



COURSE DATASHEET

Semester:	2016/17/1
Course:	Corrosion basics
Code:	NKMKFKT112K
Responsible department:	
Department code:	MKNK
Responsible instructor:	dr. Tamás Kristóf

Course objectives:

To acquire the basic knowledge in corrosion.

Course content:

Kinetics of electrode reactions. Overpotential and polarization. Activation and diffusion overpotential. General overview of corrosion, classification and characterisation of corrosion processes. Chemical corrosion, electrochemical corrosion. Forms of corrosion. Galvanic corrosion. Galvanic series. Uniform or general corrosion, pitting corrosion, crevice corrosion. Mechanical aspects: stress corrosion, erosion corrosion, cavitation. Intergranular attack. Dealloying. Hydrogen embrittlement. Atmospheric corrosion.

Underground/soil corrosion. Biologically influenced corrosion, microbiological corrosion. Corrosion characteristics of structural materials: corrosion and chemical resistances of alloys and nonmetallic materials (plastics/elastomers and resin-matrix composites, ceramics, concrete).

Thermodynamics of corrosion: potential-pH diagrams. Design of active and passive corrosion control. Testing, monitoring, techniques for diagnosis of corrosion failures. Corrosion control by protective coatings: metallic coatings, inorganic and organic coatings (paint, plastic, etc.). Corrosion protection by inhibitors. Cathodic protection.

Effects of water contaminants on the properties of water (impurities, solids and gases, sparingly soluble salts and oxides, water hardness). Water chemistry and corrosion problems in water systems (municipal water, water circuits in power plants). Corrosion by water and steam. Scaling, dissolved gases, distribution of solids, organics in water. Chemical conditioning, water regimes. Chemical cleaning, conservation.

Requirements, evaluation and grading:

After a half an hour's preparation the examinee gives an oral presentation on the topic for about 20-25 minutes.

Required and recommended readings:

Bockris J. O'M., Reddy A. K. N.: Modern Electrochemistry. Vol. 1-2, 2nd Ed., Kluwer, New York, 2002.
Dévay J.: Fémek korróziója és korrózióvédelme. Műszaki Kiadó, Budapest, 1979.



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Required and recommended readings:

Salamon T.: Korróziós alapismeretek. Veszprémi Egyetemi Kiadó, 2002.

E. McCafferty: Introduction to Corrosion Science. Springer, Heidelberg, 2010.

R. Donndorf: Szerkezeti anyagok és korrózió elleni védelem a vegyiparban. Műszaki Könyvkiadó, Budapest, 1982.

The ASME Handbook on Water Technology for Thermal Power Systems. EPRI, New York, 1989.