



COURSE DESCRIPTION CARD - SYLLABUS

Course name

New polymer processing technologies

Course

Field of study

Materials Science

Area of study (specialization)

Metal and polymer materials

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

4/6

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

prof. Marek Szostak

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of materials science of polymer materials and basic methods of their processing.

Course objective

Learning about newest processing technologies of polymer materials.

Course-related learning outcomes

Knowledge

1. Student should identify the effects of polymer melting and the phenomena describing the behavior of the melted polymers.

2. The student should characterize and propose, depending on the needs, the methods of processing plastics.

Skills

1. Student is able to choose a polymer material and an appropriate method of processing polymeric materials.



2. The student is able to suggest in detail the processing method and the type of shaping tool.
3. The student is able to define the conditions of polymer processing.
4. Student can process the polymer materials in a safe way

Social competences

1. The student is aware of the importance of the use of plastics in the economy and social life.
2. The student is able to work in a group.
3. Can think and act in an entrepreneurial way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Passed on the basis of a written exam consisting of 5 general questions (pass in the case of a correct answer to at least questions: <3 - ndst; 3 - dst; 3.5 - dst +; 4 - db; 4.5 - db +; 5 - very good) conducted at the end of the semester.

Laboratory exercises: Credit based on reports on laboratory exercises in accordance with the guidelines of the teacher.

Programme content

Lecture:

1. Gas and water assisted injection moulding technology.
2. The use of static and dynamic mixers in injection and extrusion moulding technologies.
3. Obtaining polymeric materials, magnetically soft and hard.
4. Technologies of injection moulding and sintering of powders.
5. Advanced technologies of injection moulding of polymer materials, sandwich and mono-sandwich technologies, micro injection moulding, IML technologies and multi-material injection moulding
6. Injection moulding technology with dynamic changes in mold temperature.
7. Processing of bio-degradable plastics.

Laboratory exercises :

1. Plastic injection moulding with use of a dynamic mixer
2. Analysis of the precision injection moulding process of plastic products
3. Analysis of the stability of the plastic extrusion moulding process
4. Injection moulding of bio-degradable plastics



5. Injection moulding of products made of recycled polymer materials.
6. Statistical control of the injection moulding process.
7. Micro injection moulding technology.

Teaching methods

Lecture: multimedia presentation illustrated with examples given on the board.

Laboratory exercises: Credit based on reports on laboratory exercises in accordance with the guidelines of the teacher.

Bibliography

Basic

1. Bociąga E. „Specjalne metody wtryskiwania tworzyw polimerowych, WNT, W-wa 2008 .
2. Kucharczyk W., Żurowski W., Przetwórstwo tworzyw sztucznych dla mechaników, Radom, Wydawnictwo Politechniki Radomskiej, 2005.
3. Praca zbiorowa. Poradnik - Tworzywa sztuczne, WNT, Warszawa 2006
4. Haponiuk J.T.; Tworzywa sztuczne w praktyce; Wyd. Verlag Dashofer, Warszawa 2008.

Additional

1. Czasopisma: Przegląd Odlewnictwa, Plastics Review, Rubber Review, Plast News, Tworzywa Sztuczne, Przetwórstwo Tworzyw.
2. Sikora R., Przetwórstwo tworzyw wielkocząsteczkowych, Wyd. Pol. Lubelskiej 2006
3. Smorawiński A., Technologia wtrysku, WNT, Warszawa 1989.
4. Śledziona J., Podstawy technologii kompozytów, Wyd. Politechniki Śląskiej, 1998
5. Koszkul J., Materiały polimerowe, Wyd. Politechniki Częstochowskiej, 1999

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	35	1,5

¹ delete or add other activities as appropriate