

**Electrochemical methods in corrosion and electrodeposition of metals
Kvvn9387**

Credits: 2

Coordinator/department Laura Sziráki, associate professor, Physical Chemistry

Terms for joining: physical chemistry (successful exams of BSc courses)

This course is focused on the topics:

- a) Electrochemical fundamentals of the environmental reactions of metals, alloys and structural materials (Models in anodic dissolution, mechanisms of hydrogen evolution and oxygen reduction. Catalytic and autocatalytic corrosion. Passivity, pitting. Types of corrosion);
- b) Measurement and control techniques of the corrosion of metals (Steady state and transient DC polarization techniques, AC impedance methods. Electrochemical techniques are demonstrated on virtual or real laboratory practices;
- c) Fundamentals in theory and practice of chemical and electrochemical techniques of single and alloy plating with emphasis on their environmental hazards and protective value. Operating variables of the deposition baths. Throwing power, leveling and brightening additives. Advantages of the pulsed current techniques in the formation of non-equilibrium (nanocrystalline/amorphous) structures, alloys and multilayers.

Literature:

Compulsory:

1. Lecture notes and laboratory practices,
Selected chapters of books:
2. Bard, M. Stratmann (editors): Encyclopedia of Electrochemistry Vol.4 Corrosion and oxide films, Wiley-VCH 2003, and
3. M. Paunovic, M. Schlesinger: Fundamentals of electrochemical deposition, J. Wiley 1998.

Suggested

1. E. Mattsson: Basic Corrosion Technology for scientists and engineers, Ellis Horwood series in corrosion and its prevention, 1989.