

DEPARTMENT OF CIVIL ENGINEERING

SEM III (R19)

Course Code:	CEC301		Course Name	ENGINEERING MATHEMATICS-III		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2,5	1	1.1, 2.2, 5.1	1.1.2,2.2.1, 5.1.2	5	1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
1,2,3	1	1.1.2,1.3.2	1.1.2,2.1.2, 3.2.3	3,4	2	Identify the concept of inverse linear transform and compare to various functions and its applications
2,3,4	2	2.2,3.1,4.2	2.2.1,3.1.6, 4.2.1	3	3	Determine and develop Fourier series for real life problems and applications.
2,3	1	2.2,3.2	2.2.1,3.2.1	3	4	Apply the properties of Complex analysis and select the application to orthogonal trajectories.
1,2	1	1.1,2.1	1.1.3, 2.1.3	3	5	Use the concept of matrices to solve problems in machine learning, computer graphics and in Google page ranking
2,3,12	2	2.2,3.4,12.1	2.2.1,1.3.4, 12.1.1	3	6	solve partial differential equations and analytical method for one dimensional heat and wave equations.
Course Code:	CEC303		Course Name	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	4,5	3	Analyse and distinguish various geological structures, and report geological data using standards in engineering practice and determine the thickness of
4,7	2	4.1,7.2	4.1.4,7.2.2	2,3,5	4	To explain different methods of geological investigation and mention opinion after calculations and check the suitability of a site to construct civil
7	1,2	7.2	7.2.2	3,1	5	To describe various geological considerations to select the site to construct a tunnel and define various sources of groundwater.
4	1	4.3	4.3.2	1,4,5	6	To find what are the causes of occurrence of natural hazards, distinguish between their types and recommend the control measures.
Course Code:	CEC304		Course Name	ARCHITECTURAL PLANNING AND DESIGN OF BUILDING		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,3	2	1.3 3.1	1.3.1 3.1.4	2,3	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 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 development.
7	2	7.1	7.1.1	4	5	Utilization of the concept of Green buildings and various certification methods LEED, TERI, GRIHA, IGBC
3	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:	CEC305		Course Name	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.
2	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:	CEL301		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
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
3	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:	CEL302		Course Name	ENGINEERING GEOLOGY		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.2	2.2.2	3	1	Identify various rock forming minerals on the basis of physical properties.
2	1	2.2	2.2.2	2	2	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.
4	1	4.3	4.3.3	5,6	4	Create the geological map and assess the suitability of the site for Civil Engineering works.
4	1	4.1	4.1.4	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.
4	1	4.3	4.3.4	5	6	Calculate RQD and evaluate the rock masses for Civil Engineering Works.
Course Code:	CEC305		Course Name	Fluid Mechanics-I Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.4	3.4.2	3	1	Determine the Metacentric height of a floating body
4	1	4.1	4.1.4	3	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	3	Determine coefficient of discharge through Orifice meter.
5	1	5.3	5.3.2	5	4	Verify Bernoulli equation applied to a steady flow of water through a tapered duct
4	1	4.1	4.1.2	3	5	Compare coefficient of discharge of Notches through Rectangular and Triangular notch.
2	1	2.3	2.3.2	3	6	Compute the coefficient of discharge of weirs experimentally.
Course Code:	CEL305		Course Name	Skill Based Lab Course-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		Course Name	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 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.
Course Code:	CEL 302		Course Name	MOS LAB		
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
3	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
3	2	3.3	3.3.2	4	6	Develop the concepts of principal planes and stresses and basics of slope deflection theory for structures.
Course Code:	CEL303		Course Name	ARCHITECTURAL PLANNING AND DESIGN OF BUILDING LAB		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	2	1.3	1.3.1	2	1	Design and drawing of residential building by applying the principles of buildings and code of practices.
3	2	3.4	3.4.1	3	2	Design details of building components such as Staircase etc.
3	2	3.2	3.2.2	6	3	Draw one point and two-point perspective drawing of blocks and 1 BHK.
5	2	5.1	5.1.1	3	4	How the Town planning, architectural planning should be done and study built environment using basic engineering principles for urban and rural
7	2	7.1	7.1.1	4	5	Prepare reports for Green buildings and various certification methods such as TERI, GRIHA, IGBC.
3	2	3.1	3.1.4	6	6	Design and drawing of public building using CAAD software applying principles of planning and design.

