

DEPARTMENT OF CIVIL ENGINEERING

SEM III

Course Code		CEC 301	ENGINEERING MATHEMATICS-III			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.1	1.1.2	5	1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
2	1	2.1	2.1.2	3,4	2	Identify the concept of inverse linear transform and compare to various functions and its applications
3	2	3.1	3.1.6	3	3	Determine and develop Fourier series for real life problems and applications.
3	1	3.2	3.2.1	3	4	Apply the properties of Complex analysis and select the application to orthogonal trajectories.
1	1	1.1	1.1.3	3	5	Use the concept of matrices to solve problems in machine learning, computer graphics and in Google page ranking
12	2	12.1	12.1.1	3	6	solve partial differential equations and analytical method for one dimensional heat and wave equations.

Course Code		CEC 302	MECHANICS OF STRUCTURES			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.1	2	1	Determine the engineering properties for metals and non-metals and the strains induced Along with its effects on thin shells.
2	1	2.2	2.2.2	2	2	Understand the concepts of shear force, bending moment, axial force for statically determinate beams And determinate frames and compound beams having internal hinges; and subsequently, also its application to draw the shear force, bending moment and axial force diagrams
2	1	3.2	3.2.2	3	3	Identify the flexural members for its structural behavior under the effect of flexure with respect to theory of simple bending .
3	2	3.3	3.3.1	3	4	Generate the behavior of the structural member under the action of shear and torsional forces either independently or in combination of both for beams.
3	2	3.2	3.2.2	3	5	Study the deformation behavior of axially loaded columns having different end conditions and further, evaluate the strength of such columns.(considering columns of homogeneous nature)
4	2	3.3	3.3.2	4	6	Develop the concepts of principal plains and stresses and basics of slope deflection theory for structures.

Course Code		CEC 303	ENGINEERING GEOLOGY			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.4	2.4.4	2	1	Understand and explain the significance of geological studies and its significance in various civil engineering projects.
2	2	2.2	2.2.2	3	2	Study the properties of minerals and rocks and make use of the knowledge for civil engineering.
2	1	2.1	2.1.3	2	3	Distinguish various geological structures, and report geological data using standards in engineering practice and determine the thickness of strata
3	2	3.2	3.2.3	3	4	To explain different methods of geological investigation and mention opinion after calculations and check the suitability of a site to construct civil structures and comment on their engineering considerations.
6	2	6.1	6.1.1	1	5	To describe various geological considerations to select the site to construct a tunnel and define various sources of groundwater.
3	1	3.1	3.1.1	4	6	To find what are the causes of occurrence of natural hazards, distinguish between their types and recommend the control measures.

Course Code		CEC 304	ARCHITECTURAL PLANNING & DESIGN OF BUILDING			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	2	1.3	1.3.1	3	1	Design and drawing of residential building applying the principles and code of practices for planning and design
3	2	3.4	3.4.1	3	2	Design details of building components pertaining to the norms for design and drawing.
3	2	3.2	3.2.2	6	3	Preparation of one point and two-point perspective drawing to create different views of building.
5	2	5.1	5.1.1	3,4	4	Town planning, architectural planning and built environment using basic engineering principles for for urban and rural
7	2	7.1	7.1.1	4	5	Utilization of the concept of Green buildings and various certification methods LEED, TERI, GRIHA, IGBC
5	2	3.1	3.1.4	6	6	Design and drawing of public building using CAAD software applying principles of planning and design.

Course Code		CEC 305	FLUID MECHANICS-I			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	2	1	Describe various properties of fluids and types of flow.
2	1	2.1	2.1.3	3	2	Determine the pressure difference in pipe flows at static condition and apply hydrostatic solutions for fluid flow applications
2	1	2.1	2.1.3	3	3	Apply kinematic solutions to fluid flow applications. To apply continuity equation and to study different lines.
3	1	2.4	2.4.1	3	4	Demonstrate the various laws of dynamic fluids and to use bernoulli's theorem to determine velocity and discharge
2	1	2.1	2.1.2	3	5	Apply the working concepts of various devices to measure the flow through pipes and channels
2	1	2.2	2.2.2	2	6	Explain the compressible flow, propagation of pressure waves and stagnation properties

Course Code		CEL 301	MOS LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.2	2	1	Determine the engineering properties for metals and non-metals and the strains induced
2	1	2.2	2.2.2	2	2	Understand the concepts of shear force, bending moment, axial force for statically determinate beams and compound beams having internal hinges; and subsequently, its application to draw the shear force, bending moment and axial force diagrams
2	1	3.2	3.2.2	3	3	Identify the flexural members for its structural behavior under the effect of flexure (bending),
3	2	3.3	3.3.1	3	4	Generate the behavior of the structural member under the action of shear and torsion either independently or in combination thereof
3	2	3.2	3.2.2	3	5	Study the deformation behavior of axially loaded columns having different end conditions and further, evaluate the strength of such columns.
4	2	3.3	3.3.2	4	6	Develop the concepts of principal planes and stresses and thin cylindrical and spherical shells and apply to solve the problems.

Course Code		CEL 302	EG LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.2	2.2.2	4	1	Identify various rock forming minerals on the basis of physical properties.
2	1	2.2	2.2.2	2	3	Explain the characteristics of Igneous, Sedimentary and Metamorphic rocks
2	2	2.2	2.2.2	2,4	3	Explain the characteristics of Igneous, Sedimentary and Metamorphic rocks and analyze their suitability as construction material and foundation rock.
3	1	3.2	3.2.1	5,6	4	Create the geological map and assess the suitability of the site for Civil Engineering works.
3	1	3.2	3.2.1	2,3	5	Solve the borehole problems and make use of the solution to interpret it in order to understand subsurface Geology of the area.
3	1	3.2	3.2.1	5	6	Calculate RQD and evaluate the rock masses for Civil Engineering Works.

Course Code		CEL 303	APDB LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
4	2	4.3	4.3.1	3	1	Sketch of residential building by applying the principles of buildings and code of practices.
4	2	4.4	4.4.1	1	2	Design and draw details of building components such as Staircase etc.
3	2	3.2	3.2.2	1	3	Draw one point and two-point perspective view
3	2	3.1	3.1.1	2	4	Explain the objectives of Town planning, principles of architectural planning and study built environment using basic engineering principles for urban and rural development
6	2	6.1	6.1.1	2	5	Understand Green building concepts and various certification methods.
5	2	5.1	5.1.4	3	6	Sketch of public building using CAAD software applying principles of planning and design.

