4.2 CE0420 – Structural Analysis of Determinate Structures

(1) **GENERAL**

SCHOOL	ENGINEERING SCHOOL			
ACADEMIC UNIT	CIVIL ENGINEERING DEPARTMENT			
LEVEL OF STUDIES	UNDERGRADUATE			
COURSE CODE	CE0420	SEMESTER 4		
COURSE TITLE	Structural Analysis of Determinate 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	6
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	Specialisation	Course		
PREREQUISITE COURSES:				
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS				
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/CIV236/			

(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 aim of lectures is the comprehension of design and analysis of Statically Determinate Strucrures subject to permanent or moving loadings and the evaluation of diagrams for internal forces (N, Q, M).

Thus, upon the completion of course, students will have:

- 1. In-depth knowledge and critical understanding of the theory and principles of Statics, so that with conjunction of Information systems and numerical Programming be able to analyze and solve
- 2. To analyze statically determinate structures, such as Beams, Frames, Trusses, Mixed Structures, Continuous Frames and Strengthened Structures or Bridges subject to various permanent loadings.
- 3. To analyze, evaluate and draw diagrams and envelopes of internal forces (N, Q, M) in Statically determinate Structures subject to permanent and moving loadings.

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	Respect for difference and multiculturalism
Adapting to new situations	Respect for the natural environment
Decision-making	Showing social, professional and ethical responsibility and
Working independently	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

Specifically, students will be able to:

Search for Analysis and synthesis of various statically Determinate Structures subject to various loadings, Make decision for the choice and solution of structure using various methods and dividing structure in parts subject to their eventual reaction forces and external loadings,

Design and manage the structure and its loadings in such a way it suffers as much as low internal forces,

Working in an international environment: Communicative ability in international languages, respecting diversity, multiculturalism, the environment and the demonstration of professional and ethical responsibility.

Work in a interdisciplinary environment and have ability perception of serviceability state of a structure under various loadings.

Generate new research ideas: Promoting free, creative and inductive thinking to develop strategic approaches for designing and analyzing Statically determinate structures.

(3) SYLLABUS

- 1. Free Body Diagram.
- 2. Stability equations for Statically Determinate structures.
- 3. Simply supported Beams and Frames and drawing of Axial force, Shear force and Moment Diagrams.
- 4. Methodology for solving 3-hinged Frames consisted either of beams or of trusses.
- 5. Indirect Loadings on statically Determinate structures.
- 6. Strengthened Beams and Frames by trusses.
- 7. Hanging structures (beams and plates) by truss bars and solution of them. Drawing of Axial force, Shear force and Moment Diagrams as well as evaluation of axial force in truss bars.
- 8. Continuous Beams and Plates.
- 9. Influence Lines of Internal forces (N, Q, M) in statically Determinate structures (cantilever, simply supported and continuous beams and plates).
- 10. Evaluation of the extreme values of reaction and axial Foreces in trusses using Influence lines.
- 11. Evaluation of the extreme values of reaction and internal Forces in 3-hinged Frames using Influence lines.
- 12. Evaluation of the extreme values of reaction and internal Forces in Continuous Frames using Influence lines.
- 13. Envelopes of values for reaction and internal Forces at statically determinate structures subject to permanent and moving Loadings.

(4) 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	Teaching using ICT, Communication and Electronic Submission.		
TEACHING METHODS			
The manner and methods of teaching are described	Activity	Semester workload	
Lectures, seminars, laboratory practice, fieldwork,	Lectures	52	
study and analysis of bibliography, tutorials, placements, clinical practice, art workshop,	Classwork	50	

interactive teaching, educational visits, project,	Personal Study	58
cody writing, anote creating, etc.	Course total	160
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: Greek	
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	Final written examination: 100%	
Specifically-defined evaluation criteria are given, and if and where they are accessible to students.		

(5) ATTACHED BIBLIOGRAPHY

Ελληνική Βιβλιογραφία:

- 1. Hirschfeld K. (1975), Applied Statics, Publ. M. Giourdas.
- 2. Nitsiotas, G.(1980), Statics of Linear Structures–3nd edition, Vol. I, Thessaloniki.
- 3. Valiasis Th. (1997), Statics of Linear Structures, Thessaloniki: Ziti publication.
- 4. Demakos, C.B. (2014), Lectures on "Static Analysis og Statically Determinate Structures", Dept of Civil Engineering, University of West Attica.

International Bibliography:

- 1. Beton-Kalender(1969), Wilhelm Ernst und Sohn, Berlin-Muenchen.
- 2. Tuma, J. J. (1969), Structural Analysis, Schaum's Outline Series, Mc Graw-Hill Book Co.
- 3. Reddy, C. S.(1983), Basic Structural Analysis, Tata Mc Graw-Hill Publishing Co., New Delfi.
- 4. Ghaliand, A. and Neville, A.M.(1989), Structural Analysis, a unified classical and and Matrix Approach, 3nd edition, Chapman and Hall, London-New York
- 5. Darkov, A. and Kuznetsov, V.(1991), Structural Mechanics, Mir Publishers, Moscow.
- 6. Madhu B. Kanchi (1993), Matrix Methods of Structural Analysis, 2nd enlarged edition, John Wiley and Sons.