SEM-IV (R 19)

SEM-IV (R 19)						
Course Code:	CEC401		Course Name	ENGINEERING MATHEMATICS-IV		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2,3	-	1.2,2.4,3.2	1.2.1,2.4.1,3.2.1	3	1	Apply the concept of Vector calculus to evaluate line integrals, surface integrals using Green's theorem, Stoke's theorem & Gauss Divergence theorem.
1,2,4	-	1.2,2.2,4.2	1.2.1,2.2.1,4.2.2	5	2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
2,3,12	-	2.2,3.1,12.2	2.2.1,3.1.6,12.2.1	3	3	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
2,4,12	-	2.2,4.2,12.2	2.2.1,4.2.2,12.2.1	4	4	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
1,2,3	-	1.1,2.2,3.3	1.1.2,2.2.1,3.3.1	3	5	Apply the concept of probability distribution to engineering problems & Testing hypothesis of small samples using sampling theory
2,3,4	-	2.4,3.3,4.2	2.4.1,3.3.1,4.2.3	2	6	Apply the concepts of parametric and nonparametric tests for analysing practical problems
Course Code:	CEC402		Course Name	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	2.1.2	3	3	evaluate rotation and displacement characteristics for joint frames and trusses along with degree of indeterminacies
3	2	2.3	2.2.3	3	4	apply flexibility approach of analysis for indeterminate structures and application of clapeyrons three moment theorem
3	2	3.2	3.2.3	3	5	evaluation of stiffness matrices for indeterminate structures to compute response for the same .
3	2	3.3	3.2.1	3	6	analyze indeterminate structures by MDM and to carry out plastic analysis of structures.
Course Code:	CEC403		Course Name	SURVEYING		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2	2	1.3 2.1	1.3.1 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.
4	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.
4	2	4.2	4.2.1	4	6	Design and setting out of horizontal and vertical curves using suitable methods.
Course Code:	CEC404		Course Name	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, 4.3.4	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:	CEC405		Course Name	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:	CEL401		Course Name	STRUCTURAL ANALYSIS 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:	CEL402		Course Name	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.
2,5	1	2.4,5.3	2.4.3,5.3.2	3	2	Calculate linear and angular dimensions in horizontal and vertical planes.
2,4	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:	CEL403		Course Name	Building Materials & Concrete Technology 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:	CEC404		Course Name	Fluid Mechanics Lab		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
5	1	5.3	5.3.2	5	1	Compare different types of flow using Reynold's apparatus
4	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
3	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
4	1	4.1	4.1.4	5	6	Assess the flow pattern and velocity distribution in pipe flow
Course Code:	CEL405		Course Name	Skill Based Lab Course-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
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:	CEM401		Course Name	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 (R-16)

