



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Plastic processing [S1MiBM2>PTS]

### Course

Field of study

Mechanical Engineering

Year/Semester

2/4

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

4,00

### Coordinators

dr hab. inż. Danuta Matykiewicz prof. PP  
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### Lecturers

### Prerequisites

A student starting this subject should have basic knowledge of physics and chemistry..

### Course objective

Learning the basics of the physical and physicochemical processes occurring during the processing of polymeric materials and analyzing the factors affecting the processability of product construction.

### Course-related learning outcomes

Knowledge:

1. The student has detailed knowledge of the division and classification of polymeric materials.
2. The student knows the basics of manufacturing plastic products.

Skills:

1. The student has the ability to distinguish between modern manufacturing technologies.
2. The student has knowledge of systems for simulation of technological processes.
3. Is able to cooperate with other people as part of team work (also of an interdisciplinary nature)

Social competences:

1. The student is aware of the importance of processing in the economy and social life.
2. The student demonstrates an active attitude in creating manufacturing processes.
3. The student is able to assess the quality of plastic product manufacturing processes.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Passing the course based on a test conducted at the end of the semester, containing general or test questions, passing if more than 50% of points are obtained.

Laboratory: Passing the course is based on tests conducted in the laboratories and reports. Passing the course requires obtaining more than 50% of the points.

## Programme content

Lecture:

Discussion of the specific characteristics of individual processes and their possible applications in industrial practice.

1. Technological properties of polymer materials.
2. Preparation of raw materials for processing, drying, granulation, mixing.
3. Injection molding technology, construction of injection molding machines and injection molds, parameters.
4. Special methods of plastic injection molding.
5. Extrusion of polymer materials, single- and twin-screw plasticizing systems.
6. Lamination technology, raw materials, molds, lamination methods.
7. Thermoforming technology (vacuum forming).
8. Methods of joining polymer materials, welding, and gluing.
9. Technology of applying polymer materials to metal products.
10. Rotational molding.
11. Polymer pressing technologies.
12. Composite materials and development trends in contemporary plastics processing technologies.

Laboratory

Phenomena occurring during various plastics processing processes. The influence of technological parameters of processing processes on the properties of manufactured plastic products. Typical defects of plastic products made using various technologies and ways to prevent them.

1. Injection technology.
2. Extrusion technology.
3. Pressing technology
4. Lamination technology I.
5. Laminating technology II.
6. Negative vacuum thermoforming.
7. Positive vacuum thermoforming.
8. Welding of plastics.
9. Welding and gluing plastics.
10. Applying polymer coatings to metal products.
11. Casting silicone rubbers.
12. Processing of polyvinyl chloride pastes.

## Course topics

Characteristics of plastics, their properties and basic processing methods. Discussion of individual technological processes and their possible applications in industrial practice. The influence of technological parameters of processing on the properties of manufactured plastic products. Characteristic defects of plastic products manufactured using various technologies and methods for their prevention.

## Teaching methods

lecture: multimedia presentation, illustrations, sample multimedia films of technological processes

laboratories: work with devices, production of products such as pipes, laminates, fittings, castings.

## Bibliography

### Basic:

1. R.Sikora - Przetwórstwo tworzyw wielkocząsteczkowych. Wyd. ZAK , Warszawa 1997.
2. H. Saechtling, Tworzywa sztuczne Poradnik, WNT, 2000.
3. W. Szlezyngier, Z. K. Brzozowski, Fosze, Tworzywa sztuczne. Tom 1. Tworzywa ogólnego zastosowania , 2012.

### Additional:

1. J.T Haponiuk, Tworzywa sztuczne w praktyce. Wyd. Verlag Dashofer, W-wa 2008.
2. J. Rabek: Polimery i ich zastosowania interdyscyplinarne. Tom 1 i 2, PWN 2021.
3. Czasopisma: Plastics Review, Rubber Review, Plast News, Tworzywa Sztuczne.

## Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50