Course Code		CEL 304	FM-I LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.4	3.4.2	3	CO 1	Determine the Metacentric height of a floating body
4	1	4.1	4.1.4	3	CO 2	Use venturimeter device to determine coefficient of discharge of a liquid flowing at any point along a pipeline.
4	1	4.1	4.1.4	3	CO 3	Determine coefficient of discharge through Orifice meter.
5	1	5.3	5.3.2	5	CO 4	Verify Bernoulli equation applied to a steady flow of water through a tapered duct
4	1	4.1	4.1.2	3	CO 5	Compare coefficient of discharge of Notches through Rectangular and triangular notch
2	1	2.3	2.3.2	3	CO 6	Compute the coefficient of discharge of weirs experimentally.

Course Code		CEL 305	SBLC-I			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	2	5.1	5.1.1	3	1	Make use of software to Transfer the plan from a drawing sheet to a 2-D drafting software
5	2	5.1	5.1.2	4	2	Illustrate the various elements in the software like points, lines, polygons, etc. as objects of the real world and relate it with civil engineering components.
1	2	1.3	1.3.1	3	3	Apply civil engineering concepts to draft efficient civil engineering plans in accordance to various building bye laws and forms.
5	2	5.1	5.1.2	2	4	Understand the space, logistic and statutory constraints in the real world to draw an efficient plan so that optimization is achieved
5	2	5.3	5.3.2	6	5	Integrate and retrieve information pertaining to various civil engineering components through 3-D modelling software
5	2	5.2	5.2.2	3	6	Demonstrate a virtual walkthrough of buildings

Course Code		CEM 301	MINI PROJECT- 1A			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.1	3	1	To acquaint with the process of identifying the needs and utilize it by converting it into aproblem.
2	1	2.2	2.2.3	2	2	To familarize and infer the process of solving the problem in a group .
2	1	2.4	2.4.4	4,5	3	To analyze and choose the process of applying basic engineering fundamentals to attempt solutions to the problems.
9	2	9.3	9.3.1	3	4	To develop interpersonal skills to work as a member of a group or leader.
12	2	12.2	12.2.2	6	5	To adapt the process of self learning and research in a group which leads to a life long learning.
10	2	10.3	10.3.2	5	6	To perceive project management principles during project work.

SEM IV						
Course Code		CEC 401	ENGINEERING MATHEMATICS-IV			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.1	3	1	Apply the concept of Vector calculus to evaluate line integrals, surface integrals using Green's theorem, Stoke's theorem & Gauss Divergence theorem.
2	1	2.2	2.2.1	5	2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
5	1	3.1	3.1.6	3	3	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
1	1	4.2	4.2.2	4	4	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
3	1	3.3	3.3.1	3	5	Apply the concept of probability distribution to engineering problems & Testing hypothesis of small samples using sampling theory
2	1	2.4	2.4.1	2	6	Apply the concepts of parametric and nonparametric tests for analysing practical problems

Course Code		CEC 402	STRUCTURAL ANALYSIS			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.2	2	1	Calculate the forces acting on structures and different types of forces in determinate structures as trusses and arches
2	1	2.2	2.1.2	2	2	draw influence line diagrams for axial forces for trusses and beams for rolling and static loads
2	1	2.3	2.3.3	3	3	evaluate rotation and displacement characteristics for joint frames and trusses along with degree of indeterminacies
3	2	2.3	2.3.1	3	4	apply flexibility approach of analysis for indeterminate structures and application of clapeyrons three moment theorem
3	2	3.2	3.2.2	3	5	evaluation of stiffness matrices for indeterminate structures to compute response for the same .
3	2	3.3	3.3.2	4	6	analyze indeterminate structures by MDM and to carry out plastic analysis of structures.

Course Code		CEC 403	SURVEYING			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	2.1	2.1.3	2,3	1	Linear and angular measurements and calculations by applying the principles of surveying
2	2	2.2	2.2.3	3	2	selection of suitable types of levelling for measuring vertical distances and their applications for determination of RL and check.
3	2	4.3	4.3.1	4	3	Record of data using theodolite and analysis of the field data for preparation of drawing.
5	2	5.1	5.1.1	3,4	4	Make use of Indirect and advanced methods of surveying
2	2	2.4	2.4.1	4	5	Determination of areas and volumes for solving surveying problems.
3	2	4.2	4.2.1	4	6	Design and setting out of horizontal and vertical curves using suitable methods.

Course Code		CEC 404	BUILDING MATERIALS & CONCRETE TECHNOLOGY			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	2.2	2.2.2	3	1	Develop & implement the conceptual knowledge of building materials in the construction industry.
2	2	2.2	2.2.3	2	2	Classify the type & manufacturing process of different types of building materials.
4	2	4.3	4.3.1	5	3	Assess the various quality control aspects of civil engineering materials by performing different lab tests on materials.
7	2	7.2	7.2.2	3	4	Identify the ingredients & properties of fresh and hardened concrete.
5	2	5.3	5.3.2	5,6	5	Design and interpret concrete mix for various grades for various exposure conditions.
5	2	5.2	5.2.2	2	6	Explain the new technology for manufacturing, testing & quality of concrete.

Course Code		CEC 405	FLUID MECHANICS-II			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.2	4	1	Analyze flow through pipes, various losses through pipes, pipe network and power transmission through nozzle
2	1	2.1	2.1.3	5	2	Explain the concept of Laminar flow and velocity distribution through parallel plates and pipes
2	1	2.1	2.1.3	4	3	Explain the concept of Turbulent flow and velocity distribution in pipes
2	1	2.1	2.1.3	5	4	Describe boundary layer concept , boundary layer separation and flow around submerged bodies
2	1	2.1	2.1.3	4	5	Apply Moment of Momentum Principle
3	1	3.4	3.4.2	5	6	Explain the importance of dimensionless numbers, dimensional analysis and similarity behavior of model and prototype

Course Code		CEL 401	SA LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Determine the forces acting on determinate structures such as trusses and arches
2	1	2.3	2.3.1	2	2	draw influence line diagrams for axial forces for trusses and beams for rolling and static loads
2	1	2.1	2.1.2	5	3	Evaluate rotation and displacement characteristics for joint frames and trusses and compute degree of indeterminacies
2	1	2.2	2.2.3	4	4	Analyze the indeterminate structures using flexibility approach of analysis and application of clapeyrons three moment theorem
3	2	3.2	3.2.1	5	5	evaluation of stiffness matrices for indeterminate structures to compute response for the same .
1	1	1.3	1.3.1	4	6	Analyze indeterminate structures by MDM and to carry out plastic analysis of structures.

