22CES410	APPLIED HYDRAULICS AND FLUID MCHINERY	SEMESTER IV
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	**Explain** the principles of open channel flow, dimensional analysis and momentum concepts including flow characteristics, energy relationships and similitude laws relevant to hydraulic systems.	--
CO2	**Apply** the principles of impulse momentum to determine forces exerted by fluid jets on stationary and moving surfaces and interpret their role in hydraulic machine operation.	PO1
CO3	**Analyse** open channel flow behaviour, hydraulic jumps and model studies using dimensional analysis to assess the performance and stability of hydraulic structures and systems.	PO2
CO4	**Evaluate** the performance characteristics of pumps and turbines by analyzing efficiency, operating curves and governing mechanisms for appropriate machine selection.	PO3
CO5	**Investigate** the performance of pumps, turbines and open channel flow systems using experimental data, analytical methods or simulation tools to evaluate their efficiency and operational losses.	PO4, PO5
CO6	**Assess** the efficiency, safety, and real-world applicability of hydraulic machines and flow systems and effectively communicate technical findings through seminars or assignments or case studies or projects.	PO6, PO8, PO9

CO -PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	–	–	–	–	–	–	–	–	–	–	–	2	-	–
CO2	3	–	–	–	–	–	–	–	–	–	–	2	-	–
CO3	–	3	–	–	–	–	–	–	–	–	–	3	2	-
CO4	–	–	3	–	–	–	–	–	–	–	–	3	2	-
CO5	–	–	–	3	3	–	–	–	–	–	–	2	3	2
CO6	–	–	–	–	–	2	–	2	2	-	-	-	2	3
22CES410	**3**	**3**	**3**	**3**	**3**	**2**	**–**	**2**	**2**	**–**	**–**	**2.40**	**2.25**	**2.5**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPC405	MECHANICS OF SOLIDS II	SEMESTER IV
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	**Explain** fundamental concepts, assumptions, and governing equations related to beam deflection, bending, columns, cylinders, and elastic failure theories.	--
CO2	**Apply** principles of mechanics to solveproblems involving beam deflection and statically determinate and indeterminate structures.	PO1,PO2
CO3	**Analyze** structural members and systems to determine internal forces, stresses, and buckling loads under various loading and boundary conditions.	PO1,PO2,PO3
CO4	**Analyze** the behavior of structural members subjected to unsymmetrical bending and locate the shear centre of beam sections.	PO1,PO2,PO3
CO5	**Evaluate** stresses in thick and compound cylinders and assessthe safety of components using elastic failure theories and factor of safety concepts.	PO1,PO2
CO6	**Propose** suitable structural or mechanical components by selecting appropriate analytical methods, material limits, and safety criteria under given constraints.	PO1, PO2, PO3, PO6, PO8,PO11

