

COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
DEPARTMENT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	UNDER GRADUATE		
COURSE CODE	2307543	SEMESTER	7 th
COURSE TITLE	Repair – Strengthening of Traditional and Modern Structures		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
<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>			
Lectures		2	4
Exercises		1	
<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, specialised general knowledge, skills development</i>	Specialized Knowledge, skills development		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek (official)		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	http://civil.teipir.gr/web/index.php?page=alias-35		

(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

Upon completion of the course, students will be able to:

1. They have acquired in-depth knowledge and critical understanding of the theory and principles of design and analysis of Repaired and Strengthened structures, since they could use new technologies and information systems in the design of strengthened structures with various materials (Concrete, Steel, Frps).
2. Be able to design and reanalyze strengthened structures, such as Plates, Columns, Beams and Foundations.
3. Describe and identify the failure causes of parts or the whole of a structure
4. Apply principles for Strength of Materials, appropriate Equations of Stability, Constitutive Laws of materials and Compatibility equations of deformation for determining the transmitted bending stresses from the initial section to the strengthened one.
5. Suggest various methods for repair and strengthening the structure at different loading situations using KAN.EPE.

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

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional and ethical responsibility and

sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

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Others...

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Specifically, students should be able to:

1. Searching, analysis and synthesis of data and information, using the necessary technologies. Specifically: Study of needs for applying the appropriate methods and materials for invention in structures.
2. Decision Making: Choice of the materials and appropriate method to strengthen or repair a structure in order to sustain the greater the loading the lower cost and nuisance.
3. Design and Construction Management: Redesign and choice of the appropriate material and rehabilitation method for the strengthened structure.

(3) Course Content

Theory

The core modules of the course include:

1. Basic principles for the evaluation of Loading capacity and Redesign of existing structures.
2. Seismic pathology of Reinforced Concrete and Masonry structures.
3. Various types of Failures in structures subject to various loadings.
4. Failures in cracked beams.
5. Failures in cracked columns.
6. Failures in cracked plates.
7. Failures in cracked masonry structures.
8. Study of transmitted internal forces through interphase of new and old structural element..
9. Modes and mechanisms of internal forces transfer through interphase.
10. Constituent materials for retrofit of structures failed by earthquake.
11. Techniques and strengthening methods in structural elements.
12. Evaluation of strengthening applied in cracked structural elemnts.
13. Basic principles of KAN.EPE.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Lectures and exercises, face-to-face.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Teaching using ICT, Exercises using ICT, Communication with students	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</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>	Activity	Semester workload
	Lectures	26
	Exercises	13
	Personal study	61
	Total course	100

(5) ATTACHED BIBLIOGRAPHY

- 1.Dritsos S.H. (2005), Repair and strengthening of structures, Patra: self-edition (in Greek).
- 2.Spyrakos K. (2004), Strengthening of structures in seismic actions, Athens: TEE (in Greek).
- 3.Rovilos A. (2001), Metaseismic Testing of buildings – Seismic pathology of buildings – Instructions and methods for repairing buildings with seismic damages. Athens: Papasotiriou edition (in Greek).
- 4.Penelis G.G. and Kappos A.I. (1999), Seismic resistant structures of Concrete, Thessaloniki: Ziti publication (in Greek).
- 5.Karantoni – Maragou T.(1997), Desidn and Rehabilitation of Masonry structures, Patras: Patras University edition (in Grrek).

