

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Strength of Mechanical Constructions</b>		Code <b>1010612211010213494</b>
Field of study <b>Mechanika i budowa maszyn</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>Product engineering (Inżynieria produktu)</b>	Subject offered in: <b>English</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>1</b> Classes: <b>1</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  dr hab. inż Paweł Jasion email: pawel.jasion@put.poznan.pl tel. +4861 665-2175 Mechanical Engineering and Management ul. Piotrowo 3, 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	The basic of mathematics, mechanics, strength of materials, engineering graphics, and other areas of education in the field of study. Orderly theoretical knowledge in the field of field of study.
2	<b>Skills</b>	Solving basic problems in solid mechanics. Solving basic tasks of geometry and mathematical analysis. Ability to find the necessary information in the literature, databases, directories. Ability to self-study.
3	<b>Social competencies</b>	Understanding the need for learning throughout life. Understanding the social impact of engineering activities. Understanding the need for teamwork
<b>Assumptions and objectives of the course:</b> The aim of the course is to provide the tools necessary to construct machines with particular regard to their strength and stability. Indication of the limitations of mathematical models of the structure. Discussion of the differences between the analysis of stability and strength. Transmission in an intelligible form principles of strength calculations in complex load conditions using energy methods. Getting to know the basics of strength analysis of thin-walled structures with particular emphasis circularly symmetric plates and shells assets.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Having expanded the theoretical knowledge of the strength of materials to the extent necessary for the field of study - [K2A_W01] 2. Understanding models and computational methods used in advanced methods of calculations of strength - [K2A_W12] 3. Understanding the possibility of using energy methods for solving statically indeterminate problems in complex load conditions - [K2A_W19]		
<b>Skills:</b>		
1. Calculating the strength of the construction of a small number of degrees of freedom with selected numerical methods - [K2A_U03] 2. Design elements of construction work machine or assembly due to its strength and stability - [K2A_U07] 3. Understanding the sources of risk to the environment and people coming from the designed mechanical structure of the selected group - [K2A_U14]		
<b>Social competencies:</b>		

1. Understanding the need for self-study associated with the development of technology - [K2A\_K01]
2. Awareness of non-technical aspects and impacts of mechanical engineering and its impact on the environment and responsibility for decisions - [K2A\_K02]
3. Ability to set priorities in the implementation of the undertaken tasks - [K2A\_K04]

<b>Assessment methods of study outcomes</b>		
Attendance control, written examination.		
<b>Course description</b>		
<p>The introduction stressing the need to generalize mathematical models used in the strength of materials. Stability strut: the internal forces of the deformed structure, the integral equation homogeneous and non-homogeneous line beam deflection, a generalization of Euler's formula for different ways to support, slenderness limit, the radius of inertia, compression rods involving lateral forces, the scope of applicability of the Euler formula. Energy methods in structural strength: a system of linear-elastic, generalized force, displacement generalized potential energy of elastic forces, Castigliano and Menabre theorems, method of forces, integration method of multiplication charts. Strength of the boards circularly symmetric: the concept album, the internal forces in the plates, the plate equilibrium equations, boundary conditions, the integral of the differential equation of the deflection plates, the assessment of the strength of the plate.</p>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Dyląg Z., Jakubowicz A., Orłoś Z., Wytrzymałość Materiałów Tom 1, Wydawnictwa Naukowo-Techniczne, Warszawa 2010</li> <li>2. Zielnica J., Wytrzymałość materiałów, Wydawnictwo Politechniki Poznańskiej, Poznań 2001</li> <li>3. Niezgodziński M., Niezgodziński T., Wytrzymałość materiałów, Wydawnictwo Naukowe PWN, Warszawa 2009</li> </ol>		
<b>Additional bibliography:</b>		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Preparation for the exercises	5	
2. Lecture participation	15	
3. Exercises participation	15	
4. Consolidation of material	5	
5. Consultations	5	
6. Assessment preparation	15	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	60	2
Contact hours	35	0
Practical activities	0	0