CO- PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	–	–	–	–	–	–	–	–	–	2	1	1
CO2	3	3	–	–	–	–	–	–	–	–	–	3	2	1
CO3	3	3	2	–	–	–	–	–	–	–	–	3	2	2
CO4	3	3	2	–	–	–	–	–	–	–	–	3	2	2
CO5	3	2	–	–	–	–	–	–	–	–	–	2	2	2
CO6	3	3	2	–	–	3	–	3	–	–	3	3	3	3
22CPC405	**3**	**2.67**	**2**	**–**	**–**	**3**	**–**	**3**	**–**	**–**	**3**	**2.67**	**2**	**1.83**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPC406	CONCRETE TECHNOLOGY	SEMESTER IV
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	**Explain** the properties of concrete and its constituent materials**as** per IS Codal provision	--
CO2	**Apply** standard engineering for manufacturing and operation of normal concrete and special concrete.	PO1
CO3	**Analyze** the test results and suitability of concrete and its constituents' materials with acceptance criteria.	PO2
CO4	**Design** concrete mix proportions in accordance with codalprovisions based on characteristic strength and statistical quality control	PO3
CO5	**Evaluate** the performance and suitability of special concretes and special concreting methods for complex environments.	PO4
CO6	Engage in independent study and work effectively in teams to investigate the economic, environmental, and societal impacts of modern concreting practices, and deliver an oral presentation mapping the findings to relevant Sustainable Development Goals (SDGs).	PO6, 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	–	-	3	–	2	2	2	3
22CPC406	**3**	**3**	**3**	**3**	**3**	**2**	**–**	**–**	**3**	**–**	**2**	**2.5**	**1.83**	**1.33**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPC407	DESIGN OF REINFORCED CONCRETE ELEMENTS	SEMESTER IV
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	Explain and interpret the concepts of Working Stress Method and Limit State Method for the design of reinforced concrete structural elements as per IS: 456–2000.	PO1, PO2, PO3
CO2	Apply Working Stress Method and Limit State Method principles for the flexural design of singly and doubly reinforced rectangular and flanged beams.	PO1, PO2, PO3, PO5
CO3	Analyze the flexural behavior of singly and doubly reinforced rectangular and flanged beams using appropriate analytical methods.	PO1, PO2, PO3, PO4
CO4	Design reinforced concrete elements such as beams, slabs, staircases, columns, and footings in compliance with IS codal provisions.	PO1, PO2, PO3, PO5
CO5	Apply IS codal provisions to analyze, detail, and check the safety and serviceability requirements of reinforced concrete structural elements.	PO1, PO2, PO3, PO5, PO6, PO7, PO9, PO10
CO6	Present and communicate IS code provisions clearly through quizzes, assignments, and seminar activities.	PO1, PO9, PO10

CO PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	–	–	–	–	–	–	–	–	3	2	1
CO2	3	3	3	–	1	–	–	–	–	–	–	3	2	1
CO3	2	3	2	1	–	–	–	–	–	–	–	3	2	2
CO4	3	3	3	–	2	–	–	–	–	–	-	3	2	2
CO5	3	3	3	–	2	1	2	-	1	1	-	2	2	3
CO6	1	–	–	–	–	–	–	–	1	3	–	1	1	3
22CPC407	**2.5**	**2.8**	**2.6**	**1**	**1.67**	**1**	**2**	**–**	**1**	**2**	**–**	**2.5**	**1.83**	**2**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPC408	WATER SUPPLY ENGINEERING	SEMESTER IV
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	**Describe** the integrated framework of water supply engineering, encompassing planning concepts, demand assessment, source evaluation, treatment philosophy, and distribution requirements for safe water supply systems.	PO1,PO6,PO11
CO2	**Interpret** water quality data, standards, and public health implications to judge the suitability of water for domestic and municipal use under varying environmental conditions.	PO1,PO2,PO4,PO6
CO3	**Apply** engineering principles and hydraulic concepts to analyze water conveyance, pumping, treatment, and distribution components within a complete water supply system.	PO1,PO2,PO3,PO5
CO4	**Design** system-level solutions for water treatment and distribution that balance technical performance, operational feasibility, and compliance with standards and codes.	PO3, PO4, PO5, PO10
CO5	**Evaluate** conventional and advanced water treatment technologies based on efficiency, sustainability, environmental impact, and long-term applicability.	PO2,PO4, PO6, PO11
CO6	**Assess** water supply infrastructure from societal, economic, and management perspectives, and communicate engineering decisions effectively in professional and multidisciplinary contexts.	PO6,PO8, PO9, PO10

