

19CE4602A –ADVANCED DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Category:	Program Elective	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisites:	19CE35031- Design of Reinforced design of Structures	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	Analyze and design staircases spanning transversely and longitudinally.	K4
CO2	Analyze and design cantilever and counterfort retaining walls.	K4
CO3	Analyze and design of flat slabs as per IS:456-2000.	K4
CO4	Analyze and design of water tanks as per IS:3370-2009.	K4
CO5	Analyze and design reinforced concrete solid slab bridges as per latest IRC codes.	K4

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3		2		2			2		2	3	
CO2	2	2	3		2		2			2		2	3	
CO3	2	2	3		2		2			2		2	3	
CO4	2	2	3		2		2			2		2	3	
CO5	2	2	3		2		2			2		2	3	

1- Low

2-Medium

3-High

Course Content

UNIT-1	DESIGN OF STAIRCASES: Introduction, Principles of Design, Applied Loads, Design of Stairs Spanning Transversely (Horizontally) and Stairs spanning Longitudinally.	CO1
UNIT-2	RETAINING WALLS: Types of retaining walls, forces on retaining walls, stability requirements, Preliminary proportioning of cantilever/counterfort retaining walls, Design of cantilever and counterfort retaining walls.	CO2
UNIT-3	DESIGN OF FLAT SLABS: Direct Design Method – Distribution of Moments in column strips and middle strip – moment and shear transfer from slabs to columns – shear in flat slabs – check for one way shear – Introduction to equivalent frame method. Limitation of direct design method – Distribution of moments in column strips and middle strip.	CO3
UNIT-4	DESIGN OF WATER TANKS: Introduction, Design Requirement, Methods of Analysis, Design of Circular tanks resting on ground, Design constants, rectangular tanks resting on ground.	CO4
UNIT-5	DESIGN OF SLAB BRIDGE Design loads for bridges: Introduction, load distribution theories, Design loads-Dead load, Vehicle Live Load, Impact Effect, Wind Loading, Longitudinal forces. Slab bridges: Introduction, Wheel load on slabs, Effective Width Method-Slab supported on Two Edges (Simply Supported Slabs), Dispersion length, Design of slab bridges.	CO5

Learning Resources

Text Books	<ol style="list-style-type: none"> 1. P.C.Varghese, Advanced Reinforced Concrete Design, 2/e, Prentice Hall of India, 2010. 2. S.S.Bhavikatti, Advance R.C.C Design(R.C.C. Volume- II), 2/e, New Age International Publishers, 2012. 3. T.R.Jagadeesh and M.A.Jayaram, Design of Bridge Structures, 2/e, Prentice
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	Hall of India, 2014. P.C.Varghese, Limit State Design of Reinforced Concrete, 2/e, Prentice Hall of India, 2015.
Reference Books	Pillai and Menon, Reinforced Concrete Design, 3/e, Tata McGraw Hill, 2017.
e-Resources & other digital material	1. https://freevidelectures.com/course/2686/design-of-reinforced-concrete-structures/26 2. https://nptel.ac.in/courses/105/105/105105104/ https://freevidelectures.com/course/3269/advanced-foundation-engineering/24