



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Cast metal composites

Course

Field of study

Year/Semester

Materials Engineering

2/3

Area of study (specialization)

Profile of study

Metal materials and plastics

general academic

Level of study

Course offered in

Second-cycle studies

Polish

Form of study

Requirements

full-time

elective

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:

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Prerequisites

Basic knowledge of material science and surface phenomena in multiphase systems. Logical thinking, obtaining and associating information from various sources (library, Internet) and awareness of the need to acquire new knowledge.

Course objective

Understanding the characteristics of multiphase materials, the conditions for their manufacture and the opportunities in the field of product design.



Course-related learning outcomes

Knowledge

1. Allowing to describe the basic properties of multiphase materials and their manufacturing - [K_W04, K_W11]
2. Providing orientation in new achievements in materials engineering related to cast metal composites - [K_W08]
3. Allowing proposing composite material recycling technology - [K_W12]

Skills

1. Acquiring information in the field of materials engineering and product design - [K_U05]
2. Planning and conducting technological experiments - [K_U08, K_U11, K_U13, K_U14]
3. Critical assessment of observed phenomena and processes - [K_U16]

Social competences

1. Awareness and responsibility for decisions taken - [K_K02]
2. Creative way of thinking - [K_K06]
3. Ability to work effectively in teams - [K_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

Subject pass based on a written test: 4-5 questions. Each answer is graded on a scale of 2 ÷ 5 (F ÷ A+).
Condition to pass: an average mark > 3. Final exam at the end of the semester.

Laboratory classes:

The condition of passing the exam is attendance at all classes + positive grades from answering the questions of the teacher

Programme content

Lecture:

Characteristics of cast composites. "In situ" composites. Dispersed reinforced composites. Composites with saturated reinforcing element. Characteristics of components (phases) of cast composite materials. Phase properties. Surface phenomena at the boundaries of combined phases. Chemical reactions at phase boundaries. Technological barriers. Phase joining conditions and techniques. Structure-properties relationships of metal cast composites. Gradient composite materials. Recycling of cast composite materials.



Laboratory classes:

1. Properties of components (elements) of metal cast composites
2. Preparation of metal composites with saturated reinforcement
3. Recycling of metal composites with saturated reinforcement
4. Modeling and visualization of the process of manufacturing and recycling of particle-reinforced composites (dispersion)
5. Recycling of metal composite reinforced with particles
6. Examples of microstructures of cast composites

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the board.
2. Laboratory classes: practical work, conducting experiments, modeling, discussion, teamwork.

Bibliography

Basic

1. Szweycer M., Zjawiska powierzchniowe w procesach odlewniczych, Wyd. Instytutu Odlewnictwa, Kraków 1996
2. Ślężona J., Podstawy technologii kompozytów, Wyd. Politechniki Śląskiej, Gliwice 1998

Additional

1. Górny Z., Sobczak J. , Nowoczesne tworzywa odlewnicze na bazie metali nieżelaznych, Wyd. Za-Piś ,Kraków 2005
2. Dobrzański L.A. , Metalowe materiały inżynierskie, WNT Warszawa 2004

Breakdown of average student's workload

	Hours	ECTS
Total workload	62	2,0
Classes requiring direct contact with the teacher	42	1,0
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