



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Management and Production Engineering

### Course

Field of study

Year/Semester

Material Engineering

2/3

Area of study (specialization)

Profile of study

Production systems

general academic

Level of study

Course offered in

Second-cycle studies

polisch

Form of study

Requirements

full-time

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

PhD. Kinga Mencil

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Faculty of Mechanical Engineering

Piotrowo 3 60-965 Poznań

### Prerequisites

The student should obtain knowledge of mechanical, chemical and processing properties and applications of the plastics and rubber

### Course objective

Components and classification of polymer materials. Thermoplastic polymers: polyolefins, polyvinyl chloride, plastics styrene and acrylate, polyamides, polycarbonate, polyacetal, thermoplastic rubber. Thermosetting polymers: phenoplasts and aminoplasts. Chemosetting polymers: unsaturated polyester, epoxy resins, rubber.



### Course-related learning outcomes

#### Knowledge

1. The student should characterize the basic types of polymeric materials - [K\_W08, K\_W10, K\_W14]
2. The student should explain the influence of the structure of polymers on their properties - [K\_W03, K\_W08, K\_W10, K\_W14]

#### Skills

1. The student is able to select a polymer material for specific applications - [K\_U01, K\_U16, K\_U21]
2. The student is able to determine the relationships between the structure and properties of polymers - [K\_U01, K\_U21]

#### Social competences

1. The student is able to work in a group - [K\_K03]
2. The student is aware of the role of polymeric materials in the modern economy and everyday life - [K\_K02]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Test exam? 20 questions, each has three answers, one answer is correct, for a correct answer 1 point. Ratings: 20 points ? very good, 19? 18 points db +, 17? 16 points db, 15? 14 points dst +, 13? 12 points dst. 11 and less points ndst.

Laboratory: Credit based on a written answer concerning the content of each performed laboratory exercise, a report on each laboratory exercise prepared according to the instructor's instructions. To obtain credit for the exercises, all laboratories must be passed (positive grade from the answers and the report).

### Programme content

#### Lecture:

1. Advantages and disadvantages of polymeric materials.
2. Chemical classification of polymers.
3. Rheological and technological classification of polymers: elastomers, plastomers, thermoplastics, thermosetting and chemosetting.
4. Properties and application of large-scale polymeric materials from the group of thermoplastics: polyolefins, poly (vinyl chloride), polystyrene and styrene copolymers, poly (methyl methacrylate), fluoropolymers, thermoplastic polyesters, aliphatic and aromatic polyamides, polycarbonates.

#### Lab:

1. Determination of the density of polymers



2. Determination of strength
3. Determination of impact strength
4. Determination of hardness
5. Identification of materials

### Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the blackboard.
2. Laboratory exercises: practical exercises, performing experiments, discussion, team work, case studies.

### Bibliography

#### Basic

1. Kellar K., Ciesielska D.: Fizykochemia polimerów ? wybrane zagadnienia, Wyd. Politechnika Poznańska 1998
2. Żuchowska D., Polimery konstrukcyjne, WNT, W-wa, wyd. II, 2002
3. Pieluchowski J., Puszyński A.: Technologia tworzyw sztucznych, WNT, Warszawa, 1998

#### Additional

- . Rabek J. F., Współczesna wiedza o polimerach, Wydawnictwo Naukowe PWN, Warszawa 2008

### 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/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	20	1,0

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