



Course Syllabus

Course Code	Course Title	ECTS Credits
CEE-456	Pre-Stressed Concrete	5
Prerequisites	Department	Semester
CEE-353	Engineering	Fall, Spring
Type of Course	Field	Language of Instruction
Elective	Civil & Environmental Engineering	English
Level of Course	Lecturer(s)	Year of Study
1 st Cycle	Dr Marios Kyriakides	4 th
Mode of Delivery	Work Placement	Corequisites
Face-to-face	N/A	None

Course Objectives:

The main objectives of the course are to:

- develop basic understanding of the fundamental principles of pre-stressed concrete behavior, and pre-stressing capabilities;
- apply fundamental concepts of analysis and design of pre-stressed concrete structures;
- clarify the differences in the material properties and structural behavior of pre-stressed versus reinforced concrete elements;
- develop confidence in the design of pre-stressed concrete elements using various approaches.

Learning Outcomes:

After completion of the course students are expected to be able to:

- understand the basic concepts of pre-stressing procedures and materials, and the differences with reinforced concrete;
- determine flexural stresses in pre-stressed concrete beams at different stages of construction and loadings, as well as cracking load and flexural strength;
- analyze and design various shaped-sections of pre-stressed concrete beams for flexure, shear, and torsion.
- design the end zone;
- compute/estimate short term and long term pre-stressing losses.

- analyze and design composite cast-in-place slabs (decks) with precast pre-stressed girders;
- compute deflections and camber in pre-stressed concrete beams;
- analyze and design pre-stressed continuous beams.

Course Content:

- Basic concepts of pre-stressed concrete.
- Materials and systems for pre-stressing.
- Load balancing method.
- Pre-stress losses.
- Flexural design.
- Shear and torsional design.
- Anchorage systems.
- Indeterminate pre-stressed concrete beams.
- Concordant tendons. Camber, deflection, and crack control.
- Precast concrete concepts.

Learning Activities and Teaching Methods:

Lectures, in-class examples and exercises, and homework assignments.

Assessment Methods:

Homework assignments, mid-term exam, final exam.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Prestressed Concrete: A Fundamental Approach, 5 th Edition	Edward G. Nawy	Prentice Hall	2006	978-0131497597

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Design of Prestressed Concrete to Eurocode 2, 2 nd Edition	Raymond Ian Gilbert, Neil Colin Mickleborough, Gianluca Ranzi	CRC Press	2017	978- 1466573109
Prestressed Concrete Analysis and Design: Fundamentals, 3 rd Edition	Antoine E. Naaman	Techno Press 3000	2012	978- 0967493923