



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Structural Mechanics

Course

Field of study

Sustained Building Engineering

Area of study (specialization)

–

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2 / 3

Profile of study

general academic

Course offered in

English

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

Tutorials

15

Projects/seminars

15

Other (e.g. online)

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Przemysław Litewka, prof. PP

email: przemyslaw.litewka@gmail.com

tel. +48-61-6652468

Faculty of Civil and Transport Engineering

ul. Piotrowo 5, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Student has the basic knowledge in: mathematics, foundations of mechanics, strength of materials in the scope from the current course

Student can use the possessed knowledge and gain new abilities from accessible literature. Student can apply the known theory to solve practical problems

Student is aware of necessity to expand knowledge so that he can find the justification for its application to practical problems. Student understands the necessity of constant education.

Course objective

Knowledge of theoretical foundations and models in mechanics of plane bar structures. Ability to



compute internal forces and displacements in statically determinate and indeterminate systems. Ability to compute influence lines of static and kinematic quantities in bar structures.

Course-related learning outcomes

Knowledge

1. Student knows basic theorems and principles of linear structural mechanics
2. Student knows the relations between displacements and loading in statics of straight beams
3. Student knows the methods to build the computational models of plane bar structures.

Skills

1. Student can find the distributions of internal forces and compute displacements due to external loading, temperature change and imposed displacements in plane bar structures.
2. Student can find the functions of static and kinematic quantities due to movable load.
3. Student can choose correct methods to solve plane bar structures

Social competences

1. Student can work individually and in a team
2. Student has the responsibility for the correctness of the obtained solutions and can give their interpretation
3. Student has the consciousness of necessity of continuous expansion of knowledge.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- 1) lecture

final mark based on the mark from tutorial

- 2) tutorial - 2 test during the semester

- 3) projects - 2 individual projects for each student - individual consultations, the marks based on the current verification of knowledge at the submission date

Programme content

Lecture

Mechanical models of civil engineering structures (1h)

Work of internal and external forces. Principle of virtual work (1h)

Calculation of displacements in statically determinate bar structures due to loading, temperature change and imposed displacements (2h)



Statically indeterminate structures. Flexibility method. Loading, temperature change, imposed displacements (2h)

Reciprocity theorems (2h)

Reduction theorems - computation of displacements in statically indeterminate structures (2h)

Influence lines of static and kinematic quantities in statically determinate and indeterminate structures (4h)

Tutorials

Calculation of displacements in statically determinate bar structures due to loading, temperature change and imposed displacements (4h)

Statically indeterminate structures. Flexibility method. Loading, temperature change, imposed displacements (6h)

Reduction theorems - computation of displacements in statically indeterminate structures (2h)

Exercises (projects)

1. Calculation of displacements in statically determinate bar structures due to loading, temperature change and imposed displacements (4h)

2. Statically indeterminate structures. Flexibility method. Loading, temperature change, imposed displacements. Computation of displacements in statically indeterminate structures

Teaching methods

Lecture - monographic lecture, tutorials, exercises - exercise and project method

Bibliography

Basic

1. Electronic textbook <http://www.ikb.poznan.pl/przemyslaw.litewka/str-me-w.html>

2. M. Guminiak, J. Rakowski, Zbiór zadań z mechaniki budowli, Wydawnictwo PWSZ, Piła 2008

3. M. Guminiak, J. Rakowski, Mechanika budowli. Zbiór zadań z elementami ujęcia komputerowego, Wydawnictwo PWSZ, Piła 2011

4. Z. Cywiński, Mechanika budowli w zadaniach (t.I+II), PWN, Warszawa 1976

5. J. Rakowski, Mechanika budowli, Zadania cz.1, Wydawnictwo PP, Poznań 2007

Additional

1. Internet textbook, Mechanika budowli, www.ikb.put.poznan.pl/node/49



2. W. Nowacki, Mechanika budowli, PWN, Warszawa 1974

3. Z. Dyląg i in., Mechanika budowli (t.I+II), PWN, Warszawa 1989

Breakdown of average student's workload

	Hours	ECTS
Total workload	80	3,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	30	1,0

¹ delete or add other activities as appropriate