



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Corrosion-resistant alloys

### Course

Field of study

Materials Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

polish

Requirements

elective

### 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. Natalia Makuch-Dziarska

Responsible for the course/lecturer:

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Physics

Piotrowo St 3, 60-965 Poznań

### Prerequisites

Knowledge: Knowledge of engineering materials, basic chemistry.

Skills: Logical thinking, independent learning, using the library and the Internet.

Social competences: The student is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment.

### Course objective

Students receive a complete set of basic information to help understand corrosion phenomena, and are ready to find solutions to corrosive problems with metal materials.



### Course-related learning outcomes

#### Knowledge

1. The student should have detailed knowledge of K\_W10 engineering materials
2. The student should have knowledge of chemistry to understand the structure of elements and chemical compounds; describe the elements of inorganic chemistry, acids, bases, salts, types of reactions, chemical equilibrium, chemical kinetics, electrochemistry, basics of metallurgy - [K\_W03]

#### Skills

1. The student is able to obtain information from literature, databases and other properly selected sources of materials engineering - [K\_U01]
2. The student is able to identify and formulate simple engineering tasks of a practical nature, characteristic of materials engineering, including in particular the selection of materials for specific applications; define the working conditions of the materials. - [K\_U16]
3. The student is able to select engineering materials, methods of shaping the structure and properties of materials for technical applications depending on the structure, properties and conditions of use - [K\_U21]

#### Social competences

1. The student understands the need for lifelong learning; can inspire and organize the learning process of other people - [K\_K01]
2. The student correctly identifies and resolves dilemmas related to the profession - [K\_K05]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written credit at the end of the semester (credit if at least 51% of points are obtained: <51% 2 - ndst, 51% -62% 3 - dst, 63% -74% 3.5 - dst +, 75% -84% 4 - db, 85% -94% 4.5 - db +, > 94% 5 - very good).

Laboratory: Credit based on a written test and written studies on the program content implemented during exercises. In order to pass the written test and all studies must be passed with a positive mark.

### Programme content

#### Lecture:

1. Types of corrosion and mechanisms of corrosive destruction of metals and alloys.
2. Classification of corrosion-resistant steels. Intergranular corrosion of austenitic corrosion-resistant steels.
3. Passivity, passivating metals and non-ferrous alloys.
4. Non-ferrous alloys resistant to corrosion.
5. Corrosion protection methods.



6. Corrosion resistance testing methods.

Laboratory:

1. Identification of the corrosion mechanism
2. Surface layers and corrosion-resistant coatings
3. Corrosion-resistant steels
4. Corrosion-resistant nickel alloys
5. Corrosion resistance of aluminum alloys. Anodizing of aluminum.

**Teaching methods**

1. Lecture: multimedia presentation
2. Laboratory exercises: practical exercises, discussion and teamwork.

**Bibliography**

Basic

1. J. Baszkiewicz, M. Kamiński, „Korozja materiałów”, Oficyna wydawnicza PW, Warszawa 2006
2. S. Mrowec, T. Werber, Korozja gazowa metali, Wydawnictwo Śląsk, Katowice 1975
3. M. Orman, A. Golian, Korozja aluminium i jego stopów, Wydawnictwo Śląsk, Katowice 1963
4. pod red. K. Darowicki, Procesy korozyjne, Politechnika Gdańska, Gdańsk 2008

Additional

1. L. A. Dobrzański „Podstawy nauki o materiałach i metaloznawstwo” WNT 2002
2. R.K. Tredhewey Corrosion, Longman, 1988

**Breakdown of average student's workload**

|   | Hours | ECTS |
|---|-------|------|
| Total workload  | 50    | 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) <sup>1</sup> | 15    | 1,0  |

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