CO -PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	–	–	–	2	–	–	–	–	1	2	1	–
CO2	–	3	–	2	–	2	1	–	–	–	–	3	1	–
CO3	–	3	3	–	2	–	–	–	–	–	–	3	2	1
CO4	–	1	3	3	2	–	–	–	–	2	–	3	2	2
CO5	–	1	–	3	2	2	–	–	–	–	2	2	3	2
CO6	–	–	–	–	–	2	–	2	3	3	–	2	2	3
22CPC408	**3**	**1.8**	**3**	**2.67**	**2**	**2**	**1**	**2**	**3**	**2.5**	**1.5**	**2.5**	**1.83**	**1.33**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CES411	FLUID MECHANICS AND MACHINERY LABOURATORY	SEMESTER IV
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	Apply fundamental principles of fluid mechanics to understand laboratory experiments on fluid flow and hydraulic systems	PO1
CO2	Analyze experimental data to identify flow characteristics and verify fluid mechanics laws.	PO2
CO3	Perform laboratory experiments on flow measurement devices and hydraulic systems by following standard procedures.	PO3
CO4	Calculate the flow parameters and to study the performance characteristics of pumps and turbines using experimental data.	PO4
CO5	Interpret laboratory data and apply basic software tools to record, analyse and present experimental results	PO5
CO6	Identify basic environmental and societal aspects related to hydraulic systems and suggest simple sustainable practices in laboratory applications	PO6, PO8

CO -PO MAPPING

CO/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	2	1	-
CO2	-	3	-	-	-	-	-	-	-	-	-	2	1	-
CO3	-	-	3	-	-	-	-	-	-	-	-	2	1	-
CO4	-	-	-	3	-	-	-	-	-	-	-	2	1	-
CO5	-	-	-	-	3	-	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	2	-	3	-	-	-	2	2	2
22CES411	**3**	**3**	**3**	**3**	**3**	**2**	**–**	**3**	**–**	**–**	**–**	**2**	**1.33**	**2**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CES412	ENGINEERING EXPLORATION	SEMESTER IV
COURSE OUTCOMES: On completion of the course, the students will be able to:		**PO's Mapped**
CO1	Explain the various disciplines of engineering, the distinction between science and engineering, and the Graduate Attributes required of a 21st-century engineer.	-
CO2	Apply the engineering design process—including brainstorming and research—to define problems and create solutions that meet specified requirements	PO3
CO3	Analyze structural elements under various loads and water quality parameters to determine suitability for construction and drinking purposes	PO2
CO4	Use surveying instruments and modelling tools to prepare site layouts and hydraulic models	PO5
CO5	Evaluate design solutions through testing and analysis to communicate final solutions and propose design improvements	PO4
CO6	Investigate systems engineering advancements; prepare technical reports, info graphics, and case studies communicating their financial and technical aspects, and make an oral presentation mapping these findings to relevant SDGs as a member of a team.	PO8, PO9, PO10 PO11

CO - PO MAPPING

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-	-	-
CO5	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	2	3	3	2	-	-	-
22CES412	-	3	3	3	3	-	-	2	3	3	2	-	-	-
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPC409	ENVIRONMENTAL ENGINEERING LABORATORY	SEMESTER IV
COURSE OUTCOMES: On completion of the course, the students will be able to:		**PO's Mapped**
CO1	**Identify** appropriate sampling and preservation techniques for analysis of water and wastewater.	----
CO2	**Determine** key chemical parameters such as pH, alkalinity, acidity, hardness, chlorides, and sulphates using standard laboratory methods.	PO1, PO2
CO3	**Analyze** oxygen-demand related parameters including DO, BOD and COD through experimental evaluation.	PO2,PO4
CO4	**Estimate** pollutant and chemical parameters such as fluorides, iron, and residual chlorine in water and wastewater samples using standard laboratory analytical methods.	PO2,PO4,PO5
CO5	**Interpret** the experimental results to assess water and wastewater quality with reference to BIS/WHO standards.	PO2,PO4
CO6	**Develop** the ability to record experimental data systematically, analyze results, and present technical reports effectively using appropriate communication skills.	PO4, PO6, PO7, PO9, PO10

