STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mechanics and Strength of Materials**		Code **1011104211010210975**
Field of study **Logistics - Part-time studies - First-cycle**	Profile of study (general academic, practical) **general academic**	Year /Semester **1 / 1**
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: **10** Classes: **10** Laboratory: **-** Project/seminars: **-**	No. of credits **5**

Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **university-wide**

Education areas and fields of science and art	ECTS distribution (number and %**)**

Responsible for subject / lecturer:	Responsible for subject / lecturer:
dr inż. Piotr Paczos email: piotr.paczos@put.poznan.pl tel. 616652325 Faculty of Mechanical Engineering and Management ul. Piotrowo 3 60-965 Poznań	dr inż. Piotr Paczos email: piotr.paczos@put.poznan.pl tel. 616652325 Faculty of Mechanical Engineering and Management ul. Piotrowo 3 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	basic knowledge of mathematics and physics including analysis of functions and algebraic transformations
2	**Skills**	A student can analyse functions, use basic geometrical relationships and trigonometric functions, can think logically
3	**Social competencies**	A student understands the need of lifelong learning and is aware of connections between mathematics, physics and technical subjects

Assumptions and objectives of the course:

The aim of course are learning the basic principles of mechanics and becoming familiar with theoretical and practical aspects of strength analysis based on material properties and being the basis of proper machinery design.

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

Knowledge:

1. A student knows the basic concepts of mechanics: statics, dynamics and kinematics, knows and understands the principles of statics and conditions for the equilibrium in a plane - []

2. A student can calculate external and internal forces and moments, knows how to determine stresses and displacements in bars and trusses, can solve problems of torsion of cylindrical shafts - []

3. A student can determine normal bending stresses and deflection of beams and have theoretical and practical knowledge about experimental strength investigations - []

Skills:

1. A student can formulate and understand basic sentences using the language of mechanics - []

2. A student can formulate and solve problems of strength of materials considering tensile and compressive loads - []

3. A student can think logically and convert between different SI units - []

Social competencies:

1. A student can understand the need of lifelong learning and can cooperate and work in a group - []

2. A student is aware of and understand the importance of the structural analysis in design and validation of machinery. - []

Assessment methods of study outcomes

Lectures and classes: Students? knowledge is checked regularly. There are two tests in a semester. In order to receive a positive grade and pass the course a student needs to achieve more than 50% of maximum points in each test. The final grade is based on the following rules:

very good ? if the ratio of sums of achieved and maximum points is bigger than 90%,

good plus ? if the ratio of sums of achieved and maximum points is between 80.1-90%,

good ? if the ratio of sums of achieved and maximum points is between 70.1-80%,

sufficient plus ? if the ratio of sums of achieved and maximum points is between 60.1-70%,

sufficient ? if the ratio of sums of achieved and maximum points is between 50.1-60%,

Students who receive a negative grade can take an additional test and correct their grades.

Course description

Lectures and classes:

1. Fundamentals of statics. Definitions of force, system of forces, moment of a force about a point
2. Fundamentals of kinematics. Definition of velocity, acceleration, the equations of motion
3. Fundamentals of dynamics. Definition of work, power, energy, momentum, impulse and the law of conservation of momentum
4. The principles of statics (axioms)
5. Constraints and reaction forces / moments
6. The centre of gravity of a body
7. Conditions for the equilibrium in a plane
8. Mechanical properties of material
9. Internal resultant forces and stresses
10. Tension and compression of bars, Hooke?s law, trusses
11. Tensile test, allowable stresses, factor of safety
12. Tensile and compression strength conditions
13. Moments of inertia of plane figures, Steiner?s theorem
14. Torsion of cylindrical shafts
15. Bending of beams, shear forces and bending moments, deflection of beams

Basic bibliography:

1. Leyko J., Mechanika ogólna t.1, PWN, Warszawa, 1997

2. Ostwald M., Podstawy wytrzymałości materiałów, Wydawnictwo PP, Poznań, 2007

3. Magnucki K., Szyc W., Wytrzymałość materiałów w zadaniach: pręty, płyty i powłoki obrotowe, Wydaw. Naukowe PWN, 2000

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)

Student's workload

Source of workload	hours	ECTS
Total workload	50	5
Contact hours	20	5
Practical activities	0	0