



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Designing food machines and cooling devices

### Course

Field of study

Construction and Exploitation of Means of Transport

Area of study (specialization)

Food Industry Machines and Refrigeration

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

Tutorials

0

Projects/seminars

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr hab. inż. Jan Szczepaniak

Responsible for the course/lecturer:

email: jan.szczepaniak@put.poznan.pl

tel. 618712238

Faculty of Civil and Transport Engineering

ul. Piotrowo 3, 60-965 Poznań

### Prerequisites

KNOWLEDGE:

Has basic knowledge of mechanics, basics of machine construction, machine construction, theory of mechanisms, thermodynamics

SKILLS:

Student is able to use the basic computer techniques.

SOCIAL COMPETENCES:

Student is aware of responsibility for his/her own work



### Course objective

Mastering theoretical and practical knowledge of engineering modeling methods and analysis of food machines in CAE systems.

### Course-related learning outcomes

#### Knowledge

1. Has elementary knowledge of the machine construction basis and the theory of machines and mechanisms including mechanical vibrations.
2. Has a basic knowledge of the standardized rules of recording structures and engineering graphics.
3. Has a basic knowledge of the strength of materials, including the basics of the elasticity and plasticity theory, stress hypotheses, calculation methods for beams, membranes, shafts, joints and others simple structural elements. Moreover is able to distinguish methods of testing the materials strength as well as deformations condition and stresses in mechanical structures.
4. Has elementary knowledge of the basics of computer science, i.e. computer architecture, binary, decimal and hexadecimal counting system, representation of numbers and graphic characters in computer memory, variable types.
5. Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge of construction, manufacturing and operation methods of a selected group of working, transport, thermal as well as flow machines, in particular: food and refrigeration machinery.

#### Skills

1. Is able to use computer office packages for editing technical texts, including formulas and tables, technical and economic calculations using a spreadsheet and keeping simple relational database.
2. Is able to use integrated with the packages for spatial modeling, programs for the calculation of mechanical structures by the finite element method and correctly interpret their results.
3. Is able to plan and carry out the process of constructing simple machinery units or machines and formulate requirements for electronic components and automatic control systems for industry specialists in mechatronic systems.
4. Is able to perform basic functional and strength calculations of machine elements such as traction gears, gears, friction gears, bearings, rolling and sliding gears, clutches, brakes.
5. Can use popular packages for editing technical drawings and 3D modeling to the extent that allows the creation of drawing documentation in accordance with applicable drawing standards and models of virtual machines in three-dimensional space.



### Social competences

1. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Current control of the mastery of the lecture content. Written exam in the theory of modeling and engineering analyzes, including the solution of a practical problem

### Programme content

Construction of a computational model taking into account the modular division of the topological description. Structure of a solid model for the purposes of computer simulation runs in terms of generating load cases and engineering analyzes.

### Teaching methods

An informative and problematic lecture with a multimedia presentation and a didactic discussion.

### Bibliography

#### Basic

1. Matuszek T. : Zasady projektowania maszyn w liniach technologicznych przemysłu spożywczego, Wyd. Politechnika Gdańska, Gdańsk 1986.
2. Boss J.: Maszyny i urządzenia przemysłu spożywczego. Skrypt WSI Opole, 1984.
3. Zienkiewicz O.C.; Taylor R.L.: The finite element method (fourth edition). Wyd. McGraw Hill 1998.
4. E. Chlebus, Systemy CAx, WNT, Warszawa 2000. 5. SolidWorks ver.11(10)- Users Manual.

#### Additional

1. Zienkiewicz O.C.: Metoda elementów skończonych, Arkady. Warszawa, 2004
2. Ray W. Clough.: Dynamics of structures. Mc Grow Hill, 1989
3. Zielnica J.: Wytrzymałość materiałów. W-PP, Poznań, 1998.
4. Users Manual CAD-3D systems.



### Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	45	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	15	0,5

<sup>1</sup> delete or add other activities as appropriate