



Program : Civil Engineering	
Second Year : Semester - III	
Course Code: CEC301	
Course Name: Engineering Mathematics-III	
CEC301.1	Evaluate slope and deflection of beams supported and loaded in different ways.
CEC301.2	Apply the concept of inverse Laplace transform of various functions in engineering problems.
CEC301.3	Expand the periodic function by using Fourier series for real life problems and complex engineering problems.
CEC301.4	Find orthogonal trajectories and analytic function by using basic concepts of complex variable theory.
CEC301.5	Apply Matrix algebra to solve the engineering problems.
CEC301.6	Solve Partial differential equations by applying numerical solution and analytical methods for one dimensional heat and wave equations.
Course Code: CEC302	
Course Name: Mechanics of Solids	
CEC302.1	Evaluate stress - strain behavior of elastic members and thin cylinders subjected to internal pressure.
CEC302.2	Draw variation of axial force, shear force and bending moment diagram for statically determinate beams and frames.
CEC302.3	Calculate Moment of Inertia for cross sections and analyse the material response under the action of shear and the effect of flexure (bending).
CEC302.4	Predict the angle of twist and shear stress developed in torsion and compute direct and bending stresses developed in the cross section of centrally and eccentrically loaded columns.
CEC302.5	Locate principal planes in members and calculate principal stresses using analytical and graphical method and to calculate strain energy stored in members due to elastic deformation.
CEC302.6	Evaluate slope and deflection of beams supported and loaded in different ways.
Course Code: CEC303	
Course Name: Engineering Geology	
CEC303.1	To acquire basic knowledge of Geology and to understand its significance in various civil engineering projects.
CEC303.2	To study minerals and rocks in order to understand their fundamental characteristics and engineering properties.
CEC303.3	To study structural geology for characterization of site, analysis and report geologic data using standards in engineering practice.
CEC303.4	To study methods of subsurface investigation, advantages and disadvantages caused due to geological conditions and assessment of site for the construction of civil structures.
CEC303.5	To study rock mass characterization for the construction of tunnels and assessment of rock as source of ground water.
CEC303.6	To study the control of geology over the natural hazards and their preventive measures.



Program : Civil Engineering	
Second Year : Semester - III	
Course Code: CEC304 Course Name: Architectural Planning & Design of Buildings	
CEC304.1	Understand the Principles of planning and Classification of buildings Remember and recall the intricate details of building design and drawing.
CEC304.2	Explain various concepts and components pertaining to building design and drawing.
CEC304.3	Apply professional ethics and act responsibly pertaining to the norms of building design and drawing practices also able to draw out perspective view of buildings.
CEC304.4	Apply principles of planning, architectural planning while designing and preparing building drawings and town planning.
CEC304.5	Understand the concept of green building in detail and some of modern certification methods.
CEC304.6	Effectively communicate ideas, related to building design and drawing, both orally as well as in written format like reports & drawings with the help of modern drawing software.
Course Code: CEC305 Course Name: Fluid Mechanics - I	
CEC305.1	Understand various properties of fluids and types of flow.
CEC305.2	Determine the pressure difference in pipe flows and apply of Continuity equation and Bernoulli's theorem to determine velocity and discharge.
CEC305.3	Apply hydrostatic and dynamic solutions for fluid flow applications.
CEC305.4	Analyze the stability of floating bodies.
CEC305.5	Apply the working concepts of various devices to measure the flow through pipes and channels.
CEC305.6	Explain the compressible flow, propagation of pressure waves and stagnation properties.
Course Code: CEL301 Course Name: Mechanics of Solids Lab	
CEL301.1	Evaluate stress - strain behavior of materials and assess the structural behavior by the virtue of stresses developed and deformation of elastic members.
CEL301.2	Analyze the material response under the action of shear and the effect of flexure (bending).
CEL301.3	Predict the angle of twist and shear stress developed in torsion.
CEL301.4	Evaluate slope and deflection of beams supported and loaded in different ways.