CO -PO MAPPING

COs \ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2	PSO 3
CO1	–	–	–	–	–	–	–	–	–	–	–	2	–	–
CO2	3	2	–	–	–	–	–	–	–	–	–	2	1	–
CO3	–	3	–	2	–	–	–	–	–	–	–	2	–	1
CO4	–	3	–	2	2	–	–	–	–	–	–	2	–	1
CO5	–	3	–	2	–	–	–	–	–	–	–	1	2	–
CO6	–	–	–	2	–	3	2	–	2	2	–	–	2	3
22CPC 409	**3**	**2.75**	**–**	**2**	**2**	**3**	**2**	**–**	**2**	**2**	**–**	**1.8**	**1.67**	**1.67**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPC616	STRUCTURAL ANALYSIS II	SEMESTER VI
COURSE OUTCOMES **At the end of the course, the student will be able to :**		**PO's Mapped**
CO1	Explain static indeterminacy, kinematic indeterminacy, assumptions, concepts of Slope deflection method, Moment distribution method, plastic analysis and matrix methods of Structural analysis.	--
CO2	Apply mechanics principles to determine Fixed end moments for different loads and governing equations by considering support conditions.	PO1
CO3	Analyse the continuous beams, frames and trusses by using Slope deflection method, Moment distribution method and matrix methods and to determine collapse load / plastic moment capacity of indeterminate beams and frames.	PO2
CO4	Develop structural solutions by constructing shear force, Bending moment, displacement and plastic moment diagrams for indeterminate beams and frames.	PO3
CO5	Solve realistic indeterminate beams and frames by selecting appropriate structural analysis methods and to determine load factors, plastic moment capacities.	PO4 PO5
CO6	Evaluate the behaviour and performance of indeterminate beams and frames using suitable structural analysis methods, effectively interpret and communicate analytical results.	PO6 PO9

CO- PO MAPPING

CO / POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	2	-
CO2	3	-	-	-	-	-	-	-	-	-	-	2	3	-
CO3	-	3	-	-	-	-	-	-	-	-	-	2	3	-
CO4	-	-	3	-	-	-	-	-	-	-	-	2	3	-
CO5	-	-	-	3	3	-	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	2	-	-	2	-	-	2	2	2
22CPC616	**3**	**3**	**3**	**3**	**3**	**2**	**-**	**-**	**2**	**-**	**-**	**2**	**2.5**	**2**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPC617	DESIGN OF CONCRETE STRUCTURES	SEMESTER VI
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	**Explain** the structural behaviour, stability requirements, and design principles for reinforced concrete footings, retaining walls, liquid retaining structures, slabs and earthquake-resistant structures.	--
CO2	**Apply** the principles of engineering fundamentals and relevant IS codes to determine design loads and compute ductile detailing for frames.	PO1
CO3	**Analyze** the stability requirements, and forces acting on the reinforced concrete footings, earth retaining structures, flat slabs, liquid retaining structures, and earthquake-resistant structures.	PO2
CO4	**Develop** appropriate design and reinforcement detailing drawings for reinforced concrete footings, retaining walls, flat slabs, liquid retaining structures, and ductile detailing of structures subjected to various loading in accordance with codal provisions.	PO3
CO5	**Investigate and evaluate** reinforced concrete structural systems using suitable analytical methods and engineering tools, and assess design assumptions, detailing practices, and performance through case studies.	PO4, PO5
CO6	**Evaluate** the societal impact, safety, and sustainability of reinforced concrete and earthquake-resistant structures, and effectively communicate technical findings through independent study of real-world applications and codal practices.	PO6, 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	3
22CPC617	**3**	**3**	**3**	**3**	**3**	**2**	**–**	**–**	**2**	**–**	**2**	**2.5**	**1.83**	**2**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPC618	WATER RESOURCES ENGINEERING	SEMESTER VI
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	**Explain** the principles of hydrology, reservoir planning, gravity dams, groundwater management and their role in sustainable water resources engineering.	--
CO2	**Apply** fundamental principles of hydrology, irrigation engineering, reservoir planning, dam engineering, and groundwater hydrology to analyze surface water and subsurface water systems.	PO1
CO3	**Analyze** hydrological and irrigation engineering problems such as rainfall–runoff estimation, reservoir yield determination, canal design, dam stability and groundwater yield using standard engineering methods.	PO2
CO4	**Design** basic water resources engineering components including irrigation canals, gravity dams, reservoirs, and groundwater wells to meet specified water demands.	PO3
CO5	**Investigate** and **evaluate** water resources systems by interpreting hydrological data, hydrographs, mass curves, pumping test results, and by using standard charts, empirical formulae, analytical methods, and engineering tools for effective assessment and decision-making.	PO4, PO5
CO6	**Assess** the environmental implications and sustainability aspects of water resources engineering projects and **present** sustainable practices for efficient and responsible management of water resources through written reports, presentations and visual representations	PO6, PO7, PO10

