COURSE DESCRIPTION CARD - SYLLABUS

Course name
Modeling of industrial processes

Course

Field of study
Chemical Technology
Area of study (specialization)
Polymer Technology
Level of study
Second-cycle studies
Form of study
full-time

Year/Semester
1/2
Profile of study
general academic
Course offered in
Polish
Requirements
compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars
30

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Wydział Technologii Chemicznej

ul. Berdychowo 4, 61-131 Poznań

Responsible for the course/lecturer:

Prerequisites

The student should have the necessary knowledge in the selection of construction materials used in the

construction of chemical devices, apparatus and installations and knows the principles of their functioning. The student knows the necessary principles of operation of control and measurement systems and electronic control systems used in chemical technology. The student has knowledge in the field of technology and chemical engineering, machine science and apparatus of the chemical industry.

Course objective

Acquiring basic knowledge in the field of conceptual development and design of plastic products as well as technological research and modeling of plastic processing processes

Course-related learning outcomes

Knowledge

1. The student has expanded and in-depth knowledge in the field of plastics processing necessary for modeling, planning, optimization and characterization of industrial technological processes. [K_W1, K_W11]

2. The student has knowledge in the field of processing, including the appropriate selection of polymer materials, raw materials, methods, techniques, apparatus and equipment for their implementation and characterization of the products obtained. [K_W3]

3. The student has expanded knowledge in the field of investing in the plastics processing industry, management, including quality management, business operations and technology transfer. [K_W9]

Skills

1. The student has the ability to obtain and critically evaluate information from literature, databases and other sources and formulate opinions and reports on plastics processing on this basis. [K_U1]

2. The student has the ability to communicate with specialists and non-specialists in the field of plastics processing and related fields. [K_U4]

3. The student has the ability to adapt knowledge in the field of plastics processing and related fields to solve problems in the field of processing and planning of new industrial processes. [K_U12]

4. The student is able to critically analyze the industrial processes of plastic processing and introduce modifications and improvements in this area, using the acquired knowledge, including knowledge about the latest achievements of science and technology. [K_U15]

Social competences

1. The student is aware of the need for lifelong learning and professional development in the field of plastics processing. [K_K1]

2. The student is aware of the limitations of science and technology related to plastics processing, including environmental protection. [K_K2]

3. The student is able to think and act in a creative and entrepreneurial way. [K_K6]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Stationary/Online: Assessment of knowledge from project classes based on oral answers and paper. Evaluation of the final project.

Programme content

Course contents include the following topics:

- plastics as construction materials, composition of plastics, examples and applications, modification of polymers;

- polymer composites (properties, methods of preparation);

- basics of polymer rheology, melt polymer flows (stresses, deformations in flow, Barus effect);

- plastics processing techniques: foaming, non-pressure casting, polyester-glass laminates and composites, pressure processing - pressing, rotomoulding, thermoforming, extrusion (method definition, extrusion line composition, screw theory, technology and products), injection of thermoplastic plastics (definition, description of methods, process parameters, examples of products, basics of process calculations) and connecting plastics: welding, gluing;

- assessment of the technological usefulness of polymeric raw materials and selection of the technological process in relation to the quality requirements of plastic products.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples on the board.

2. Papers in the form of a multimedia presentation.

3. Project: working with students in class (calculations, discussion, etc.)

Bibliography

Basic

1. J. Ferguson, Z. Kembłowski: „Reologia stosowana płynów”, Łódź 1995.

2. K. Wilczyński: „Reologia w Przetwórstwie Tworzyw Sztucznych”, WNT W-wa 2001.

3. R. Sikora: „Przetwórstwo tworzyw wielkocząsteczkowych”, PWN W-wa 1987.

4. R. Sikora: „Podstawy przetwórstwa tworzyw polimerowych”, WPL Lublin 1992.

5. K. Wilczyński: „Przetwórstwo tworzyw sztucznych”, WPW W-wa 2000.

6. A. Smorawiński: „Technologia wtrysku”, WNT W-wa 1984.

Additional

1. H. Saechtling: „Tworzywa sztuczne. Poradnik", WNT Warszawa 2000.

2. W. Szlezyngier, „Podstawy reologii polimerów", PRz. Rzeszów 1994.

3. R. Sikora i in., „Przetwórstwo tworzyw polimerowych. Podstawy logiczne, formalne i terminologiczne", WPL Lublin 2006.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for classes, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate