



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electroplating [S2TCh2-ES>Gal]

### Course

Field of study

Chemical Technology

Year/Semester

1/1

Area of study (specialization)

Applied Electrochemistry

Profile of study

general academic

Level of study

second-cycle

Course offered in

polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

75

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

8,00

### Coordinators

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### Lecturers

dr inż. Marek Baraniak

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### Prerequisites

Basic knowledge of physical chemistry, inorganic chemistry and electrochemistry. Ability to use basic laboratory glassware and equipment and to apply the safety rules of work in a chemical laboratory. Ability to use computer programs for report preparation. The need for further education and enhance of professional and personal competences.

### Course objective

To acquaint student with the theoretical aspects of electrodeposition and current trends of electroplating technology, economic aspects of metal deposition as well as current legal regulations. The course is focused on the management and technological processes in electrocoating plants.

### Course-related learning outcomes

Knowledge:

1. Student, who has completed the course gained the knowledge concerning comprehensive

information about electroplating processes, including the selection of materials, components, methods, techniques, apparatus and equipment for the implementation of electrochemical processes and testing the properties of the obtained coatings - [[K\_W03, K\_W07, K\_W12]

Student has knowledge of the basic legal aspects and methods of galvanic waste utilization - [[K\_W03, K\_W08]]

#### Skills:

Student, who has completed the course gained the skills concerning design and control the deposition process of galvanic coatings. He is able to select the appropriate coating and deposition technique for the substrate material - [[K\_U05, K\_U13, K\_U15, K\_U22]]

2. Student has the ability to operate electrochemical equipment (for example galvanic-potentiostat) used in galvanic processes - [[K\_U05, K\_U09]]

3. Student is able to critically evaluate the obtained experimental results, determine their further direction and present them in the report form [[K-U06, K-U21]]

#### Social competences:

1. The student understands the need for self-education and raising their professional competences - [[K\_K01]]

2. The student is aware of compliance with the principles of engineering ethics - [[K\_K03, K\_K05]]

3. The student has formed awareness of the need to protect the environment - [[K\_K02]]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Laboratory assessment based on current work in the laboratory and oral answers on laboratory classes and/or evaluation of reports. Written exam (preferred) or oral exam in a classroom or online.

### Programme content

Basic principles of metal and alloys deposition, surface preparation, the production of conversion coatings, the chemical composition of baths for electroplating and oxide coatings, the utilization of galvanic sewage, coating quality control and electroplating devices will be presented. The legal aspects of galvanizing plants will be also discussed.

### Teaching methods

Lectures supply the theoretical principles and knowledge of technologies used in electrochemical and chemical deposition of metal layers and conversion coatings. The laboratories will complement the lecture material by putting it into practice.

### Bibliography

#### Basic:

1. Poradnik galwanotechnika, praca zbiorowa, WNT Warszawa 2002.

2. A. Ciszewski, Podstawy inżynierii elektrochemicznej, PP Poznań 2004.

3. M. Schlesinger, M. Paunovic, Modern Electroplating, Fifth Edition Wiley 2010.

#### Additional:

1. N. Kanani Electroplating. Basic principles, processes and practice Elsevier 2004.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	200	8,00
Classes requiring direct contact with the teacher	109	4,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	91	3,50