



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physicochemistry of polymers

Course

Field of study

Materials Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Prof. dr hab. inż. Tomasz Sterzyński

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo street 3, 60-965 Poznań

Prerequisites

Basic knowledge of materials science of polymeric materials. The ability to think logically, to use information obtained from basic and specialist literature in the field of materials science. Student understanding the need to learn and acquire new material knowledge

Course objective

Understanding the physicochemical basics of solid and melt polymeric materials

Course-related learning outcomes

Knowledge

1. Student should distinguish types and groups of polymers - [K_W04]



2. The student should formulate the basic physical laws in connection with the specific properties and structure of polymers - [K_W02 K_W04]

3. The student should formulate the basic chemical laws in connection with the specific properties of polymers - [K_W02 K_W05]

Skills

1. The student is able to define the dependence of the structure and properties of a polymer material - [K_U09, K_U11]

2. The student is able to propose a method of assessing the properties and structure of a polymer material - [K_U10]

Social competences

1. The student is aware of the importance of the use of plastics in the economy and social life - [K_K02]

2. The student is open to cooperation with other specialists (technologists) - [K_K03, K_K05]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

Written exam 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.

Programme content

Lecture:

1. Functionality of monomers

2. Polymer synthesis methods: polymerization and copolymerization, polycondensation, polyaddition

3. Cross-linking of polymers: homocross-linking, heterocross-linking

4. Methods of chemical modification of the properties of polymers

5. Basic properties of amorphous and crystalline polymers

6. Methods of assessing the crystal structure

7. Crystallization, crystal structures, unit cell,

8. WAXS wide-angle diffraction in polymer research

9. Macromolecular orientation, direct and indirect description

10. Thermal and calorimetric methods in the evaluation of polymers



- 11. Mechanical models of liquids and solids? relaxation, creeping
- 12. Mechanical properties? tensile curve, elastic and plastic deformations

Teaching methods

Lecture: multimedia presentation, presentation illustrated with examples given on the board.

Bibliography

Basic

- 1. Kelar K., Ciesielska D.: Fizykochemia polimerów wybrane zagadnienia, Wyd. Politechnika Poznańska 1998
- 2. Żuchowska D.: Polimery konstrukcyjne, WNT, W-wa, wyd. II, 2002
- 3. Przygocki W.: Metody fizyczne badań polimerów, WNT, Warszawa, 1990
- 4. Kelar K.: Modyfikacja polimerów, Wydawnictwo Politechniki Poznańskiej Poznań, 1992

Additional

- 1. Pielichowski J., Puszyński A.: Technologia tworzyw sztucznych, WNT, Warszawa, 1998

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹		

¹ delete or add other activities as appropriate