



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Podstawy przetwórstwa tworzyw sztucznych (Basics of plastic processing)

Course

Field of study

Year/Semester

Technologia chemiczna (Chemical Technology)

I/2

Area of study (specialization)

Profile of study

Technologia polimerów (Polymer Technology)

general academic

Level of study

Course offered in

Second-cycle studies

Polish

Form of study

Requirements

full-time

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

45

Tutorials

Projects/seminars

0

0

Number of credit points

7

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr hab. inż. Arkadiusz Kloziński

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Wydział Technologii Chemicznej

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Prerequisites

The student has the necessary knowledge of chemistry to enable understanding of chemical phenomena and processes. The student has knowledge in the field of technology and chemical engineering, machine science and apparatus of the chemical industry.

Course objective

Transfer of knowledge in the field of plastics processing. Developing the skills to acquire technological knowledge in the field of plastics processing and to become familiar with the principles of functioning of modern processing plants.

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 about advanced devices and apparatus used in plastics processing [K_W13]

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 posiada umiejętność wykorzystywania wiedzy nabytej w ramach specjalności w działalności zawodowej. [K_U23]

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:

1. Knowledge evaluation based on a written exam.
2. Evaluation of knowledge from laboratory exercises based on oral and written answers.
3. Evaluation of the laboratory report.

Programme content

The course content includes the following topics:

- 1) The importance of polymers and polymer processing in the modern world - what is processing.
- 2) Modification of polymer materials with particular emphasis on processing modification.
- 3) Methods for preparing plastics for processing - pre-treatment processes.
- 4) Indices of processability of polymer materials.



5) Plastic processing methods:

- extrusion: basics of extrusion process together with discussion of technological lines and special extrusion techniques: blow film extrusion, foaming extrusion, film extrusion, co-extrusion;
- the basics of the conventional injection molding process together with a discussion of special injection techniques: foaming injection, water assisted injection molding, gas assisted injection molding, micro injection molding, large injection molding, precision injection molding, etc.;
- pressing;
- foaming;
- pressureless molding - composites;
- rotational molding;

6) Methods of secondary processing of plastics:

- thermoforming;
- combining (welding, sealing, gluing, riveting);
- machining, plastic forming, surface treatment.

The laboratory exercises include:

- Tests of the films functional properties.
- Blow film extrusion.
- Material recycling of polymer.
- Injection molding.
- Methods for preparing polymer materials for processing.
- Thermoforming
- Combining the polymer materials.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples on the board.
2. Laboratories - practical classes.

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 | 175 | 7,0 |
| Classes requiring direct contact with the teacher | 90 | 3,6 |
| Student's own work (literature studies, preparation for laboratory classes, preparation for exam) ¹ | 85 | 3,4 |

¹ delete or add other activities as appropriate