STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mechanics and Strength of Materials**		Code **1010134241010110899**
Field of study **Environmental Engineering Extramural First-**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 4**
Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **32** Classes: **14** Laboratory: **-** Project/seminars: **14**		No. of credits **8**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	
Education areas and fields of science and art **technical sciences**		ECTS distribution (number and %) **8 100%**

Responsible for subject / lecturer:

dr inż. Ewa Oleszkiewicz
email: ewa.oleszkiewicz@put.poznan.pl
tel. 616652107
Faculty of Civil and Environmental Engineering
ul. Piotrowo 5 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basis of mathematics.
2	**Skills**	Elements of the theory of differential equations and integral calculations.
3	**Social competencies**	Student is responsible for performed calculations.

Assumptions and objectives of the course:

The main objective of mechanics and strength of materials course is to develope in the engineering student the ability to analyze a given problem in a simple and logical manner and to apply a few fundamental and well-understood principles. The student will be able to develope all the necessary formulas and to clearly indicate to conditions under which they can be safely applied to the analysis of design of actual engineering structures.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows the methods of determining internal forces in structural members. - [-]
2. Student knows basic concepts and classification of materials used in engineering structures. - [-]

Skills:

1. Student can determine internal forces in plane structures. - [-]
2. Student can determine normal and shear stresses in various structural members. - [-]
3. Student understands the basic concepts of stress, strain, deformation, and material behavior under different types of loading: axial, torsion, bending. - [-]
4. Student can perform stress analysis and design of beams subjected to bending and shearing loads. - [-]

Social competencies:

1. The student is aware of the responsibility that lies with the person conducting the structural calculations. - [-]
2. The student uses a variety of computational methods to eliminate possible errors (check calculations). - [-]

Assessment methods of study outcomes

Two tests (90 min each).
Four projects.
Exam.

Course description

Topics:
1.Basing principles of statics.
2.Properties of structural section - area, centroid, moment of inertia and product of inertia of plane area.
3.Basic assumptions and concepts in the theory of construction.
4.Structural elements and loading.
5.Internal forces.
6.Trusses, beams, frames and arcs.
7.Mechanical properties: elasticity, plasticity, buckling.
8.Strength, stiffness and stability conditions.
9.Stress-strain behavior.
10.Beams design problems.
11.Deformations of axial members.
12.Eccentric loading.
13.Statics.
14.Stresses in thin-walled tanks.

Basic bibliography:

1. Przewłócki J., Górski J., Podstawy mechaniki budowli, Arkady, Warszawa 2008
2. Zielnica J., Wytrzymałość materiałów, Wyd. PP, 1996
3. Wytrzymałość materiałów. Zarys teorii, przykłady, zadania. (Pr. zbiorowa pod redakcją K. Wrześniowskiego), 1985

Additional bibliography:

1. Orłowski W., Słowański L., Wytrzymałość materiałów. Przykłady obliczeń. Arkady, Warszawa 1978
2. Cywiński Z., Mechanika budowli w zadaniach, PWN 1997
3. Leyko J., Mechanika ogólna, PWN, Warszawa 2007
4. Jakubowicz A., Orłoś Z., Wytrzymałość materiałów, WNT, Warszawa 1997
5. Dyląg Z., Jakubowicz A. , Orłoś Z., Wytrzymałość materiałów, WNT 1999
6. Nowacki W., Mechanika budowli, PWN Warszawa 1975
7. Jastrzębski P., Mutermilch J., Orłowski W., Wytrzymałość materiałów, Arkady , Warszawa 1986

Result of average student's workload

Activity	Time (working hours)
1. Lectures	32
2. Classes	14
3. Projects	14
4. Preparation of examples	20
5. Preparation to tests	20
6. Preparation to an exam	18
7. Exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	120	8
Contact hours	60	5
Practical activities	0	0