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	1	1
CO4	–	–	3	–	–	–	–	–	–	–	–	3	1	2
CO5	–	–	–	3	3	–	–	–	–	–	–	2	1	2
CO6	–	–	–	–	–	2	2	–	–	2	–	2	1	2
22CPC618	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**–**	**–**	**2**	**–**	**2.5**	**1**	**1.75**

1 – Slight, 2 – Moderate, 3 – Substantial

22CPC619	FOUNDATION ENGINEERING	SEMESTER VI
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	Examine the properties of soil, principles of effective stress and fundamental concepts of geotechnical engineering involved in site investigation, foundation behavior and earth pressure theories.	--
CO2	Interpret soil exploration data, field and laboratory test results to evaluate bearing capacity, settlement characteristics, pile capacity and stability of retaining structures.	PO1, PO2
CO3	Analyze and design shallow and pile foundations and retaining structures considering soil conditions, loading systemswith the relevance ofcodal provisions.	PO3
CO4	Apply modern geotechnical tools, techniques and softwarerelated to the design of foundations and stability analysis of retaining structures.	PO5
CO5	Present seminar or research papers related to subsoil investigationand recent developments in the field of geotechnical engineering.	PO9, PO11
CO6	Prepare and submit report on case studies of failures of substructures, interpret the causes and suggest suitable remedial measures in accordance with Code of practice.	PO7, PO11

CO-PO MAPPING

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	–	–	–	–	–	–	–	–	–	–	–	2	–	–
CO2	3	2	**--**	–	–	–	–	–	–	–	–	3	–	–
CO3	–	**-**	3	–	–	–	–	–	–	–	–	3	–	2
CO4	–	–	–	–	3	–	–	–	–	–	–	2	2	–
CO5	–	–	–	–	–	–	–	–	3	–	2	2	3	2
CO6	–	–	–	–	–	–	3	–	–	–	3	2	3	3
22CPC619	**3**	**2**	**3**	**–**	**3**	**–**	**3**	**–**	**3**	**–**	**2.5**	**2.33**	**2.67**	**2.33**
1 – Slight, 2 – Moderate, 3 – Substantial														

22CPE632	AIRPORT,DOCKSANDHARBOUR ENGINEERING	SEMESTER VI
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	Define and list the basic concepts of air and water transportation systems, including AAI, ICAO, aircraft characteristics, tides, harbours, ports and docks.	PO1, PO6
CO2	Explain airport planning principles, regional planning, site selection, air traffic estimation, runway orientation and classification of harbours and ports.	PO1, PO2, PO6, PO7, PO10
CO3	Apply standard procedures to determine runway length, prepare wind rose diagrams, and use geometric design principles for runways, taxiways, airport layouts and berthing structures.	PO1, PO2, PO3, PO5
CO4	Analyse the functional and operational performance of visual aids, runway pavements, airport drainage systems, breakwaters, navigational aids and dredging methods.	PO1, PO2, PO3, PO4,PO5, PO7
CO5	Evaluate the performance and suitability of airport and harbour components such as visual aids, runway pavements, drainage systems, breakwaters, navigational aids, and berthing structures with respect to safety**,** functionality**,** and operational requirements.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO11
CO6	Develop conceptual airport or harbour planning layouts by integrating runway/taxiway geometry, airport facilities, harbour components, breakwaters, and navigational aids in accordance with case studies.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO10, PO11

