



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Materials science with chemistry elements [N1MiBM1>NOMzEC2]

### Course

Field of study	Year/Semester
Mechanical Engineering	1/2
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	Polish
Form of study	Requirements
part-time	compulsory

### Number of hours

Lecture	Laboratory classes	Other
8	10	0
Tutorials	Projects/seminars	
0	0	

### Number of credit points

3,00

### Coordinators

### Lecturers

### Prerequisites

Knowledge: basics of chemistry, physics and mathematics; Skills: the ability to think logically, associating the picture with the description; Social competencies: understanding the need to learn and acquire new knowledge, regularity in science

### Course objective

Knowledge of the relationship between chemical composition, physical properties and structure of the material in connection with heat, thermochemical and plastic treatments.

### Course-related learning outcomes

Knowledge:

1. Student can on based of microstructural observations determine the structure and properties of materials
2. Student should know a materials propewrties
3. Student can determine the cause of damage of machine parts

Skills:

1. Student can based onmicrostructural observations determine the structure and properties of materials

2. Student can identify the material and its previous heat treatment based on microstructure observation

Social competences:

1. Student is able to work in a group
2. Student is aware of the importance of material properties in the economy

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

Forming rating:

- a) in the field of laboratory classes based on oral responses from each exercise,
- b) in the field of lectures based on exam conducted during in the exam session.

Summary rating:

- a) in the laboratory classes, the average of grades obtained from the exercises,
- b) in the field of lectures - exam in a written form.

### Programme content

Lectures:

Ceramics - types, microstructure, properties, purpose. Plastics - types, microstructure, properties, purpose. Composites - types of construction and properties. Meaning, types and properties of surface layers.

Laboratory classes:

1. Steels in able of delivery
2. Heat-treated constructional steels
3. Structure and properties of steel after thermochemical treatment
4. Tool steels
5. Cast iron and cast steel
6. Copper and copper alloys
7. Light alloys
8. Surface layers
9. Processes of wear materials
10. Composites

### Course topics

none

### Teaching methods

Lecture: multimedia presentation, examples of samples after various processes, discussion

Laboratory: practical exercises, discussion

### Bibliography

Basic

1. Dobrzański L. A.: Podstawy nauki o materiałach i metaloznawstwo, WNT, Warszawa, 2002
2. Przybyłowicz K.: Metaloznawstwo. WNT, Warszawa, 1999
3. Blicharski M.: Wstęp do inżynierii materiałowej. WNT, Warszawa, 1998
4. Barbacki A.: Materiały w budowie maszyn. Praca zbiorowa, Wydawnictwo Politechniki Poznańskiej, Poznań, 2006
5. Ashby M.F., Jones D.R.H.: Materiały inżynierskie t. 1 i 2, WNT, Warszawa, 1995, 1996

Additional

1. Burakowski T., Wierzchoń T.: Inżynieria powierzchni metali. WNT, Warszawa, 1995
2. Leda H.: Współczesne materiały konstrukcyjne i narzędziowe. Wydawnictwo Politechniki Poznańskiej, Poznań, 1998.
3. Młynarczyk A., Jakubowski J.: Obróbka powierzchniowa i powłoki ochronne. Wydawnictwo Politechniki Poznańskiej, Poznań, 1998.

## Breakdown of average student's workload

	Hours	ECTS
Total workload	36	3,00
Classes requiring direct contact with the teacher	18	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	18	1,50