



SILVER OAK UNIVERSITY

Engineering and Technology (M.Tech.)

Civil Engineering (Computer Aided Structural Analysis & Design)

Subject Name: Prestressed Concrete Structures

Subject Code:

Semester: II

Prerequisite: Structural Analysis

Objective:

To introduce the need for prestressing as well as the methods, types and advantages of prestressing to the students. Students will be introduced to the design of prestressed concrete structures subjected to flexure and shear.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Evaluation Scheme				Total Marks
L	T	P	C	Internal		External		
				Th	Pr	Th	Pr	
3	2	0	4	40	20	60	30	150

Content:

Unit No.	Course Contents	Teaching Hours	Weightage %
1.	Introduction: Principles of prestressing - types and systems of prestressing, need for High Strength materials, Loading stages, Determination of losses, deflection (short-long term), camber, cable layouts.	4	05
2.	Behavior under flexure - IS codal provisions, ultimate strength, Design of flexural members including large span slabs and beams. Design for Shear, bond and torsion. Design of End blocks.	9	25
3.	Design of tension members - application in the design of prestressed pipes and prestressed concrete cylindrical water tanks. Design of compression members with and without flexure - its application in the design piles, flag masts and similar structures.	9	25
4.	Composite beams - analysis and design, ultimate strength - their applications. Partial prestressing - its advantages and applications. Application of prestressing in continuous beams, concept of linear transformation, Concordant cable profile and cap cables.	9	25

5.	Introduction to the special prestressed structures like prestressed folded plates, prestressed cylindrical shells, prestressed concrete poles.	8	20

Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	Apply concepts & methods for pre stressing systems for different materials.	1
CO-2	Compute stresses in beams due to transverse loads & prestressing.	2
CO-3	Determine the losses in beams due to prestress, short and long term deflection, flexural and shear strength of beam.	3,4
CO-4	Design the composite beams and introduction to special Structures.	5

Teaching & Learning Methodology:-

1. Use of Learning Management system like canvas
2. Demonstration through ppt and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

List of Experiments:

- NIL

Books Recommended:-

1. Prestressed concrete - Krishna Raju
2. Design of Prestressed Concrete Structures - T.Y.Lin
3. Fundamentals of Prestressed Concrete - N.C.Sinha&S.K.RoyS.Chand& Co., 1985.
4. Prestressed Concrete- Design and Construction - Leonhardt.F., Wilhelm Ernst and Shon, Berlin
5. Prestressed Concrete - Freyssinet
6. Prestressed Concrete, - Evans, R.H. and Bennett, E.W., Chapman and Hall

List of Open Source Software/learning website:

<https://nptel.ac.in/courses/105/106/105106117/>