COURSE DESCRIPTION CARD - SYLLABUS

Course name

Modern high strength alloys

Course

Field of study

Material Engineering

Year/Semester

1/2

Area of study (specialization)

Metal and Polymeric Materials

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

Polish

Form of study

full-time

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:

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Wydział Inżynierii Materiałowej i Fizyki Technicznej

ul. Piotrowo 3 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of materials science, physics, phase transformations and strength of materials.Logical thinking, self-learning, use of library and internet.Student is aware of the importance and understanding of non-technical aspects and results of engineering activities including its influence on the environment

Course objective

To teach students how to fulfil demands for properties of materials applied for products of high durability and reliability in extreme work conditions

Course-related learning outcomes

Knowledge

1. K2_W04 The student has a structured, theoretically based general knowledge of materials engineering, thanks to which he can describe the basic functional properties of materials, technological properties of materials, factors affecting the properties of materials - chemical and phase composition, structure, manufacturing process, work environment.

2. K2_W10 The student knows the basic methods, techniques, tools and materials used in solving complex engineering tasks in materials science, thanks to which he can describe advanced electron microscopy methods, advanced diffraction, spectroscopic and thermal methods, surface testing methods, advanced mechanical properties testing methods, thermal, optical, electrical and magnetic

Skills

K2_U16 The student is able to make a critical analysis of the functioning and evaluate - especially in connection with the field of material engineering - existing technical solutions, in particular devices, technological processes, materials.

K2_U17 The student is able to propose improvements to existing technical solutions

Social competences

K2_K03 The student is able to interact and work in a group, assuming different roles in it.

K2_K07 The student is aware of the social role of a graduate of a technical university, understands the need to formulate and communicate to the public, in particular through the mass media, information and opinions on the achievements of technology and other aspects of engineering activity; endeavors to provide such information and opinions in a way that is generally understandable, with justification for different points of view.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: oral examination

Laboratory: On the basis of a written or oral tests and written reports on the content of the program during exercises. In order to pass the exercises, a written tests and all papers must be counted as positive

Programme content

Mechanisms and methods of strengthening of alloys. Alloys applied for different products e.g. in vehicles, airplanes, ships and ect. Alloys applied for work at low and at high temperatures. Creation of products properties by controlled thermomechanical and thermal treatment, quenching and tempering, controlled bainitic quenching.

Teaching methods

Lecture: multimedia presentation.

Laboratory exercises: performing exercises, discussion, team work.

Bibliography

Basic

1. Van Vlack L.H. Elements of Materials Science and Engineering, Massachusetts, Adison Wesley Publishing Company 1989

2. Flinn R.A., Trojan P.K. Engineering Materials and Their Application, Houghton Mifflin Company 1990 Boston

Additional

1. Dobrzański L.A. Metallurgy and Materials Science Principles (in Polish) WNT Warszawa 1998

2. Blicharski M. Introduction to Materials Science (in Polish) WNT Warszawa 1998.

Breakdown of average student's workload

	Hours	ECTS
Total workload	70	2,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	35	1,0

[1] delete or add other activities as appropriate