

COURSE OUTLINE

(1) GENERAL

SCHOOL	UNIVERSITY OF THESSALY		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ΔΟ0300	SEMESTER	9 th
COURSE TITLE	PRESTRESSED CONCRETE DESIGN & INTRODUCTION TO BRIDGE ENGINEERING		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		WEEKLY TEACHING HOURS	CREDITS
		4	6
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialized general knowledge, skills development</i>	Specialized general knowledge		
	Solid Mechanics, Statics I, Strength of Materials I & II, Reinforced Concrete Design I & II		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS			
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/CIV_U_299/		

(2) LEARNING OUTCOMES

Learning outcomes <i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i> <i>Consult Appendix A</i> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
The course aims to present the main engineering principles for the design of prestressed concrete structures and an introduction to the fundamentals of bridge engineering. The main learning outcomes of the course are the introduction to theory and applications of prestressed concrete, the acquisition of the necessary skills to design efficiently prestressed concrete members and the understanding of the fundamentals of bridge design concept.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	Project planning and management
Adapting to new situations	Respect for difference and multiculturalism
Decision-making	Respect for the natural environment
Working independently	Showing social, professional and ethical responsibility and sensitivity to gender issues
Team work	Criticism and self-criticism
Working in an international environment	Production of free, creative and inductive
Working in an interdisciplinary environment	
Production of new research ideas	Others...

The course aims at offering the following general competences:

- Search for, analysis and synthesis of data
- Project planning
- Decision-making
- Working independently
- Engineering judgment
- Production inductive reasoning
- Showing professional and ethical responsibility

(3) SYLLABUS

1	Introduction to bridge engineering
2	Fundamentals of bridge design, key elements of the bridge
3	Introduction to prestressed concrete (P/C), basic concepts and applications
4	Materials (basic mechanical principles & constitutive laws)
5	Analysis of section
6	Preliminary design, Magnel diagram
7	Tendon profile arrangement (constant and variable tendon eccentricity)
8	Section properties
9	Losses of prestress (immediate and time-dependent losses)
10	Serviceability limit state (cracking, deflection, stresses)
11	Design of P/C beams in flexure at ULS
12	Design of P/C beams in shear at ULS
13	Design of anchorage zone
14	Indeterminate P/C structural members

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of ICT in teaching, communication with students via email, use of online classroom system (eclass)	
TEACHING METHODS <i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop,</i>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	52 ώρες
	Study of course material	30 ώρες
	Semester project	40 ώρες
	Exam preparation	20 ώρες
	Final exam	3 ώρες
	Course total	145 hours

<i>interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i> <i>The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS</i>		
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	Language of Evaluation: Greek Course evaluation: (a) 30% written assignment (semester project) (b) 70% written examination at the end of the semester The evaluation aims at examining both the knowledge and the judgment of students. The procedure evaluates the candidate's ability to solve a series of problems that cover all the fundamental sections of the course and require (a) in-depth understanding of the theory and (b) dedicated preparation through the completion of a semester project. The evaluation criteria are explained in class at the beginning of the semester.	

(5) ATTACHED BIBLIOGRAPHY

-Suggested bibliography:

1. C. Karagiannis, *Prestressed Concrete Structures*, Sofia, 2022 (in Greek)
2. M. Fardis, *Prestressed Concrete*, University of Thessaly Press, 2006 (in Greek)
3. J. J. Zhao, D. E. Tonnias, *Bridge Engineering: Design, Rehabilitation, and Maintenance of Modern Highway Bridges*, 3rd Edition, McGraw-Hill Education, 2012
4. M. J. N. Priestley, F. Seible, G.M. Calvi, *Seismic design and retrofit of bridges*, John Wiley & Sons, 1996
5. P. P. Xanthakos, *Theory and design of bridges*, John Wiley & Sons, 1994
6. Eurocode 2: Part 1-1 (EN1992-1-1)
7. Eurocode 8: Part 1 (EN 1998-1)

- Related academic journals: