Sankalchand Patel University

Faculty of Engineering and Technology

First Year Master of Technology in Civil Engineering

(Structural Engineering)

In Effect from Academic Year 2017-18

Subject Code: 1ET2060103	Subject Title: ADVANCED DESIGN OF CONCRETE STRUCTURES
Pre-requisite Subject	Elementary design of concrete structures and Concrete Technology

Course Objective:

Reinforced cement concrete is one of widely used construction material. With rapid development of infrastructure facilities, large number of special structures like bunker and silos, flat slabs, grid floors, folded plates, water retaining structures etc. are being designed and constructed across the globe. The course on Advanced Design of Concrete Structures acquaints the structural engineering students to analyze and design such special structures as per Indian Standard code of practice.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory		Practical		
Lecture	Tutorial	Practical	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total
3	2	-	5	60	40	-	20	120

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
01	Serviceability criteria: Deflection and crack width	03	10
02	Proportioning, analysis and design of flat slab by direct design method and detailing.	04	10
03	Analysis and design of Grid floors by Rankine Grashoff Method, classical equivalent plate theory and IS:456 method	05	10
04	Design of rafts, Strip footing and pile cap.	07	15
05	Design of domes with openings	03	10
06	Design of Intze type shaft supported water tank	10	15
07	Analysis and design of Folded plate roofs.	06	15
08	Design of Bunker and Silos.	04	15

List of Tutorials:

At least two designs suitably selected from topics of the course. The report shall consist of full analytical treatment, design procedure, references and all necessary drawings in the form of neat dimensioned sketches.

List of References:

1. Design of Multi-Storied Building (G+3) - Shah and Karve, Structure Pub., Pune.
2. Advanced Design of Concrete Structures – Krishana Raju N., Tata Mc-Graw Hill, Delhi.
3. Reinforced Concrete Design – Sinha S. N., Tata Mc-Graw Hill, Delhi.
4. Limit State Design of Reinforced Concrete – Jain A. K., Nemchand & Bros., Roorkee.
5. Advanced Reinforced Concrete, Varghese A. V., Prentice Hall of India.
6. Reinforced concrete, Vol - I and II – Shah H. J., Charotar Pub., Anand.
7. IS Codes : IS:456, IS:875, IS:1893, IS:4326, IS:13920, IS: 3370, IS: 4995 (I & II), SP:16, SP:34.

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Course Outcome:

After learning the course, the students should be able to:

1. carry out load calculation, analysis, design and detailing of flat slabs, grid floor, water tanks, bunker and silos, folded plate and domes as per relevant IS code of practice.,
2. Analysis and design of raft foundation, strip footing and pile caps,
3. Ensure serviceability criteria for reinforced concrete structural elements.

Open Ended Problems:

Apart from above tutorials/experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.:

1. Development of spread sheets for design of various structural elements like beam, column, slab, foundation etc.
2. Design of RCC High-rise building with shear walls and cross checking with any open-source / professional software and/or self-developed spread sheet/programs.

List of Open Source Software/learning website:

http://nptel.ac.in/