



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Construction materials

### Course

Field of study

Materials Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

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:

dr inż. Kamil Kowalski

Responsible for the course/lecturer:

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Wydział Inżynierii Materiałowej i Fizyki

Technicznej

ul. Piotrowo 3 60-965 Poznań

### Prerequisites

Knowledge of the field of metals, plastics, basics of ceramic materials, forming, casting Wiadomości z metaloznawstwa, tworzyw sztucznych, podstawowe wiadomości o materiałach ceramicznych, obróbce plastycznej, odlewnictwie, obróbce cieplnej. Necessary logical thinking skills, associating an image with a description. Understanding the need to learn and acquiring knowledge, systematic learning

### Course objective

Acquainting with the methods of meeting the requirements concerning the properties of materials used for products of high durability and reliability, working in extreme conditions.



## Course-related learning outcomes

### Knowledge

1. The student should know the requirements for materials used for construction elements - [K\_W09]
2. The student should know the characteristics of metal, ceramic and polymer materials - [K\_W08, K\_W10]

### Skills

1. Student is able to choose the material and its heat treatment ensuring failure-free operation of the structure - [K\_U16, K\_U21]
2. The student can determine the cause of damage to machine parts - [K\_U01]

### Social competences

1. The student is able to work in a group - [K\_K03]
2. The student is aware of the problems resulting from the failure of devices - [K\_K02]

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: oral exam

Laboratory: Assessment based on oral responses in the content of each laboratory exercise according to the instructions of the laboratory teacher. In order to pass the laboratories, all exercises must be passed (positive grade from the answers and the report).

## Programme content

Materials used in the construction of vehicles, for the construction of airplanes, spacecraft and shipbuilding. Materials for fasteners, gears, rolling bearings, plain bearings, for operation at low and high temperatures. Specific properties of steel with nitrogen, shaping the properties of products by controlling thermo-mechanical and thermal treatment, hardening and tempering, controlled cooling with bainite.

## Teaching methods

1. Lecture: multimedia presentation with examples given on the blackboard.
2. 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 classes

## Bibliography

### Basic

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



2. Dobrzański L.A. Metaloznawstwo i podstawy inżynierii materiałowej, WNT Warszawa 1998.

3. Blicharski M. Wstęp do inżynierii materiałowej. WNT Warszawa 1998.

Additional

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

**Breakdown of average student's workload**

|                                                                                                                                                     | Hours | ECTS |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
| Total workload                                                                                                                                      | 50    | 2,0  |
| Classes requiring direct contact with the teacher                                                                                                   | 30    | 1,0  |
| Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup> | 20    | 1,0  |

<sup>1</sup> delete or add other activities as appropriate