STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Strength of Materials**		Code **1010601231010210494**
Field of study **Transport**	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) **full-time**	
No. of hours Lecture: **1** Classes: **2** 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** **Technical sciences**		ECTS distribution (number and %) **3 100%** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The basic knowledge with technical mechanics and the mathematics (the program basis for secondary-schools, the basic level; elementary knowledge with range of higher mathematics: calculus of vectors and matrixes, differential and integral calculus, solving differential equations)
2	**Skills**	The skill of the elementary problems solving with technical mechanics and the mathematics on basis of possessed knowledge; skill of information acquire from indicated sources
3	**Social competencies**	Understanding of necessity of broadening the own competences; readiness to team cooperation undertaking

Assumptions and objectives of the course:

The student should obtain knowledge of theoretical fundamentals and of practical methods used in Strength of Materials analysis. S/he should be able to calculate and design members of plants taking into account strength of material.

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

Knowledge:

1. Has knowing about the definitions applied in strength analysis and their physical interpretation as well as examples of their application - [K1A_W04]
2. Has understanding of basic dependences used in description of mechanical proprieties of materials as well as the elements of machines, range of their applicability and can to pass the examples of use - [K1A_W04]
3. Has knowledge of simplified strength models applied in description of elements of construction - [K1A_W013]
4. Has the basic knowledge in the range of the strength conditions, which should fulfil the elements of machines - [K1A_W013]

Skills:

1. Is able to apply the basic simplified strength models in solving uncomplicated technical problems - [K1A_U02]
2. Has the ability to execute the uncomplicated strength calculation of elements of machines and to formulate conclusions on basis of received results - [K1A_U03]
3. Can take advantage with understanding from indicated sources of knowledge - [K1A_U01, K1A_U06]
4. Is able to design a simple mechanical constructions and to execute uncomplicated strength calculations of structure elements - [K1A_U02]

Social competencies:

1. Is actively involved in solving of considered problems, has ability to spread his competences by self-learning - [K1A_K01]
2. Shows the responsibility for results of the strength calculations and the rational use the constructional materials as well as the joint responsibility for effects of teamwork - [K1A_K02, K1A_K03]

Assessment methods of study outcomes

The written examination (the grade / the number of points):

3 / 50.1%-70.0%, 4 / 70.1%-90.0%, 5 / above 90%

Kolokwium (the evaluation / the number of points):

3 / 50.1%-70.0%, 4 / 70.1%-90.0%, 5 / above 90%

The evaluation of activity in calculation practices:

grade 3 / student shows moderated commitment in solving problems, encouraged it seeks solution on basis of got knowledge,

grade 4 / student shows commitment in solving problems, it seeks solution on basis of got knowledge,

grade 5 / student shows large commitment in solving problems, it self-actively seeks solution on basis of got knowledge and useful additional sources

Course description

Internal force, stress, strain. Saint-Venant?s principle. Stress-strain diagrams. Mechanical properties of materials. Differential strain-displacement relations. Generalized Hooke?s law. Stress concentration. Statically indeterminate systems of bars. Analysis of plane stress. Principal stresses. Mohr?s circle for biaxial stress. Stresses in thin-walled pressure vessels. Moments of inertia of plane areas. Torsion of a circular shaft. Statically indeterminate shafts. Stresses in beams. Shear and bending moment diagrams. Differential equation of the elastic line. Deflection of beams. Statically indeterminate beams. Strain energy. Materials under combined stresses. Fundamental failure theories. Combined bending and torsion.

Basic bibliography:

1. J. Zielnica, Wytrzymałość materiałów, WPP 2001

Additional bibliography:

1. M. Ostwald, Podstawy wytrzymałości materiałów, WPP 2003

Result of average student's workload

Activity	Time (working hours)
1. preparation to lectures	5
2. participation in lectures	15
3. strengthen the content of lecture	5
4. participation in consultations connected with lectures	2
5. preparation to examination	10
6. participation in examination	1
7. preparation to calculation practices	5
8. participation in calculation practices	30
9. strengthen the content of calculation practices	6
10. participation in consultations connected with calculation practices	2
11. preparation to credit of calculation practices	4
12. participation in credit of calculation practices	1

Student's workload

Source of workload	hours	ECTS
Total workload	86	3
Contact hours	51	2
Practical activities	35	1