Course Code		CEL 402	SURVEYING LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
4	1	4.2	4.2.1	3	1	Use and operate the surveying instruments according to the accuracy and suitability.
5	1	2.4,5.3	2.4.3, 5.3.2	3	2	Calculate linear and angular dimensions in horizontal and vertical planes.
2	2	2.2,4.3	4.3.1, 2.2.2	4	3	Analyse, collect and record the field data systematically.
4	1	4.3	4.3.3	6	4	Develop plans of the existing features on the ground, sections and contours.
2	2	2.1	2.1.3	5	5	Measure the area of land and the volume of earthwork.
4	1	4.3	4.3.3	6	6	Develop curves and foundation plans.

Course Code		CEL 403	BMCT LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	2.2	2.2.2	6	1	Test physical properties of cement, aggregate & concrete.
2	2	2.2	2.2.3	3	2	Experiment with the physical attributes and mechanical strength of various other building materials like tiles, bricks & timber.
4	2	4.3	4.3.1, 4.3.4	5	3	Evaluate the effects of admixtures on physical properties of concrete.
7	2	7.2	7.2.2	4	4	Examine the different basic non-destructive tests determine the durability and strength of existing concrete structures.
5	2	5.3	5.3.2	6	5	Design the concrete mix
9	2	9.3	9.3.1	3	6	Develop collaborative skills to work in team/group.

Course Code		CEL 404	FM-II LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	5.3	5.3.2	5	1	Compare different types of flow using Reynold's apparatus
2	1	4.1	4.1.4	5	2	Evaluate the viscosity of fluid flowing through pipes
2	1	2.3	2.3.2	3	3	Calculate head loss due to friction incurred by a fluid along a pipeline
2	1	3.4	3.4.2	3	4	Determine different minor losses in pipe fittings
2	1	2.3	2.3.1	4	5	Analyse the behaviour of Laminar flow through pipes
2	1	4.1	4.1.4	5	6	Assess the flow pattern and velocity distribution in pipe flow

Course Code		CEL 405	SBLC-II			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	2	5.2	5.2.2	2,3	1	Explain the fundamental features and working principle of Total Station (TS) and demonstrate the settings of TS for traversing.
5	2	5.3	5.3.2	3	2	Show various operations to determine height of structures, area of plot, subdividing area, demarcating boundaries, etc. Using Total Station.
5	2	5.1	5.1.1	3	3	Make use of CAD software in Total Station to develop foundation plan.
5	2	5.2 5.3	5.2.2 5.3.2	2,3	4	Explain the fundamental features of Global Navigation Satellite System (GNSS) and determine latitudes, longitudes, altitudes of points, length of roads, area of plots, etc. using GNSS.
5	2	5.1	5.1.1	1,2	5	Name some Geographical Information System (GIS) softwares available and discuss their various features, and functions.
5	2	5.1	5.1.1	3	6	Make use of GIS in GNSS and TS and show various statistical operations in GIS.

Course Code		CEM 401	MINI PROJECT-1B			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.1	3	1	To acquaint with the process of identifying the needs and utilize it by converting it into a problem.
2	1	2.2	2.2.3	2	2	To familiarize and infer the process of solving the problem in a group .
2	1	2.4	2.4.4	4,5	3	To analyze and choose the process of applying basic engineering fundamentals to attempt solutions to the problems.
9	2	9.3	9.3.1	3	4	To develop interpersonal skills to work as a member of a group or leader.
12	2	12.2	12.2.2	6	5	To adapt the process of self learning and research in a group which leads to a life long learning.
10	2	10.3	10.3.2	5	6	To perceive project management principles during project work.

SEM V						
Course Code		CEC 501	THEORY OF REINFORCED CONCRETE STRUCTURE			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	2	1.3	1.3.1	3	1	Apply fundamentals of Working stress method in Civil Engineering to solve engineering problems
1	1	1.4	1.4.1	2	2	Understand the basic concept of Limit State Method of design to solve Civil Engineering problems.
2	1	2.2	2.2.3	4	3	Identify existing solution method to analyse and design various types of beam sections under flexure, shear, bond and torsion using Limit State Method.
3	2	3.1	3.1.4	4	4	Extract engineering requirements from IS-456:2000 for analyzing and design Slabs.
2	1	2.1	2.1.3	4	5	Identify the mathematical, engineering and other relevant knowledge that applies to the design of columns.
3	2	3.1	3.1.6	5	6	Determine design objectives, functional requirements and arrive at design specifications of different types of footing.

Course Code		CEC 502	APPLIED HYDRAULICS			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Demonstrate impact of jet on stationary, moving, hinged and series of plates also solve the numerical based on forces acting on it.
2	2	2.1	2.1.3	4	2	Distinguish various types of turbines, Characteristic curves and its components
2	2	2.1	2.1.2	4	3	Analyse Centrifugal pumps by incorporating velocity triangle diagrams.
2	1	2.1	2.1.2	2	4	Explain the working mechanism of various Hydraulic machines.
3	2	3.2	3.2.3	3	5	Identify the hydraulic behaviour of open channel flow and design the most economical section of channels
3	2	3.1	3.1.6	3	6	Apply mathematical relationships for hydraulic jumps, surges, and critical, uniform, and gradually-varying flows.

Course Code		CEC 503	GEOTECHNICAL ENGINEERING-I			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.3	2	1	Explain the basic concepts of the physical and engineering properties of soil and use the relationship among various unit weights & other parameters to solve the problems.
4	1	4.3 4.1	4.3.1 4.1.4	1,3	2	Evaluate the index properties of soil and describe clay mineralogy.
2	1	2.2	2.2.4	1,4	3	Classify the soil as per IS code.
2	1	2.2 4.1	2.2.3	3	4	Calculate the coefficient of permeability of different types of soils and summarize flow net.
2	1	2.1	2.1.3	2	5	Determine the total stress, neutral stress and effective stress in a soil mass subjected to different geotechnical condition.
2	1	2.2	2.2.3 2.2.4	1,3	6	Calculate the optimum moisture content of a soil and explain the necessity and methods of soil exploration.

