**COURSE DESCRIPTION CARD - SYLLABUS**

Course name
Processing of polymeric materials
**Course**

Field of study
Mechanical Engineering
Area of study (specialization)
-
Level of study

Form of study

Year/Semester

Profile of study

Course offered in
english
Requirements

 **Number of hours**

Lecture
15
Tutorials
0
Laboratory classes
0
Projects/seminars
0
Other (e.g. online)
0

**Number of credit points**6

**Lecturers**

Responsible for the course/lecturer:
DSc. Eng. Marek Szostak, prof. PP

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Mechanical Engineering Department

Piotrowo 3 street, 60-965 PoznanResponsible for the course/lecturer:

 **Prerequisites**
Basic knowledge of material science particularly polymers, physics, polymers rheology and processing.

**Course objective**
Get knowledge of main polymer processing technologies: injection moulding, extrusion, thermoforming, pressing and rotational moulding, learning of polymer materials rheology.

**Course-related learning outcomes**Knowledge
1. Student has knowledge of various polymers processing methods [K\_W07]

2. Student understand the relationship between polymers rheology and polymers processing [K\_W04], [K\_W07].

3. Student has knowledge about influence of the processing methods on the properties of polymeric materials [K\_W06], [K\_W13].

Skills
1. Student is able to select the appropriate polymer processing technology for production of any product [K\_U15], [K\_U16], [K\_U20].

2. Student is able to appreciate the rheological the influence of polymer processing technologies on properties of produced product [K\_U16], [K\_U21].

Social competences
1. Student can work on a designated task independently and work in a group, - [K\_K03]

2. Student understands the need of continuous learning in order to improve professional qualifications. - [K\_K01]

3. Student has knowledge of the role of polymeric materials processing in contemporary industry and applications [K\_K07].

**Methods for verifying learning outcomes and assessment criteria**Learning outcomes presented above are verified as follows:
The lectures ends with a written work, for a knowledge and understanding of the material and the ability to draw conclusions from this knowledge.

**Programme content**

1. Introduction to polymer processing.

2. Description of main polymer processing methods: injection moulding, injection and extrusion stretch blow molding, extrusion, thermoforming and rotational moulding.

3. Processing of polymer composites.

4. Polymers recycling.

5. Selection of polymer processing method for production of specific products.

6. Influence of processing parameters on the mechanical properties of polymers.

**Teaching methods**

Lectures with the use of multimedia.

**Bibliography**

Basic
1. Tim A. Ostwald, Understanding Polymer Processing, Carl Hanser Verlag, Munchen 2010.

2. Natalie Rudolph, Tim Osswald, Understanding Polymer Rheology – From Molecular Structure to Polymer Processing, Carl Hanser Verlag, Munchen 2014.

3. T. A. Osswald, G. Menges; Material Science of Polymer Engineerings, 3rd edition, Hanser Verlag, Monachium 2012.

4. Collective work, Plastics Technology Handbook, Taylor & Francis, New York 2006.

Additional
1. Articles in scientific journals: Polimery, Kunststoffe, Journal of Applied Polymer Science, Polymer.

2. C. Rauwendaal, „Polymer Extrusion”, Carl Hanser Verlag, Munich 2001.

3. R. J. Craford, J. L. Throne; Rotational Moulding Technology, New York 2001.

**Breakdown of average student's workload**

|  | Hours | ECTS |
| --- | --- | --- |
| Total workload | 30 | 4,0 |
| Classes requiring direct contact with the teacher | 15 | 4,0 |
| Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [[1]](#footnote-1) | 15 | 0,0 |

1. delete or add other activities as appropriate [↑](#footnote-ref-1)