



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Design of plastic materials [S1TCh2E>PMzTS]

Course

Field of study

Chemical Technology

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

English

Form of study

full-time

Requirements

elective

Number of hours

Lecture

0

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

15

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

Knowledge of the basic issues of general chemistry and organic chemistry.

Course objective

Obtaining basic knowledge about polymeric materials, their preparation and properties, as well as modern applications.

Course-related learning outcomes

Knowledge:

Student has basic knowledge of the chemistry and technology of polymeric materials, as well as their properties and applications (K_W03). Has the necessary knowledge of both natural and synthetic raw materials, products and processes used in polymer technology (K_W9)

Skills:

Is able to find the necessary information in the literature, databases and other sources concerning chemical sciences, interprets them properly, draws conclusions (K_U1). Can work both individually and in a team in academic environment (K_U2). Can prepare and present in Polish language an oral

presentation in the scope of polymer technology (K_U4). Has the ability to self-educate (K_U6).

Social competences:

Understands the need for learning and improving their professional, personal and social competences (K_K01). Can interact and work in a group, inspire and integrate engineering environments (K_K03). Can properly define priorities for the implementation of the assigned task (K_K04).

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The final grade is determined on the basis of partial grades received during classes in direct contact with the teacher (in the case of online classes - in "live view" mode with a webcam via the eKursy platform) during the semester, which consists of: preparation of multimedial presentation on the topic related to the application and properties of selected polymeric materials, project evaluation based on the written form of the project (in the case of online classes - sent via the eKursy platform or by e-mail using the university e-mail system) and project defense evaluation.

The final grade is the arithmetic average of the grades obtained during the project.

Programme content

Issue related to design of plastic materials.

Course topics

Knowledge of the structure of the most popular monomers and their polymers, such as e.g. polyolefins, vinyl polymers, rubbers, polyesters, polyamides, polyurethanes, epoxy and polyester resins, special polymers.

Structure of polymers (linear, branched, crosslinked), thermoplastics and duroplastics and their properties.

Plastic - concept, ingredients; composites. Preparation, properties and modification of polymeric materials in terms of their applications.

Become familiar with modern applications of plastics. Besides to commonly known applications, such as rubber, food, packaging, electrotechnical industries, construction, aviation, automotive, agriculture, the project will also cover plastics in cosmetics, medicine, pharmacy, dentistry, the computer industry, stereolithography (3D printers), microlithography, optoelectronics, microelectronics, etc.

Requirements for polymer materials depending on their target application.

Teaching methods

Project: Carrying out the particular stages of the project, solving problems related to the particular stages of the project, preparing multimedia presentations and the written part of the project, discussion.

Bibliography

Basic:

1. J. Pielichowski, A. Puszyński „Chemia Polimerów” TEZA, Kraków, 2004
2. J. Pielichowski, A. Puszyński „Technologia tworzyw sztucznych”, WNT, Warszawa, 1994
3. W. Szlezyngier „Tworzywa sztuczne” Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów 1996.
4. Z. Wirpsza „Poliuretany. Chemia, technologia, zastosowanie.” WNT Warszawa 1991.

Additional:

1. Praca zbiorowa pod red. Z. Floriańczyka i S. Penczka „Chemia polimerów” tom II, III Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1995 i 1997.
2. Scientific publications related to the subject of the project.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50