COURSE OUTLINE

(1) GENERAL

SCHOOL	**UNIVERSITY OF THESSALY**		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**ΓΚ1700**	**SEMESTER**	4ο
COURSE TITLE	Strength of Materials II		

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, specialized general knowledge, skills development*	General background
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/CIV_U_350/

(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*

Starting from the knowledge the student has acquired in the course of Strength of Materials I, this course aims to develop relatively advanced knowledge and computational skills, so that the student is now capable of understanding and analyzing advanced problems of elastic and elasto-plastic bending and torsion in beams, as well as solve problems using energy methods.

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…
	…….

The goal of the course is to introduce the student to the basic concepts of Strength of Materials II, specifically the qualitative study of bending, shear, and torsion phenomena in beams. At the same time, the course aims to teach the use of literature and research information through the internet. The student is encouraged to work autonomously through homework exercises, while also promoting critical thinking, as well as productive and inductive reasoning regarding the application of Strength of Materials II knowledge to civil engineering structures.

(3) SYLLABUS

1. Bending Theory

The first section examines more advanced topics in bending theory. Specifically, the following topics are analyzed: Bending of Composite Sections, Elasto-Plastic Bending, Oblique Bending, Eccentric Loading, Bending with Shear, Elastic Curve.

2. Torsion Theory

The second section examines more advanced topics in the technical theory of torsion. Specifically, the following topics will be examined: Torsion of Thin-Walled Sections with Closed and Open Cross-sections.

3. Energy Theorems

The third section introduces the basic energy methods in Strength of Materials, starting with the formulation of the Principle of Virtual Work. Focusing on truss and beam bending problems, the concept of strain energy is examined, and the fundamental Castigliano theorems are presented.

(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*	Powerpoint presentations, Communication with students, Use of E-class
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*	

Activity	*Semester workload*
Lectures	56 hrs
Study	25 hrs
Non-directed study	35 hrs
Exam preparation	30 hrs
Exams	3 hrs

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*		
	Course total	149 hrs
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 The evaluation is conducted through: (a) Optional exercises submitted by the student at regular intervals. (b) A written exam at the end of the semester. The evaluation includes: • Written exams (80% of the final grade if the student has submitted exercises, otherwise 100%) • Optional Exercises (20% of the final grade) Evaluation criteria (apply to both written exams and exercises): The assessment evaluates the extent to which the student is capable of: • Solving complex problems of bending with shear and torsion, • Applying energy methods to elastic materials. The evaluation criteria are discussed in class at the beginning of the semester.	

(5) **ATTACHED BIBLIOGRAPHY**

-Suggested bibliography:

1. I. Vardoulakis, «Technical Mechanics II», 2nd Ed, 1999, Symmetria publishing (in Greek).
2. E. Papamichos, N.C. Charalampakis, «Strength of Materis», Tziola publishing, (in Greek).
3. Beer F., Johnston R., DeWolf J., Mazurek D., «Mechanics of Materials», 7th edition., 2015, McGraw Hill
4. G. Tsamasfyros, «Mechanics of deformable bodies», Vol I & II , Symmetria publishing (in Greek)..
5. R. Hibbeler, «Mechanics of Materials», 9η ed., Pearson.
6. N. Aravas «Mechanics of Materials», Vol I, Tziola publishing, (in Greek).
.

- Related academic journals: