

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, VII-Semester

Departmental Elective CE 702(A) Prestressed Concrete Structures

Unit I

Introduction – Theory and Behaviour: Basic concepts – Advantages – Materials required – Systems and methods of prestressing – Analysis of sections – Stress concept – Strength concept – Load balancing concept – Effect of loading on the tensile stresses in tendons – Effect of tendon profile on deflections – Factors influencing deflections – Calculation of deflections – Short term and long term deflections – Losses of prestress – Estimation of crack width.

Unit II

Design for Flexure and Shear: Basic assumptions for calculating flexural stresses – Permissible stresses in steel and concrete as per I.S.1343 Code – Design of sections of Type I and Type II post-tensioned and pre-tensioned beams – Check for strength limit based on I.S. 1343 Code – Layout of cables in post-tensioned beams – Location of wires in pre-tensioned beams – Design for shear based on I.S. 1343 Code.

Unit III

Deflection and Design of Anchorage Zone: Factors influencing deflections – Short term deflections of uncracked members – Prediction of long term deflections due to creep and shrinkage – Check for serviceability limit state of deflection. Determination of anchorage zone stresses in post-tensioned beams by Magnel's method, Guyon's method and IS1343 code – design of anchorage zone reinforcement – Check for transfer bond length in pre-tensioned beams.

Unit IV

Composite and Continuous Beams and Slabs: Analysis and design of composite beams – Methods of achieving continuity in continuous beams – One and two way slabs, flat slab. Analysis for secondary moments – Concordant cable and linear transformation – Calculation of stresses – Principles of design.

Unit V

Miscellaneous Structures: Design of tension and compression members – Tanks, pipes, sleepers and poles – Partial prestressing – Definition, methods of achieving partial prestressing, merits and demerits of partial prestressing.

References Books:

1. Krishna Raju N., Prestressd Concrete, Tata Mc Graw Hill Book Co.Ltd. New Delhi.
2. Pandit.G.S. and Gupta.S.P., Prestressed Concrete, CBS Publishers and Distributers Pvt. Ltd.
3. Lin T. Y. and Ned H Burns., Design of Prestressed Concrete Structures, Wiley India Pvt. Ltd.
4. Dayaratran P., Prestressed Concrete Structures, Oxford & IBH Co., Delhi.

5. Rajagopalan.N, "Prestressed Concrete", Narosa Publishing House.
6. IS: 1343, Indian Standard code of Practice for Prestressed Concrete, Bureau of Indian Standards, New Delhi.
7. IS: 784, Indian Standard Specification for Prestressed Concrete Pipes, Bureau of Indian Standards, New Delhi.
8. IS: 3935 - Code of Practice for Composite Construction, Bureau of Indian Standards, New Delhi.