

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Strength of materials		Code 1010342521010346364
Field of study Mathematics	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 2
Elective path/specialty -	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: 2 Project/seminars: -		No. of credits 5
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 Technical sciences		ECTS distribution (number and %) 5 100% 5 100%
Responsible for subject / lecturer: dr hab. inż. Ewa Magnucka-Blandzi email: ewa.magnucka-blandzi@put.poznan.pl tel. 61 665 2354 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student should has a basic knowledge of mathematics (mathematical analysis: differential and integral calculus, ordinary differential equations, complex numbers, vector algebra; algebra; geometry: right triangle, plane trigonometry; elements of differential geometry), and mechanics (statics)
2	Skills	Student solves algebraic systems of linear equations with constant coefficients; Student solves the ordinary linear differential equation of second order with constant coefficients; Student calculates integrals (including the integration over an area)
3	Social competencies	Student knows his own limitations of knowledge and understands the need for further education; Student can search some information in literature by himself also in foreign languages
Assumptions and objectives of the course: -Theoretical knowledge of problems related to the basic methods of analysis of the strength of structure. The ability to determine the stresses and displacements in state of tensile / compression, torsion and bending.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student is able to relate issues of the strength of the simple structure to theoretical and applied mathematics - [[K_W07++]] 2. Student is able to apply appropriate computational techniques supporting the work of mathematicians and understands their limitations - [[K_W08++]]		
Skills:		
1. Student uses adequate tools of of mathematical analysis, including differential and integral calculus to solve strength and stability problems - [[K_U05++]] 2. Student is versed in the classical methods of solving ordinary differential equations and applies them in typical practical issues - [[K_U06++]] 3. Student uses the algebraic methods (in particularly the linear algebra) in solving practical tasks - [[K_U10++]]		
Social competencies:		
1. Student knows his own limitations of knowledge and understands the need for further education - [[K_K01++]] 2. Student can search some information in literature by himself also in foreign languages - [[K_K06++]]		

Assessment methods of study outcomes		
<p>Lecture: -Assessment of the knowledge and skills basing on the written exam -Assessment of the knowledge and skills during the oral exam</p> <p>Classes: -Assessment of knowledge and skills related to solving the tasks on the basis of short tests (at the beginning of each subsequent class) -Assessment of student preparation to classes (the questions devoted to previously mentioned issues / tasks discussed during the lecture)</p>		
Course description		
<p>The equations of statics. External and internal forces and moments. States of stress and strain. Rods and rod systems statically determined and statically indeterminate. Tension and compression. The stresses and displacements in the rod systems. Generalized Hooke's law. A plane stress state. Torsion of rods with circular cross sections. Static moments and moments of inertia of beam cross-sections. Bending beams. Normal stresses (bending) and tangential (shear) in beams. A differential equation of the beam deflection. Beam statically determinate and statically indeterminate. Stability of beams under compression.</p>		
Basic bibliography:		
<p>1. Wytrzymałość materiałów, wyd. II, J. Zielnica, Wydawnictwo Politechniki Poznańskiej, Poznań , 1998 2. Wytrzymałość materiałów, A. Jakubowicz, Z. Orłowski, WNT, Warszawa, 1996 3. Mechanics of materials, J.M. Gere, S. Timoshenko, PWS-Kent Publishing Company, Boston, 1994</p>		
Additional bibliography:		
<p>1. Wytrzymałość materiałów w zadaniach, K. Magnucki, W. Szyk, Wyd. Naukowe PWN, Warszawa-Poznań, 2000</p>		
Result of average student's workload		
Activity		Time (working hours)
Student's workload		
Source of workload	hours	ECTS
Total workload	133	5
Contact hours	76	3
Practical activities	57	2