POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fundamentals of mechanics

Course

Field of study	Year/Semester
Civil Engineering	1/1
Area of study (specialization)	Profile of study
-	general academic
Level of study	Course offered in
First-cycle studies	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	0	0
Tutorials	Projects/seminars	
30	30	

Number of credit points

6

Lecturers

Responsible for the course/lecturer:

dr inż. Maciej Przychodzki

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tel. 665-2697

Faculty of Civil and Transport Engineering

ul. Piotrowo 5 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Knowledge: Basic knowledge of the vector calculus and the mathematical analysis.

Skills: Capability to apply the vector calculus and calculate derivatives and integrals of simple functions.

Social competencies: Understanding the necessity of constant actualization and complementation of knowledge and skills.

Course objective

The aim of this subject is to prepare the student to be able to solve two- and three-dimensional static tasks, especially the statics of bar systems.

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Course-related learning outcomes

Knowledge

1. Student knows the equilibrium conditions for two- and three-dimensional forces sets.

2. Student knows methods of calculation of internal forces in statically determined plane bar systems.

3. Student knows the principle of virtual work.

Skills

1. Student can determine reactions in two- and three-dimensional bar systems.

2. Student can determine internal forces in two- dimensional statically determined bar systems.

3. Student can apply the principle of virtual work to determine reactions and internal forces.

Social competences

1. Student can work independently on specific task.

2. Student is responsible for the accuracy of obtained results of his work and their interpretation.

3. Student can formulate conclusions and describe results of his own work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The subject ends with a written exam. The exam consists of four tasks checking the subject learning outcomes. Each task is assessed on a scale of 2.0-5.0. The final grade of the exam is a weighted average of grades from individual tasks. Task weights depend on their level of difficulty.

The grade from the class of the tutorial exercises is the average of the grades of the two written tests covering all the material of the exercise, carried out in the middle and at the end of the semester.

The grade from the project exercises is the arithmetic average of the grades from the four project tasks. The oral or written defense of this task has a decisive impact on the grade of the project task. The grade is reduced due to the failure to submit the project task within the prescribed period.

Programme content

Elements of vector calculus, moment of a vector about a point, and about a given axis. Principles of statics. Moment of a couple and its properties. Reduction of a system of forces. Resultant equilibrium of a system of forces. Constrains, degrees of freedom. Conditions of geometrical invariability of a system of rigid bodies. Statically determined systems. Internal forces in beams and frames. Differential equilibrium equations of bars. Internal forces in statically determined trusses. Friction and the laws of dry friction. Rolling resistance. Principle of virtual work and its applications.

Teaching methods

Lecture - informative, monographic.

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Tutorials - exercise method.

Projects - project method.

Bibliography

Basic

1. J. Misiak, Mechanika ogólna. T. 1, Statyka i kinematyka, WNT Warszawa 1998,

2. Z. Cywiński, Mechanika budowli w zadaniach. Układy statycznie wyznaczalne, PWN Warszawa 1999,

3. J. Dębiński, J. Grzymisławska, Podstawy mechaniki płaskich układów prętowych. Cz. 1-3, Wydawnictwo PP, Poznań 2019

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	160	6,0
Classes requiring direct contact with the teacher	92	3,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	68	2,5

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[1] delete or add other activities as appropriate