

22CPC721 –ESTIMATION, COSTING AND VALUATION		
COURSE OUTCOMES At the end of the course, the student will be able to:		PO's Mapped
CO1	Explain the fundamentals of estimation, types of contracts, and the principles of valuation and report preparation.	--
CO2	Apply standard engineering methods to calculate quantities for buildings, RCC members (using bar bending schedules), and sanitary installations.	P01
CO3	Analyze unit rates for various construction items based on data, lead statements, and the prevailing Schedule of Rates (SOR).	P02
CO4	Prepare (Design) detailed specifications and tender documents for engineering works while considering legal and technical requirements.	P03
CO5	Evaluate the market value and rental fixation of land and buildings using various valuation methods and depreciation concepts.	P04
CO6	Engage in independent study to conduct a market survey on cost escalation and prepare a technical report on the financial aspects of a building, mapping findings to SDGs.	P07, P08,P09, P011

CO PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	–	–	–	–	–	–	–	–	–	–	–	2	1	–
CO2	3	–	–	–	–	–	–	–	–	–	–	3	1	–
CO3	–	3	–	–	–	–	–	–	–	–	–	3	2	1
CO4	–	–	3	–	–	–	–	–	–	–	–	3	2	2
CO5	–	–	–	3	–	–	–	–	–	–	–	2	3	2
CO6	–	–	–	–	–	–	2	2	3	–	2	2	2	3
22CPC721	3	3	3	3	–	–	2	2	3	–	2	2.5	1.83	2

1 – Slight, 2 – Moderate, 3 – Substantial

22CPC722 –PRESTRESSED AND PRECAST CONCRETE STRUCTURES

COURSE OUTCOMES At the end of the course, the student will be able to:		PO's Mapped
CO1	Explain the fundamental philosophies of prestressing (pretensioning and post-tensioning), material properties, and the core principles of prefabrication, modular coordination, and standardization.	–
CO2	Apply engineering fundamentals and codal provisions to determine fiber stresses, calculate prestress losses and estimate long-term deflections in flexural members.	PO1
CO3	Analyze the structural behavior, ultimate flexural strength, and shear capacity of prestressed sections, stress distributions in anchorage zones, precast frames and their connections.	PO2
CO4	Develop appropriate design solutions for prestressed flexural members, end-zone reinforcement, and precast components like Inverted Tee and L-beams.	PO3
CO5	Investigate the performance and serviceability of precast building systems, including the effectiveness of various manufacturing, transportation, and erection methods	PO4, PO5
CO6	Communicate engineering design concepts and construction methodologies of prestressed and precast concrete structures effectively while considering professional ethics, sustainability, safety, teamwork, and lifelong learning.	PO8, PO9, PO10, PO11

CO PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	2	1	-
CO2	3	-	-	-	-	-	-	-	-	-	-	3	2	1
CO3	-	3	-	-	-	-	-	-	-	-	-	3	2	2
CO4	-	-	3	-	-	-	-	-	-	-	-	3	3	2
CO5	-	-	-	3	3	-	-	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	3	3	2	2	1	2	3
22CPC722	3.0	3.0	3.0	3.0	3.0	-	-	3.0	3.0	2.0	2.0	2.5	2.0	2.2

1 – Slight, 2 – Moderate, 3 – Substantial

22CPC723 –SOFTWARE APPLICATION LABORATORY

COURSE OUTCOMES At the end of the course, the student will be able to:
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C01	Outline the basic concepts of structural analysis, design and detailing based on relevant design codes.
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PO's Mapped

PO1, PO2, PO3, PO6, PO7, PO8, PO9, PO11
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PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO10, PO11
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PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11

PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11

PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11

PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11

CO PO MAPPING

[illegible]

22CPC510– STRUCTURAL ANALYSIS – I

COURSE OUTCOMES At the end of the course, the student will be able to:		PO's Mapped
CO1	Explain the fundamental concepts of structural analysis and structural behavior.	--
CO2	Apply energy methods to analyze statically determinate structures.	PO1
CO3	Analyze arches, cables, and suspension bridges under various loading conditions.	PO2
CO4	Construct influence lines for beams, trusses, and arches subjected to moving loads.	PO2, PO3
CO5	Analyze statically indeterminate beams and trusses using influence line methods.	PO2, PO3
CO6	Investigate recent advances in structural analysis and present the findings.	PO5, PO9, PO10, PO11

