
CO3	Able to adjust the traverse and calculation of coordinates i.e., latitude and departures.
CO4	Use surveying data for preparation of maps.
CEP210: Geology Lab	
CO1	Learn the identification of different type of rocks and minerals.
CO2	Learn the identification and interpretation skills of geological maps having different type of geological features.
CO3	Learn consideration and importance of geological aspects in civil engineering related infrastructure projects.

COs for IV Semester Courses

CET221: Building Technology	
CO1	Understand practical knowledge about manufacturing of concrete and other construction practices.
CO2	Visualize buildings as objects through drawings.
CO3	Monitor and execute construction activities in building projects.
CO4	Select correct and suitable equipment for construction as per site conditions.
CET222: Pipe and Channel Hydraulics	
CO1	Able to understand flow characteristics in open channels.
CO2	Understand concepts and characteristics of boundary layer, laminar flow, and turbulent flow.
CO3	Learn the working of hydraulic machines like pumps, ram and turbines.
CO4	Able to analyse the performance of hydraulic machines.
CET223: Advanced Surveying	
CO1	Plan and execute triangulation surveying schemes and survey.
CO2	Make measurements on satellite images and aerial photographs using photogrammetric concepts
CO3	Use advance surveying equipment for preparation of maps, determination of positions.
CO4	Measure time and other astronomical observations
CET224: Highway Engineering	
CO1	Be able to understand the difference between material characteristics of different types of highwaymaterials i.e. aggregates, bituminous materials such as cutback emulsions and Tar etc.
CO2	Acquire skills for understanding the basics for design of various geometric elements.
CO3	Acquire broad knowledge for design of transition curve, radius of curve, valley curve and summit curve.
CO4	Acquire the ability to design the pavement crust for Rural Roads as per IRC SP-72.
CET225: Structural Analysis – I	
CO1	Analyse deformation for statistically determinate structures.
CO2	Analyse statistically determinate and indeterminate structures.
CO3	Analyse statistically determinate and indeterminate arches
CET226: Water Supply Engineering	
CO1	Understand the planning of water supply systems.
CO2	Able to select the suitable source of water supply after analysis of water quality and other parameters.
CO3	Able to design the water supply system components like intake, transmission, and distribution network.
CO4	Able to select suitable water treatment to be given and design of components of a water treatment plant.

COs for IV Semester Courses (Continued)

CEP227: Building Drawing	
CO1	Understand the basic concepts of building drawing.
CO2	Understand the basic steps of building construction and their components.
CO3	Able to draw different type of drawings required for construction of buildings.
CEP228: Hydraulics Lab	
CO1	Able to demonstrate the flow characteristic in open channels like hydraulic jump.
CO2	Able to draw performance characteristics of pumps.
CO3	Able to draw performance characteristics of turbines and hydraulic ram.
CEP229: Advanced Surveying Lab	
CO1	Understand the errors in traversing, their propagation and adjustment.
CO2	Able to book and reduce field observations.
CO3	Able to use advance equipment like total station for traverse measurements.
CO4	Understand the use of astronomy in surveying and measurements from aerial photographs.
CEP230: Road Material Testing Lab	
CO1	Understand the different important engineering properties of road material like aggregate and binding materials
CO2	Able to demonstrate the different test procedures related to road materials.
CO3	Able to measure the engineering properties of road material in laboratory like fine aggregate, coarseaggregates and different type of binding materials.
CEP231: Public Health Engineering Lab	
CO1	Understand the different important water quality parameters and their permissible limits as per the standards.
CO2	Able to analyse the water quality in laboratory by measuring different physical and chemical characteristics of water.
CO3	Able to determine the biological quality of water.

