# STUDY MODULE DESCRIPTION FORM

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|---|---|---|
| Name of the module/subject<br>**Structural Mechanics** | | Code<br>**1010104151010100048** |
| Field of study<br>**Civil Engineering First-cycle Studies** | Profile of study (general academic, practical)<br>**(brak)** | Year /Semester<br>**3 / 5** |
| Elective path/specialty<br>**-** | Subject offered in:<br>**Polish** | Course (compulsory, elective)<br>**obligatory** |
| Cycle of study:<br>**First-cycle studies** | Form of study (full-time,part-time)<br>**part-time** | |
| No. of hours<br>Lecture: **10** Classes: **10** Laboratory: **-** Project/seminars: **10** | | No. of credits<br>**5** |
| Status of the course in the study program (Basic, major, other)<br>**(brak)** | (university-wide, from another field)<br>**(brak)** | |
| Education areas and fields of science and art<br>**technical sciences** | | ECTS distribution (number and %)<br>**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 in the plane of generalized systems framework displacement method. Acquainted with the methods of calculation of stability and dynamics of simple flat bar structures.

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

### Knowledge:

1. Manners to create computational models of flat bar structures in terms of the method of displacement. - [[K_W03]]
2. Manners to build discrete dynamic models for flat bar structures. - [[K_W03]]

### Skills:

1. Calculate the internal forces in the frame by the displacement method - [[K_W03]]
2. Calculate the natural vibration frequency and amplitude of the harmonic forced vibration of simple flat bar structures crete mass distribution - [[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_W03]]

## Assessment methods of study outcomes

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

## Course description

Determination of influence lines for continuous beams.

Construction of the envelope of the internal forces of the moving load.

Solving framework by the displacement method (transformational formulas, equations, canonical method of displacement).

The dynamic loading of the structure, free and forced vibration system with one degree of freedom. The phenomenon of resonance damping. Free and forced vibrations of an n-degrees of freedom.

## 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 | 14 |

## Student's workload

| Source of workload | hours | ECTS |
|---|---|---|
| Total workload | 120 | 5 |
| Contact hours | 36 | 3 |
| Practical activities | 0 | 0 |