



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Processing of Polymer Materials [S1IMat1>PTS]

### Course

Field of study

Materials Engineering

Year/Semester

2/3

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

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr hab. inż. Karol Bula prof. PP  
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### Lecturers

### 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:

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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

1. Peripheral and auxiliary equipment used in plastics processing.
2. Technologies for shaping polymeric plastic products.
3. Tools used for shaping plastics.
4. Joining of plastics - methods, materials.

### Course topics

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	50	2,00
Classes requiring direct contact with the teacher	35	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	0,50