



Course Code CVEE-456	Course Title Pre-Stressed Concrete	ECTS Credits 6
Department Engineering	Semester Fall, Spring	Prerequisites CVEE-351
Type of Course Elective	Field Civil & Environmental Engineering	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 4 th	Lecturer(s) Dr Loizos Papaloizou
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- Develop firm 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:

- 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 and shear, and 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 Contents:

- Basic concepts of pre-stressed concrete
- Materials and systems for pre-stressing
- Load balancing method

- Pre-stress losses
- Flexural analysis
- Flexural, 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, Projects, Discussion

Assessment Methods:

Homework, Project assignments, exams, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Edward G. Nawy	Prestressed Concrete: A Fundamental Approach	Prentice Hall	2005	978-0131497597

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Antoine E. Naaman	Prestressed Concrete Analysis and Design: Fundamentals	Techno Press 3000	2004	978-0967493916