

M.Tech. (Structural Engineering) (Revised in 2018)

Programme Educational Objectives:

PEO 1: To impart students with strong knowledge base through theory courses and sessional that makes them suitable for industries, academics, research and consultancies.

PEO 2: To develop students analytical, computational and research skills through assignments, weekly presentations and modelling software.

PEO 3: To train the students on developing practical, efficient and cost-effective solutions on problems and challenges on structural engineering.

PEO 4: To inculcate among student's sensitivity towards social and corporate responsibilities.

Programme outcomes:

PO1: An ability to independently carry out research /investigation and development work to solve practical problems.

PO2: An ability to write and present a substantial technical report/document.

PO3: Students should be able to demonstrate a degree of mastery for designing and solving structural engineering problems.

PO4: An ability to use appropriate modern tools in structural engineering. In doing so he should demonstrate sufficient knowledge of competing tools and their relative merits and demerits.

PO5: An ability to demonstrate the traits of learning and unlearning throughout his professional career, and be willing to learn new techniques, methods and processes.

PO6: Tune his knowledge to be a responsible engineer adhering to all established practices of his profession.

Course outcomes:

Course code: CE501

Course title: ADVANCED SOLID MECHANICS

CO1	Interpret the theory of elasticity including strain/displacement and Hooke's law relationships
CO2	Analyse principal stresses and strains using theories of failure

CO3	Analyse the two-dimensional problems using Airy's stress function
CO4	Explain linearly elastic bodies behaviour using Hooke's law
CO5	Asses torsional stresses developed in thin walled sections
CO6	Apply various failure criteria for general stress states at points

Course code: CE502

Course title: ADVANCED STRUCTURAL ANALYSIS

CO1	Obtain the static and kinematic indeterminacy of structure.
CO2	Analyse the beam and plane frame using Matrix method.
CO3	Calculate displacements and internal forces of statically indeterminate structures
CO4	Analyse the behaviour of prismatic Beam-Column element.

Course code: CE503

Course title: STRUCTURAL DYNAMICS

CO1	Calculate response of SDOF and MDOF system
CO2	Find out mode shape, frequencies and amplitude for motion of two/three DOF systems
CO3	Solve problem on earthquake steeping loading by Cauchy Euler and Trapezoidal method
CO4	Analyze structure for earthquake forces according to IS code provisions

Course code: CE506

Course title: FINITE ELEMENT METHOD

CO1	Use Finite Element Method for structural analysis.
CO2	Execute the Finite Element Program/ Software.
CO3	Solve continuum problems using finite element analysis.

Course code: CE507

Course title: THEORY OF PLATES AND SHELLS

CO1	Use analytical methods for the solution of thin plates and shells.
CO2	Apply numerical techniques for the complex problems in thin plates and shells.

Course code: CE508

Course title: EARTHQUAKE ENGINEERING

CO1	Determine the response of SDOF & MDOF structural system due to earthquake.
CO2	Determine the lateral forces generated in the structure due to earthquake.
CO3	Apply the concepts of Earthquake Resistant Design to real life structures.

Course code: CE511

Course title: ADVANCED CONCRETE TECHNOLOGY

CO1	Discuss about concrete ingredients and its influence on gaining strength
CO2	Determine the properties of fresh and hardened of concrete
CO3	Design the concrete mix using ACI and IS code methods.
CO4	Provide solutions related with concrete and concreting problems.

Course code: CE541

Course title: ANALYTICAL AND NUMERICAL METHODS IN STRUCTURAL

CO1	Analyse and asses the accuracy of common numerical methods.
CO2	Apply numerical methods to obtain approximate solutions to mathematical problems.
CO3	Create programming code and present numerical results in an informative way.

Course code: CE542

Course title: BRIDGE ENGINEERING

CO1	Able to calculate design loads for bridges.
CO2	Able to design RC and Pre-stressed Concrete Slab Bridges.
CO3	Able to design RC and Pre-stressed Concrete Girder Bridges.
CO4	Able to analyze Box-Girder Bridges, Arch Bridges, Suspension and Cable Stayed Bridges.

Course code: CE543

Course title: DESIGN OF HIGH RISE STRUCTURE

CO1	Analyse, design and detail Transmission/ TV Tower, Mast and Trestles with different loading conditions.
CO2	Analyse, design and detail the RC and Steel Chimney.
CO3	Analyse, design and detail the tall buildings subjected to different loading conditions using relevant codes.

Course code: CE544

Course title: DESIGN OF INDUSTRIAL STRUCTURE

CO1	Design Steel Gantry Girders, Portal & Gable Frames, Bunkers, Silos, Chimneys and water tanks
CO2	Use relevant IS codes for design of industrial structures.

Course code: CE545

Course title: DESIGN OF PLATES AND SHELLS

CO1	Analyse and design prismatic folded plate systems.
CO2	Analyse and design shells using approximate solutions
CO3	Analyse and Design Cylindrical Shells

CO4	Design Doubly Curved Shells using Approximate Solutions.
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Course code: CE546

Course title: FRACTURE MECHANICS

CO1	Develop physical intuition necessary to idealise a complicated practical Fracture problem.
CO2	Possess the analytical and computational tools needed to solve the idealised problem.
CO3	Interpret the results of the solutions for the idealised problem.
CO4	Use the solutions to guide a corresponding design, manufacture, or failure analysis.

Course code: CE547

Course title: PRE-STRESSED CONCRETE

CO1	Understand the basic aspects of prestressed concrete
CO2	Find out losses in the prestressed concrete
CO3	Analyse the prestressed concrete beam, deck slab and girders.
CO4	Design the prestressed concrete beam, deck slab and girders.

Course code: CE548

Course title: SOIL STRUCTURE INTERACTION

CO1	Able to model structure, soil and boundary.
CO2	Able to solve problem on wave propagation for SSI.
CO3	Able to solve dynamic stiffness matrix for out of plane and in-plane motion.
CO4	Able to analyze soil and structure considering nonlinearity in material of soil and structure.
CO5	Able to analyze SSI for engineering application like nuclear power plant, bridges, dams, multi storey buildings etc.

Course code: CE549

Course title: STRUCTURAL DESIGN OF FOUNDATION

CO1	Select a suitable foundation from the myriad choices available for a tricky structure on difficult ground.
CO2	Design safe, cost-effective, durable and buildable Foundation.
CO3	Create, communicate and execute designed foundation at site.
CO4	Analyse and design real time complex foundation problem and give its solution.

Course code: CE550

Course title: STRUCTURAL HEALTH MONITORING

CO1	Able to understand the fundamentals of maintenance and repair strategies
CO2	Able to diagnose for serviceability and durability aspects of concrete and know the materials and techniques used for repair of structures.
CO3	Able to decide the appropriate repair, strengthening, rehabilitation and retrofitting technique required for a case study building.
CO4	Able to use an appropriate health monitoring technique and demolition technique.

Course code: CE551

Course title: STRUCTURAL OPTIMIZATION

CO1	Able to develop optimization techniques, linear optimization, algorithm.
CO2	Able to solve problem of nonlinear optimization-I, non-linear optimization-II and one dimensional minimization methods (by different methods).
CO3	Able to use optimization techniques for simple structures.

Course code: CE552

Course title: THEORY OF STRUCTURAL STABILITY

CO1	Determine stability of columns and frames
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CO2	Determine stability of beams and plates
CO3	Use stability criteria for analysing and designing discrete and continuous systems.