



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Polymer composites

Course

Field of study

Materials Engineering

Area of study (specialization)

Metal materials and plastics

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

prof. dr hab. Inż. Tomasz Sterzyński

Responsible for the course/lecturer:

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Prerequisites

Basic knowledge of materials science and processing of polymeric materials: thermoplastic and chemically hardening. Logical thinking skills, using information obtained from the library and the Internet. Social competences: understanding the need to learn and acquire new knowledge.

Course objective

Understanding the principles of selection of ingredients, production methods and properties of polymer composites.

Course-related learning outcomes

Knowledge



1. Student should characterize the functional properties of the most important polymer composites. - [K_W01, K_W04, K_W05]

2. Student should describe the methods and devices used in polymer composite technologies - [K_W02, K_W04, K_W08]

Skills

1. Student is able to shape the properties of composite materials - [K_U11, K_U13, K_U16]

2. The student is able to propose a method of processing polymer composites - [K_U13, K_U16, K_U20]

Social competences

1. Student is aware of the environmental impact of the chemically hardened laminates processing products - [K_K02]

2. Student is able to work in a group - [K_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

Assessment based on a test at the end of the semester. (pass if get at least 50.1% of correct answers).

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% - bdb.

Lab:

Credit based on a written answer concerning 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 assessment of the written test and report).

Programme content

Lecture:

1. Polymer construction materials.
2. Characteristics of modern fillers and nanofillers.
3. The rule of mixtures in determining the properties of composites.
4. Technologies for producing composites reinforced with cut glass fiber.
5. Technologies for producing nanocomposites based on thermoplastic polymers.
6. Polymer-wood composites.
7. Single-polymer composites (self reinforced composites).



8. The newest methods of producing layered composites (laminates).
9. Biocidal and compostable composites.
10. Polymer composites with high thermal resistance and sliding properties.
11. Selected methods of testing laminates.

Lab:

1. Production of polymer-wood composites - part 1
2. Production and testing of polymer-wood composites - part 2
3. Production of composites filled with cut glass fiber - part 1
4. Production and testing of composites with chopped glass fiber - part 2
5. Production of rubber mixtures with dispersion fillers - part 1
6. Vulcanization and testing of rubber mixtures with dispersion fillers - part 2

Teaching methods

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

Bibliography

Basic

1. Boczkowska A.: Kompozyty, Wyd. politechniki Warszawskiej, 2003
2. Garbarski J.: Materiały i kompozyty niemetalowe, Wyd. Politechniki Warszawskiej, 2001
3. White J., De S.. :Poradnik Technologa Gumy, Rapra Technology Limited, 2001

Additional

1. Śledziona J.: Podstawy technologii kompozytów, Wyd. Politechniki Śląskiej, 1998
2. Koszkuł J.: Materiały polimerowe, Wyd. Politechniki Częstochowskiej, 1999



Breakdown of average student's workload

	Hours	ECTS
Total workload	66	2,0
Classes requiring direct contact with the teacher	34	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	15	1,0

¹ delete or add other activities as appropriate