# COURSE DESCRIPTION CARD - SYLLABUS

Course name
Materials science [N1IŚrod2>Mater]

## Course

Field of study
Environmental Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

## Number of hours

Lecture
20

Laboratory classes
20

Other
0

Tutorials
0

Projects/seminars
0

## Number of credit points

4,00

## Coordinators

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## Lecturers

## Prerequisites

1. Knowledge: Chemistry and physics: basic terms related to properties of solids and liquids. 2. Skills: Ability to read technical drawings. 3. Social competencies: Awareness of need to constantly update and supplement knowledge and skills.

## Course objective

Acquire of basic knowledge and skills in materials technology and fittings techniques essential to solving typical practical problems appear in environmental engineering.

## Course-related learning outcomes

Knowledge:
1. Student knows basic chemical, physical, mechanical and technological features of materials used in environmental engineering and understand theirs significance.
2.Has a basic knowledge concerning of using metals and alloys, polymers and sanitary ware in

environmental engineering.
3. Has a basic knowledge concerning of using various kind of fittings in accordance with piping materials.
4. Knows and understands principle of various kind of valves.
5. Has a knowledge concerning of materials resistance at external factors.
6. Understands the need for appropriate selection of materials in accordance with their properties.
7. Knows and understands limitations of fitting techniques used in environmental engineering.

Skills:
1. Student can show possible application of individual materials in environmental engineering.
2. Can select material for projects for technical subjects at next years of studies.
3. Can point at possible kind of jointing for individual materials.
4. Can show application of individual kind of valves (fittings).

Social competences:
1. Student understands the need for teamwork in solving theoretical and practical problems.
2. Is aware of the advantages, disadvantages and limitations technical solutions applied.
3. Is aware of fundamental principles of industrial safety during installation work.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:
Exam - written final multianswer test (effects W1 to W7).
Mark scale (percentage / mark): 0-50 ndst, 51-60 dst, 61-70 dst+, 71-80 db, 81-90 db+, 91-100 bdb
Laboratory exercises:
Laboratory in two modules (work in groups).
The first module consist of 11 classes, final multianswer test (threshold to pass 50%). The second module consist of 4 classes, final test with open questions or multianswer test (threshold to pass 50%). Final mark calculated as mean. Weight of an mean - 11/15 from first module, 4/15 - from second module. It is necessary to obtain minimum 3,0 form each module.

## Programme content

1. Chemical, physical, mechanical and technological properties of materials used in environmental engineering.
2. Group of materials used in environmental engineering: iron alloys, cupper, cupper alloys, other metals and their alloys, polymers, sanitary ware.
3.Valves (fittings) used in environmental engineering.
4.Special technical solutions of sanitary installations.

## Course topics

Lecture:
1. Basic chemical, physical, mechanical and technological properties of materials used in environmental engineering.
2. Materials used in environmental engineering:
a) advantages, disadvantages and limitations in using of individual materials,
b) possible interactions between different materials or between them and environment,
c) classification of materials due to their properties, production technology etc.,
d) materials marking methods,
e) methods and technologies for materials jointing,
f) tools and equipment used in various jointing technologies.
3.Valves (fittings) used in environmental engineering:
a) classification,
b) applications, advantages, disadvantages and limitations in using.
4.Special technical solutions of sanitary installations.

Laboratories:
1. Sorts and dimensionig of instalation element joints.
2. Screwed connection of steel pipes.

3. Soldered connections of copper pipes.
4. Glued connections, welded and clamped connections of plastic pipes.
5. Corrosion process of selected metals and their alloys.
6. Fittings.
7. Identification of polymers, properties of mineral materials.

## Teaching methods

Lectures (conversatory and problem elements of lectures) using multimedia presentation.
Laboratory clases with demonstration and assembly of instalation elements.

## Bibliography

Basic:
1.Bagieński J., Materiałoznawstwo instalacyjne, Wydawnictwo Politechniki Poznańskiej, Poznań 1985
2. Płuciennik M., Zimmer J., Projektowanie instalacji wodociągowych wody zimnej i ciepłej, Instytut Techniki Budowlanej, Warszawa 2012
3. Adamski M., Materiałoznawstwo instalacyjne. Ćwiczenia laboratoryjne, Wydawnictwo Politechniki Białostockiej, Białystok 2006

Additional:
1. Lars-Eric J., Rury z tworzy sztucznych do zaopatrzenia w wodę i odprowadzania ścieków, Polskie Stowarzyszenie Producentów Rur i Kształtek z Tworzyw Sztucznych, Toruń 2010
2. Hyla I., Tworzywa sztuczne. Własności-przetwórstwo-zastosowanie, Wydawnictwo Politechniki Śląskiej, Gliwice 2004

## Breakdown of average student's workload

| | Hours | ECTS |
|---|---|---|
| Total workload | 100 | 4,00 |
| Classes requiring direct contact with the teacher | 40 | 1,50 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 60 | 2,50 |