



OPIS PREDMETA / SUBJECT SPECIFICATION

Predmet: Subject Title:	Fizikalna kemija 2  Physical Chemistry 2
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Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
Izobraževalna kemija Educational Chemistry		3.	poletni Spring

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. Vaje Lab. Work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	30		60		180	10

Nosilec predmeta / Lecturer:

Jeziki / Predavanja / Lecture:   
Languages: Vaje / Tutorial:

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Prerequisites:

Osnovno znanje splošne in anorganske kemije, matematike in fizike.

Basic knowledge of general and inorganic chemistry, mathematics and physics.

Vsebina:

Contents (Syllabus outline):

- Ravnotežna elektrokemija: ionske raztopine, elektrode in elektrokemijski člani
- Molekule v gibanju: Kinetičen model plina, Transportne lastnosti idealnega plina, Prevodnost raztopin elektrolitov, Difuzija
- Kemijska kinetika: Eksperimentalna kinetika, Mehanizem reakcije, Kinetika kompleksnih reakcij, Reakcije v plinih, Reakcije v tekočinah
- Proces na trdnih površinah: Adsorpcija, Kataliza, Reakcije na površinah
- Laboratorijske vaje: Kalorimetrija, Parni tlak in izparilna entalpija, Viskoznost, Površinska napetost, Parcialna molska prostornina, Krioskopija, Vrelni diagrami, Heterogeno ravnotežje, Galvanski člani, Prevodnost elektrolitov, Transportno število, Kemijska kinetika, Adsorpcija

- Equilibrium electrochemistry: Ionic solutions, Electrodes and the electrochemical cell
- Molecules in motion: The kinetic model of gases, Transport properties of a perfect gas, The conductivities of electrolyte solutions, Diffusion
- Chemical kinetics: Experimental kinetics, The reaction mechanism, The kinetics of complex reactions, Gas reactions, Liquid phase reactions
- Processes at solid surfaces: Adsorption, Catalysis, Reaction at surfaces
- Laboratory: Calorimetry, Vapour pressure and Enthalpy of vaporization, Viscosity, Surface tension, Partial molar volume, Cryoscopy, Temperature – composition diagrams, Heterogeneous equilibrium, Electrochemical cells, Conductivity of electrolyte solutions, Transport number, Chemical kinetics, Adsorption

Temeljni študijski viri / Textbooks:

- P. W. Atkins, J. de Paula : *Physical Chemistry*, 8<sup>th</sup> Ed., Oxford University Press, 2006.
- P. W. Atkins, J. de Paula: *Physical Chemistry*, 7<sup>th</sup> Ed., Oxford University Press, 2002.
- P. W. Atkins: *Physical Chemistry*, 6<sup>th</sup> Ed., Oxford University Press, 1998.
- Aljana Petek: *Zapiski predavanj* – interno študijsko gradivo ( Course notes), 2007.

- Več avtorjev: *Laboratorijske vaje iz fizikalne kemije*, FKKT – UL Ljubljana, 2000.

**Cilji:**

- Razumeti fizikalni pomen fizikalno-kemijskih zakonitosti in formul ter povezave med njimi in to znati uporabiti pri reševanju enostavnih znanstvenih problemov. Pridobiti osnovne spretnosti za izvedbo in ovrednotenje eksperimentalnih meritev.

**Objectives:**

- Have more insight in the physical meaning of the physicochemical principles and formulas and the links between them and apply these when solving simple scientific problems. Acquiring basic skills to conduct and evaluate experimental measurements.

**Predvideni študijski rezultati:**
**Znanje in razumevanje:**

- določiti lastnosti idealnih plinov na osnovi kinetične molekularne teorije;
- razumeti, kako izpeljemo iz eksperimentalnih podatkov hitrostne zakone, v kakšni povezavi so hitrostni zakoni in reakcijski mehanizmi in kako teoretično razložimo reakcijsko hitrost

**Prenesljive/ključne spretnosti in drugi atributi:**

- Študenti bodo razvili spretnost pisnega komuniciranja, reševanja problemov, kritičnega in logičnega razmišljanja, kot tudi sposobnost samostojnega študija.

**Intended learning outcomes:**
**Knowledge and Understanding:**

- determine properties of ideal gases using kinetic molecular theory;
- understand how rate equations are deduced from experimental data, how rate equations and reaction mechanisms are related and how the reaction rate is interpreted theoretically.

**Transferable/Key Skills and other attributes:**

- Students will develop written communication skills, problem solving, critical and logical thinking, as will the ability to study independently.

**Metode poučevanja in učenja:**

- Predavanja
- Reševanje problemov
- Domače naloge
- Laboratorijske vaje

**Learning and teaching methods:**

- Classroom lectures
- Classroom problem solving sessions,
- Homework assignments
- Laboratory work

**Načini ocenjevanja:**

Delež (v %) /  
Weight (in %)

**Assessment:**

- Pisni izpit
- Ustni izpit
- Laboratorijske vaje

35  
35  
30

- Written examination
- Oral examination
- Lab work

**Materialni pogoji za izvedbo predmeta :**

- predavalnica s potrebno opremo in multimedijijskimi pripomočki,
- laboratorij z eksperimentalno opremo.

**Material conditions for subject realization**

- lecture room with necessary equipment and multimedia facilities,
- laboratory room with experimental equipment.

**Obveznosti študentov:**

*(pisni, ustni izpit, naloge, projekti)*

- pisni izpit,
- ustni izpit.
- opravljene laboratorijske vaje.

**Students' commitments:**

*(written, oral examination, coursework, projects):*

- written exam,
- oral exam.
- completed laboratory work.