5.5 CE0550 – Steel Structures I

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
ACADEMIC UNIT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**CE0550**	**SEMESTER**	**5**
COURSE TITLE	**Steel Structures 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**
	4	4
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*	Special Background Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/PEY108/

(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 course is a basic introduction to design of steel structures.
This course aims to give the students theoretical and practical developments in technology and in the design of steel structures. During the course students learn the fundamentals of steel structures design and developments and issues of regulations and design code, Eurocode 3, (EC3).
After the course the student will be able to

- Shape and design the structural form of a metal structure and can suggest frames and system to take vertical and horizontal loads (wind, earthquake) acting on the metal structure.
- Design steel structures at ulitimate limit states
- Implement the provisions of the European Regulation for steel structures design, EC3, and designing steel structures in accordance with it.

- Can understand the plans and details of the study a metal structure and can organize the manufacturing process.
- Can make budget amounts and the cost of a metal structure and be able to plan the construction stages.

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 desing steel structures according to Eurocode 3.
- Use the suitable analysis software to perform analysis and desing of structures.
- Participate in a team of engenneers and express his opinion about the desing of the project.
- Execute an autonomous work in his private office for desinging 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. Advantages and disadvantages of steel structures. Properties, description of steel. Forms of steel sections.
2. Description limit state design, ultimate limit state and serviceability limit state.
3. Study and forming of steel construction. How to create the static models of steel structures
4. Calculation of strength of steel profiles
    a. Tensile strength
    b. Shear strength
    c. Bending strength
    d. Simultaneous bending and shear force
5. Stability Control, Calculation of buckling resistant of a steel member.
6. Connection, bolted and welded connections
7. Semester project

(4) TEACHING and LEARNING METHODS – EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face or / and distance learning
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Teaching using ICT, Communication and Electronic Submission. Teaching using special software analysis
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.*	

Activity	***Semester workload***
Lectures	52
Classwork	38
Preparation for Project	10
Personal Study	10

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			
		Course total	**110**

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: 60% Preparation for the project: 40%

(5) ATTACHED BIBLIOGRAPHY

Greek Bibliography:

1. Vagias I., Ermopoulos I., Ivannidis G. , (2013). Design of steel works with worked examples, Editor Klidarithmos, (in Greek)
2. Baniotopoulos K., Nikolaidis N., (2012), Steel structures, Design examples according to EC3, EDITOR ZHTH, (in Greek)
3. Androic, B., Dujmovic, D. and Dzeda, I. (1997). Examplew based on EC3. Calcilations and design of steel structures, Editor Giourdas, , (in Greek)

Foreign Bibliography:

1. Chen, W.F. and Kim, S.E. (1997). LRFD Steel design using advanced analysis, CRC Press, New York.
2. Usami T., Itoh Y. (1998). Stability and ductility of steel structures, Pergamon.
3. AISC, Load and Resistance Factor Design (L.R.F.D.), Code, Load and Resistance Factor Design Specification for structural steel buildings, Publisher American Institute of Steel Construction Inc., 1986.
4. Salmon, C., Johnson, J. (2008). Steel structures: design and behavior, Pearson.
5. Segui, W. (1999). LRFD Steel design, Thomson.
6. ASCE, Task Committee on Effective length, (1997). Effective length and notional load approaches for assessing frame stability: Implications for American Steel Design, ASCE.
7. Eurocode 3 Design of steel structures Part 3: Buildings, CEN Document EN 1993-3:2001
8. BS 5950 Design Code, Structural use of steel building, Part 1, Code of practice for design – Rolled and welded sections, Publisher British Standards Institution, 2008.
9. Manual for the design of steelwork building structures to Eurocode 3, 2010 The Institution of Structural Engineers
10. Manual for the design of Building Structures to Eurocode 0 and Eurocode 1, 2010 The Institution of Structural Engineers
11. Steel Building Design: Worked examples for students, In accordance with Eurocodes, Edited by M E Brettle, Published by The Steel Construction Institute
12. Steel structure design ASD/LRFD, Alan Wiliams, International Code Council, 2012
13. Eurocode 3 Manual For The Design Of Steelwork Building Structures, 1989 Institution of structural engineering
14. Earthquake Resistant Steel Structures, Long Carbon Europe, Sections and Merchant Bars, www.arcelormittal.com/sections

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