

DEPARTMENT OF CIVIL ENGINEERING
CO-PO matrices of courses (Theory)
CLASS - M.Tech
ACADEMIC YEAR 2024-25

Note: Enter correlation levels 1,2 or 3 as defined below:
1: Slight(Low) 2: Moderate(Medium) 3: Substantial (High)

SR. NO.	COURSE NAME	COURSE CODE	COURSE OUTCOMES (Enter statement)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Theory of Elasticity and Plasticity	MCVSTEPT 101	Understand and analyze stress and strain at a point, including stress equilibrium, strain compatibility, and three-dimensional stress states from various perspectives.	3	1	1	2								2		2	3
			Establish and apply the relationship between stress and strain for different materials using elastic constants, and simplify three-dimensional problems into two-dimensional analyses, including stress concentration scenarios.	3	3	2	1								2		3	3
			Formulate and analyze structural members subjected to torsion using classical theories and approaches, considering complex loading and geometries.	3	3	3	1								3	3	3	3
			Understand the post-yield behavior of materials and apply fundamental plasticity theories to solve problems involving material nonlinearity.	3	2	3	3								3	3	3	3
2	Matrix Methods of Structural Analysis	MCVSTEPCT 102	Illustrate deflected shapes of structural elements under various loading and boundary conditions, demonstrating an understanding of structural behavior.	3	2	2	2								3		3	
			Differentiate between force-based and displacement-based methods and apply both approaches to the analysis of plane structural systems.	3	3	2	3								2		2	3
			Analyze plane structures using direct and generalized flexibility and stiffness methods, showcasing competence in classical analysis techniques.	3	1	3	3								2		3	3
			Develop and implement computer-based codes for the structural analysis of plane systems using matrix methods.	3	2	2	2								3		3	3
3	Structural Dynamics	MCVSTEPT 103	Understand basics of response of structures to forced vibrations and free vibrations for SDOF systems subjected to general loading	3	2	2	2								3		3	
			Analyze a response of structures to ground excitations, support excitations and torsional excitations.	3	3	2	3								2		2	3
			Understand and Analyse structures for natural frequency and modal analysis.	3	1	3	3								2		3	3
			Analyze response of structural system by numerical evaluation using various classical approaches.	3	2	2	2								3		3	3
4	Program Elective-I	MCVSTEPET 104	Understand the preliminary concepts, development, various types of bridges and it's conceptual	3	1	1	1								2			
			Study various types of loading coming on road and railway bridges and behaviour of various types of bridges under different loadings.	3	3	2	2								2	1	1	
			Study the behaviour of various types of bridges under different loadings.	3	3	3	3								3	3	3	3
			Design of slab decks of various types of RC and PSC bridges	3	3	3	3								3	3	3	3
5	Program Elective-II	MCVSTEPET 105	Understand the fundamental concepts, terminologies, and methodologies associated with prestressed concrete systems.	3	2	2	2								3	3	3	3
			Analyze and design anchor blocks and prestressed concrete members for flexure, shear, and deflection criteria.	3	3	2	3								3		3	
			Design both determinate and indeterminate prestressed structures, including continuous beams and portal frames.	3	1	3	3								2		2	3
			Analyze and design composite sections and various types of slabs used in prestressed concrete construction.	3	2	2	2								3		3	3
6	Communication Skills	MCVSTEHTM 107	Demonstrate effective communication skills through technical vocabulary, structured writing, and formal correspondence, including emails, letters, memos, and notices.	3	1	1	1								2			
			Prepare and deliver impactful technical presentations using appropriate tools, graphical elements, nonverbal techniques, and audience engagement strategies.	3	3	2	2								2	1	1	
			Develop well-structured project research proposals and reports, incorporating elements such as abstract, background, objectives, methodology, organization of content, and proofreading.	3	3	3	3								3	3	3	3
			Participate in and conduct business meetings professionally by planning agendas, scheduling, taking minutes, and formulating action plans for effective decision-making.	3	3	3	3								3	3	2	3
7	Theory of Plates and Shells	MCVSTEPT 201	Understand and derive the governing differential equations for the deflected shapes of rectangular and circular plates under various boundary and loading conditions.	3	2	2	2		3						3		3	
			Solve the governing differential equations for rectangular plates subjected to different types of loads and support configurations.	3	3	2	3		1						2		2	3
			Solve the governing differential equations for circular plates considering various loading and boundary conditions.	3	1	3	3								2		3	3
			Understand and apply membrane theory to analyze internal forces in different types of shell structures.	3	3	2	2								3		3	3
8	Finite Element Analysis	MCVSTEPCT 202	Understand the different energy methods in structural analysis and basic concepts of finite element method.	3	2	2	2		3						3		2	3
			Analyze 1-D problems related to structural analysis like Bars, Trusses, Beams and Frames using finite element approach.	3	3	2	3		2						3		3	
			Find solution to problems using direct approach methods and also to apply knowledge of theory of elasticity.	3	1	3	3								2		3	3
			Students will be able to implement the knowledge of numerical methods in FEM to find the solution to the various problems in statics and dynamics, Analyse 1D, 2D, and 3D structures using different	3	3	2	2								3		3	3
9	Program Elective- III	MCVSTEPET 203	Understand the types of cross-sections, mechanical and thermal properties, and practical applications of cold-formed steel (CFS) structures.	3	2	2	2								3		3	
			Analyze thin-walled CFS elements for strength under various loading conditions such as tension, compression, and bending, based on applicable design criteria.	3	3	2	3								2		2	3
			Design cold-formed steel members subjected to flexure, compression, axial load, and combined loading conditions.	3	1	3	3								2		3	3
			Design different types of connections used in cold-formed steel structures, considering strength, stability, and practical implementation.	3	1	2	2								3		2	3
10	Program Elective- IV	MCVSTEPET 204	Understand Engineering Seismology and Seismic zones in India.	3	2	1	2								2	2		
			Understand earthquake response of SDOF Linear systems and instrumentation in measurement of earthquakes.	3	2	2	2								2	2	2	
			Understand factors resisting earthquake forces, earthquake risk analysis and Perform Seismic Analysis of buildings as per IS 1893.	3	3	3	3								3	3	2	2
			Understand, analyse and Design structural elements and its elastic detailing using IS 13020.	3	3	3	3								3	3	1	3
11	Open Elective-V	MCVSTEOET 205	Understand the fundamental concepts of research, including its types, methodologies, and systematic procedures for identifying and solving research problems.	3	1	1	2								3		3	
			Apply appropriate mathematical and statistical techniques relevant to research analysis and interpretation.	3	3	2	3								2		2	3
			Utilize suitable sampling techniques and data collection methods to ensure accuracy and reliability in research.	3	1	3	2								2		2	3
			Design experiments and apply correlation and prediction techniques to analyze relationships between research parameters.	3	1	2	2								3		3	
12	Indian Knowledge System	MCVSTEHTM 208	Understand the foundational techniques of urban planning, masonry, and drainage systems developed in ancient Indian civilizations.	3	1	1	1								2			
			Analyze architectural and structural features of Indian temple and Islamic construction, with emphasis on material usage and load-bearing systems.	3	3	2	2								2	1	1	
			Assess the evolution of modern Indian structural engineering, focusing on high-rise construction, sustainable practices, and compliance with structural codes.	3	3	3	3								3	3	3	2
			Evaluate structural innovations during the Mughal and colonial periods, including abutments in dome construction, masonry, and early infrastructure development.	3	3	3	3								3	2	3	3