

IV Year – I SEMESTER

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CE702-PRESTRESSED CONCRETE

Lecture :	3 hrs/Week	Internal Assessment :	Marks
Tutorial :	1 Hrs/Week	Semester End Examination :	Marks
Practical :	--	Credits :	3

Course Learning Objectives:

The objective of this course is:

1. Familiarize Students with concepts of prestressing.
2. Equip student with different systems and devices used in prestressing.
3. Understand the different losses of prestress including short and long term losses.
4. Familiarize students with the analysis and design of prestressed concrete members under flexure, shear and torsion.

Course Outcomes:

At the end of this course the student will be able to

- a. Understand the different methods of prestressing.
- b. Estimate the effective prestress including the short and long term losses.
- c. Analyze and design prestressed concrete beams under flexure and shear.
- d. Understand the relevant IS Codal provisions for prestressed concrete

SYLLABUS:**UNIT-I**

Basic concepts of Prestressing- Advantages and Applications of Prestressed Concretes, High Strength Concrete- Permissible Stresses, Shrinkage, Creep, Deformation Characteristics, High strength Steel- Types, Strength-Permissible Stresses- Relaxation of Stress, Stress Corrosion- Durability, Fire Resistance, Cover Requirements.

UNIT-II

Prestressing Systems- Introduction, Tensioning devices, Pre-tensioning Systems, Post tensioning Systems, Basic Assumptions in Analysis of prestress and design, Analysis of prestress, Resultant Stresses at a section-

pressure line- Concepts of load balancing- Stresses in Tendons, Cracking moment.

UNIT-III

Losses of Pre-stressing- Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes -Elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage, differential shrinkage- bending of members and frictional losses- Total losses allowed for design.

UNIT-IV

Design for Flexural resistance- Types of flexural failure – Code procedures- Design of sections for flexure- Control of deflections- Factors influencing- Prediction of short term and long term deflections.

UNIT-V

Design for Shear and Torsion- Shear and Principal Stresses- Design of Shear reinforcements- Codal Provisions- Design for Torsion, Design for Combined bending, shear and torsion.

UNIT-IV

Transfer of Prestress in pre tensioned members- Transmission length- Bond stresses- end zone reinforcement- Codal provisions- Anchorage zone Stresses in Post tensioned members- Stress distribution in end block- Anchorage Zone reinforcement.

TEXT BOOKS

1. 'Prestressed Concrete' by N. Krishna Raju, Tata McGraw hill
2. 'Prestressed Concrete' by S. Ramamrutham

REFERENCES:

1. 'Prestressed Concrete' by P. Dayaratnam
2. 'Prestressed Concrete' by T. Y. Lin & Burns, Wiley Publications
