CE/BOS/ CE C607/0709

K L UNIVERSITY

ADVANCED PRESTRESSED CONCRETE (CE C607)

SYLLABUS

L	T	P	Cr
3	1	0	4

UNIT – 1: Introduction, Prestressing Systems And Material Properties

Basic concepts of pre-stressing; Historical development; Advantages and Types of Pre-stressing, Pre-tensioning Systems and Devices, Post-tensioning Systems and Devices, Need for High strength steel and High strength concrete; **Losses Of Prestress:** Nature of losses of pre-stress; Loss due to elastic deformation of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, friction and anchorage slip; Total losses allowed for in design.

UNIT – 2: Analysis of Prestressed Member

Analysis of Members under Axial Load: Analysis at Transfer, Analysis at Service , Analysis for Ultimate Strength, Analysis of Member under Flexure:, Analysis at Transfer and at Service, Cracking Moment, Kern Point, Pressure Line, Analysis for Ultimate Strength, design loads and strength, Calculation of Crack Width, Variation of Stress in Steel, Analysis of a Rectangular Section, Analysis of a Flanged Section.

UNIT – 3: Deflections Of Prestressed Concrete Members:

Importance of control of deflections; Factors influencing deflections; Short term deflections of uncracked members. Long term deflection of cracked member; **Transmission Of Pre-Stress:** Transmission of Pre-stressing force by bond; Transmission length; Bond stresses; Transverse tensile stresses; End zone reinforcement; Flexural bond stresses in pre –tensioned and post – tensioned grouted beams, stress distribution in end block, Anchorage zone reinforcements; **Shear And Torsion Resistance Of Prestressed Concrete Member:** Shear and Principal stresses; Ultimate shear resistance of pre-stressed concrete members; Design of shear reinforcement, pre-stressed concrete members in torsion, Design of reinforcements for torsion, shear and bending.

UNIT – 4: Design Of Pre-Stressed Members

Design of sections for flexure, Design of Sections for Axial Tension, Design of Sections for compression and bending, design of pre-stressed section for shear and torsion, design of pre-stressed member for bond. Dimensioning of flexural member, design for pre-tensioning member, design of post-tensioning members.

UNIT – 5: Composite Construction Of Prestressed Concrete

Composite structural member, types of composite construction, analysis of stresses, differential shrinkages, deflection of composite member, flexural strength of composite sections, shear strength of composite section; **Design Of Continuous Prestressed Concrete Member:** Advantages of continuous members, ultimate load analysis of continuous pre-stressed member, design of continuous pre-stressed concrete beams.

TEXT BOOKS: (supplemented with IS:1343)

1. Prestressed Concrete by N. Krishna Raju; Tata Mc Graw - Hill Publishing Company Limited, New Delhi.3rd edition, 1995.
2. Design of Prestressed Concrete Structures by T.Y. Lin & Ned H. Burns; John Wiley & Sons, 3rd edition, 1981.

Reference Books

1. Prestressed concrete by N. Rajagopalan; Narosa Publishing House.2nd edition, 2005.
2. Design of Prestressed Concrete by A. Nilson; John Willey & Sons.2nd edition, 1987.