COs for V Semester Courses

CET301: Sanitary Engineering	
CO1	Understand basic concepts of wastewater generation, collection system, waste water quality and standards.
CO2	Learn the methods for design of sewerage system components.
CO3	Understand the construction methodologies of sewerage system.
CET302: Structural Analysis – II	
CO1	Analyse statistically determinant structures using displacement approaches.
CO2	Analyse statistically determinant and indeterminate arches.
CO3	Analyse structures using matrix approaches.
CET303: Design of RC Structures	
CO1	Understand basic philosophy of Working Stress and Limit State Design of RCC structures.
CO2	Able to design different structural components like beams, columns, slabs etc.
CO3	Able to design different structural frames.
CET304: Hydrology	
CO1	Apply probability distributions to hydrologic processes and understand the scope and limitations of statistical methods.
CO2	Estimate the time of concentration of a watershed, based on information about surface type and travellength, slope, and rainfall intensity.
CO3	Able to develop design storms and estimate infiltration and hydrologic losses based on information about land use and soil type.
CO4	Understand hydrologic and hydraulic methods of flow routing.
CO5	Able to use software for the hydrologic design of small-scale rural or urban watersheds.
CET305: Soil Mechanics	
CO1	Understand basic concepts and principles of soil mechanics.
CO2	Able to classify the soils
CO3	Learn about compaction, compressibility, permeability of soils.
CO4	Learn about characteristics and strengths of soil.
CET306: Estimation and Costing	
CO1	Learn about estimate of building components and BOQ preparation
CO2	Learn about detailed estimates of roads
CO3	Understand methods of rate analysis for different building/civil construction items.

COs for V Semester Courses (Continued)

CEP307: RC Design and Drawing	
CO1	Learn about design and drawings of real field concrete structures
CO2	Learn design of various structural components of buildings
CO3	Learn about structural detailing of reinforcement.
CEP308: Structural Analysis Lab	
CO1	Able to verify theorems of structural engineering.
CO2	Able to measure hardness of different materials.
CO3	Able to measure the deflection characteristics of different structural components.
CET309: Soil Mechanics Lab	
CO1	Able to identify and determine the basic engineering properties of soil.
CO2	Learn the procedure for experimental investigations required for classification of the soils.
CO3	Learn experimental methods of measurement of compaction, permeability and strength characteristics of soils.

COs for VI Semester Courses

CET321: Railway and Airport Engineering	
CO1	Learn basic aspects of railway track and its components i.e. gauge, ballast, sleepers and rails.
CO2	Learn the basics to design the railway cant and know the functioning of points & crossings etc.
CO3	Learn different types of railway signals, interlocking of signals.
CO4	Learn the design and analysis of airport runway length, taxiways, aprons and design of runway pavement crust.
CO5	Acquire the skills to understand the aircraft characteristics, wind rose diagrams and other factors necessary for selection of airport site.
CET322: Design of Steel Structures	
CO1	Understand stability of structures
CO2	Learn about Plastic design of Steel Structures
CO3	Learn about design of Gantry Girders, Truss Girder Bridge, Steel Tanks, using latest IS codes.
CET323: Design of Foundations and Earth Structures	
CO1	Understand various aspects of foundation engineering including soil exploration, theories and designof various foundation components, retaining walls etc.
CO2	Estimate safe bearing pressure of different type of soils and rocks.
CO3	Design different foundation components.
CET324: Design of RC Systems	
CO1	Apply relevant BIS codes for design of advance RCC structures like flat slab, retaining walls, curved beams.
CO2	Design RCC industrial structural systems like retaining walls, flab slabs, curved beams intz tanks etc.
CO3	Understand yield line theory and its application in design of RCC structural components.
CET325: Design of Masonry Structures	
CO1	Understand engineering characteristics of different type of masonry structures.
CO2	Understand behaviour of masonry under different type of loads i.e., vertical load, lateral loads etc.,
CO3	Plan and design masonry structures.
CO4	Plan retrofitting of masonry structures.
CET326: Water Resources Engineering	
CO1	Understand the basics of water resources planning and management,
CO2	Estimate the crop water requirement, design of unlined canals, falls and regulators.
CO3	Learn about the basics of dam design and hydropower generation

