COURSE DESCRIPTION CARD - SYLLABUS

Course name
Construction materials [S1ZiIP2>MaK]

Course

Field of study
Management and Production Engineering

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

Lecturers

Prerequisites

Basic knowledge of physics and chemistry. Logical thinking, exploring of various sources of knowledge. Understanding of necessity of learning and acquisition of new knowledge.

Course objective

To provide students with basic knowledge of construction materials in the to the extent specified by the curricular content specific to the field of study. To develop in students the ability to solve simple problems related to the selection of materials, to distinguish between materials and to analyze the results of microscopic observations based on the acquired knowledge.

Course-related learning outcomes

Knowledge:
Knows the basic groups of construction materials, their properties and areas of application. Knows the basic relationships between the chemical composition, structure and properties of materials. Knows the basic structural tests of materials and their selected properties.

Skills:
Can characterize the basic groups of materials and suggest a potential area of their application. Can relate the structure of a material to its properties, determine basic properties.

Social competences:
Is aware of the role of materials in the modern economy and civilizational development of society

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture
Written assessment, covering three issues discussed during lectures. A positive mark when half of the points are obtained.
Laboratory
Performance of all exercises. Obtaining a positive assessment of the knowledge of the problems covered in the laboratory - oral or written response. Getting a positive assessment of the reports. The final grade is the average of the obtained assessments.
Assignment of grades to percentage ranges of results: <90-100> very good; <80-90) good plus; <70-80) good; <60-70) satisfactory plus; <50-60) satisfactory; <0-50) unsatisfactory.

Programme content

The aim of the course is to provide students with a general overview of the basic knowledge about the classification of construction materials, their structure, properties and applications.

Course topics

Lecture:
Classification , requirements and selection criteria of construction materials. Correlation structure of properties. Mechanical properties of structural materials. Mechanisms of strengthening. Structure of structural materials. Phase equilibrium systems. Heat treatment: annealing, volumetric hardening, surface hardening, tempering, steel hardening and quenching, precipitation hardening. Ciplnochemical treatment: carburizing, nitriding. Steels: classification of steels, properties and applications, influence of alloying additives. Non-ferrous metals and their alloys: structure and properties of copper and its alloys, aluminum and its alloys, Al-Cu and Al-Si phase equilibrium system. Ceramics and glass: structure, properties and applications. Polymers and composites: classification, structure, properties and applications.
Laboratory classes:
1. Structure and mechanical properties of steel in the delivery condition
2. Heat treated structural steels
3. Structure and properties of steel after thermo-chemical treatment
4. Tool steels
5. Cast iron and cast steel
6. Copper and its alloys
7. Light alloys
8. Surface layers with special properties
9. Composite materials
10. Causes of wear and failure of machine parts and tools

Teaching methods

Lecture: multimedia presentation with examples given on the blackboard.
Laboratory exercises: practical use of selected microscopic research techniques, discussion and preparation of the results in the form of a report, formulation of conclusions regarding the issues discussed during classe

Bibliography

Basic:
Dobrzański L., Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo, WNT, Warszawa, 2006
Blicharski M.,Wstęp do inżynierii materiałowej, WNT, Warszawa, 2017

Additional:

Ashby M.F., Jones D.R.H., Materiały inżynierskie tom. 1 i 2, WNT, 2004.
Leda H., Współczesne materiały konstrukcyjne i narzędziowe, Wydawnictwo Politechniki Poznańskiej,Poznań, 1996
Leda H., Wybrane metalowe materiały konstrukcyjne ogólnego przeznaczenia, WydawnictwoPolitechniki Poznańskiej, Poznań, 1997
Leda H., Strukturalne aspekty własności mechanicznych wybranych materiałów, WydawnictwoPolitechniki Poznańskiej, Poznań, 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)	30	1,00