

Yeshwantrao Chavan College of Engineering, Nagpur

Name of the Department: Civil Engineering

Name of the PG Programme: M.Tech (Structural Engineering)

Course Outcomes (CO)

First Year: Semester I:

Course Code: CV3901	Course Name: - Theory of Elasticity and Elastic Stability
CO1	Demonstrate the knowledge of fundamental methods of elasticity for 2-D and 3D stress analysis
CO2	Analyze bending and torsional problems and apprise various theories to solve 2-D problems
CO3	Apply the basic knowledge of elastic stability to various structural elements
CO4	Explain and solve the problems of beam-column, column and built up column using the concept of elastic stability

Course Code: CV3902	Course Name: - Structural Dynamics
CO1	An ability to apply knowledge of mathematics, science, and engineering by developing the equations of motion for vibratory systems and solving for the free and forced response.
CO2	Ability to identify, formulate and solve engineering problems having motions varying with time. This will be accomplished by having students model, analyze and modify a vibratory structure, in order to achieve specified requirements.
CO3	Understanding professional and ethical responsibilities. This will be accomplished by emphasizing the importance of understanding how structural vibrations may affect safety and reliability of engineering systems.
CO4	An ability to Understand IS codes related to earthquake loading.

Course Code: CV3903	Course Name: - Lab : Structural Dynamics
CO1	An ability to understand the behavior of vibratory system during cyclic loading.
CO2	An ability to understand phenomenon like damping and its relevance in actual structural applications.
CO3	An ability to understand the effect of earthquake phenomenon on water media and subsoil.
CO4	An ability to understand provision of various Indian standards for design of structures from seismic safety point of view.

Course Code: CV3904	Course Name: - Matrix Analysis of Structures
CO1	Understand the different types of structures
CO2	Apply the matrix stiffness method to model the behavior of planar trusses, beams, and frames.
CO3	Analyze any multistoried building using Matrix Stiffness methods of structural analysis.
CO4	Recognize special effects on behavior of structures.
CO5	Implement the method developing their own computer program to analyze structures.

Course Code: CV3905	Course Name: - Lab:- Matrix Analysis of Structures
CO1	Apply the stiffness method for structural analysis.
CO2	Analyze continuous beams, plane truss, space truss, plane frame neglecting axial deformation, plane frame considering axial deformation, plane grids.
CO3	Recognize special effects on behavior structures.

Course Code: CV3906	Course Name: - Design of Substructures and Foundations
CO1	Students will be able to identify the type of foundations to be used for various site conditions
CO2	Students will be able to analyze and design different types of foundation structures.
CO3	Students will be able to draw RCC detailing and to prepare working drawing.
CO4	Students will be able to understand the importance of various codes used for different types of foundation structures.

Course Code: CV3907	Course Name: - Earthquake and Wind Effects on Structures
CO1	An ability to apply the knowledge of geological feature, plate tectonics in understanding occurrence of earthquake.
CO2	An ability to understand causes and sources of earthquake damages and possible response of structure and system to earthquake
CO3	An ability to understand characteristics of wind and its static and dynamic effects on structures
CO4	An ability to understand relevant I.S. codes and philosophy in design of earthquake & Wind resistant structure

Course Code: CV3908	Course Name: - Advanced Concrete Structures
CO1	An Ability to know provisions of relevant IS codes / IRC code required for design of advanced concrete structures such as water tank, bridges ,multistoried building
CO2	An ability to design advanced concrete structures such as water tank , bridge and culvert
CO3	An ability to understand the various methods of design of multistoried buildings, retaining wall.
CO4	An ability to draw RCC detailing of structures.

Course Code: CV3909	Course Name: - Lab : RCC Design Studio
CO1	An Ability to know provisions of relevant IS codes / IRC code required for design of advanced concrete structures such as water tank, bridges ,multistoried building
CO2	An ability to design advanced concrete structures such as water tank , bridge and culvert
CO3	An ability to understand the various methods of design of multistoried buildings.
CO4	An ability to draw RCC detailing of structures

First Year: Semester II:

Course Code: CV3915	Course Name: - Finite Element Method
CO1	An ability to derive element matrix equation by different methods by applying basic laws in structural analysis.
CO2	An ability to apply the knowledge of finite element method to solve simple problems.
CO3	An ability to extend the knowledge of finite element method to solve complex problems using various elements.
CO4	An ability to understand solution and modeling techniques used in finite element method

Course Code: CV3916	Course Name: - Lab: Finite Element Method
CO1	An ability to identify the information required to conduct a structural analysis using finite element software
CO2	An ability to interpret the solutions obtained from finite element analyses
CO3	An ability to have basic skills in using commercial finite element software and effective presentation of their analysis results
CO4	An ability to communicate effectively in writing to report (both textually and graphically) the method used, the implementation and the numerical results obtained

