INSTITUTE	**FACULTY OF TECHNOLOGY**
PROGRAM	**BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)**
SEMESTER	**7**
COURSE TITLE	**DESIGN OF PRESTRESSED CONCRETE STRUCTURE**
COURSE CODE	**01CI0723**
COURSE CREDITS	**3**

Objective:

1. Gain an understanding of the fundamental principles underlying prestressing structures, including concepts such as pre-tensioning and post-tensioning.
2. Develop the ability to calculate different types of prestress losses, such as friction losses and elastic shortening, and determine deflections in prestressed members.
3. Learn to analyze determinate and indeterminate prestressed concrete members using appropriate analytical techniques and methods.
4. Master the application of Indian Standard code provisions in the design of prestressed concrete structures, ensuring compliance with relevant guidelines and regulations to achieve safe and efficient construction practices.

Course Outcomes: After completion of this course, student will be able to:

1. Apply principles, concepts & methods of prestressing to analyze and design prestressed concrete structures.
2. Calculate the various types of prestress losses and deflections of the prestressed members.
3. Analyze the various types of prestressed concrete members.
4. Design prestressed concrete structures as per Indian Standard code provisions.

Pre-requisite of course: Structural Analysis, Elementary Design of Structures.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction** Introduction, Basic Concepts, History of the development of materials and prestressing., Different methods of prestressing, Advantages, and Limitations, IS provisions related to materials properties & prestressing, Systems & Devices.	8

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Contents : Unit	Topics	Contact Hours
2	**Analysis of Prestress and Bending Stress** Estimation of Losses due to various effects in prestress, Short- term and long-term deflections; flexural, shear and torsional strength, and Estimation of crack width. Fatigue and impact strength, resistance to fire, and corrosion, Analysis of PSC Flexural members, Basic concept, Bending Stresses at various Stages, Pressure Line, Codal Provisions, Ultimate Strength in Prestress, Design for Ultimate and Serviceability Limit States for Flexure, Analysis and Design for Shear and Torsion,	18
3	**Design of Structural Elements** Prestress Transmission in pre-tensioned members, Anchorage zone stresses and design for post-tensioned members, Limit state design criteria, Analysis and Design of Continuous Beam, Choice of Cable Profile, Creep and Shrinkage Effects. Partial prestressing - principles, Analysis and design concepts, Crack width calculations	16
Total Hours		**42**

Textbook :

1 Krishna Raju, Prestressed concrete, , Tata McGraw Hill Education Pvt. Ltd., Tata McGraw Hill Education Pvt. Ltd., 2001

References:

1 Prestressed Concrete Structures, , Prestressed Concrete Structures, , T.Y.Lin , Design of , Wiley India Private Limited, 2001

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
5.00	10.00	25.00	30.00	20.00	10.00

Instructional Method:

1 At the start of the course, the course delivery pattern and prerequisite of the subject will be discussed.

2 Lectures will be taken in the classroom with the use of multi-media presentations, whiteboard– a mix of both.

3 Attendance is compulsory in lectures which carries a 5% component of the overall evaluation.

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Instructional Method:

4 About 10 to 15% of the topics/ sub-topics, which are relatively simple, are to be given to the students for self-learning and collaborative learning methods. The assessment of Cos for the particular topics will be through classroom presentations.

5 Guide Students to undertake a micro-project/ physical model of the various elements.

6 Minimum two internal exams will be conducted an average of two will be considered as a part of continuous evaluation

7 Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular intervals. It carries a weightage of 5%.

8 Surprise tests/Quizzes will be conducted, which carry a 5% component of the overall evaluation.

Supplementary Resources:

1 https://archive.nptel.ac.in/courses/105/106/105106118/

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