



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials

Course

Field of study

Product Lifecycle Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

English

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Faculty of Mechanical Engineering

Piotrowo Street No 3, 60-965 Poznań

Prerequisites

The student has basic knowledge of materials science and physicochemical properties of materials. The student is aware of importance of knowledge about materials in engineering practice.



Course objective

The student will learn principles and methodology of selecting materials for engineering structures' design. The student will acquire the ability to apply procedures and criteria for the selection of materials and technologies in the subsequent stages of engineering design.

Course-related learning outcomes

Knowledge

The student will be able to define basic issues regarding the division of materials and their use, become familiar with the methods of measuring materials' properties, technological processes, as well as be able to choose the type of material for the specified use.

Skills

The student will be able to recognize and group types of construction materials, measure and analyze utility properties of materials, analyze cost and material aspects taking into account customer's needs, be able to select technological processes for manufacturing of specific products.

Social competences

The student will recognize the importance of optimal material selection.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Credit based on a colloquium consisting of closed questions carried out at the end of semester.

Laboratory: Credit based on an oral or written test regarding content of each laboratory exercise and a report prepared on each laboratory exercise as instructed by the teacher. In order to get a credit for the laboratories all exercises must be passed (positive assessment of responses and reports).

Programme content

Lecture:

1. The importance of choosing materials. Division and properties of construction materials. Selecting materials based on their prices and availability.
2. Stages of structure design combined with the principles of materials' selection. Factors determining a selection of materials: utility functions of the structure, shape of elements, manufacturing technologies.
3. Rules for the selection of manufacturing technology.
4. Methods for selecting engineering materials. Case studies on selection of materials for the products' manufacturing.

Laboratory:

1. Selection of materials based on the results of product properties testing (flame analysis, density measurement using a hydrostatic balance).



2. Selected research methods determining thermal properties of products.
3. Selected research methods determining mechanical properties of products.
4. Technological processes used to manufacture products.
5. Selection of materials for products' manufacturing based on the Ashby's concept.

Teaching methods

Lecture supported by multimedia presentations and exercises at laboratory stands.

Bibliography

Basic

M. F. Ashby: Dobór materiałów w projektowaniu inżynierskim. WNT, Warszawa 2000

Dobrzański L.A.: Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie z podstawami projektowania materiałowego. WNT GliwiceWarszawa 2002

Broniewski T. i inni: Metody badań i ocena własności tworzyw sztucznych, WNT, 1970

Additional

M. F. Ashby, D. R. H. Jones: Materiały inżynierskie 1 - właściwości i zastosowania, WNT, Warszawa 1995;

M. F. Ashby, D. R. H. Jones: Materiały inżynierskie 2 - kształtowanie struktury i właściwości, dobór materiałów, WNT, Warszawa 1995

Kutz M. (Ed.): Handbook of Materials Selection. John Wiley & Sons Inc., New York 2002.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	38	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	37	1,5

¹ delete or add other activities as appropriate