Course Code		CEC 504	TRANSPORTATION ENGINEERING			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.2	2.2.3	2	1	Summarize various modes of transportation and explain basic technical aspect of railways, airways and waterways
3	1	1.3	1.3.1	1,3	2	Describe different roads plans, requirements of alignment and calculate the sight distances, superelevation, widening and gradient compensation on a highway.
4	1	4.1	4.1.2	1,4	3	Identify different traffic studies and analyze basic parameters of traffic engineering for efficient planning and control of traffic
3	1	3.1	3.1.4 3.1.6	3	4	Calculate the thickness of flexible and rigid pavement as per IRC-37 & IRC-58
2	1	2.2	2.2.4	2	5	Describe different types of pavements, use of soil stabilization and planning of highway drainage
2	1	2.1	2.1.2	2	6	Identify the failures in pavement and determine the thickness of overlay

Course Code		CEDLO 5015	AIR & NOISE POLLUTION CONTROL			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2,1	1	1.3 2.2	1.3.1 2.2.2	2, 3, 4, 5	1	· Apply fundamental engineering concepts to gain the knowledge of Air pollutants and its classification, sources of generation, Emission Inventory & Indoor air pollution. · Identify, assemble and evaluate information and resources of Air Quality Index and Numerical on conversion of units of pollutants.
1,3	1	1.3 3.2	1.3.1 3.2.1	2, 3 & 4	2	Apply fundamental engineering concepts to explain and analyze the effects of air pollutants on human beings, plants, animals, properties and visibility. Exposure to air pollution. Apply formal idea generation tools to solve numerical problems based on COH, CoHb
3	1	3.2	3.2.1	2, 3 & 4	3	Apply formal idea generation tools to learn how to measure and Control technology of Air Pollutants
5	1	5.1	5.1.1	2 & 3	4	Identify and apply modern engineering tools to study meteorological process and air quality monitoring.
1	1	1.3	1.3.1	2	5	Apply fundamental engineering concepts to learn and explain Current Issues on Air Pollution.
2	1	1.3	1.3.1	2	6	Apply fundamental engineering concepts to learn and explain Noise Pollution.

Course Code		CEDLO 5013	SUSTAINABLE BUILDING MATERIALS			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	2.2	2.2.3	1	1	Outline different environmental issues and significance of sustainable developments.
3	2	3.2	3.2.1	1	2	Define specific environmental issues related to manufacturing of building materials and suggest sustainable solutions.
4	2	4.3	4.3.3	2	3	Select alternative masonry units and mortars based on sustainable practices.
4	2	3.2	3.2.1	2	4	Explain use of different alternative for cement to reduce environmental issues due to construction industry.
5	2	5.3	5.3.1	2	5	Select suitable alternative building technologies for sustainable development.
5	2	5.3	5.3.1	2	6	Explain uses of different roofing system and waste materials in construction industry.

Course Code		CEDLO 5017	ADVANCED CONCRETE TECHNOLOGY			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.2	1.2.1	2	1	Understand the various properties and tests of materials used in concrete along with the rheology of fresh concrete.
5	1	5.3	5.3.1, 5.3.2	2	2	Explain the different procedures for testing hardened concrete, its compositions and quality of in place concrete.
7	1	7.2	7.2.2	2	3	Understand the concept of durability and cracking in concrete, also understand the significance and parameters of concreting under extreme environment and conditions.
5	1	5.1 5.3	5.1.2, 5.3.2	6	4	Generate the mix proportions of concrete for field application by using various methods.
3	1	3.1	3.1.5, 3.1.6	1	5	Describe the various properties of special concrete.
7	1	7.1	7.1.1	3	6	Judge the quality of concrete by evaluating the acceptance criteria.

Course Code		CEL 501	TRCS LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	2.1	1.3	3	1	Apply fundamentals of Working stress method in Civil Engineering to solve engineering problems
2	1	2.1	2.1.2	2	2	Understand the basic concept of Limit State Method of design to solve Civil Engineering problems.
2	1	2.2	2.2.3	4	3	Identify existing solution method to analyse and design various types of beam sections under flexure, shear, bond and torsion using Limit State Method.
2	2	2.1	2.1.3	4	4	Extract engineering requirements from IS-456:2000 for analyzing and design Slabs.
2	1	2.1	2.1.3	4	5	Combine the basic principles and engineering concepts to apply limit state of collapse in compression for designing of different types of columns
3	2	3.2	3.2.1	5	6	Design different types of footing by identifying the existing processes and solution method.

Course Code		CEL 502	AH LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	2	5.1	5.3.2	5	1	Evaluate the efficiencies and discuss the working of various pumps and turbines.
2	1	2.1	2.1.3	4	2	Apply impulse momentum principle to hydraulic machines.
2	1	2.1	2.1.2	4	3	Determine the rate of flow through open channel
2	1	2.1	2.1.2	2	4	Generate and evaluate Gradually varied flow (GVF) and Rapid varied Flow (RVF) in open channel flow.
3	2	3.2	3.2.3	3	5	Compute the Chezy's Constant through tilting flume
3	1	3.1	3.1.6	3	6	Apply mathematical relationships for hydraulic jumps, surges, and critical, uniform, and gradually-varying flows.

Course Code		CEL 503	GE-I LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.1	4	1	Classify the physical and engineering properties of soil.
2	1	2.1	2.1.2	3	2	Examine the plasticity characteristics of soil.
3	1	3.4	3.4.2	5	3	Summarize the sieve analysis of soil, plot grain size distribution curve and determine the IS classification of soil.
4	1	4.2	4.3.1	4	4	Illustrate coefficient of permeability of soils.
5	2	5.1	5.3.2	5	5	Evaluate the compaction characteristics of soils.
6	2	6.1	6.1.1	6	6	Compose the field SPT 'N' value and prepare the bore log.