CO- PO Mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	–	–	–	–	1	–	–	–	–	–	2	–	1
CO2	3	2	–	–	–	1	1	–	–	1	–	3	–	2
CO3	2	3	3	–	2	–	–	–	–	–	–	3	2	2
CO4	2	3	2	3	2	–	2	–	–	–	–	3	2	3
CO5	2	3	3	2	2	1	2	1	–	–	1	3	2	3
CO6	2	3	3	2	3	1	2	–	1	1	1	3	2	2
22CPE632	3	3	3	3	3	1	2	1	1	1	1	3	2	3
1–Slight,2–Moderate, 3–Substantial														

22COE601	DISASTERMANAGEMENTAND MITIGATION	SEMESTER VI
COURSEOUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	Explain the basic concepts of disaster management such as disaster, hazard, vulnerability,resilienceandrisk,andclassifydisasterswiththeircauses, Impacts and global trends.	PO1, PO2, PO6, PO7, PO9, PO11
CO2	Apply hazard identification, risk assessment and vulnerability analysis Techniques considering physical, social, economic and environmental factors.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO11
CO3	Analyze mitigation strategies and preparedness measures and assess the role Of government, public participation and media in disaster risk reduction.	PO1, PO2, PO3, PO6, PO7, PO8, PO9, PO11
CO4	Design appropriate disaster response and recovery plans including Emergency response, relief management, rehabilitation and long-term Recovery strategies.	PO1, PO2, PO3, PO6, PO7, PO8, PO9, PO10 PO11
CO5	Apply disaster management principles, environmental health and safety practices, and ISO45001concepts to real-lifecase studies.	PO1, PO2, PO5, PO6, PO7, PO11
CO6	Present seminar/assignments on disaster management case studies, policies And emerging issues beyond the syllabus to enhance professional and ethical responsibility.	PO6, PO7, PO8, PO9, PO11

CO-PO MAPPING

COs\ POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	3	2	–	–	–	3	1	–	1	–	1	2	1	2
CO2	3	3	2	2	2	3	1	–	–	–	1	3	2	2
CO3	2	2	2	–	–	3	2	1	1	–	1	3	1	3
CO4	2	3	3	–	–	3	2	2	1	2	1	3	2	3
CO5	2	2	–	–	1	3	3	–	–	–	1	2	2	3
CO6	–	–	–	–	–	2	2	2	3	–	3	1	2	3
22COE601	**2.4**	**2.4**	**2.33**	**2**	**1.5**	**2.83**	**1.83**	**1.67**	**1.5**	**2**	**1.33**	**2.33**	**1.67**	**2.67**
1–Slight,2–Moderate, 3–Substantial														

22CEE602	COMPUTER AIDED CIVIL ENGINEERING DRAWING	SEMESTER VI
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	**Explain** the fundamental principles of building planning, the concept of perspective drawing, and the significance of utility layouts	--
CO2	**Apply** modern engineering and CAD tools to prepare detailed constructional plans, elevations, and site plans for residential buildings	PO1, PO5
CO3	**Analyze** the specific functional and spatial requirements to design line plans for diverse public, health, and industrial structures	PO2
CO4	**Design** comprehensive layouts for water supply, drainage, electrical wiring, and fire protection systems for multistoried buildings	PO3, PO5
CO5	**Evaluate** the efficiency of building solid waste collection and disposal systems, including segregation and vermicomposting, for environmental impact	PO4
CO6	**As a member of a team,** engage in independent study to design a sustainable building project integrating fire safety and waste management, and make a presentation mapping findings to SDGs	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	–	–	–	–	–	–	3	1	–
CO3	–	3	–	–	–	–	–	–	–	–	–	3	2	1
CO4	–	–	3	–	3	–	–	–	–	–	–	3	2	2
CO5	–	–	–	3	-	–	–	–	–	–	–	2	3	2
CO6	–	–	–	–	–	2	–	2	2	–	2	2	2	3
22CEE602	**3**	**3**	**3**	**3**	**3**	**2**	**–**	**2**	**2**	**–**	**2**	**2.5**	**1.83**	**2**
1–Slight,2–Moderate, 3–Substantial														

