

Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE368	PRESTRESSED CONCRETE	3-0-0-3	2016

Pre-requisite: CE201Mechanics of Solids

Course objectives:

- To make students familiar with the concepts and design of typical pre-stressed concrete structural elements and to have a knowledge of the codal provisions

Syllabus :

Basic concept and principles of pre-stressed concrete systems- analysis for flexure- loss of pre-stress, Design philosophy and design for flexure, codal provisions , Shear and torsional behavior – analysis and design - calculation of deflection (short & long term), Anchorage Zone stresses in post tensioned members, Prestressed concrete poles and sleepers, Partial pre-stressing, composite beams – analysis and design, Statically indeterminate structures

Expected Outcomes:

The students will be able to

- analyse prestressed concrete members
- design prestressed concrete members using codal provisions
- design for shear and torsion of prestressed concrete members
- design end blocks and provide detailing of reinforcements
- design composite members and other applications
- design continuous members

Text Books :

- G S Pandit & S P Gupta, " Prestressed Concrete", CBS Publishers,2014
- Krishna Raju N., Prestressed concrete, Tata McGraw Hill Company, New Delhi 1998
- Rajagopalan, N, "Prestressed Concrete", Alpha Science, 2002

References:

- Lin T.Y. Design of prestressed concrete structures, Asia Publishing House, Bombay 1995
- Mallik S.K. and Gupta A.P., Prestressed concrete, Oxford and IBH publishing Co. Pvt. Ltd., 1997
- Ramaswamy G.S., Modern prestressed concrete design, Arnold Heinimen, New Delhi, 1990
- IS 1343 – 1998 ISCode Bureau of Indian Standards

COURSE PLAN

Module	Contents	Hours	Sem. Exam Marks %
I	Review- Basic concept and principles of pre-stressed concrete, materials, prestressing systems – Analysis of prestress and bending stresses loss of pre-stress Stresses at transfer and service loads.	6	15

II	Limit state design criteria: Inadequacy of elastic and ultimate load method, criteria for limit states, strength and serviceability. Design of sections for flexure codal provisions- ultimate strength in flexure	6	15
FIRST INTERNAL EXAMINATION			
III	Shear and torsional resistance: design of shear reinforcement, design of reinforcement for torsion, shear and bending.	7	15
IV	Deflections of prestressed concrete members: Importance, factors, short term and long term deflection. Codal provisions	7	15
SECOND INTERNAL EXAMINATION			
V	Anchorage Zone stresses in post tensioned members: Stress distribution in end block, anchorage zone reinforcement. Prestressed concrete poles and sleepers: Design of sections for compression and bending Partial pre-stressing- Definitions, principles and design approaches and applications	8	20
VI	Composite beams –Analysis and design – Ultimate strength – applications, Elementary idea of composite construction for tee beams in bridges. Statically Indeterminate structures: advantages of continuous member(Concepts and steps for analysis)-	8	20
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End semester examination)

Maximum Marks :100

Exam Duration: 3 Hrs

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI : 2 questions out of 3 questions carrying 20 marks each

Note : 1.Each part should have at least one question from each module

2.Each question can have a maximum of 4 subdivisions (a, b, c, d)