Course Code		CEL 504	TRE LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
4	1	4.3	4.3.1	4	1	Classify Bitumen on the basis of Penetration value
4	1	4.1	4.1.3	1	2	Select Bitumen as per suitability on basis of softening point and ductility value
7	1	7.1	7.1.1	3	3	Determine suitability of aggregate on basis of Impact value, Abrasion value and crushing value
4	1	4.1	4.1.4	4	4	Distinguish Elongated and Flaky aggregate on basis of Shape test
4	1	4.3	4.3.3	3	5	Calculate classified volume study at mid-block section of road
4	1	4.3	4.3.3	4	6	Analyze speed profile curve at mid-block section of a road

Course Code		CEL 505	PROFESSIONAL COMMUNICATION & ETHICS			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
11		10.1	10.1.1	6	1	Plan and prepare effective business/technical documents which will in turn provide a solid foundation for their future managerial roles
9		10.2	10.2.2	2	2	Demonstrate and strategize their personal and professional skills to build a professional image and meet the demands of the industry
7		9.2	9.2.1	4	3	Take part in isuccessful in group discussions, meetings and result-oriented agreed solutions in group communication situations
10		10.2	10.2.2	1	4	Define and deliver persuasive and professional presentations
10		9.2	9.2.1	3	5	Develop creative thinking and interpersonal skills required for effective professional communication
8		8.2	8.2.2	3	6	Apply codes of ethical conduct, personal integrity and norms of organizational behaviour.

Course Code		CEM 501	MINI PROJECT-2A			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.2	2.2.3	3	1	Illustrate the problems based on societal /research needs and formulate a solution strategy.
4	1	4.1	4.1.3	3	2	Apply fundamentals to develop solutions to solve societal problems in a group
3	1	3.1	3.1.1	4	3	Analyze the specific need, formulate the problem and deduce the interdisciplinary approaches, software-based solutions and computer applications.
5	1	5.2	5.2.1	5	4	Identify the systematic flow chart, evaluate inter disciplinary practices, devices, available software, estimate and recommend possible solutions.
5	2	5.3	5.3.2	3	5	Demonstrate the proper inferences from available results through theoretical/ experimental/ simulations and assemble physical systems.
5	2	5.1	5.1.1	6	6	Create devises or design a computer program or develop computer application.

SEM VI						
Course Code		CEC 601	DESIGN & DRAWING OF STEEL STRUCTURES			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	2.1	2.1.1	2	1	Understand usefulness of steel sections and able to use suitable philosophy for the design of steel structures.
2	2	3.2	3.2.2	3	2	Categorize and design steel structural connections (bolted and welded)
3	1	2.2	2.2.3	2	3	Design members subjected to axial tension using single angle and double angle section
2	1	3.2	3.2.2 3.2.3	3	4	Design and sketch the structural details of compression member including the design of columns and column bases
3	2	3.3	3.3.1	3	5	Design laterally supported and unsupported beams and apply the concept in the design of welded plate girders
3	1	2.2	2.2.3	2	6	Design and sketch the structural details of roof truss and steel roof truss.

Course Code		CEC 602	WATER RESOURCE ENGINEERING			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	2.2 2.3	2.2.1 2.3.2	2	1	Summarize the basics of Irrigation engineering and types of irrigation projects along with National Water policy.
5	2	5.1	5.1.1	5	2	Determine flood discharge and Runoff by traditional and modern usage tools for planning and management of water resources projects.
5	2	5.1	5.1.2	5	3	Apply knowledge on ground water, well hydraulics to estimate the safe yield and ground water potential
4	2	4.2,5.2	4.2.1	4,5	4	Analyze and design gravity dams and earthen dams with spillways for sustainable development
4	2	5.2	4.3.2	5	5	Compare different silt theories related to irrigation channel and design the same.
3	2	5.2, 6.2	3.3.1	5,6	6	Classify and explain various canal structures and suggest remedial measures for water logging to save fertile irrigation

Course Code		CEC 603	GEOTECHNICAL ENGINEERING-II			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
4	1	4.1	4.1.4	5	1	Appraise the consolidation parameters for the soil
4	1	4.3	4.3.3	5	2	Interpret the shear strength parameters for the soil
4	1	4.3	4.3.3	6, 2	3	Estimate the factors of safety of different types of slopes under various soil conditions and infer the stability of slopes, retaining walls & lateral earth pressures.
2	1	2.2	2.2.3	3, 5	4	Calculate the lateral earth pressure using Rankine , coulombs and graphical method also evaluate the stability analysis of gravity and cantilever retaining walls
3	2	3.1	3.1.4	2	5	Evaluate the bearing capacity of shallow foundation using theoretical, field methods, Vesic methods and IS code method.
3	1	3.1	3.1.6	5	6	Determine the load bearing capacity of individual as well as group of pile foundations and their settlement using theoretical and field Method.

Course Code		CEC 604	ENVIRONMENTAL ENGINEERING			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.2	1,2	CO1	Understand and analyse the quality of water and make outline of water Supply scheme.
4	1	3.4	3.4.1 3.4.2	3,6	CO2	Design the various units of water treatment plant and apply the advanced, miscellaneous treatments whenever necessary.
4	1	2.2	2.2.2	2	CO3	Build service connection of water supply from main and building drainage system at construction site along with rain water harvesting layout.
5	1	2.2	2.2.1	2,3	CO4	Analyse and plan sewerage system along with test for sewer line.
4	1	3.4	3.4.1 3.4.2	3,6	CO5	Design the units of sewage treatment plant. Also, able to apply the knowledge of low-cost treatment and stream sanitation.
6	1	2.1 2.2	2.1.1 2.1.2 2.2.3	1,2	CO6	Understand air pollution, noise pollution and functional elements of solid waste management

Course Code		CEDLO 6013	CONSTRUCTION EQUIPMENTS& TECHNOQUES			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.2	2	1	Summarize the use and application of various conventional construction equipment's in different construction projects.
5	1	5.1,5.2	5.1.2, 5.2.1	2	2	Explain advance methods and special equipment used for underground as well as under water tunnelling.
10	1	10.2	12.2.2	6	3	Compare the conventional and modern methods of form work on the basis of productivity, reuse value, ease of erection and dismantling, flexibility offered and overall cost
12	1	12.2	12.2.2	4	4	Identify different methods/equipment of construction for road/flyovers/bridge projects and systems for locating underground utilities
1	1	1.3	1.3.1	5	5	Perceive knowledge about the setting up of different kinds of the power generating structures.
5	1	5.1, 5.2	5.1.2, 5.2.1	2	6	Discuss the techniques involved and the equipment required thereof for construction of various transporting facilities. Choose proper equipment for construction of transporting facilities based on function.

