3.2 CE0320 – Strength of Materials

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
ACADEMIC UNIT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**CE0320**	**SEMESTER**	**3**
COURSE TITLE	**Strength of Materials**		

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*	Special Background Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/CIV247/

(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 the course is to give the students fundamental knowledge on the concepts of Mechanics of Materials.

Upon completion of the course, students will have:

1. Knowledge and understanding of bending in beams, both uniaxial and biaxial, with or without axial load.
2. Understanding of how skew loads or eccentric axial loads lead to biaxial bending.
3. Understanding of how the deflection of beams is evaluated.
4. Knowledge of the behavior of cylindrical beams under torsion.
5. Adequate comprehension skills of the concept of buckling in beams.
6. Knowledge of the concept of shear in beams.

Specifically, students will be able to:

1. Analyze symmetric and asymmetric cross sections in biaxial bending with axial load.

2. Understand skew loads and eccentric axial loads.
3. Evaluate the cross sectional data of built-up and possibly asymmetric cross sections.
4. Evaluate the deflection of a beam due to bending.
5. Evaluate the core and the ineffective area of a cross section.
6. Understand the concept of buckling in beams.
7. Solve simple problems of torsion of cylindrical beams.
8. Understand the concept of shear in beams.
9. Manage time in an appropriate manner.

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…*

Specifically, students will be able to perform:

- Search, analysis and synthesis of data and information, using the necessary technologies.
- Decision Making.
- Autonomous work

(3) SYLLABUS

1. Biaxial bending with axial load in doubly symmetric beams.
2. Doubly symmetric beams with skew loads.
3. Eccentric axial loading.
4. Evaluation of cross sectional data in built-up asymmetric cross sections.
5. Biaxial bending of asymmetric cross sections.
6. Deflection of beams due to bending.
7. Core of a cross section.
8. Ineffective area of a cross section.
9. Buckling of beams. Evaluation of critical load.
10. Torsion of cylindrical beams.
11. Shear.

(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 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	28
Preparation for Project	70
Personal Study	

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	**150**
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: 100%		

(5) ATTACHED BIBLIOGRAPHY

Greek Bibliography:

1. Vouthounis P. (2019) Strength of Materials – Mechanics of deformable solids, 4th edition, Vouthouni A. publications (in Greek).
2. Papamichos E., Charalampakis N. (2017) Strength of materials and structural components, 2nd edition, Tziolas publications (in Greek).

Foreign Bibliography:

1. Beer F., Johnston E.R. Jr, DeWolf J., Mazurek D. (2014), Mechanics of materials, 7th edition, McGraw Hill.