



Course Syllabus

Course Code	Course Title	ECTS Credits
CEE-351	Reinforced Concrete I	5
Prerequisites	Department	Semester
MENG-270, CEE-220	Engineering	Fall
Type of Course	Field	Language of Instruction
Required	Civil & Environmental Engineering	English
Level of Course	Lecturer(s)	Year of Study
1 st Cycle	Dr Marios Kyriakides	3 rd
Mode of Delivery	Work Placement	Corequisites
Face-to-face	N/A	None

Course Objectives:

The main objectives of the course are to:

- give the principles of the mechanics of reinforced concrete as a composite material;
- develop an understanding of the design principles, general code requirements and design process of reinforced concrete beams and columns.

Learning Outcomes:

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

- know the mechanical properties of concrete and steel;
- recognize the stress condition of a concrete member for a given problem;
- fully understand the response of steel and concrete and their composite behaviour;
- understand and recognize the various failure modes of concrete members;
- understand the meaning of design loads, safety factors and strength requirements;
- calculate the design strength of a given member for each typical limit state;
- analyse and design a linear concrete member under a given loading condition.

Course Content:

- Introduction: History of concrete structures and applications.
- Concrete technology: Basic constituents of concrete. Concrete composition. Mechanical properties of concrete. Durability, shrinkage, and creep. Stress-strain response of concrete.
- Reinforcing steel: Mechanical properties of reinforcing steel. Stress-strain curve. Classification. Bond and anchorage.
- Limit states: Ultimate limit state and serviceability limit state.
- Actions: Load combinations, load safety factors, Eurocode 1 provisions.
- Analysis and design: Types of concrete members, basic design principles, actions, failure modes of members, safety factors, general code requirements, analysis of section forces (bending, compression and tension).
- Beam members: Rectangular and flanged (T) section, pure bending, bending without axial force, bending with axial force, shear and torsion.
- Columns: Rectangular sections, bending with axial load, and interaction diagrams.

Learning Activities and Teaching Methods:

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

Assessment Methods:

Homework assignments, mid-term exam, and final exam.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Reinforced Concrete Design: to Eurocode 2, 7 th Edition	W.H. Mosley, J.H. Bungey, R. Hulse	Red Globe Press	2012	978-0230302853

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Design of Reinforced Concrete, 10 th Edition	Jack C. McCormac, Russell H. Brown	Wiley	2015	978-1118879108
Reinforced Concrete Structures: Analysis and Design, 2 nd Edition	David A. Fanella	McGraw-Hill Education	2016	978-0071847841
Properties of Concrete, 5 th edition	A.M. Neville	Prentice Hall	2012	978-0273755807
Reinforced Concrete: Mechanics and Design, 6 th Edition	James G. MacGregor, James K. Wight	Prentice Hall	2011	978-0132176521