22CPC620	TRANSPORTATION ENGINEERING LABORATORY	SEMESTER VI
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO's Mapped**
CO1	Conduct standard laboratory tests on aggregates and bituminous materials and interpret the results to assess their physical, mechanical, and rheological properties.	PO1,PO2,PO4,PO5
CO2	Analyze the results of aggregate and bituminous material tests and assess their suitability for field applications in pavement construction.	PO1,PO2,PO3,PO4
CO3	Apply the outcomes of laboratory tests on aggregates and bituminous materials to select and justify suitable materials for field applications in pavement construction.	PO1,PO2,PO3,PO5
CO4	Carry out traffic studies including traffic volume, spot speed, and roadway capacity studies, to studythe traffic flow characteristics.	PO1,PO2,PO3,PO4,PO5
CO5	Analyze the collected traffic data to evaluate traffic flow characteristics and road performance.	PO1,PO2,PO3,PO4,PO5
CO6	Use modern laboratory and field equipment safely to conduct transportation engineering experiments and report the results effectively.	PO1,PO5,PO9, PO10

CO- PO MAPPING

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	–	2	1	–	–	–	–	–	–	3	2	1
CO2	2	3	2	2	–	–	–	–	–	–	–	3	2	1
CO3	2	2	3	–	1	–	–	–	–	–	–	3	2	1
CO4	2	3	2	3	1	–	–	–	–	–	–	2	2	2
CO5	2	3	2	3	1	–	–	–	–	–	–	2	2	2
CO6	1	–	–	–	3	–	–	–	1	3	–	1	1	3
22CPC620	**2**	**2.6**	**2.25**	**2.5**	**1.4**	**–**	**–**	**–**	**1**	**3**	**–**	**2.33**	**1.83**	**1.67**
1–Slight,2–Moderate, 3–Substantial														

22CES613	DESIGN THINKING FOR CIVIL ENGINEERING	SEMESTER VI
COURSE OUTCOMES **At the end of the course, the student will be able to:**		**PO Mapped**
CO1	Evaluate user needs, stakeholder expectations, and contextual constraints through empathy-based research techniques to identify real-world problems.	PO1, PO2, PO3
CO2	Formulate and validate clear problem statements by critically analyzing user insights, impact, feasibility, and constraints.	PO1, PO2, PO3
CO3	Apply structured ideation methods and creative thinking approaches to generate multiple innovative solution concepts.	PO2, PO3, PO5
CO4	Justify and select optimal solution concepts based on criteria such as feasibility, impact, and user value.	PO2, PO3, PO5
CO5	Design and develop functional prototypes by integrating technical knowledge, user feedback, and iterative improvement strategies.	PO1, PO2, PO5, PO6
CO6	Assess and refine solutions based on testing outcomes, scalability, viability, and execution planning for real-world implementation.	PO1, PO2, PO3, PO5

CO-PO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	3	3	2	-	-	-	-	-	-	-	-	-	-	3
CO2	3	2	3	-	-	-	-	-	-	-	-	-	-	3
CO3	-	3	3	-	2	-	-	-	-	-	-	-	3	3
CO4	-	3	3	-	2	-	-	-	-	-	-	-	3	3
CO5	3	3	-	-	2	2	-	-	-	-	-	3	-	3
CO6	3	3	3	-	2	-	-	-	-	-	-	3	-	3
22CES613	**3**	**2.83**	**2.8**	**-**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**3**

1–Slight,2–Moderate, 3–Substantial