Program : Civil Engineering	
Second Year : Semester - III	
Course Code: CEL302 Course Name: Engineering Geology Lab Practice	
CEL302.1	Identify various rock forming minerals on the basis of physical properties.
CEL302.2	Explain the characteristics of Igneous, Sedimentary and Metamorphic rocks and assess their suitability as construction material and foundation rock.
CEL302.3	Interpret the rock characteristics and comment on their suitability as water bearing horizons.
CEL302.4	Interpret the geological map and assess the suitability of the site for Civil Engineering works.
CEL302.5	Solve the borehole problems and interpret it in order to understand subsurface Geology of the area.
CEL302.6	Calculate RQD and evaluate the rock masses for Civil Engineering Works.
Course Code: CEL303 Course Name: Architectural Planning & Design of Buildings Lab	
CEL303.1	Plan and design of residential and public building by implementing the principles of planning of buildings, Green building principles, byelaws, regulations and codes for planning.
CEL303.2	Preparing various working and detailed drawing of the buildings in CAD.
CEL303.3	Preparing layouts of various building services.
CEL303.4	Preparing perspective views for all types of buildings.
CEL303.5	Preparing the reports based on the drawings prepared, if required.
Course Code: CEL304 Course Name: Fluid Mechanics – I Lab	
CEL304.1	Calculate the metacentric height.
CEL304.2	Verify the Bernoulli's theorem.
CEL304.3	Determine the discharge coefficients.
CEL304.4	Measure fluid flow using various devices.
CEL304.5	Determine the hydraulic coefficients of an orifice.



Program : Civil Engineering	
Second Year : Semester - III	
Course Code: CEL305	
Course Name: Computer Aided Drafting & Building Information Modelling	
CEL305.1	Transfer the plan from a drawing sheet to a 2-D drafting software.
CEL305.2	Visualize the various elements in the software like points, lines, polygons, etc. as objects of the real world and relate it with civil engineering components.
CEL305.3	Apply civil engineering concepts to draft efficient civil engineering plans in accordance to various building bye laws and forms.
CEL305.4	Conceptualize the space, logistic and statutory constraints in the real world to draw an efficient plan so that optimization is achieved.
CEL305.5	Attach and retrieve information pertaining to various civil engineering components through 3-D modelling software.
CEL305.6	Demonstrate a virtual walkthrough of buildings.
Course Code: CEM301	
Course Name: Mini Project - 1A	
CEM305.1	Identify problems based on societal /research needs.
CEM305.2	Apply Knowledge and skill to solve societal problems in a group.
CEM305.3	Develop interpersonal skills to work as a member of a group or leader.
CEM305.4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
CEM305.5	Analyze the impact of solutions in societal and environmental context for sustainable development.
CEM305.6	Use standard norms of engineering practices.
CEM305.7	Excel in written and oral communication.
CEM305.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
CEM305.9	Demonstrate project management principles during project work.



Program : Civil Engineering

Second Year : Semester - IV

Course Code: CEC401

Course Name: Engineering Mathematics-IV

CEC401.1	Apply the concept of Vector calculus to evaluate line integrals, surface integrals using Green's theorem, Stoke's theorem & Gauss Divergence theorem.
CEC401.2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
CEC401.3	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
CEC401.4	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
CEC401.5	Apply the concept of probability distribution to engineering problems & Testing hypothesis of small samples using sampling theory.
CEC401.6	Apply the concepts of parametric and nonparametric tests for analysing practical problems.

Course Code: CEC402

Course Name: Structural Analysis

CEC402.1	Calculate axial forces in the Coplanar trusses by using Method of joints and method of sections and also calculate radial shear, normal thrust and bending moment in parabolic 3- Hinged arches.
CEC402.2	Draw Influence Line Diagrams for axial forces in trusses, Reactions, SF and B M in beams and find their values when rolling loads are passing over them.
CEC402.3	Evaluate rotation and displacement at a joint of frames and deflection at any joint of truss and will be able to compute static and kinematic indeterminacy of structure.
CEC402.4	Apply Flexibility methods and make use of Clapeyron's Theorem to analyze the indeterminate Structures.
CEC402.5	Analyse the indeterminate structures such as beams & simple rigid jointed frames using direct stiffness method.
CEC402.6	Analyse the indeterminate structures using Moment Distribution as Stiffness method and make plastic analysis.

Course Code: CEC403

Course Name: Surveying

CEC403.1	Apply the principles of surveying and field procedures to conduct the various surveys.
CEC403.2	Use various methods for taking linear and angular measurements.
CEC403.3	Collect, record and analyse the field data for preparing drawings.
CEC403.4	Explain the advancements in instruments and methods.
CEC403.5	Calculate the area of land and volume of earthwork.
CEC403.6	Set out curves.