Course Code		CEDLO 6018	INTRODUCTION TO OFFSHORE ENGINEERING			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	2	1.2	1.2.1	1,2	1	To remember and understand the history, types and loading of offshore structures.
11	2	1.3, 11.3	1.3.1, 11.3.1	2,5	2	To understand the offshore construction, project management and evaluate the offshore environment properties.
1	2	1.2	1.2.1	1,2	3	To understand different types of offshore platforms and site investigations.
1	2	1.2	1.2.1	1,2	4	To illustrate the general engineering concepts during construction stages
1	2	1.3, 11.3	1.3.1, 11.3.1	2, 4	5	To discuss different types of mooring systems and its advantages and disadvantages.
1	2	1.2	1.2.1	1, 2	6	To understand probabilistic design and deepwater challenges.

Course Code		CEL 601	DDSS LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.1	1.1.1	2	1	Calculate dead, live and wind loads on the structure.
2	2	2.2	2.2.2	3	2	Analyze the structure by analytical/graphical method.
3	1	3.2	3.2.2	2	3	Use steel table for selecting appropriate section.
3	1	3.2	3.2.2 & 3.2.3	3	4	Design the members for various load combinations.
3	2	3.3	3.3.1	3	5	Design the bolted and welded connection. Read and Prepare the detailed fabrication drawing and design report
2	1	2.2	2.2.3	2	6	Read and Prepare the detailed fabrication drawing and design report.

Course Code		CEL 602	WRE LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	2	1.2 1.3	1.2.1 1.3.2	2	1	Classify various techniques of water distribution and compute water requirement of crops.
2	2	2.1	2.1.1	2	2	Conclude in detail about hydrological process, calculation of missing rainfall data and plotting of hydrographs.
2	2	5.1	5.1.2	3	3	Apply their knowledge on well hydraulics and compute discharge from an aquifer.
4	2	4.2	4.2.1	4	4	Design and analyze dam for its structural stability.
4	2	4.2	5.3.1 5.3.2	5	5	Compare different silt theories related to irrigation channel and design the same.
2	2	2.2	2.2.1 2.2.2	2	6	Illustrate different canal head works - its distribution system and canal Structures.

Course Code		CEL 603	GE-II LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.1	4	1	Examine the consolidation parameters such as coefficient of compressibility, coefficient of volume change, coefficient of consolidation.
2	1	2.1	2.1.2	3	2	Analyze the cohesion and angle of shearing resistance for various soil types.
3	1	3.4	3.4.2	5	3	Summarize the CBR value of soil for pavement design.
4	1	4.2	4.3.1	4	4	Evaluate the swelling pressure of soil.
5	2	5.1	5.3.2	5	5	Formulate the concept of stress distribution in soils due to vertically applied load.
6	2	6.1	6.1.1	6	6	Solve design problems using geotechnical software.

Course Code		CEL 604	EE LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.2	1,2	1	Impart the knowledge on quality or characteristic of water and wastewater sample.
4	1	4.1	4.1.1 4.1.2	5	2	Interpret the required treatment for water based on the drinking water standards and norms
4	1	4.1	4.1.1 4.1.2	5	3	Identify the required treatment for water water based on the sewage disposal standards and norms
2	1	2.1	2.1.2	1	4	Impart the knowledge on quality of solid waste
4	1	4.3	4.3.1	5	5	Measure the concentration of particulate matters, dust and dispersed pollutants in air
4	1	4.3	4.3.1	2	6	Inspect the levels of noise and interpret the results

Course Code		CEL 605	SBLC-III			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	2	5.2 5.3	5.2.1 5.3.2	2	1	Explain the importance, needs, advantages and limitations of software.
5	2	5.1	5.1.1	2	2	Classify different types of software available in Civil Engineering.
5	2	5.1	5.1.2	3	3	Identify the applications of different types of software.
5	2	5.2	5.2.1 5.2.2	3	4	Make use of software results and validate them by analysing results obtained from conventional methods.
11	2	11.3	11.3.1 11.3.2	3	5	Organize an executive summary of the report based on whole work.
9	2	9.2 9.3	9.2.1 9.2.2 9.2.3	3	6	Build their communication skill as well as teamwork qualities.

Course Code		CEM 601	MINI PROJECT-2B			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.2	2.2.3	3	1	Illustrate the problems based on societal /research needs and formulate a solution strategy.
4	1	4.1	4.1.3	3	2	Apply fundamentals to develop solutions to solve societal problems in a group
3	1	3.1	3.1.1	4	3	Analyze the specific need, formulate the problem and deduce the interdisciplinary approaches, software-based solutions and computer applications.
5	1	5.2	5.2.1	5	4	Identify the systematic flow chart, evaluate inter disciplinary practices, devices, available software, estimate and recommend possible solutions.
5	2	5.3	5.3.2	3	5	Demonstrate the proper inferences from available results through theoretical/ experimental/ simulations and assemble physical systems.
5	2	5.1	5.1.1	6	6	Create devises or design a computer program or develop computer application.

SEM VII						
Course Code		CEC 701	DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	3.1 3.4	2.1.3	3	1	Refine a conceptual design into a detailed design by applying the provisions of relevant engineering codes and standards
3	2	3.1	3.1.6	3	2	Identify the mathematical, engineering, and other relevant knowledge that applies to the design of retaining walls.
2	2	2.1	2.1.3	3	3	Discuss the structural behaviour and apply the concepts of WSM in the design of RCC water tanks
2	1	2.2	2.2.3	2	4	Explain the basics of structural dynamics and identify the structural behavior under the dynamic load and the effect of damping.
7	1	7.2	7.2.2	3	5	Demonstrate the response of a structure during earthquake and determine design seismic forces based on IS:1893:2016
3	1	3.2	3.2.3	3	6	Explain principles of prestressing and analyse the losses in prestressed sections

Course Code		CEC 702	QUANTITY SURVEY ESTIMATION & VALUATION			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	To emphasize the importance of relevant IS: 1200 - 1964 codes and understand Measurement systems for various items of civil engineering structures
5	1	5.1	5.1.2	5	2	Draft specifications for various items of work and perform rate analysis of various civil engineering items of work
2	1	2.4	2.4.2	3 & 4	3	To determine the quantities of different Civil Engineering items of work using different methods of Detailed Estimates. Also to prepare Approximate Estimates and to understand the process of sanctioning of Projects
2	1	2.4	2.4.2	4	4	To Compute the Quantity of Earthwork using different methods
4	2	4.3	4.3.1	3 & 5	5	Draft tender, prepare valid contract documents
10	2	10.3	10.3.1	5	6	Understand the role of a valuer and asses the value of a property