CO PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	–	–	–	–	–	–	–	–	–	–	–	2	1	–
CO2	3	–	–	–	–	–	–	–	–	–	–	3	2	–
CO3	–	3	–	–	–	–	–	–	–	–	–	3	2	1
CO4	–	2	2	–	–	–	–	–	–	–	–	3	3	2
CO5	–	3	2	–	–	–	–	–	2	2	2	3	3	2
CO6	–	–	–	–	2	–	–	–	2	2	2	2	2	3
22CPC510	3	2.67	2	–	2	–	–	–	2	2	2	2.67	2.16	2

1–Slight, 2–Moderate, 3–Substantial

22CPC511 – DESIGN OF STEEL STRUCTURES		
COURSE OUTCOMES At the end of the course, the student will be able to:		PO's Mapped
CO1	Explain the properties of structural steel, limit state design philosophies, and the various load types and combinations acting on steel structures	--
CO2	Apply limit state design principles to design bolted and welded connections for both simple and eccentric loading conditions	P01
CO3	Analyze the structural behavior of tension and compression members, including net area, shear lag, and stability requirements for built-up columns with lacing and battens	P02
CO4	Design laterally supported/unsupported beams and complex structural components like plate girders to meet specific flooring system requirements	P03
CO5	Evaluate design forces for roofing systems as per IS 875 and design industrial building components such as purlins and gantry girders	P04
CO6	Working in a team, engage in independent study to investigate sustainable steel construction practices—such as re-use of resources—and make an oral presentation mapping findings to SDGs	P06, P08,P09, P011

CO PO MAPPING

[illegible]

22CPC512 – WASTEWATER ENGINEERING		
COURSE OUTCOMES At the end of the course, the student will be able to:		PO's Mapped
CO1	Explain the objectives of sanitary engineering, sewerage system types, house drainage principles, and the basic cycles of decomposition.	-
CO2	Apply engineering fundamentals to estimate sewage quantity, storm runoff and to design layouts for house drainage systems.	PO1
CO3	Analyze the hydraulics of sewers and sewage quality parameters to interpret their significance in primary and secondary treatment processes.	PO2
CO4	Design structural components for wastewater treatment, including sewer sections, grit chambers, and settling tanks, to meet identified environmental needs.	PO3
CO5	Evaluate the performance of biological treatment units and sludge management techniques to provide valid conclusions for sustainable disposal.	PO4
CO6	Investigate recent advances in sewage treatment, reuse strategies and communicate findings through teamwork.	PO8, PO9, PO11

1-Slight, 2-Moderate, 3-Substantial

22CPC513 – HIGHWAY AND RAILWAY ENGINEERING

COURSE OUTCOMES:
At the end of the course, the student will be able to:

PO's Mapped

CO1	Understand highway planning, alignment, and geometric design principles.	PO1, PO2, PO3
CO2	Apply traffic engineering studies and analysis to highway systems.	PO1, PO2, PO3, PO4
CO3	Analyze pavement materials and design flexible and rigid pavements.	PO1, PO2, PO3, PO4, PO5
CO4	Evaluate construction methods and maintenance of highways and railways	PO1, PO2, PO3, PO4, PO5
CO5	Apply modern tools in traffic management and safety engineering.	PO1, PO2, PO3, PO4, PO5, PO10, PO11
CO6	Evaluate environmental and economic aspects in highway and railway engineering projects.	PO1, PO2, PO3, PO4, PO5, PO10, PO11

CO PO MAPPING

[illegible]

22CPC514 – MECHANICS OF SOILS

COURSE OUTCOMES At the end of the course, the student will be able to:
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PO's Mapped

CO1	Explain the fundamental properties and classification of soil, theories of stresses, Engineering properties of soil, and shear strength.	---
CO2	Apply basic inter-relationship to determine physical and index properties of soil and stresses evaluation for self weight and external loads.	PO1
CO3	Analyze the engineering behaviour of soils such as permeability and seepage characteristics using flow net.	PO2
CO4	Interpretation of compaction and consolidation characteristics of soil from experimental and empirical relations.	PO3
CO5	Evaluate the principal stresses and shear strength of various types of soil.	PO4
CO6	Engage in characterization by testing of soil and preparation of soil analysis report to give suitable and sustainable solutions to field problems.	PO6, PO8, PO9, PO11

