COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physicochemistry of polymers [S2IMat1>FizPolimer]

Course

Field of study
Materials Engineering

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

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:

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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	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	0	0,00