Program : Civil Engineering

Second Year : Semester - IV

Course Code: CEC404 Course Name: Building Materials & Concrete Technology

CEC404.1	To develop and implement the conceptual knowledge of building materials in the construction industry.
CEC404.2	Assess the properties of building stones and their classifications. Understand the concept of various methods of manufacturing of bricks and different types of concrete blocks.
CEC404.3	To expose students to various quality control aspects of civil engineering materials by performing different lab tests on materials.
CEC404.4	Identify the ingredients and properties of fresh and hardened concrete.
CEC404.5	To interpret and design concrete mix for various grades for various exposure conditions.
CEC404.6	To study the new technology for manufacturing, testing and quality of concrete.

Course Code: CEC405 Course Name: Fluid Mechanics - II

CEC405.1	Analyze flow through pipes, various losses through pipes, pipe network and power transmission through nozzle.
CEC405.2	Explain the concept of Laminar flow and velocity distribution through parallel plates and pipes.
CEC405.3	Explain the concept of Turbulent flow and velocity distribution in pipes.
CEC405.4	Describe boundary layer concept, boundary layer separation and flow around submerged bodies.
CEC405.5	Apply Moment of Momentum Principle.
CEC405.6	Explain the importance of dimensionless numbers, dimensional analysis and similarity behavior of model and prototype.

Course Code: CEL401 Course Name: Structural Analysis Tutorial

CEL401.1	Calculate axial forces in the Coplanar trusses by using Method of joints and method of sections and also calculate radial shear, normal thrust and bending moment in parabolic 3-Hinged arches.
CEL401.2	Draw Influence Line Diagrams for axial forces in trusses, Reactions, SF and B M in beams and find their values when rolling loads are passing over them.
CEL401.3	Evaluate rotation and displacement at a joint of frames and deflection at any joint of truss and will be able to compute static and kinematic indeterminacy of structure.
CEL401.4	Analyse the indeterminate structures such as beams & simple rigid jointed frames using Flexibility methods and direct stiffness method.



Program : Civil Engineering	
Second Year : Semester - IV	
Course Code: CEL402 Course Name: Surveying Lab	
CEL402.1	Operate and use the surveying instruments according to the accuracy and suitability.
CEL402.2	Measure linear and angular dimensions in horizontal and vertical planes.
CEL402.3	Collect, record and analyse the field data systematically.
CEL402.4	Prepare plans of the existing features on the ground, sections and contours.
CEL402.5	Compute the area of land and the volume of earthwork.
CEL402.6	Set out curves and foundation plans.
Course Code: CEL403 Course Name: Building Materials & Concrete Technology Lab	
CEL403.1	Develop collaborative skills to work in a team/group.
CEL403.2	Test physical properties of cement, aggregates and concrete.
CEL403.3	Test various other building materials like tiles, bricks and timber.
CEL403.4	Evaluate the effects of admixtures on physical properties of concrete.
CEL403.5	Design the concrete mix.
CEL403.6	To bridge the gap between theoretical and market/industrial practices by market surveys.
Course Code: CEL404 Course Name: Fluid Mechanics – II Lab	
CEL404.1	Verify the Reynold's experiment.
CEL404.2	Estimate the viscosity of fluid.
CEL404.3	Calculate the losses in pipes.
CEL404.4	Assess the flow pattern and velocity distribution in pipe flow.
CEL404.5	Learn the water hammer phenomenon through demonstration.
CEL404.6	Learn the wind tunnel testing through demonstration.



Program : Civil Engineering	
Second Year : Semester - IV	
Course Code: CEL405	
Course Name: Total Station and Geographical Information System Lab	
CEL405.1	Operate a Total Station and traverse the field.
CEL405.2	Perform various operations like computing height of a structure, computing area of plot, subdividing area, demarcating boundaries, etc. Using Total Station.
CEL405.3	Set out foundation plan using Total Station.
CEL405.4	Compute the point, line and area features using Global Navigation Satellite System.
CEL405.5	Plot various existing features in a geographic area on a GIS platform.
CEL405.6	Add attribute and perform various statistical operations in GIS.
Course Code: CEM401	
Course Name: Mini Project - 1B	
CEM401.1	Identify problems based on societal /research needs.
CEM401.2	Apply Knowledge and skill to solve societal problems in a group.
CEM401.3	Develop interpersonal skills to work as member of a group or leader.
CEM401.4	Draw the proper inferences from available results through theoretical/ experimental/ simulations.
CEM401.5	Analyze the impact of solutions in societal and environmental context for sustainable development.
CEM401.6	Use standard norms of engineering practices.
CEM401.7	Excel in written and oral communication.
CEM401.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
CEM401.9	Demonstrate project management principles during project work.