# STUDY MODULE DESCRIPTION FORM

| Name of the module/subject | | | Code |
|---|---|---|---|
| **Strength of Materials** | | | **1011101231011100134** |
| Field of study | Profile of study (general academic, practical) | | Year /Semester |
| **Engineering Management - Full-time studies -** | **(brak)** | | **2 / 3** |
| Elective path/specialty | Subject offered in: | | Course (compulsory, elective) |
| **-** | **Polish** | | **obligatory** |
| Cycle of study: | Form of study (full-time,part-time) | | |
| **First-cycle studies** | **full-time** | | |
| No. of hours | | | No. of credits |
| Lecture: **30** Classes: **15** Laboratory: **15** Project/seminars: **-** | | | **3** |
| Status of the course in the study program (Basic, major, other) | (university-wide, from another field) | | |
| **(brak)** | **(brak)** | | |
| Education areas and fields of science and art | | | ECTS distribution (number and %**)** |

## Responsible for subject / lecturer:

Dr inż Piotr Stasiewicz
email: piotr.stasiewicz@put.poznan.pl
tel. +48(61) 6652044
Faculty of Mechanical Engineering and management
ul. Piotrowo 3, 60-965 Poznań

## 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

Forming rating:

a) in the field of exercises: on the basis of an assessment of the current progress of the implementation of tasks assessed by written work-tests

b) within the scope of laboratories: on the basis of an oral answer

c) in the field of lectures: based on the answers to questions about the material assimilated in previous lectures,

Summary rating:

a) in the field of exercises based on the results of the average partial grades of the forming evaluation

b) in the field of laboratories: on the basis of the results of the average partial assessments of the forming assessment and the approved reports

c) in the field of lectures: exam in the form of a test. You can take the exam after completing the exercises.

## 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. Ostwald M., Podstawy wytrzymałości materiałów, Wydawnictwo PP, Poznań, 2007.
2. Ostwald M., Wytrzymałość materiałów. Zbiór zadań. Wydawnictwo PP, Poznań, 2008.
3. Badania eksperymentalne w wytrzymałości materiałów. Pod redakcją S. Joniaka, WPP. 2006.
4. Misiak J., Mechanika techniczna t.1, WNT, Warszawa, 1998, 2012.

## Additional bibliography:

1. Magnucki K., Szyc W., Wytrzymałość materiałów w zadaniach: pręty, płyty i powłoki obrotowe, Wydawnictwo Naukowe PWN, 2000.
2. Dyląg Z., Jakubowicz A., Orłoś Z., Wytrzymałość materiałów t.1 i 2, WNT, Warszawa, 2000.

## 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 | 14 |
| 6. Passing tests | 6 |

## Student’s workload

| Source of workload | hours | ECTS |
|---|---|---|
| Total workload | 90 | 3 |
| Contact hours | 76 | 3 |
| Practical activities | 30 | 1 |