



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mechanics 1 [S1Arch1E>MECH1]

### Course

Field of study

Architecture

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

english

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

30

Projects/seminars

0

### Number of credit points

4,00

### Coordinators

### Lecturers

dr inż. arch. Anna Sygulska  
anna.sygulska@put.poznan.pl

### Prerequisites

1. Knowledge: Preparation from trigonometry and algebra. Vector calculations. Fundamentals of differential and integral calculus. 2. Skills: Solving trigonometric problems, adding, subtracting, multiplying vectors. Student can calculate derivatives and integrals for simple functions. 3. Social competences: Student is prepared to work actively in a group

### Course objective

1. Preparation for the design and calculation of simple and complex building structures.

### Course-related learning outcomes

Knowledge:

Student knows and understands:

B.W4. mathematics, space geometry, statics, material strength, shaping, construction and dimensioning of structures, to the extent necessary to formulate and solve tasks in the field of architectural and urban design;

B.W5. issues of construction, construction technologies and installations, construction and building physics, covering key issues in architectural, urban and planning design as well as issues related to fire protection of

buildings;

Skills:

Student can:

B.U4. develop solutions for individual building systems and elements in terms of technology, construction and materials;

Social competences:

Student is capable of:

B.S2. reliable self-assessment, formulating constructive criticism regarding architectural and urban planning activities.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

1. Two tests during the semester.
2. Four design works to be passed, checked by the teacher, with active consultations.

Formative assessment:

Assessment of knowledge, computational skills and projects carried out during exercises.

Final grading scale: 2.0; 3.0; 3.5; 4.0; 4.5; 5.0

Summative assessment:

The grade obtained during written tests and design works as well as the grade from the oral answer concerning the lectures.

Assessment scale: 2.0; 3.0; 3.5; 4.0; 4.5; 5.0

### Programme content

Vectors, forces, moments. Supports. Forces acting on a structure. Equations of static equilibrium. Calculation of support reactions in beams and frames. Construction of trusses and calculation of internal forces using the method of joints and method of sections. Calculation of internal forces (normal forces, shear forces and bending moments) in beams and statically determinate frames. Calculation of geometrical characteristics of sections

### Teaching methods

1. Lecture.
2. Exercises based on the study of specific examples.
3. Projects - calculation example individual for each student, with active consultations with the teacher of the subject.
4. eLearning Moodle (a system supporting the teaching process and distance learning).

### Bibliography

Basic:

1. Kenneth R. Lauer, Structural engineering for architects, McGraw-Hill Book Company 1981
2. Philip Garrison, Basic structures for engineers and architects, Blackwell Publishing 2005

Additional:

1. Edmond Saliklis, Architectural Structures, Visualizing Load Flow Geometrically, Routledge 2022
2. Paulo B. Lourenço, Angelo Gaetani, Finite Element Analysis for Building Assessment Advanced Use and Practical Recommendations, Routledge 2022
3. Sygulska A., The study of the influence of the ceiling structure on acoustics in contemporary churches, Archives of Acoustics, Vol. 44, No. 1, pp. 169-184, 2019.

### Breakdown of average student's workload

|                                                                                                                                            | Hours | ECTS |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| Total workload                                                                                                                             | 100   | 4,00 |
| Classes requiring direct contact with the teacher                                                                                          | 45    | 2,00 |
| Student's own work (literature studies, preparation for laboratory classes/<br>tutorials, preparation for tests/exam, project preparation) | 55    | 2,00 |