



COURSE DATASHEET

Semester:	2013/14/1
Course:	Applied Physical Chemistry and electrochemical basics of corrosion
Code:	VEMKFKT118A
Responsible department:	Department of Physical Chemistry
Department code:	MKFK
Responsible instructor:	dr. Dezső Boda

Course objectives:

Fundamentals of thermodynamics and kinetics, physical chemistry of metals and electrochemical basics of corrosion

Course content:

An introduction to chemical thermodynamics. The laws of thermodynamics. Entropy-maximum and energy-minimum. Conditions of equilibrium. Energy functions and applications. Chemical equilibrium. Mass action law. Heterogeneous equilibria. Dissociation equilibria in electrolyte solutions. The change of the equilibrium constant by the temperature and by the pressure. The electrochemical potential. Electrolyte solutions. Ionic solvation. Real electrolyte solutions. Conductivity in electrolyte solutions, ionic mobility. Introduction to reaction kinetics. Simple reactions, the first order rate law, the second order rate law. Half life. Rate of chemical reactions. Simple reactions. Parallel reactions. Consecutive reactions. Equilibrium reactions. Catalytic reactions. Potential – pH diagram of water, iron, copper and aluminium. Applications and limitations of the diagrams. Equilibria in electrolyte solutions. Electrolytic dissociation, acids and bases, pH. Buffer solutions. Heterogeneous equilibria of electrochemistry. Electrical double layer, electrochemical potential. Electrodes. The gas/inert metal, ion-insoluble salt/metal and oxidation-reduction electrodes. Irreversible electrode phenomena: overpotential and polarization. Galvanic cells. Transport phenomena, ionic mobility, diffusion, conductivity of strong and weak electrolytes. Electrokinetic phenomena: sedimentation and streaming potential, electrophoresis, electro-osmosis

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.

Fail (1) when the examinee is unable to prove either the definition of the basic notions or the short scheme of things connected with the topic.

Pass (2) when the examinee is able to interpret the basic notions of the topic.

Satisfactory (3) when the examinee is well-versed in the basic notions of the topic and is able to present their logic connections - with the help of the examiner.

Good (4) when the examinee provides a logic, well-structured presentation with all the important facts and connections but he does not know or partly knows the required reading material connected



COURSE DATASHEET

Semester:	2013/14/1
Course:	Applied Physical Chemistry and electrochemical basics of corrosion
Code:	VEMKFKT118A
Responsible department:	Department of Physical Chemistry
Department code:	MKFK
Responsible instructor:	dr. Dezső Boda

Requirements, evaluation and grading:

with the topic.

Very good (5) when the examinee gives a logic, excellent, well-structured, perfect in details oral presentation that completely reveals the connection of the concepts within the topic.

Required and recommended readings:

Liszi, J.: Fizikai kémia, Veszprém, 1993. Kézirat.

Liszi, J., Ruff, I., Schiller, R., Varsányi, Gy.: Bevezetés a fizikai kémiába, Műszaki Könyvkiadó, Budapest, 1993.

Moore, J.,W.: Chimica Fisica, Piccin, 1983.

Atkins,W.,P.: Physical Chemistry, Oxford University Press, 1990.

Kiss L.: Az elektrokémiai fémoldódás kinetikája Akadémiai Kiadó Budapest 1980

Dévay J.: Fémek korróziója és korrózióvédelme Műszaki Budapest 1979

Bockris J. O'M., Reddy A. K. N.: Modern Electrochemistry Vol.2 3. Ed. Plenum New York 1973

Dévay J.: A korrózió elmélete, BME Továbbképző Intézete, Budapest 1976