COs for VI Semester Courses (Continued)

CEP327: Structural Design and Drawing	
CO1	Understand the basics of design of RCC and Steel structural components.
CO2	Design and prepare drawings of flat slab, retaining walls, domes, curved beams and foundations.
CO3	Design and prepare drawings of steel structural components of civil engineering structures.
CEP328: Environmental System Design	
CO1	Learn different code provisions of design of water and wastewater conveyance and treatment facilities.
CO2	Design water and wastewater conveyance system.
CO3	Design water and wastewater treatment facilities
CEP329: Geotechnical Engineering Laboratory	
CO1	Understand and estimate different soil engineering properties like shear strength, swelling pressure, free swell.
CO2	Determine allowable bearing pressure, unconfined compressive strength and other properties of rocks.
CO3	Demonstrate the experimental determination of soluble salts and sulphates

COs for VII Semester Courses

CET401: Concrete Technology	
CO1	Able to design concrete mix of different grade.
CO2	Learn about properties of concrete
CO3	Learn about various NDT techniques
CO4	Learn about durability of concrete
CET402: Design of Hydraulic Structures	
CO1	Learn about various type of hydraulic structures and their function
CO2	Learn about Design principles of gravity and earth dams
CO3	Learn about Components of diversion head work and their design
CET403: Ground Improvement Techniques	
CO1	Able to identify various types of problems
CO2	Learn the various aspect of ground improvement techniques
CO3	Learn about various conventional methods of ground improvement techniques
CO4	Learn about the modern methods of ground improvement e.g. soil reinforcement techniques, geogrids, geosynthetic etc.
CET407: Prestressed Concrete	
CO1	Learn about pre-stressing, processes and construction of pre-stressed structural components.
CO2	Learn method of analysis of pre-stressed structural components.
CO3	Able to design pre-stressed components for different Civil Engineering Construction Projects
CET409: Traffic Engineering and Transport Planning	
CO1	Able to conduct traffic studies and analysis
CO2	Able to design parking, traffic signalling, street lighting, etc.
CO3	Able to plan proper mass transit systems
CES499: Training Seminar	
CO1	Understand the impact of industry/research work on society, its well bring and upliftment, as well as how the industry/research is incorporating and promoting sustainable development
CO2	Understand and appreciate the norms of Civil Engineering practices in the industry/ ethical practices followed in research work
CO3	To be able to prepare and deliver a professional report as well as a technical presentation on the learnings of industrial/research training in front of a panel of evaluation

COs for VIII Semester Courses

CET421: Construction Information System	
CO1	Learn about various aspects of Construction Information systems.
CO2	Able to understand Management information systems in construction industry.
CO3	Able to understand web applications and e-business in construction.
CO4	Learn about green building software.
CET422: Structural Dynamics	
CO1	Understand various types of degree of freedom systems in structures.
CO2	Understand orthogonal relationship of principle modes, Rayleigh's principle, and its application.
CO3	Learn about application of structural dynamics to civil engineering problems.
CET423: Finite Element Method	
CO1	Understand basic concepts of Finite Element Analysis technique.
CO2	Able to formulate the FEM model for the analysis of different structural components.
CO3	Learn about applications of FEM for Civil Engineering problems.
CET424: Advanced Foundation Design	
CO1	Able to understand various aspects of Design and Construction of foundation including special foundations on difficult soils
CO2	Able to analyse shallow and deep foundations
CO3	Able to design pile foundation
CO4	Able to design well foundation
CED498: Major Project	
CO1	Identify a multidisciplinary problem related to societal and socio-environmental issues and to find their sustainable solutions
CO2	Ability to formulate, develop methodology, collect required data, and experiment results for any problem related to civil engineering
CO3	Ability to develop the solution to the identified problem using relevant codes/standards and available state-of-the-art.
CO4	Ability to effectively communicate with the help of reports, presentations, charts, figures, etc. the main findings of the project