SEM V (R-16)						
Course Code:	CEC501		Course Name	STRUCTURAL ANALYSIS - II		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	2	1.3	1.3.1	3	1	Apply the civil engineering concepts to solve problems related to stability of civil engineering structures.
1	1	1.3	1.3.1	3	2	Compute the deflection of statically determinate structures due to loading/temperature variations/support settlements.
2	1	2.2	2.2.3	4	3	Identify existing solution methods for solving the problems related to flexibility of indeterminate structures with justified assumptions.
2	1	2.2	2.2.3	4	4	Identify existing solution methods for solving the problems related to stiffness of indeterminate structures with justified assumptions and approximations.
2	2	2.3	2.3.1	4	5	Combine the basic principles and engineering concepts related to plastic analysis of structures for accurately ascertaining structural collapse conditions
2	1	2.3	2.2.3	4	6	Identify the analytical methods for solving the problems on multi-storeyed building frames using justified approximations and assumptions.
Course Code:	CEC503		Course Name	Geotechnical Engineering-1		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2,4	1	2.1,4.1	2.1.3 4.1.4	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
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.
2,4	1	2.2 4.1	2.2.3 4.1.4	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:	CEC503		Course Name	Applied Hydraulics		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.3	3	1	Apply the concepts of fluid dynamics to solve pipe bend and sprinkler problems.
2	1	2.3	2.3.1	3	2	Determine the flow phenomenon using the dimensional analysis or model analysis.
2	1	2.1	2.1.3	3	3	To apply the concept of fluid dynamics to determine the impact of jet on various bodies.
3	2	3.1	3.1.6 5.2.1	3	4	Demonstrate the working and Determine the design parameters for different types of turbines.
3	2	3.1	3.1.6	3	5	Examining the working of centrifugal pump along with the governing properties of pump
3	2	3.2	3.2.6	3	6	Explain the basic concepts of open channel hydraulics. Calculate the flow parameters for uniform and non uniform flow in open
Course Code:	CEC505		Course Name	Transportation Engineering-1		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
12	1	12.2	12.2.21	2	1	Classify the roads based on the different criteria and explain alignments and different types of surveys for highway.
1	1	1.3	1.3.1	2,3	2	Explain the various types of geometric elements of highway and calculate sight distance, horizontal curves and gradients.
4	1	4.1, 4.3	4.1.2 4.3.3	5	3	Assess different traffic studies, control devices, different types of intersections and evaluate the traffic capacity and traffic volume.
4	1	4.3	4.3.1	5	4	Evaluate the properties of materials used in highway construction by performing various tests
3	1	3.1	3.1.4 3.1.6	6	5	Design flexible and rigid pavement as per IRC-37 & IRC-58
3,5	1	3.1 5.3	3.1.4 5.3.1	2,6	6	Describe the various types of highway construction, drainage and maintenance and design the overlay thickness in flexible pavement using IRC-81

Course Code:	CEDLO5062		Course Name	ADVANCED CONCRETE TECHNOLOGY		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	1	1	To recall the various materials used for concrete making and also learn different properties in Concrete
2	1	2.2	2.2.2	4	2	To categorize the various properties of concrete and identify,assemble,evaluate information and resource
3	1	3.1,3.2	3.1.4,3.2.3	4	3	To analyse the different methods of mix design and select optimal mix design as per requirement of a structure
2	1	2.4	2.4.4	3	4	To evaluate knowledge of Fibre Reinforced Concrete and extract desired understanding and conclusion
2	1	2.3	2.3.1	3	5	To apply the different procedures to demonstrate the tests on concrete for determining conclusions by combining scientific principle & engineering
3	1	3.2	3.2.1	5	6	To summarize the concept of durability of concrete to develop multiple civil engineering design solutions.
Course Code:	CEC504		Course Name	Environmental Engineering-I		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.2	2.2.2	2, 3	1	Identify, assemble and evaluate information and resources, related to water supply system, its components, and water demand by various consumers.
1	1	1.2	1.2.1	2	2	Apply laws of natural science to study the quality of drinking water for civil engineering problem.
2	1	2.2	2.2.3	2, 3 & 6	3	To identify existing solution methods for solving the problems related to design of water treatment plant with justified assumptions.
2	1	2.3	2.3.1	2	4	Combine scientific principles and engineering concepts to understand various components of building water supply system and storage of water in terms of
2	2	2.1	2.1.2	2	5	Identify engineering systems, variables, and parameters for rain water harvesting.
2	1	2.2	2.2.4	2	6	Compare and contrast alternative solution processes for air and noise pollution problems and select the best process.
Course Code:	CEC507		Course Name	Buisness and Communication Ethics		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
7	1	7.1	7.1.2	2	1	Describe technical document using precise language, suitable vocabulary and apt style.
6	2	6.1	6.1.1	2	2	Associate the life skills/ interpersonal skills to progress professionally by building stronger relationships.
8	1	8.2	8.2.2	3	3	Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
9	1	9.2	9.2.1	1	4	Identify the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and
8	1	8.1	8.1.1	1	5	Define Intellectual Property Right and Professional and work ethics
10	2	10.1	10.1.3	1	6	Discuss formal presentations effectively implementing the verbal and non-verbal skills.

