# STUDY MODULE DESCRIPTION FORM

| Name of the module/subject | | Code |
|---|---|---|
| **Structural Mechanics** | | **1010104141010100048** |
| Field of study | Profile of study (general academic, practical) | Year /Semester |
| **Civil Engineering First-cycle Studies** | **(brak)** | **2 / 4** |
| Elective path/specialty | Subject offered in: | Course (compulsory, elective) |
| **-** | **Polish** | **obligatory** |
| Cycle of study: | Form of study (full-time,part-time) | |
| **First-cycle studies** | **part-time** | |
| No. of hours | | No. of credits |
| Lecture: **12** Classes: **10** Laboratory: **-** Project/seminars: **10** | | **5** |
| 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 %) |
| **technical sciences** | | **5 100%** |

## Responsible for subject / lecturer:

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## Prerequisites in terms of knowledge, skills and social competencies:

| | | |
|---|---|---|
| 1 | **Knowledge** | 1. Student knows the basic concepts of static of statically determinate rod structures.<br>2. Student knows the basic concepts related to the strength of materials. |
| 2 | **Skills** | 1. Student can calculate the internal forces in statically determinate rod structures.<br>2. Student can calculate the stress and strain in the cross sections of bars. |
| 3 | **Social competencies** | Student is responsible for brought a basic knowledge of general mechanics and strength of materials |

## Assumptions and objectives of the course:

Knowledge of the theoretical models and mechanics flat rod systems. Learn how to calculate internal forces and displacements of generalized systems statically determinate and indeterminate.

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

### Knowledge:

1. Relationships between displacements, and the load on the statics of simple flat bas structures. - [[K_W03]]
2. Basic principles and theorems of linear structural mechanics. - [[K_W03]]
3. Manners to create computational models of flat bar structures - [[K_W03]]

### Skills:

1. Determine influence lines if reaction and internal forces in simple beams and trusses statically determinate - [[K_W03]]
2. Determine the distribution of internal forces and calculate the generalized displacement caused by any load, the influence of thermal and kinematic systems in flat rod systems (trusses, beams and frames). - [[K_W03]]
3. Determine the distribution of internal forces in statically indeterminate systems using flexibility methods. - [[K_W03]]

### Social competencies:

1. Student is responsible for the correctness of the calculations undertaken. - [[K_W03]]
2. Student describes performed calculations and draw conclusions from their results - [[K_03]]

## Assessment methods of study outcomes

1. Written and oral examination at the end of the semester.
2. Two written tests checking the knowledge and skills in the subject.
3. Two exercises for individual design solutions.

## Course description

1. Models structural systems.
2. Determination of influence lines for beams and trusses statically determinate.
3. The principle of virtual work.
4. Theorem: Betti, Maxwell and Rayleigh.
5. Statically indeterminate flat bar structures, the impact load forces generalized changes in temperature and settling supports.
6. Solving framework, continuous beams, trusses and arches using flexibility method.

## Basic bibliography:

1. W. Nowacki, MECHANIKA BUDOWLI, PWN-Warszawa, 1974
2. Mechanika budowli (t. I i II), Z. Dyląg i in., PWN, Warszawa, 1989

## Additional bibliography:

1. Mechanika budowli (cz. I i II), skrypt opracowany przez studentów, www.intranet.put.poznan.pl
2. Mechanika budowli. Zadania cz. I, J. Rakowski, Wydawnictwo PP, Poznań, 2007
3. Zbiór zadań z mechaniki budowli. Wyd. II rozszerzone, M. Guminak, J. Rakowski, Wyd. PWSZ w Pile, 2009

## Result of average student's workload

| Activity | Time (working hours) |
|---|---|
| 1. Preparation of the first exercise design | 20 |
| 2. Preparation of the second exercise design | 20 |
| 3. Preparation of the first test | 15 |
| 4. Preparation of the second test | 15 |
| 5. Preparation of the exam | 12 |

## Student's workload

| Source of workload | hours | ECTS |
|---|---|---|
| Total workload | 120 | 5 |
| Contact hours | 38 | 5 |
| Practical activities | 0 | 0 |