1.1.1 Numerical Simulation and Analysis of Structures

GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	CIVIL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΔΟΜ025	**SEMESTER**	8th
COURSE TITLE	Numerical Simulation and Analysis of Structures		

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**
	4	5
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:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://elearning.cm.ihu.gr/course/view.php?id=712

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 successful completion of the course, the student will be able to:

• Recognize, understand and classify the type of finite elements used in a case study.

• Distinguish and comprehend the parameters and assumptions related to simulation issues and identify potential weaknesses when simulating specific structures.

• Select the appropriate simulation approach, potentially combining different types of finite element types and parameters.

• Develop, using appropriate computing tools (specialized computer software), computing models by assembling individual parts of the examined problem.

• Integrate skills from different fields, while complying with the contemporary code provisions, in a unified structural simulation and analysis environment, in order to solve a civil engineering problem.

• Evaluate the effectiveness and assess the accuracy of selected simulation approaches, both on the basis of the general principles learned during the lectures as well as on the basis of critical evaluation of analysis results.

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…*
	…….

- Search, analysis and synthesis of information and data, utilizing the required technology
- Decision making
- Working independently
- Project planning

SYLLABUS

The aim of the course is to help the student understand the basic principles of simulation and analysis of structures utilizing computer software (Computer Aided Analysis) and following the code regulations, in order to develop the ability to synthesize and apply knowledge from different topics of the civil engineering scientific field.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lecture presentations using computer and projector, in person or by teleconference (remotely) if required. Learning and utilization of specialized structural analysis software (computer aided analysis). Support of the learning process through the e-learning platform and electronic communication with students (online announcements and comments, e-mail, announcements on the Department's website etc.). If required, support of students by using teleconference tools and software.
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*	
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*	Written final exam including: • Theoretical knowledge and judgment questions on course subjects • Questions on structural simulation and behavior issues • Assessment of understanding of key concepts Lab examination (in specialized computer software) including:

Activity	***Semester workload***
Lectures	26
Practice/exercises	26
Practice/exercises	28
Individual study	50
Course total (26 hours workload per ECTS credit)	***130***

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.*	• Simulation of a case study • Analysis and evaluation of results

ATTACHED BIBLIOGRAPHY

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• [In Greek] Αβραμίδης Ι.Ε., Αθανατοπούλου Α., Μορφίδης Κ., Σέξτος Α. (2017), "Αντισεισμικός σχεδιασμός κτιρίων Ο/Σ και αριθμητικά παραδείγματα ανάλυσης διαστασιολόγησης σύμφωνα με τους Ευρωκώδικες", Εκδόσεις Σοφία, Θεσσαλονίκη, ISBN: 978-960-6706-97-4
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• CEN, European Committee for Standardisation (2004), "EN 1992–1-1: Eurocode 2: Design of concrete structures, Part 1-1: General rules and rules for buildings", European Committee for Standardisation, Brussels
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