SEM VI (R16)

SEM VI (R16)						
Course Code:	CEC601		Course Name	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
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
5 3	2	5.3 3.1	5.3.1 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:	CEC603		Course Name	Transportation Engineering-II		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
7	1	7.1 7.2	7.1.2, 7.2.2	1, 2	1	Identify and explain the various elements pertaining to air transportation, water transportation, and railway transportation. Classify the various components and
1,2	1	1.3 2.2	1.3.1 2.2.3	1, 2, 4	2	Analyze the geometric features along with functions of points and crossings.
3	1	3.1 3.2	3.1.6 3.2.1	1, 5, 6	3	Define and explain the various geometric features of airport runway, airport layout, marking- lighting and design the exit taxiway along with the different
4,5	1	4.2 5.1	4.2.2 5.1.1	2	4	Illustrate the air traffic control aids, airport drainage and explain runway gate capacity and taxiway capacity.
7	1	7.2	7.2.2	2	5	Illustrate the various modes of water transportation like harbours and port facilities, jetties, wharves, piers, dolphins etc.
1 2	1	1.3,2.1	1.3.1 2.1.2	2, 5	6	Classify the different components of bridge, and determine the concept of economic span and scour depth in bridge engineering
Course Code:	CEC603		Course Name	WATER RESOURCES ENGINEERING-I		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2,3	2,3	2.1 3.1	2.1.2,3.1.2	2	1	Able to understand the basics of Irrigation engineering and types of irrigation projects along with National Water policy
3,5	1	3.1 5.1	3.1.2,5.1.2	3,4	2	Able to choose and compare different techniques and methods of irrigation for a particular crop grown over an area in view of pros and cons of each technique.
2,7	1	2.3 7.1	2.3.1,7.1.2	4,6	3	Able to understand the relation between duty & delta, calculation of water requirement of the crop, design discharge of canal, the storage requirements for
2	2	2.4	2.4.1	4,5	4	Analyze and interpret runoff resulting from a rainfall over a catchment area with the knowledge of various type of hydrograph
1,2	1	1.1 2.2	1.1.3,2.2.3	5,6	5	Identify the existing methods to design a well for required discharge and Estimate yield from a well.
3,7	1	3.2 7.1	3.2.1, 7.1.2	3,5	6	Identify suitable nonfunctional requirement for evaluation of alternate techniques to know the investigations for reservoir planning and
Course Code:	CEC6061		Course Name	ADVANCED CONSTRUCTION EQUIPMENT		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3,6,9	1	3.2, 6.2, 9.3	3.2.1, 6.2.2,9.3.1	1	1	Recall the use and application of various conventional construction equipment's in different construction projects.
5,7	1	5.1,5.2,7.2	5.1.2, 5.2.1	2	2	Understand advance methods and special equipment used for under-ground as well as under water tunnelling.
10,12	1	10.2, 12.2	10.2.2, 12.2	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
11,12	1	11.3, 12.2	11.3.2,12.2	4	4	Identify different methods/equipment of construction for road/flyovers/bridge projects and systems for locating under-ground utilities
1,3	1	1.3,3.3	1.3.3, 3.3.1	5	5	Perceive knowledge about the setting up of different kinds of the power generating structures.
5,11	1	5.1, 5.2, 11.3	5.1.2,5.2.1	6	6	Understand the techniques involved and the equipment required thereof for construction of various transporting facilities. Choose proper equipment for