Course Code: CV3917	Course Name: - Theory of Plates and Shells
CO1	Demonstrate behavior of various plates
CO2	Analyze plates using different methods
CO3	Explain various theories of shells
CO4	Evaluate structural actions of shells using various theories

Course Code: CV3918	Course Name: - Advanced Steel Structures
CO1	An ability to understand the configuration (component of structures, civil\structural engineering drawing etc.) of the structure.
CO2	An ability to understand the effect of natural phenomenon (wind and earthquake), in structural engineering applications
CO3	An ability to analyze and design the advanced steel structures by applying the provision of Indian Standard Code

Course Code: CV3919	Course Name: - Lab: Steel Design Studio
CO1	An ability to apply the basic knowledge of structural steel.
CO2	An ability to develop the model (structure) in commercially available software, analyze and design it by applying appropriate loads
CO3	An ability to present the analysis and design results in schematic way of the desired structure

Course Code: CV3920	Course Name: - PE-I : New Engineering Materials
CO1	An ability to introduce different high quality materials for civil engineering applications
CO2	An ability to use engineering materials for better and durable Civil Engineering Structures

Course Code: CV3921	Course Name: - PE-I : Prestressed Concrete
CO1	Students will be able to apply basic concepts of prestressed concrete in construction industry.
CO2	Students will be able to identify, formulate and solve engineering problems pertaining to prestressed concrete.
CO3	Students will be able to Understand IS codes related to prestressed concrete.
CO4	Students will be able to design special prestressed concrete structures.

Course Code: CV3922	Course Name: - PE-I : Smart Structures and Applications
CO1	An ability to understand passive and active systems.
CO2	An ability to understand the characteristics and behavior of smart materials
CO3	An ability to understand control system and its applications
CO4	An ability to understand techniques of base isolation

Course Code: CV3923	Course Name: - PE-II : RC Tall Buildings
CO1	The students will be able to describe fundamental concept, principle and application of earthquake engineering.
CO2	The students will be able to analyze and design RCC structures with ductile detailing as per Indian standards.
CO3	The students will be able to apply technical design principles and techniques such as P-delta effect, soil structure interaction for a design of high rise structures.
CO4	The students will be able to apply various provisions for earthquake resistance design of structures as per Indian standards.

Course Code: CV3924	Course Name: - PE-II : Composite Structures
CO1	Students will be able to understand basic concepts and characteristics of Composite materials.
CO2	Students will be able to understand elastic behavior of lamina.
CO3	Students will be able to understand various failure theories.
CO4	Students will be able to analyse laminated plates under bending and vibration.

Course Code: CV3925	Course Name: - PE-II : RC Bridge Design
CO1	An ability to identify the types of bridge to be used for various site and loading conditions
CO2	An ability to understand applicability of IRC codes related to bridges
CO3	An ability to analyze and design slab bridges and its components

Course Code: CV3926	Course Name: - PE-III : Plastic Analysis & Design of Steel Structure
CO1	An ability to understand behavior of steel structure elements beyond yield point loading and basic concepts of plastic analysis
CO2	An ability to understand techniques for estimation of collapse loads on steel structures
CO3	To understand the effects of axial and shear forces on plastic moment of resistance
CO4	To understand philosophies of plastic design of steel structural elements

Course Code: CV3927	Course Name: - PE-III : Seismic Analysis and Design of Structures
CO1	An ability to apply basic concepts Earthquake resistant design in construction industry.
CO2	An ability to identify, formulate and solve engineering problems pertaining to earthquake effects on structures.
CO3	An ability to understand IS codes related to static as well as dynamic analysis of high rise buildings.
CO4	An ability to design special structures subjected to more effective earthquake forces

Course Code: CV3928	Course Name: - PE-III : Design of Industrial Structures
CO1	An expertise to understand planning of industrial structures.
CO2	The capability to analyse large span structures.
CO3	An expertise to understand stability of silos and bunkers under dynamic loads
CO4	The skill to analyse and design foundations for industrial structures

Second Year: Semester III:

Course Code: CV3939	Course Name: - Project Phase-I
CO1	An ability to understand the advances in structural engineering
CO2	An ability to understand the use of modern tools
CO3	An ability to work independently and in a team for effective communication
CO4	An ability to understand the importance of lifelong learning

Second Year: Semester IV:

Course Code: CV3940	Course Name: - Project Phase-II
CO1	An ability to understand the advances in structural engineering
CO2	An ability to solve real world structural engineering problems
CO3	An ability to understand the importance of lifelong learning and the use of modern tools
CO4	An ability to work independently and in a team for effective communication