

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Strength of Materials I		Code 1010604131010204311
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
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: 18 Classes: 8 Laboratory: - Project/seminars: -		No. of credits 3
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 %) 3 100%
Responsible for subject / lecturer: dr hab. inż. Waław Szyc email: waław.szyc@put.poznan.pl tel. +48 61 665 2319 Faculty of Mechanical Engineering ul. Jana Pawła II 24, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Knowledge and understanding of mathematical problems (function analysis, algebraic transformations, differential equations) and mechanical problems (equilibrium of force sets, mechanical energy).
2	Skills	Effective activity in the domain of function analysis and illustration, handling of fundamental geometrical and trigonometric relations. Skills of physical unit manipulation.
3	Social competencies	Consciousness of connection and interdependence between mathematical knowledge, physical description and technical applications.
Assumptions and objectives of the course: Recognition of theoretical and practical problems connected with strength analysis basing on mechanical properties of materials as the ground for proper projecting and designing of machines and devices.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Determination of stresses and displacements in rods and rod systems statically determined and undetermined - [K1A_W10] 2. Methods of appointment of external and internal forces and moments, of fundamental tests for mechanical properties examination of materials. - [K1A_W10] 3. Methods of geometrical characteristic (inertia moments) of cross-sections determination. - [K1A_W10] 4. Torsion of rods (shafts) with circular cross-sections and some non-circular. - [K1A_W10]		
Skills: 1. Ability to formulate and to solve the fundamental strength problems in the field of tension/compression, torsion and bending . - [K1A_U08] 2. Competence for effective determination of fundamental characteristics of complex shaped cross-sections. - [K1A_U08]		
Social competencies: 1. Consciousness of importance and understanding of strength analysis influence on designing and verification of objects in mechanical engineering area. - [K1A_K02]		
Assessment methods of study outcomes		

-Classes - two tests performed in the semester. Within each one a practical problem to be solved in writing.		
- Lecture - credit. Short test at the end of the semester, not demanded in the case of positive mark of the classes.		
Course description		
-Initial conceptions of generalized forces, strains and displacements. Loading classification, internal forces and stresses. Testing of material mechanical properties and strength condition. Tension and compression of the rods. Rod systems - statically determined and undetermined trusses. Thermal stresses and prestrain effects. General state of stress and strain (3D). Generalized Hooke's law. Plane stress state analysis and the base of strain measurement. Moments of inertia of the cross-sectional area. Stresses and strains in torsion for the members with circular cross-section and some non-circular. Bending moments and shear forces in beams.		
Basic bibliography:		
1. Z. Dyląg, A. Jakubowicz, Z. Orłoś, Wytrzymałość materiałów (t. I i II), WNT, Warszawa 1996		
2. J. Zielnica, Wytrzymałość materiałów, Wyd. PP, Poznań 1996		
3. M. Niezgodziński, T. Niezgodziński, Zadania z wytrzymałości materiałów, WNT, Warszawa 2000		
Additional bibliography:		
1. M. Ostwald, Podstawy wytrzymałości materiałów, Wyd. PP, Poznań 2003		
2. M. Ostwald, Wytrzymałość materiałów ? zbiór zadań, Wyd. PP, Poznań 2008		
3. K. Magnucki, W. Szyc, Wytrzymałość materiałów w zadaniach, Wyd. Naukowe PWN, Warszawa-Poznań 1999		
4. H. Głowacki, Mechanika techniczna ? wytrzymałość materiałów, Ofic. Wyd. Polit. Warsz. 2000		
5. M. Banasiak, K. Grossman, M. Trombski, Zbiór zadań z wytrzymałości materiałów, Wyd. Naukowe PWN, Warszawa 1998		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparation for the lecture	5	
2. Participation in the lecture	30	
3. Fixing the lecture	8	
4. Consultation for the lecture	2	
5. Preparation to exam	6	
6. Preparation of practical classes	6	
7. Participation in the classes	15	
8. Consultation for the classes	8	
9. Preparing to pass the classes	2	
10. Participation in the completion of the classes	8	
11. Fixing the classes	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	92	3
Contact hours	51	2
Practical activities	3	1