Course Code:	CEC607		Course Name	Software Applications in Civil Engineering		
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	3	6	Build their communication skill as well as teamwork qualities.
Course Code:	CEC604		Course Name	Environmental Engineering-II		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2,1	1	2.2,1.3	2.2.2, 1.3.1	2, 3, 4 & 5	1	Identify, assemble and evaluate information and resources of wastewater collection systems in buildings and municipal areas. Apply fundamental
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 characteristics of wastewater. Apply formal idea generation tools to design the
3	1	3.2	3.2.1	2, 3 & 4	3	Apply formal idea generation tools to learn on-site treatment methods and to design wastewater treatment systems such as ASP, Aerated lagoon and
5	1	5.1	5.1.1	2 & 3	4	Identify and apply modern engineering tools for proper treatment for reclamation and reuse of wastewater and disposal and analysis; techniques and resources for
1	2	1.3	1.3.1	2	5	Apply fundamental engineering concepts to learn and explain sludge characteristics and processing methods.
2	1	2.2	2.2.2	2 & 3	6	Identify, assemble and evaluate information and resources of solid waste collection system, characteristics of solid waste and to identify hazardous waste
Course Code:	CEC602		Course Name	DDSS		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.1	2.1.2	2	1	Understand usefulness of steel sections and able to use suitable philosophy for the design of steel structures.
2	1	2.2	2.2.1	2	2	Design and sketch the structural details of tension members for an industrial roof truss.
2	1	3.2	3.2.2	3	3	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	4	Design laterally supported and unsupported beams and apply the concept in the design of welded plate girders
3	2	3.2	3.2.3	3	5	Categorize and design steel structural connections (bolted and welded)
3	2	3.3	3.3.2	4	6	Estimation of loadings, analysis, load combinations, design forces and design of all components of an industrial building. Confirming, manually done design

SEM: VII

SEM: VII						
Course Code:	CEC701		Course Name	QUANTITY SURVEY ESTIMATION AND VALUATION		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Read, understand and interpret plans sections and detailed drawings. Prepare estimates for different construction projects.
2	1	2.4	2.4.2	3,4	2	Perform Quantity survey of materials, labours and equipments.
5	1	5.1	5.1.2	5	3	Draft specifications for various items of work
3	2	3.3	3.3.3	6	4	Perform the rate analysis for various items of work
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:	CEC702		Course Name	THEORY OF REINFORCED CONCRETE STRUCTURES		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1	1	1.3	1.3.1	3	1	Apply fundamental concepts/method in Civil Engineering to solve engineering problems
1	1	1.4	1.4.1	2	2	Use of LSM concepts to solve Civil Engineering problems.
2	1	2.2	2.2.3	3	3	Identify existing solution method for solving the problem, including forming justified approximations and assumptions
3	2	3.1	3.1.4	4	4	Extract engineering requirements from IS-456:2000 for analyzing and design Slabs.
2	2	2.1	2.1.3	3	5	Identify the mathematical, engineering and other relevant knowledge that applies to a given problem
3	2	3.1	3.1.6	4	6	Determine design objectives, functional requirements and arrive at design specifications
Course Code:	CEC703		Course Name	WATER RESOURCES ENGINEERING II		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	2	3.3	3.3.1	4	1	Able to analyze dam sections and check the modes of failure of gravity dam
3	2	3.1	3.1.1	4	2	Able to identify seepage line in earth dam in different condition.
4	1	4.3	4.3.4	3	3	Able to choose different types of spillways and design energy dissipaters.
3	2	3.3	3.3.1	3	4	Able to calculate channel dimensions using Kennedy's & Lacey's theory of channel design.
2	1	2.2	2.2.3	2	5	Able to understand canal classification, canal losses and canal lining.
1	1	2.2	2.2.4	3	6	Able to suggest the canal structures on field.
Course Code:	CEC7042		Course Name	SOLID WASTE MANAGEMENT		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2	1	2.2	2.2.2	2	1	Identify and evaluate information and resources related to solid waste management.
2	1	2.2	2.2.3	2,3	2	To understand the characteristics of different types of solid waste and solving problem related to waste characteristics
2	1	2.3	2.3.1	2	3	Identify method of waste collection, storage, transport and optimization of transportation routes.
2	1	2.2	2.2.4	2	4	Study methods or techniques for waste processing.
2	1	2.1	2.1.2	2,3	5	Identify engineering systems for disposal of solid waste and plan waste minimization.
2	1	2.2	2.2.2	2	6	Discuss treatment, disposal and management of industrial, hazardous, biomedical and E- waste.

