

Informačný list predmetu

Vysoká škola: Žilinská univerzita	
Fakulta: Strojnícka fakulta	
Kód predmetu: 2Y026	Názov predmetu: Corrosion and Surface Treatment (CST_E)
Druh, rozsah a metóda vzdelávacích činností: 2 - 0 - 2 (prednášky-cvičenia-lab.cv.) hodín za týždeň, prezenčná metóda výučby.	
Počet kreditov: 5.0	
Odporúčaný semester/trimester štúdia: 1 semester	
Stupeň štúdia: 4	
Podmieňujúce predmety: Materials Science, Technical Chemistry	
Podmienky na absolvovanie predmetu: <i>Priebežné hodnotenie:</i> theoretical preparation, reports, control written work <i>Záverečné hodnotenie:</i> Written and oral exam. Final classification of the subject: Evaluation A: 93 - 100 points Evaluation B: 85 - 92 points Evaluation C: 77 - 84 points Evaluation D: 69 - 76 points Evaluation E: 61 - 68 points FX Evaluation: Less than 61 points <i>Minimálny počet bodov pre prihlásenie na skúšku nie je zadany</i>	
Výsledky vzdelávania: The main goal of the subject is in to find the connections between theoretical aspects of corrosion processes and practice of mechanical structures protection from corrosion point of view. The aims of seminars are in practice tasks of corrosion measurements and formation of various protection layers and coatings on metal surfaces.	
Stručná osnova predmetu: Lectures: <ul style="list-style-type: none">• Introduction to the issue from the point of view of corrosion resistance of metals. Historical and economic aspects of corrosion and corrosion protection.• Basic mechanism of corrosion, electrochemical and chemical corrosion.• Thermodynamics of corrosion processes, internal energy, enthalpy, entropy, Gibbs energy• Construction of diagrams potential (E) - concentration of hydrogen ions in solution (pH), practical use of E-pH diagrams• Transport events, oxidation and reduction reactions, coupled reactions, voltammetric characteristics of corrosion systems• Interaction of the anode and cathode curves, the influence of material characteristics and environmental parameters on the passivity of metals and their alloys• Total corrosion, galvanic corrosion, pitting and crevice corrosion, intergranular corrosion and selective corrosion attack• Corrosion in electrolytes, corrosion in water, atmospheric corrosion, corrosion in soils• The effect of mechanical stress on the corrosion properties of alloys, corrosion cracking, corrosion fatigue.• Pre-preparation of the surface before the operation of selected systems, non-metallic protective coatings and their properties.	

- Metal coatings and methods of their application.
- Corrosion protection by environmental treatment and inhibitors

Laboratory exercises:

- Transition of the metal into passive and transpassive state. Exposure tests - gravimetric measurements. Anodic oxidation of aluminum alloys. Electrochemical polishing of metals. Potentiodynamic cyclic tests - critical concentration of chlorides, spot corrosion of stainless steels. Applications of equivalent circuits - electrochemical impedance spectroscopy.

Odporúčaná literatúra:

Popov, B.N.: Corrosion Engineering Principles and Solved Problems. Elsevier 2015, 774 s., ISBN 978-0-444-62722-3.

Hadzima, B. - Liptáková, T.: Základy elektrochemickej ochrany kovov. EDIS ŽU v Žiline, Žilina 2008.

Chovancová, M. - Fellner, P. - Špirk, E.: Základy korózie a povrchovej úpravy kovových materiálov. STU Bratislava, Bratislava 2002

Bard, A.J. - Faulkner, L.R.: Electrochemical methods: fundamentals and applications. Wiley, New York 2002.

Schweitzer, P.A.: Fundamentals of Corrosion: Mechanisms, Causes, and Preventative Methods. CRC Press, York 2009, 416 s.

Jazyk, ktorého znalosť je potrebná na absolvovanie predmetu: English

Poznámky:

Hodnotenie predmetov:

Celkový počet hodnotených študentov:

A	B	C	D	E	FX

Vyučujúci: prof. Ing. Branislav Hadzima, PhD.

Dátum poslednej zmeny: 2022-12-07

Schválil: prof. Ing. Eva Tillová, PhD.