CO PO MAPPING

Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	1	-
CO2	3	-	-	-	-	-	-	-	-	-	-	3	1	-
CO3	-	3	-	-	-	-	-	-	-	-	-	3	2	1
CO4	-	-	3	-	-	-	-	-	-	-	-	3	2	2
CO5	-	-	-	3	-	-	-	-	-	-	-	2	3	2
CO6	-	-	-	-	-	2	-	2	2	-	2	2	2	3
22CPC514	3	3	3	3	-	2	-	2	2	-	2	2.5	1.83	2

1–Slight, 2–Moderate, 3–Substantial

22CPC515 – GEOTECHNICAL ENGINEERING LABOATORY		
COURSE OUTCOMES At the end of the course, the student will be able to:		PO's Mapped
CO1	Recall and explain the foundational principles of soil phase relations, grain size distribution, consistency limits, and the importance of in-situ testing.	---
CO2	Apply standard engineering procedures and IS codes to determine the primary physical properties and index properties of various soil.	PO1
CO3	Analyze experimental data from sieve/hydrometer analysis, compaction, and consolidation tests to classify soils and estimate engineering parameters.	PO2
CO4	Evaluate the shear strength of cohesive and cohesionless soils using various laboratory tests.	PO3
CO5	Conduct demonstration on in-situ field equipments / field tests and modern materials like Geosynthetics.	PO4
CO6	Working in a team to collect and test the soil samples for characterization, identifying sustainable solutions to problematic soils and to prepare detailed soil laboratory test report for different types of soils.	PO8, PO9, PO11

CO PO MAPPING

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	2	-
CO2	3	-	-	-	-	-	-	-	-	-	-	3	2	-
CO3	-	3	-	-	-	-	-	-	-	-	-	3	2	1
CO4	-	-	3	-	-	-	-	-	-	-	-	2	2	2
CO5	-	-	-	2	2	-	-	-	-	-	-	2	3	2
CO6	-	-	-	-	-	-	-	2	2	-	2	2	2	3
22CPC515	3	3	3	2	2	-	-	2	2	-	2	2.33	2.16	2

1-Slight, 2-Moderate, 3-Substantial

22CPC301 –MECHANICS OF SOLIDS I		
COURSE OUTCOMES At the end of the course, the student will be able to:		PO's Mapped
CO1	Elucidate mechanical properties, stress-strain behavior of various materials, and fundamental theories related to axial loading, bending, and torsion.	--
CO2	Apply Hooke's law, elastic constants, and principles of superposition to compute deformations and stresses in simple/compound bars, thin shells, and shafts.	PO1
CO3	Analyze determinate beams to construct shear force and bending moment diagrams and determine internal stress distributions at various cross-sections.	PO2
CO4	Formulate solutions for complex stress states using Mohr's circle and determine forces in plane and space trusses using appropriate analytical methods.	PO3
CO5	Evaluate the performance and energy absorption of springs and structural members under impact or suddenly applied loads to provide substantiated conclusions.	PO4
CO6	Working in a team, engage in independent study to identify structural failures in engineering history and make an oral presentation mapping these to professional ethics and SDGs.	PO7, PO8, PO9, PO11

CO PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	–	–	–	–	–	–	–	–	–	–	–	2	1	–
CO2	3	–	–	–	–	–	–	–	–	–	–	3	1	–
CO3	–	3	–	–	–	–	–	–	–	–	–	3	2	1
CO4	–	–	3	–	–	–	–	–	–	–	–	3	2	2
CO5	–	–	–	3	3	–	–	–	–	–	–	2	3	2
CO6	–	–	–	–	–	–	2	2	2	–	2	2	2	3
22CPC301	3	3	3	3	3	–	2	2	2	–	2	2.5	1.83	2