Course Code		CEDLO 7011	PRE-STRESSED CONCRETE			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	4	1	Distinguish between Prestressed Concrete and RCC.
2	1	2.2	2.2.4	3	2	Calculate the stresses in PSC beams using stress method, Internal resisting couple method and load balancing concept.
2	1	2.2	2.2.3	2	3	Estimate the losses in prestress concrete.
2	1	2.2	2.2.3	2	4	Compute the instantaneous and long term deflection in prestressed concrete beams.
4	2	4.3	4.3.2	3	5	Calculate the principal tension and flexural strength of prestressed concrete beams in limit stste of servicability.
4	2	4.2	4.2.2	6	6	Design of prestressed concrete beams in limit state of servicability, maximum compression and cracking.

Course Code		CEDLO 7015	ADVANCED CONSTRUCTION TECHNOLOGY			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2	1	1.3	1.3.1	5	1	Evaluate the procedure of construction techniques for sub structure of major civil engineering projects.
1,2	1	2.3	2.3.1	2	2	Explain various stages of construction of super structure of major civil engineering projects.
1,2	1	1.3	1.3.1	2	3	Classify the implementation of new construction technology on engineering concepts which are applied in the field Advanced construction technology in special structures.
1,2	1	2.3	2.3.1	3	4	Examine diverse knowledge of the different methods of advancement in construction techniques and ground improvement techniques.
1,2	1	1.3	1.2.1	5	5	Determine various dredging systems for major civil engineering projects.
1,2	1	1.3	1.3.1	3	6	Explain the theoretical and practical aspects of rehabilitation and strengthening techniques in civil engineering along with the design and management applications.

Course Code		CEDLO 7022	SOLID & HAZARDOUS WASTE MANAGEMENT			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
10	1	10.1	10.1.1	1 & 2	1	Read, understand and interpret technical and non-technical information which describe functional elements of solid waste management and its need.
2	1	2.1	2.1.2	1 & 2	2	Identify engineering systems of solid waste management such as segregation, Storage, Collection and transportation to solve the problems
2	1	2.2	2.2.4	2 & 3	3	Compare and contrast alternative solution/methods to select the best techniques for waste processing and energy recovery.
2	1	2.1	2.1.2	2 & 3	4	Identify engineering systems, variables, and parameters for disposal of solid waste like sanitary landfills-site selection, leachate and landfill gas management, volume reduction of waste, etc.
2	1	2.2	2.2.3	1, 2 & 3	5	Identify existing hazardous waste management processes or methods for solving the problem through its safe handling and disposal.
3	1	3.1	3.1.5	2	6	Explore and synthesize engineering requirements considering health, safety risks, environmental and societal issues for treatment, disposal and management of Biomedical, plastic, Construction and Demolition waste & E- waste.

Course Code		CEDLO 7024	GREEN BUILDING CONSTRUCTIONS			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	2	1	Explain environmental impact of buildings, discuss the concepts of sustainable development & green buildings and overview the features of green buildings
1	1	1.2	1.2.1	1	2	Describe site selection, planning and designing of green buildings
1	1	1.3	1.3.1	2	3	Explain water conservation and energy efficiency in green buildings
2	1	2.1	2.1.1	4	4	Identify green building materials and indoor environmental quality
2	1	2.3	2.3.1	3	5	Apply green building rating systems
2	1	2.3	2.3.1	2	6	Understand green audit and green retrofitting

Course Code		CEDLO 7025	LEGAL ASPECTS IN CONSTRUCTION			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
7	1	7.1	7.1.2	3	1	Explain needs of various laws and legislation related to Construction Industry.
11	1	11.1	11.1.2	1	2	Describe applications of various Contracts and their forms
11	1	11.2	11.2.1	1	3	Describe applications of various Tenders and their forms
11	1	11.3	11.3.2	5	4	Evaluate needs and methods of arbitration and dispute resolution mechsanim
6	1	6.2	6.2.1	3	5	Explain health, safety and labour laws associated with construction industry.
7,8	1	7.1, 8.1	7.1.2, 8.1.1	3	6	Apply needs of environmental protection and ethics in construction industry

Course Code		CEILO 7017	DISASTER MANAGEMENT & MITIGATION MEASURES			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
6	1	6.1	6.1.1	4	1	Understand and distinguish the various types of disasters occurring around the world.
11	1	11.3	11.3.1	4	2	Identify and analyse natural and manmade disasters and their extent and possible effects on the economy
7	1	6.2	6.2.1	5	3	Determine and get acquainted with government policies, acts and various organizational structure associated with an emergency.
5	1	5.1	5.1.1	3	4	To explain the institutional framework and GIS application in disaster management
7	1	7.1	7.1.2	4	5	Categorize the various ways to raise the funds for relief operations
12	1	12.1	12.1.2	3	6	and after disasters.

Course Code		CEL 701	DDRCS LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	2	3.1 3.4	2.1.3	3	1	Refine a conceptual design into a detailed design by applying the provisions of relevant engineering codes and standards
3	2	3.1	3.1.6	3	2	Identify the mathematical, engineering, and other relevant knowledge that applies to the design of retaining walls.
2	2	2.1	2.1.3	3	3	Discuss the structural behaviour and apply the concepts of WSM in the design of RCC water tanks
2	1	2.2	2.2.3	2	4	Explain the basics of structural dynamics and identify the structural behavior under the dynamic load and the effect of damping.
7	1	7.2	7.2.2	3	5	Demonstrate the response of a structure during earthquake and determine design seismic forces based on IS:1893:2016
3	1	3.2	3.2.3	3	6	Explain principles of prestressing and analyse the losses in prestressed sections

Course Code		CEL 702	QSEV LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
7	1	7.2	7.2.2	2	1	Paraphrase the importance of relevant IS: 1200 - 1964 codes and understand measurement systems for various items of civil engineering structures.
10	1	10.1	10.3.2	4 & 5	2	Justify the specifications for various items of work & determine unit rates of items of works by preparing rate analysis.
5	1	5.1	5.3.2	3	3	Generalize the various methods of detailed and approximate estimates.
8	2	8.2	8.1.1	5	4	Appraise the quantity of earthwork by using various methods.
11	2	11.3	11.3.1	4	5	Interim the process of tendering and its various stages, various types of contracts, its suitability and validity as per the Indian Contract Act 1872.
4	2	4.3	4.3.1	3	6	Generalize the concept of valuation & to determine the present fair value of any constructed building at stated time.

