



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Processing of polymer materials

### Course

Field of study

Biomedical engineering

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

Tutorials

0

Laboratory classes

15

Projects/seminars

0

Other (e.g. online)

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

DSc. Eng. Karol BULA

email: karol.bula@put.poznan.pl

tel. +48 61 665 28 95

Faculty of Mechanical Engineering

Piotrowo 3 st., 60-965 Poznań

Responsible for the course/lecturer:

### 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

Student should be able to characterize bulk materials prepared for processing .

Student should be to describe typical technology used in polymer processing.

#### Skills

Student should be able to make selection of the technology for making plastic parts.

Student is able to select machine and equipment for realizing some technological processes .

#### Social competences

Student is prepared for cooperation in a workgroup

Student is able to define priorities which are enable for resolving tasks.

### 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 open questions of any kind of presented technologies (credit in case of obtaining at least 50,1% correct answers).

#### 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, Wylaczanie, 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	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for colloquium) <sup>1</sup>	20	1,0

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