



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Examination of Polymeric Materials

### Course

Field of study

Year/Semester

Material Engineering

1/2

Area of study (specialization)

Profile of study

Metal and Polymeric Materials

Level of study

Course offered in

Second-cycle studies

Form of study

Requirements

full-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

15

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr inż. Kinga Mencil

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Wydział Inżynierii Mechanicznej

ul. Piotrowo 3, 60-965 Poznań

### Prerequisites

Basic knowledge of physics, chemistry, materials science. Logical thinking, using information obtained from the library and the Internet. Understanding the need to learn and acquire new knowledge

### Course objective

Methods of investigation of polymer structure. Examination of static and dynamic properties of polymers. Hardness. Friction and abrasion. Examination of thermal properties. Static fatigue tests. Aging of polymers. Permeability of porous materials. Examination of plastic products.

### Course-related learning outcomes

Knowledge

1. Student should describe the basic properties of plastics - [K\_W04]



2. The student should characterize the basic research methods for plastics - [K\_W11]

#### Skills

1. The student is able to choose the appropriate research method to determine the properties - [K\_U10]

2. The student is able to propose a substitute research method - [K\_U10]

3. The student is able to test selected properties of plastics - [K\_U10]

#### Social competences

1. The student is able to work in a group - [K\_K03]

2. Understands the need for lifelong learning - [K\_K01]

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

Written credit carried out at the end of the semester (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% up to 90.0% - db +, from 90.1% - very good.

Lab:

Passing on the basis of an oral or written answer regarding the content of each performed laboratory exercise, a report on each laboratory exercise according to the instructions of the laboratory teacher. In order to pass the laboratories, all exercises must be passed (positive grade from the answers and the report).

#### Programme content

Lecture:

1. Introduction, characteristics of properties, measurement errors
2. The influence of structure on the properties of polymeric materials
3. Physicochemical properties of plastics
4. Thermal and thermal properties of polymeric materials
5. Mechanical properties of thermoplastics and rubbers
6. Chemical resistance of polymeric materials
7. Test methods of foils and porous materials

Lab:

1. Determination of water absorption



2. Determination of the softening point of plastics using the Vicat method
3. Determination of abrasion of plastics and rubber
4. Determination of elasticity of rubber by the Schow method
5. Determination of chemical resistance of plastics
6. Film tensile strength

### Teaching methods

1. Lecture: multimedia presentation, presentation illustrated with examples given on the board,
2. Laboratory exercises: practical exercises, taking measurements, discussion, team work.

### Bibliography

#### Basic

1. Sikora R.: Tworzywa wielkocząsteczkowe . Rodzaje, właściwości i struktura
2. Galina H.: Fizykochemia polimerów.
3. Broniewski T. metody badań materiałów polimerowych

#### Additional

#### Standards

### Breakdown of average student's workload

	Hours	ECTS
Total workload	70	2,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	35	1,0

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