STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Strength of Materials**		Code **1011101331010200134**

Field of study **Engineering Management - Full-time studies -**	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				No. of credits **3**
Lecture: **30**	Classes: **15**	Laboratory: **15**	Project/seminars: **-**	

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 knowledge of fundamentals in mathematics, applied mechanics and statics.
2	**Skills**	The fundamentals of statics of undeformable bodies.
3	**Social competencies**	The understanding of the significance of technical sciences and applications.

Assumptions and objectives of the course:

The objective of the subject is to deliver the basics of the engineering science in the mechanics of deformable bodies and expanding the abilities of the analytical solution in the mechanics of materials.

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

Knowledge:

1. Basic knowledge on the cycle of machine life - [[K01-InzA_W01]]

2. Basic knowledge on the life cycle of jndustrial manufacture   - [K04-InzA_W01]

3. Basic knowledge on the methods, tools and materials utilized in the solution of engineering problems in mechanical engineering - [K04-InzA_W02]

4. Knows typical industrial technologies in machine operation - [K07-InzA_W5]

Skills:

1. Be able to recognize the project identification and to solve uncomplicated project problems on the structure and operation of machines   - [K01-InzA_U6]

2. Be able to apply typical methods of uncomplicated problem solution on the structure and operation of machines   - [K01-InzA_U7]

3. Be able to design a simple structure and technology of machine parts and modules, and to design the organization of production units of the first complexity degree   - [K01-InzA_U8]

Social competencies:

1. Be aware and utilizes technical problems in product creation - [K01_InzAK2]

Assessment methods of study outcomes

Evaluation mark:

a) Exercises: Current evaluation of problem solution progress evaluated by tests.

b) Lectures: On the basis of answers on the questions of the related material delivered during foregoing lectures.

Final grade:

a) Exercises: On the basis of average mark of the semestral marks.

b) Lectures: A final test; a student who obtained a positive mark on exercises can access the final exam.

Course description

The module program includes the following: External and internal loads, stress and strain. Basic tests of the mechanical properties of materials. Strength condition and generalized Hooke's law. Tension and compression within elastic limits. Statically determinate and indeterminate bar systems. Material failure theories. First and second moments of area. Torsion of bars of circular cross section. Bending of beams. Stresses in beams and differential equation of the elastic line. Statically indeterminate beams. Strain energy methods. Clapeyron's systems, reciprocal theorems. The theorem of Castigliano and the minimum work principle. Strength analysis of plane frames.

Basic bibliography:

1. . J. Zielnica, Mechanics of Materials, UBI, Covilha, ISBN ? 972-9209-48-0, 1994, pp. 387.

2. J. Zielnica, Strength of materials (in Polish), WPP,.II-nd Ed., Poznań 1998, pp. 554.

3. J. M. Gere, S. Timoshenko, Mechanics of Materials, PWS-Kent Publishing Company, Boston, 1984.

Additional bibliography:

1. M. E. Niezgodziński, T. Niezgodziński: Problems in strength of materials (in Polish), WNT Warsaw, 1997

Result of average student's workload

Activity	Time (working hours)
1. Lectures	30
2. Exercises	15
3. Laboratories	15
4. Consultations	10
5. Preparation to exercises and laboratory	16
6. Passing tests	6

Student's workload

Source of workload	hours	ECTS
Total workload	92	3
Contact hours	76	2
Practical activities	30	1