COURSE DESCRIPTION CARD - SYLLABUS

Course name
Material Science and Theory of Machines

Course

Field of study
Chemical Technology

Year/Semester
II/3

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
0	0	0
Tutorials	**Projects/seminars**	
0	15	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
Ph.D. Eng. Piotr Tomasz Mitkowski

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Responsible for the course/lecturer:
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Prerequisites

Knowledge in the field of mathematics, physics and the basics of technical drawing and engineering graphics. Ability to read and understand technical drawings. Readiness to make decisions and cooperation within a given team, awareness of the need to expand their knowledge.

Course objective

Getting acquainted with fittings occurring in the constructions of industrial apparatus and devices. Transfer of knowledge in the field of calculation of flat bar systems including tools for computer-aided calculations. Acquiring engineering skills in own designing of a truss structure that keeps the tank in a vertical or horizontal position.

Course-related learning outcomes

Knowledge

1. Student knows the basic forces operating in the supports of camera construction, [K_W5, K_W13]

2. Student knows selection criteria for construction materials for process equipment components, [K_W15]

3. Student knows calculation methods for the determination of flat bar systems, K_W15

4. Student knows the process of designing the structure of the truss keeping the tank in a vertical or horizontal position, [K_W15]

Skills

1. Student can choose the right type of construction material in the process of designing process apparatus, [K_U1, K_U14]

2. Student know how to apply different methods for the determination of flat bar systems, [K_U20]

3. Student know how to choose a computer program to speed up the design process, [K_U6]

4. Student can design a truss structure that keeps the tank in a vertical or horizontal position, [K_U20]

Social competences

1. Student is aware of the limits of his own knowledge, and therefore the need for education and development, [K_K1]

2. Student knows the advantages and disadvantages of team work and adheres to the principles accompanying this way of solving problems in industry, [K_K4]

3. Student can think and act in a creative and enterprising way, [K_K5]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Skills acquired in the project classes are verified on the basis of the preparation of individual project task and passing the classes in the form of oral verification of the submitted project, consisting of 3-5 open-ended questions related to the project. Passing threshold: 51% of points from oral answer and the correctness of prepared project task.

Programme content

As a part of the course, theoretical basics and calculation methods regarding flat bar systems (trusses, beams and frames) with particular emphasis on truss systems. Presentation of tools for computer-aided calculations of flat bar systems. Practical strength calculations of apparatus components such as supports and load-bearing structures that holding the apparatus in a vertical or horizontal position will be presented.

Teaching methods

Multimedia presentation illustrated with examples given on the board, and completing tasks given by the teacher - practical exercises.

Bibliography

Basic

1. William D. Callister, Jr., Materials Science and Engineering, John Wiley & Sons, Inc., 2007

2. Materials delivered by the lecturer.

Additional

1. Leyko J., Mechanika ogólna, PWN, Warszawa 1978.

2. Blum A., Kratownice, AGH Uczelniane Wydawnictwa Naukowo-Dydaktyczne, Kraków 2004.

3. Jastrzębski P., Solecki R., Szymkiewicz J., Kratownice. Obliczenia statyczne, Arkady, Warszawa 1970.

4. Gawęcki A., Mechanika materiałów i konstrukcji prętowych. Tom 1 i 2., Wydawnictwo Politechniki Poznańskiej, Poznań 1998.

5. Leyko J., Szmelter J., Zbiór zadań z mechaniki ogólnej. Tom 1 i 2, PWN, Warszawa 1983

6. Mieszczerski I.W., Zbiór zadań z mechaniki, PWN, Warszawa 1969

7. Kucharski T., Mechanika ogólna: rozwiązywanie zagadnień z MATHCAD-em, WNT, Warszawa 2002

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	25	1,0
Student's own work (literature studies, preparation for tutorials, preparation for tests, project preparation) [1]	25	1,0

[1] delete or add other activities as appropriate