1-Slight, 2-Moderate, 3-Substantial

22CPC302 - CONSTRUCTION MATERIALS AND TECHNOLOGY

COURSE OUTCOMES At the end of the course, the student will be able to:	
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<i>CO1</i>	Recall and explain the properties, composition, and types of fundamental construction materials (stones, bricks, timber, glass, polymers) and masonry techniques
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<i>CO2</i>	Apply standard engineering procedures and Indian codes to identify materials and conduct crushing, water absorption, and compression tests in the laboratory
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PO2

CO4	Design layout plans for plumbing services and select appropriate centering, shuttering, and formwork systems for diverse construction practices
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PO4, PO5

CO6	Working in a team, engage in independent study to investigate sustainable construction practices and recent technological advancements, and make an oral presentation mapping findings to SDGs
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1	PSO1	PSO2
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COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
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22CPC303 - SURVEYING

COURSE OUTCOMES At the end of the course, the student will be able to:
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PO's Mapped

CO1	Explain the fundamental principles of surveying, chain surveying, compass surveying, surveying instruments, scales, bearings, traversing, and error corrections used for linear and angular measurements.	PO1, PO2, PO11
CO2	Apply levelling principles, contouring methods, area and volume computations, and perform calculations related to curvature, refraction, reciprocal levelling, and contour mapping for engineering projects	PO1, PO2, PO3, PO4, PO11
CO3	Analyze the principles of theodolite and tacheometric surveying to determine horizontal angles, distances, elevations, gradients, and evaluate measurement errors using appropriate surveying methods	PO1, PO2, PO4, PO5, PO11
CO4	Design simple curve layouts and hydrographic surveys by selecting suitable curve setting-out methods, sounding techniques, and reduction procedures for transportation and water resource engineering applications	PO1, PO2, PO3, PO4, PO5, PO6, PO11
CO5	Evaluate triangulation, geodetic surveying, Total Station, GPS, Drone Surveying, and other modern surveying instruments for establishing horizontal and vertical control and solving real-world surveying problems	PO1, PO2, PO4, PO5, PO6, PO11
CO6	Demonstrate surveying skills through practical assignments, field observations, seminars, and case studies by integrating conventional and modern surveying techniques for civil engineering applications beyond the syllabus.	PO1, PO4, PO5, PO7, PO8, PO9, PO10, PO11

CO PO MAPPING

[illegible]

22CPC304 – SURVEY LABORATORY

COURSE OUTCOMES

At the end of the course, the student will be able to:

PO's Mapped

At the end of the course, the student will be able to:

CO1	Explain the principles, working procedures, and field applications of chain, compass, plane table, levelling, theodolite, tacheometer, and Total Station used in surveying practice.	PO1, PO11
CO2	Apply chain surveying, compass surveying, plane table surveying, and levelling techniques to measure distances, bearings, reduced levels, and prepare field records accurately.	PO1, PO2, PO5, PO11
CO3	Analyze field observations obtained from theodolite and tacheometric surveying to determine horizontal angles, heights, distances, and elevations with appropriate accuracy.	PO2, PO4, PO5, PO11
CO4	Perform Total Station surveying and setting out of foundations and simple curves by selecting appropriate surveying methods for civil engineering projects.	PO3, PO4, PO5, PO6, PO11
CO5	Evaluate the accuracy of survey measurements by identifying and minimizing observational and instrumental errors while interpreting field data for engineering applications.	PO2, PO4, PO5, PO11
CO6	Demonstrate professional ethics, teamwork, communication skills, and lifelong learning through laboratory experiments, field surveys, technical report preparation, and seminar presentations beyond the syllabus.	PO7, PO8, PO9, PO10, PO11

CO PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	2	-	-	-	-	-	2	2	1	1
CO2	3	3	-	-	2	-	-	-	-	-	2	3	2	2
CO3	3	3	-	3	2	-	-	-	-	-	2	3	2	2
CO4	3	2	3	2	3	2	-	-	-	-	2	3	3	2
CO5	2	3	-	3	2	-	-	-	-	-	2	2	2	2
CO6	-	-	-	-	-	-	3	3	3	2	3	2	3	3
22CPC304	2.8	2.75	3	2.67	2.2	2	3	3	3	2	2.16	2.5	2.16	2

1-Slight, 2-Moderate, 3-Substantial