



Course description: This course will cover the basic of prestressed concrete design. Principles of prestressing, properties of concrete and prestressing steel, working and ultimate stress analysis and design, shear and torsion, deflections and prestress losses.

Aims of the course: This course is intended to provide civil engineering students with the necessary knowledge to understand the structural behavior, analysis and design of prestressed concrete elements subjected to variety of loadings. The emphasis is the concepts and methods used in designing prestressed concrete structural elements.

Intended Learning Outcomes (ILOs):

By the end of this course, students will be able to:

- 1- Identify the basic concepts of prestressing and its methods.
- 2- Identify the different properties of constituent materials including reinforcing steel, prestressing steel and concrete
- 3- Calculate losses in a prestress force.
- 4- Design a statically determinate prestressed concrete beam in working stresses limit.
- 5- Check capacity of prestressed concrete beams to resist bending moments and shear forces.
- 6- Calculate camber, deflections, and cracking of prestressed concrete beam.

Course structures:

Week	C. Hrs	ILOs	Topics	Teaching Procedure	Assessment methods
1	3	1	Basic Concepts	Lectures	H.W, Quizzes & Exams
2	3	2	Materials	Lectures	H.W, Quizzes & Exams
3,4	6	3	Prestress Losses	Lectures	H.W, Quizzes & Exams
5,6,7,8	12	4,5	Flexure Design	Lectures	H.W, Quizzes & Exams
9,10,11	9	5	Shear and Torsion	Lectures	H.W, Quizzes & Exams
12,13	6	6	Deflections and camber	Lectures	H.W, Quizzes & Exams

References:

- 1) Edward W. Nawy: "Prestressed Concrete – A Fundamental Approach." Prentice-Hall, 5th edition, 2006.
- 2) Naaman, A. E. "Prestressed Concrete Analysis and Design – Fundamental," 3rd edition, Techno Press 3000.

Assessment Methods:

Methods	Grade	Date
Exam 1	20	
Exam 2	20	
Quizes+ Homeworks	10	
Final Exam	50	