Course Code:	CECILOC701		Course Name	Disaster Management and 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, 12	1	11.3, 12.3	11.3.1, 12.3.2	3, 4	2	Identify and analyse natural and manmade disasters and their extent and possible effects on the economy
7	1	6.1, 6.2	6.1.1, 6.2.1	5	3	Determine and get acquainted with government policies, acts and various organizational structure associated with an emergency.
5, 7	1	5.1, 6.2	5.1.1, 6.2.1	5	4	To explain the institutional framework and GIS application in disaster management
7, 11	1	6.1, 11.1	6.1.1, 11.1.1	4	5	Categorize the various ways to raise the funds for relief operations
6, 12	1	7.2, 12.1	7.2.2, 12.1.2	3	6	Make use of simple preventive and mitigation measures before and after disasters.
Course Code:	CEC7042		Course Name	DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	2	3.1 3.4	3.1.2, 3.4.2	3	1	Refine a conceptual design into a detailed design by applying the provisions of relevant engineering codes and standards
3	2	3.1	3.1.2	3	2	Determine design objectives, functional requirements and arrive at design specifications for staircases
2	2	2.1	2.1.1	3	3	Identify the mathematical, engineering, and other relevant knowledge that applies to the design of retaining walls.
2	2	2.2	2.2.3	2	4	Discuss the structural behaviour and apply the concepts of WSM in the design of RCC water tanks
7	1	7.2	7.2.1	3	5	Demonstrate the response of a structure during earthquake and determine design seismic forces
3	1	3.2	3.2.2	3	6	Explain principles of prestressing and analyse the stresses in prestressed beams

SEM VIII (R16)

SEM VIII (R16)						
Course Code:	CEC802		Course Name	CONSTRUCTION MANAGEMENT		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
9,11	2	9.2,11.3	9.2.1,11.3.1	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.
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:	CE-DLO8032		Course Name	INDUSTRIAL WASTE TREATMENT		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
2,6	1	2.2,6.2	2.2.2,6.2.2	2	1	Understand different types and characteristics of industrial wastes. Interpret standards relevant to effluent standards and stream standard.
2	1	2.2	2.2.3	2,3	2	Identify sampling methods and analyze industrial wastewater.
2	1	2.2	2.2.2	2,3	3	Determine the effects of industrial wastewater on self-purification of streams, reclamation of industrial wastewater.
2	1	2.2	2.2.3	2	4	Explain general treatment of industrial wastes, dewatering and disposal of sludge and advanced treatment methods
2	1	2.2	2.2.3	2	5	Describe manufacturing processes and treatment of wastewater.
6,7	1	6.2,7.2	6.2.1,7.2.2	2	6	Study of location, design, need of CETP. Discuss about provision of various acts pertaining to industrial wastes, EIA,
Course Code:	CE-CEP805		Course Name	Project Part- B		
PO	PSO	Competancy	PI	Bloom's Level	CO	Description
3	1	3.2	3.2.1	3	1	Apply formal idea generation tools to develop multiple engineering design solutions through project research work.
10	1	10.3	10.3.1	6	2	Create engineering-standard figures, reports and drawings to complement research writing and its presentations.
3	1	3.3	3.3.1	3	3	Apply developed product to formal decision-making tools to select optimal engineering design solutions for further development.
9	2	9.3	9.3.1	2	4	Present results of the project as a team, with smooth integration of contributions from all individual efforts.
2	2	2.1	2.1.2	3	5	Identify engineering systems, variables, and parameters to formulate the project design and solve various problems.
6	2	12.1	12.1.1	2	6	Describe the requirement of knowledge, skills and attitudes for continuing professional development.