

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Strength of Mechanical Constructions</b>		Code <b>1010622111010203494</b>
Field of study <b>Mechanical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>Internal Combustion Engines</b>	Subject offered in: <b>Polish</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>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  Piotr Stasiewicz email: piotr.stasiewicz@put.poznan.pl tel. 616652044 Faculty of Mechanical Engineering and Management 60-965 Poznań, ul. Piotrowo 3		
<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 of 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 design 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 of revolution.		
<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_12] 2. Understanding models and computational methods used in advanced methods of calculations of strength of the structures - [K2A_12] 3. Awareness of the importance of examining the stability of the structure. - [K2A_12] 4. Understanding the possibility of using energy methods for solving statically indeterminate problems in complex load conditions. - [K2A_12] 5. Having a basic knowledge of the nonlinear behavior of the structure - [K2A_12] 6. Understanding the selected numerical methods used in the computer simulation - [K2A_W02]		
<b>Skills:</b>		

1. Determining 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 tasks undertaken. - [K2A_K04]

<b>Assessment methods of study outcomes</b>		
Final test, active participation in classes.		
<b>Course description</b>		
The introduction emphasizing the need to generalize mathematical models used in the strength of materials. Stability of compressed beams: the internal forces of the deformed structure, integral of homogeneous and non-homogeneous equation of 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: linear-elastic structures, generalized force, generalized displacement, potential energy of elastic forces, Castigliano theorem, Menabre theorem, the method of forces, integration method of multiplication charts. Strength of the axi-symmetrical plates, the concept of the internal forces in the plates, the plate equilibrium equations, boundary conditions, the integral of the differential equation of the deflection of plates, the assessment of the strength of the plate.		
<b>Basic bibliography:</b>		
<b>Additional bibliography:</b>		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Preparing for classes	5	
2. Participation in the lecture	15	
3. Participation in exercises	15	
4. Consolidation of the lecture	5	
5. Consultation	5	
6. Preparing for classes	15	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	60	2
Contact hours	35	0
Practical activities	0	0