

### 1.1.1 Structural Analysis II – Indeterminate structures

#### GENERAL

<b>SCHOOL</b>	Engineering		
<b>ACADEMIC UNIT</b>	CIVIL ENGINEERING		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	ΔOM014	<b>SEMESTER</b>	5th
<b>COURSE TITLE</b>	Structural Analysis II – Indeterminate structures		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <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>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
	4	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Scientific Field		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	<a href="http://elearning.teicm.gr/course/view.php?id=228">http://elearning.teicm.gr/course/view.php?id=228</a>		

#### LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><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></p> <p>Consult Appendix A</p> <ul style="list-style-type: none"> <li>• Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</li> <li>• Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</li> <li>• Guidelines for writing Learning Outcomes</li> </ul>																		
<p>Comprehend the degree of indeterminacy. Analyse statically indeterminate structures. Compute, displacements and rotations. Determine the influence of temperature changes and support movements on structural response</p>																		
<p><b>General Competences</b></p> <p><i>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?</i></p> <table border="0"> <tr> <td>Search for, analysis and synthesis of data and information, with the use of the necessary technology</td> <td>Project planning and management</td> </tr> <tr> <td>Adapting to new situations</td> <td>Respect for difference and multiculturalism</td> </tr> <tr> <td>Decision-making</td> <td>Respect for the natural environment</td> </tr> <tr> <td>Working independently</td> <td>Showing social, professional and ethical responsibility and sensitivity to gender issues</td> </tr> <tr> <td>Team work</td> <td>Criticism and self-criticism</td> </tr> <tr> <td>Working in an international environment</td> <td>Production of free, creative and inductive thinking</td> </tr> <tr> <td>Working in an interdisciplinary environment</td> <td>.....</td> </tr> <tr> <td>Production of new research ideas</td> <td>Others...</td> </tr> <tr> <td></td> <td>.....</td> </tr> </table>	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...		.....
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- 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 interdisciplinary environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

## SYLLABUS

Introduction to statically indeterminate structures. Differences between statically determinate and indeterminate structures  
 Deformation Method (Method of Nodal Displacements). Application to plane structures. Symmetry of structures and loading. Support retreat, settlements, elastic supports, thermal loads.  
 Force Method. Application to plane structures, frames and trusses. Comparison to the Deformation Method  
 Influence lines of indeterminate structures. Müller-Breslau Principle. Computation of the extreme response values.

## TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face to face.	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Communication via e-mail and Zoom platform. Additional material is provided via a dedicated e-learning website.	
<b>TEACHING METHODS</b> <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, 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</i>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	40
	Practice/exercises	12
	Individual study	78
	Course total (26 hours workload per ECTS credit)	<b>130</b>
<b>STUDENT PERFORMANCE EVALUATION</b> <i>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.</i>	Formative evaluation consisted of: 1. Non-compulsory intermediate tests (2 to 3 in total) focused on solving problems (30% of final mark) 2. Final written exams that includes: a. Theoretical questions of knowledge and critical thinking and b. Solving of problems-exercises (70% of final mark)	

## ATTACHED BIBLIOGRAPHY

Ghaliand, A. and Neville, A.M.(1989), Structural Analysis, a unified classical and and Matrix Approach, Chapman and Hall.

Hibbeler R.C. (2002), Structural Analysis, Prentice Hall.

W.Wagner and G. Erhlog (2012), Applied Statics, ΚΛΕΙΔΑΡΙΘΜΟΣ publication (Greek translation from German).