Course Code		CEP 701	MAJOR PROJECT PART-I			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3,4	1	3.3,4.2	4.2.2	3,4	1	Apply formal idea generation tools to develop multiple engineering design solutions through project research work.
5	1	5.3	5.3.2	6	2	Create engineering-standard figures, reports and drawings to complement research writing and its presentations.
6,7	1	6.2,7.1	6.2.1,7.1.1	3,4	3	Apply developed product to formal decision-making tools to select optimal engineering design solutions for further development.
8,9	2	8.1,9.3	9.3.1	2,3	4	Present results of the project as a team, with smooth integration of contributions from all individual efforts.
10,11	2	10.1,11.3	10.1.11.3.1,	3,4	5	Identify engineering systems, variables, and parameters to formulate the project design and solve various problems.
12	2	12.1	12.1.2	2	6	Describe the requirement of knowledge, skills and attitudes for continuing professional development.

SEM VIII						
Course Code		CEC 801	CONSTRUCTION MANAGEMENT			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
9	2	9.2	9.2.1	2,3	1	Understand & apply the knowledge of management functions like planning, scheduling, executing & controlling the construction projects
3	2	3.4	3.4.1	4,5	2	Discover the importance of construction Industry. Classify the construction Projects. Decide how to select the lay -out of a site
5	2	5.1	5.1.2	3,6	3	Construct feasible project schedule by using scheduling techniques like CPM and PERT and evaluate the critical path in the network .
5	2	5.3	5.3.1	5	4	Evaluate the daily resource requirement and interpret the best possible schedule from different combinations
11	2	11.2	11.2.1	4	5	Analyze the given network and determine an optimum time cost optimization curve
7	2	7.1	7.1.1	4	6	Inspect the quality & safety measures on construction sites during execution of civil engineering projects and adopt the laws pertaining to construction industry

Course Code		CEDLO 8013	CONSTRUCTION SAFETY			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3, 1.4	1.3.1, 1.4.1	3	1	Apply safety mechanisms and concepts for improving overall safety of construction sites.
1	1	1.3, 1.4	1.3.1, 1.4.1	3	3	Explain the various safety requirements.
4	1	4.1	4.1.1, 4.1.3	3	3	Explain the various techniques to prevent accidents.
7	1	7.1	7.1.1, 7.1.2	3	4	Examine construction safety management.
6	1	6.2	6.2.1	4	5	Analyze safety policies, methods and training on construction sites.
4	1	4.1	4.1.1, 4.1.3	3	6	Apply safety in construction operations.

Course Code		CEDLO 8015	INDUSTRIAL WASTE TREATMENT			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.2	2.2.2	3	1	Explain the impact of industrial wastewater characteristics on natural streams.
2	1	2.4	2.4.4	4	2	Analyze various stream protections measures to protect the natural streams.
2	1	2.2	2.2.2	2	3	Summarize waste minimization techniques for industrial wastewater
2	1	2.2	2.2.3	2	4	Relate biological treatment concept and summarize various treatments along with advance technologies.
2	1	2.2	2.2.3	1	5	Describe waste water generated during manufacturing process and decide the suitable treatment for effluents.
7	1	7.2	7.2.1	5	6	Evaluate legislative framework for the remediation of industrial wastewater through environmental audit, environmental impact assessment and common effluent treatment plant.

Course Code		CEDLO 8021	REPAIRS, REHABILITATION & RETROFITTING OF STRUCTURES			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1		1.3	1.3.1	2,3	1	Explain the need for repairs, rehabilitation & maintenance of buildings
2		2.1	2.1.1	3	2	Judge the cause & extent of damage in buildings
3		3.1	3.1.6	1,3	3	Select the appropriate repair materials & methods to rectify cracks & corrosion
3	1	3.1	3.1.6	2	4	Demonstrate various rehabilitation & retrofitting methods for concrete structures
3		3.1	3.1.1	2	5	Understand causes & repair procedure for steel structures
3	1	3.1	3.1.6	2	6	Understand the effect the earthquake & procedure for seismic retrofitting & maintenance of heritage structures

Course Code		CEL 801	CM LAB			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
9	2	9.2	9.2.1	2,3	1	Understand & apply the knowledge of management functions like planning, scheduling, executing & controlling the construction projects
3	2	3.4	3.4.1	4,5	2	Discover the importance of construction Industry. Classify the construction Projects. Decide how to select the lay -out of a site
5	2	5.1	5.1.2	3,6	3	Construct feasible project schedule by using scheduling techniques like CPM and PERT and evaluate the critical path in the network .
5	2	5.3	5.3.1	5	4	Evaluate the daily resource requirement and interpret the best possible schedule from different combinations
11	2	11.2	11.2.1	4	5	Analyze the given network and determine an optimum time cost optimization curve
7	2	7.1	7.1.1	4	6	Inspect the quality & safety measures on construction sites during execution of civil engineering projects and adopt the laws pertaining to construction industry

Course Code		CEP 801	MAJOR PROJECT PART-II			
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3,4	1	3.3,4.2	4.2.2	3,4	1	Apply formal idea generation tools to develop multiple engineering design solutions through project research work.
5	1	5.3	5.3.2	6	2	Create engineering-standard figures, reports and drawings to complement research writing and its presentations.
6,7	1	6.2,7.1	6.2.1,7.1.1	3,4	3	Apply developed product to formal decision-making tools to select optimal engineering design solutions for further development.
8,9	2	8.1,9.3	9.3.1	2,3	4	Present results of the project as a team, with smooth integration of contributions from all individual efforts.
10,11	2	10.1,11.3	10.1.11.3.1,	3,4	5	Identify engineering systems, variables, and parameters to formulate the project design and solve various problems.
12	2	12.1	12.1.2	2	6	Describe the requirement of knowledge, skills and attitudes for continuing professional development.