



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Processing of Polymer Materials

### Course

Field of study

Materials Science

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

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

2

### Lecturers

Responsible for the course/lecturer:

DSc. Eng. Karol BULA

Responsible for the course/lecturer:

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### Prerequisites

Student should have basic knowledge of polymeric materials and their properties.

### Course objective

Student should obtain knowledge about selected issues and methods in processing of plastics.

### Course-related learning outcomes

Knowledge

1. Students have knowledge how to characterize bulk materials prepared for processing . - [K\_W08, K\_W010].

2. Students have knowledge how describe typical technologies used in polymer processing. - [K\_W12].



### Skills

1. Students are able to select manufacturing technologies for a specific product. - [K\_U21].
2. Students are able to select machines and devices for production processes. - [K\_U20].

### Social competences

1. Students are aware of non-technical aspects of engineering activities and its impact on the environment. - [K\_K02].
2. Students are aware of setting priorities for the implementation of the task. - [K\_K04].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Lecture

Written colloquium at the end of the semester, contains 5 to 6 questions (credit if at least 50.1% of correct answers are obtained). Up to 50.0% - ndst, from 50.1% to 60.0% - dst, from 60.1% to 70.0% - dst +, from 70.1% to 80.0% - db, from 80, 1% to 90.0% - db +, from 90.1% - very good.

#### Laboratory classes:

Every single exercise should be passed by giving the written answer and additional final report on a training. All laboratory exercises must be passed with positive note.

### Programme content

#### Lecture

1. Preparation of bulk materials for processing, drying, pelletizing, mixing.
2. Injection molding technique, IMM construction, injection molds, processing parameters.
3. Extrusion of polymeris materials, single and twin screw plastisizing units, extrusion profile calibration.
4. Laminating technique, resins, fillers, hand lay-up techniques and other
5. Vacuum forming technology.
6. Welding of plastics, joining with adhesives.
7. Application of polymers as a thin protective layers on metals.

#### Laboratory classes

1. Injection molding technique.
2. Extrusion technique.
3. Laminating.



4. Thermoforming.
5. Joining techniques of plastic parts.
6. Thin protective polymer layers technique application.

### Teaching methods

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

Laboratory classes: demonstration of machine and equipment operation, performing experiments, solving tasks, discussion, teamwork.

### Bibliography

Basic

1. A. Smorawinski, Technologia wtrysku, WNT 1982.
2. W. Frącz, Przetwórstwo tworzyw polimerowych, wyd. Politechnika Rzeszowska, Rzeszów 2011.
3. K. Wilczyński, Przetw. Tworzyw Sztucznych, wyd. Politechnika Warszawska, 2000.
4. J. Stasiak, Wytłaczanie, Wyd. Uniw. Techn.-Przyrodn., Bydgoszcz 2003.
5. A. Boczkowska i in.: Kompozyty, Oficyna Wydawnicza Politechniki Warszawskiej, 2000.
6. J. Garbarski, Materiały i kompozyty niemetalowe, Oficyna Wydawnicza Politechniki Warszawskiej, 2001.

Additional

1. Poradnik: Tworzywa Sztuczne, WNT, W-wa, 2000.
2. D. Żuchowska, Polimery Konstrukcyjne, WNT, Warszawa 2000.
3. W. Frącz, B. Krywult – Projektowanie i wytwarzanie elementów z tworzyw sztucznych, wyd. Politechnika Rzeszowska, 2005.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	57	2,0
Classes requiring direct contact with the teacher	32	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for colloquium) <sup>1</sup>	25	1,0

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