COURSE DESCRIPTION CARD - SYLLABUS

Course name
Strength of materials [N1Bud1>WM2]

Course

Field of study
Civil Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
10

Laboratory classes
10

Other (e.g. online)
0

Tutorials
10

Projects/seminars
10

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Knowledge: Mathematics: basic algebra, calculus, geometry, planimetry, trigonometry; Mechanics: knowledge about equations of equilibrium and internal forces in beams and frames. Skills: Mathematics: calculation of derivatives; Physics: usage of Newton"s laws of motion; Mechanics: calculation of reactions and internal forces in statically determinate beams and frames. Social competencies: Student can work in team. Student acts according to ethical rules.

Course objective

The objective is to gain knowledge, skills and competences in basic design of 2D beams and frames.

Course-related learning outcomes

Knowledge:
Student knows the rules of the theory of structures and analysis of 2D systems of beams and frames related to statics and stability (lecture).

Skills:
Student can derive geometric characteristics of 2D cross-sections (classes and projects).

Student can calculate stress and strain fields in an arbitrary point of bar"s cross-section in 2D beams and frames (classes and projects)
Student can calculate stresses in fillet and butt welds in standard types of steel joints.
Student can calculate the critical force of axially compressed bar with different types of supports.

Social competences:
Student is responsible for reliability of his results. Student is ready to get a critical feedback about the results of his work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lectures - exam which consits of two parts. The basis for passing the lecture is recieving more than 50% of points from each of exam parts. Final mark is calculated based on the sum of points from both exam parts. Marks scale: very good (5,0), good + (4,5), good (4,0), sufficient + (3,5), sufficient (3,0), insufficient (2,0)
Classes - single test at the end of semester. The basis for passing the class is recieving more than 50% of points. Marks scale: very good (5,0), good + (4,5), good (4,0), sufficient + (3,5), sufficient (3,0), insufficient (2,0)
Projects - 4 separate indiviually evaluated assignments. The basis for passing the projects is recieving more than 50% of points from all of the assignments. Marks scale: very good (5,0), good + (4,5), good (4,0), sufficient + (3,5), sufficient (3,0), insufficient (2,0)
Laboratories - 6 separate laboratory assignments (one shown by university staff, five conducted individually by students). The basis for passing the laboratories is presence on all the classes and preparation of reports from each of laboratory assignments. Marks scale: very good (5,0), good + (4,5), good (4,0), sufficient + (3,5), sufficient (3,0), insufficient (2,0)

Programme content

Lecture:
1. Asymmetric bending of beams.
2. Eccentricity of normal force.
3. Torque in beams.
4. Stability of axially loaded bars.
5. Calculation of stresses in fillet and butt welds.
Classes:
1. Asymmetric bending of beams.
2. Eccentricity of normal force.
3. Torque in beams.
4. Stability of axially loaded bars.
Projects:
1. Asymmetric bending of beams.
2. Eccentricity of normal force.
3. Torque in beams.
4. Stability of axially loaded bars.
Laboratories:
1. Tensile test.
2. Analysis of beam by the use of strain gauges.
3. Elastooptical analysis of bended beam.
4. Displacements in beam under asymmetric bending.
5. Calculation of shear modulus based on twisting beam test.
6. Calculation of critical force of axially compressed bar using Southwell"s method.

Teaching methods

Informative lecture
Excercises - solving excercises
Projects - solving homework assignments
Laboratories - conducting tests and peparing reports

Bibliography

Basic
Janusz Dębiński, Justyna Grzymisławska, Wytrzymałość materiałów, części 1-3, Wydawnictwo Politechniki Poznańskiej, 2019.
Janusz Dębiński, Justyna Grzymisławska, Postawy mechaniki płaskich konstrukcji prętowych, części 1-3, Wydawnictwo Politechniki Poznańskiej, 2019.
Janusz Dębiński, Justyna Grzymisławska, Badania laboratoryjne z wytrzymałości materiałów, Wydawnictwo Politechniki Poznańskiej, 2016.
Additional
Andrzej Gawęcki, Mechanika materiałów i konstrukcji prętowych, części 1-2, Wydawnictwo Politechniki Poznańskiej, 1998.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	50	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	75	3,00