

## 8.11 CE0831 – Composite Structures

### (1) GENERAL

<b>SCHOOL</b>	ENGINEERING SCHOOL		
<b>ACADEMIC UNIT</b>	CIVIL ENGINEERING DEPARTMENT		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	CE0831	<b>Semmester</b>	8
<b>COURSE TITLE</b>	Composite Structures II		
<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>
		3	4
<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>	Special Background Course		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uniwa.gr/courses/PEY149/">https://eclass.uniwa.gr/courses/PEY149/</a>		

### (2) LEARNING OUTCOMES

<b>Learning outcomes</b> <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> <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>The course contributes to the understanding of the behavior of the composite constructions where the knowledge from the reinforced concrete structures and steel structures are combined. Emphasis is placed on the development of methods for solving special forms, in order to make the connection with the practical application. The course helps to the students' contact on specific topics in the design of composite structures.</p> <p>The material of the course aims to deepen the students in the design of composite structures. To learn the special provisions of the regulations and the current technological developments in the issues of composite structures. The course aims to give the students theoretical and practical developments in technology and in the design of composite structures. During the course students learn the details design and developments of composite structures . Special regulations and design code, according to Eurocode 4, (EC4).</p> <p>After the course the student will be able to</p>

- Shape and design the structural form of a composite structure and can suggest frames and system to take vertical and horizontal loads (wind, earthquake) acting on the composite structure.
- Design composite structures at ultimate limit states and serviceability limit state.
- Design of composite connections
- Implement the provisions of the European Regulation for composite structures design, EC4, and designing composite structures in accordance with it.

#### 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*

*.....*

*Others...*

Specifically, students will be able to:

- Perform analysis and design composite structures according to Eurocode 4.
- Use the suitable analysis software to perform analysis and design of structures.
- Participate in a team of engineers and express his opinion about the design of the project.
- Execute an autonomous work in his private office for design or construction of structures
- Search, analysis and synthesis of data and information, using the necessary technologies.
- Decision Making.
- Autonomous work

### (3) SYLLABUS

The content of the course is summarized below:

1. Description limit state design, ultimate limit state and serviceability limit state
2. Elastic and plastic analysis of composite beams
3. Resistance calculation of composite sections to shear forces
4. Shear connection - shear studs
5. Composite plates
6. Composite column
7. Connections
8. Fire resistance of composite structure
9. Study and forming of composite construction. How to create the static models of composite structures
10. Practical issues in composite construction, construction stages, erection study
11. Semester project

### (4) TEACHING and LEARNING METHODS – EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face or / and distance learning					
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Teaching using ICT, Communication and Electronic Submission. Teaching using special software analysis					
<b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i>	<table><tr><th>Activity</th><th>Semester workload</th></tr><tr><td>Lectures</td><td>52</td></tr></table>		Activity	Semester workload	Lectures	52
Activity	Semester workload					
Lectures	52					

<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>	Classwork	38
	Preparation for Project	10
	Personal Study	10
	Course total	<b>110</b>
<b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i>  <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  Final written examination: 60% Preparation for the project: 40%	

## (5) ATTACHED BIBLIOGRAPHY

### Greek Bibliography:

1. Vagias I. K., (2018), Composite structures from steel and RC, (4<sup>th</sup> edition), Editor Klidarithmos, (In Greek).
2. Ermopoulos I. (2008). Steel and composite bridges according to EC1 to EC8, Editor Klidarithmos, (In Greek).

### Foreign Bibliography:

1. Manoj Kumar Buragohain, 2017, Composite Structures Design, Mechanics, Analysis, Manufacturing, and Testing, CRC Press, ISBN 9781138746671.
2. Roger .P. Johnson Yong C. Wang, 2018, Composite Structures of Steel and Concrete: Beams, Slabs, Columns, and Frames for Buildings, 4th Edition, Wiley-Blackwell ISBN: 978-1-119-40135-3
3. Eurocode 4: Design of composite steel and concrete structures - Part 1-1: General rules and rules for buildings
4. Design of Composite Structures: Eurocode 4 - Design of Composite Steel and Concrete Structures Part 1-1 - General Rules and Rules for Buildings 1st Edition by ECCS - European Convention for Constructional Steelwork (Editor)
5. Darko Dujmović, Boris Androić, Ivan Lukačević, 2015, Composite Structures according to Eurocode 4 Worked Examples, Ernst & Sohn.

### Related academic journals:

1. Journal of Constructional Steel Research
2. International Journal of Steel Structures
3. Practices Periodical on Structural and Construction, ASCE
4. Advances in Structural Engineering
5. American Institute of Steel Construction, AISC.
6. Engineering structures
7. Journal of Structural Engineering, ASCE