SCHEME OF COURSE WORK

Course Details:

Course Title	**: Advanced Design of Concrete Structures**		
Course Code	**:** 15CE2201	**L P C**	**: 4 0 3**
Program:	**: M. Tech.**		
Specialization:	**: Structural Engineering**		
Semester	**: I**		
Prerequisites	**: Strength of Materials,Reinforced concrete structures .**		
Courses to which it is a prerequisite	**: None**		

Course Outcomes (COs):
At the end of the course, the student will be able to:

1	Estimate the crack width and deflection with regard to serviceability.
2	Analysis and design of grid floor system.
3	Analysis and design a flat slab system.
4	Discuss fire and seismic resistance of concrete structures.
5	Analyse and design bunkers, silos and chimneys.

Program Outcomes (POs):
Post graduates will be able to:

1	Synthesize existing and new knowledge in various sub areas of structural engineering
2	Analyse complex engineering problems critically with adequate theoretical background for practical applications.
3	Evaluate a wide range of feasible and optimal solutions after considering safety and environmental factors.
4	Demonstate the ability to pursue research by conducting experiments and extract the relevant information through literature surveys.
5	Use state –of- the- art of modern tools for interpeting the behaviour and modeling of complex engineering structures.
6	Attain the capability to work in multi disciplinary teams to achieve common goals.
7	Demonstrate the knowledge to perform the projects efficiently in multi disciplinary environments after consideration of economical and financial matters.
8	Communicate effectively on complex engineering activities to prepare reports and make presentations.
9	Engage in life-long learning independently to improve knowledge.
10	Understand the responsibility of carrying out professional practices ethically for sustainable development of society.

11	Examine critically and independently one's actions and take corrective measures by learning from mistakes.

Course Outcome versus Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO-1	S	S	M	M							M
CO-2	S	S	M		M						M
CO-3	S	S	M	M							
CO-4	S	S		M							M
CO-5	S	S	S	M	S						M

S - Strongly correlated, *M - Moderately* correlated, *Blank - No correlation*

Assessment Methods:	Assignment / Seminar / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week No.	TOPIC / CONTENTS	CO	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Introduction, short-term deflection of beams and slabs, deflection due to imposed loads	CO-1	What is short-term deflection of beams and slabs, deflection due to imposed loads	▫ Lecture/ Discussion	
2	Short-term deflection of beams due to applied loads, deflection of slabs by IS:456.	CO-1	Calculate the Short-term deflection of beams due to applied loads, deflection of slabs by IS:456.	▫ Lecture ▫ Lecture ▫ Problem solving	
3	Introduction, factors affecting crack width in beams, mechanisms of flexural cracking.	CO-1	Analyze the given frame by flexibility method	▫ Lecture ▫ Problem solving	
4	Calculation of crack width, simple empirical method, estimation of crack width in beams by IS: 456, Shrinkage and thermal cracking.	CO-1	Calculation of crack width, simple empirical method, estimation of crack width in beams by IS: 456, Shrinkage and thermal cracking.	▫ Lecture ▫ Lecture ▫ Problem solving	Assignment
5	Introduction, Analysis of flat grid floors, analysis of rectangular grid floors by Timoshenko's plate theory.	CO-2	Analysis of flat grid floors, analysis of rectangular grid floors	▫ Lecture ▫ Lecture ▫ Problem solving	
6	Analysis of grid by stiffness matrix method, analysis of grid floors by equating joint deflection.	CO-2	Analysis of grid by stiffness matrix method, analysis of grid floors by equating joint deflection.	▫ Lecture ▫ Problem solving	seminar
7	Comparison of methods of analysis, detailing of steel in flat grids.	CO-2	Design of flat grids slab.	▫ Lecture ▫ Problem solving	Assignment
8	Introduction, proportioning of flat slabs, determination of bending moment and shear force	CO-3	determination of bending moment and shear force in flat slabs.	Lecture ▫ Problem solving	
9	**MID TEST – I**				
10	The direct design method, equivalent frame method, slabs reinforcement details.	CO-3	Equivalent frame method, slabs reinforcement details.	▫ Lecture Problem solving	
11	Introduction, ISO 834 Standard heating conditions, grading and classifications	CO-4	Introduction, ISO 834 Standard heating conditions, grading and classifications	▫ Lecture Problem solving	Assignment

12	Effect of high temperature on steel and concrete, Effect of high temperature on different types of structural members	CO-4	What is Effect of high temperature on steel and concrete, Effect of high temperature on different types of structural members	▫ Lecture Problem solving	
13	Fire resistance by structural detailing by tabulated data, analytical determination of ultimate bending moment, capacity of reinforced concrete beams under fire, other considerations	CO-4	Fire resistance by structural detailing by tabulated data, analytical determination of ultimate bending moment, capacity of reinforced concrete beams under fire, other considerations	▫ Lecture Problem solving	
14	Introduction, general principals, factors, specifications, ductile detailing of beams	CO-4	What is ductile detailing	▫ Lecture Problem solving	
15	ductile detailing of columns and frame members with axial load (P) and moment (M) requirements shear walls joints in frames	CO-4	Design ductile detailing of columns and frame members with axial load (P) and moment	▫ Lecture Problem solving	
16	Design of rectangular, circular bankers and silos	CO-5	Design of rectangular, circular bankers and silos	▫ Lecture ▫ Problem solving	Assignment
17	Chimneys- design factors stresses due to self weight wind temperature, combination of stresses	CO-5	Design factors stresses due to self weight wind temperature, combination of stresses	▫ Lecture Problem solving	
18	**MID TEST – II**			▫	
	END EXAM			▫	