COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
ACADEMIC UNIT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	UNDER GRADUATE		
COURSE CODE	2305524	SEMESTER	5th
COURSE TITLE	Reinforced Concrete I		

INDEPENDENT TEACHING ACTIVITIES *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*	WEEKLY TEACHING HOURS	CREDITS
Lectures and Exercises	5	7
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	NO
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	http://civil.teipir.gr/web/index.php?page=alias-40

(2) LEARNING OUTCOMES

Learning outcomes

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.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aim of the course is the comprehension of the behaviour of concrete and its use in structures, the knowledge of its properties and the design of reinforced concrete members.

Upon completion of the course, students will have:

1. Knowledge of the properties of reinforced concrete.
2. In-depth knowledge and critical understanding of theory and principles of structural design and calculation of reinforced concrete structures.
3. Knowledge and skills in modelling, design and calculation of reinforced concrete members.
4. Ability to put what they learn in practical use.
5. Ability to develop personal responsibility and offer scientific opinion.
6. Ability to manage time in an appropriate manner.

Specifically, students will be able to:

1. Understand subjects relevant to the of reinforced concrete structures
2. Design new reinforced concrete members
3. Calculate the structural capacity of reinforced concrete members

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 thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

Specifically, students will be able to perform:

Search, analysis and synthesis of data and information, using the necessary technologies.
Decision Making.
Autonomous work.

(3) Course Content

Introduction. Concrete. Stress-strain diagram of material. Reinforcement steel. Bond between concrete and reinforcement bars. Anchorage of steel bars. Reinforced concrete. Design limit states. Ultimate and Serviceability limit states. Design against axial actions: Assumptions, Properties of materials. Rectangular sections. Axial

tension. Prevalent Bending, diagrams and CEB design tables. Prevalent Compression. Slabs. One-way slabs, Two-way slabs. Cantilever Slabs. Flat slabs. Stairs. Modelling of RC structures. Construction detailing, minimum covers, distance of bars, allowed curvatures. Minimum requirements per structural element (sectional dimensions, minimum reinforcement). Course assignment: (i) software development for the calculation of the yield and capacity bending moment of a rectangular concrete section. (ii) Slab design of a concrete structure.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face lectures
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Teaching using ICT, Communication and Electronic Submission
TEACHING METHODS *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, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *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*	

Activity	*Semester workload*
Lectures	39
Classwork	26
Preparation for Project	30
Personal Study	80
Course total	175

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *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* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Language of evaluation: Greek Final written examination: 80% Preparation for project: 20%

(5) ATTACHED BIBLIOGRAPHY

1. Chouliaras Ioannis (2003). Reinforced Concrete Constructions: According to Greek Reinforced Concrete Rule 2000, Papasotiriou Publications, Athens (in Greek).
2. Gros G. (2004), Reinforced Concrete according to Greek Reinforced Concrete Rule 2000. Comparison with Eurocode 2 and DIN 1045/2001. Materials – Design – Structures, Athens: Symmetria Publications (in Greek).
3. Georgopoulos Th., (2004), Reinforced Concrete (vol. A), Pavlos Georgopoulos Publications (in Greek).
4. Georgopoulos Th., (2004), Reinforced Concrete (vol. B), Pavlos

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5. Economou Ch.M., (2009), Reinforced Concrete from A to Z, SELKA-4M Publications.
6. Zararis Pr., (2002), Reinforced Concrete, Thessaloniki: Kyriakidis Br. Publications (in Greek).
7. Konstantinidis A., (1994), Reinforced Concrete Applications – Vol A, Athens: Π Systems International Publications (in Greek).
8. Konstantinidis A., (1994), Reinforced Concrete Applications – Vol B, Athens: Π Systems International Publications (in Greek).
9. Bhatt, P., MacGinley, T. J., & Choo, B. S. (2006). "Reinforced Concrete, Design Theory and Examples". 3rd Edition. Taylor & Francis
10. Brooker, O. et. al. (2006). "How to Design Concrete Structures using Eurocode 2". The Concrete Centre.
11. Goodchild, C. H. (2009). "Worked Examples to Eurocode 2". Volume 1. The Concrete Centre.
12. Mosley, B., Bungey, J. & Hulse R. (2007). "Reinforced Concrete Design to Eurocode 2". 6thEdition. Palgrave McMillan
13. Narayanan, R. S., & Goodchild, C. H. (2006). "Concise Eurocode 2". The Concrete Centre.
14. Park and Paulay, (1975), "Reinforced Concrete," John Wiley & Sons.