Faculty of Metalurgy and Technology / METALLURGY AND / PHYSICAL CHEMISTRY AND ELECTROCHEMISTRY

Course:	PHYSICAL CHEMISTRY AND ELECTROCHEMISTRY			
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
2988	Mandatory	2	6	3+1+1
Programs	METALLURGY AND			
Prerequisites				
Aims	Getting to know the aggregate states of matter, as well as the application of thermodynamic laws on the physical-chemical processes. Interpretation of colligative properties of solutions and properties of electrolytes.			
Learning outcomes	At the end of this course, the student will be able to: - defines the basic laws of the ideal and real gas state, - reproduces basic theoretical concepts and models about the physico-chemical properties of matter in solid and liquid aggregate state, -applies thermodynamic laws to physical-chemical processes, - analyzes the properties of dilute solutions, as well as the balance of single and multi-component and multi-phase systems, --calculates the equilibrium constants of chemical reactions in homogeneous and heterogeneous systems, - distinguishes methods and techniques used in the research of kinetics and mechanisms of chemical reactions, - explains the basic laws of the interaction of chemical systems and electric current, - applies electrochemical laws to solve the various analytical and physical-chemical problems.			
Lecturer / Teaching assistant	Prof. Dr. Ivana Bošković, Prof. Dr. Veselinka Grudić, Dr. Jana Mišurović			
Methodology	Lectures, exercises (laboratory and computational), independent preparation of homeworks. Consultations.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. Students will get to know with classes, homework, colloquiums, final exam, distribution of information for students and work plan.			
I week exercises	Computational exercises.			
II week lectures	The aggregate states. Ideal gas state and gas laws.			
II week exercises	Computational exercises.			
III week lectures	Solid aggregate state of matter.			
III week exercises	Computational exercises.			
IV week lectures	Diffusion. The first and the second law of diffusion.			
IV week exercises	Computational exercises.			
V week lectures	Liquid aggregate state. The viscosity of the liquid.			
V week exercises	Experimental exercise: Verification of Gay-Lisaks law			
VI week lectures	Application of the first law of thermodynamics. Thermochemistry.			
VI week exercises	Experimental exercise: Determination of the viscosity coefficient of a liquid using the Ostwalds method.			
VII week lectures	Application of the second law of thermodynamics to physical-chemical systems.			
VII week exercises	Experimental exercise: Determining the surface tension of a liquid. I test.			
VIII week lectures	Chemical equilibrium and phase equilibrium.			
VIII week exercises	Experimental exercise: Determining the dependence of the vapor pressure of an easily volatile liquid on temperature. Correctional I test.			
IX week lectures	The properties of dilute solutions.			
IX week exercises	Experimental exercise: Determination of integral change enthalpy of dissolution of solid substances.			
X week lectures	Adsorption.			
X week exercises	Experimental exercise: Determination of the Freundlichs adsorption isotherm of acetic acid on activated carbon.			

XI week lectures	Chemical kinetics and catalysis.
XI week exercises	Experimental exercise: Preparation of colloidal systems.
XII week lectures	Electrolyte solutions. Faradays laws. Equilibrium and nonequilibrium processes in electrolytes.
XII week exercises	Experimental exercise: Determining the rate constant of sucrose inversion reaction.
XIII week lectures	Galvanic couplings. Thermodynamics. Types of electrodes and couplings.
XIII week exercises	Experimental exercise: Determination the rate law o of iodide ions oxidation by persulfate ions. II test.
XIV week lectures	Non-equilibrium electrode processes. Overvoltage.
XIV week exercises	Experimental exercise: Copper coulometer. Correctional II test.
XV week lectures	Corrosion processes.
XV week exercises	Presentation of reports of the laboratory exercises.
Student workload	Weekly: 6 credits x 40/30 = 8 hours In the semester: 6 x 30=180 hours

Per week	**Per semester**
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 1 sat(a) practical classes 1 excercises **3 hour(s) i 0 minuts** of independent work, including consultations	Classes and final exam: **8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts** Total workload for the subject: **6 x 30=180 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **36 hour(s) i 0 minuts** Workload structure: **128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to attend classes and all laboratory exercises. If a student takes a retake exam, the regular exam is canceled.
Consultations	Tuesday: 9-11 a.m. Friday: 9-11 a.m
Literature	(1) S. Djordjevic, Fizicka hemija, TMF, Beograd, 1987. (2) I.Holclajtner-Antunovic, Opsti kurs fizicke hemije, Beograd, 2000. (3) Grupa autora, Zbirka zadataka TMF, Beograd, 1985. (4) Grupa autora, eksperimentalna fizicka hemija TMF, Beograd, 1981. (5) D.Šepa, Osnovi hemijske kinetike, Beograd, 2001.
Examination methods	- Activity during the lecture: (0 - 3 points), - Activity in exercises and submitted reports: (0 - 4 points), - Correctly completed homework: (0 - 3 points), - I colloquium: (0 - 20 points), - II colloquium: (0 - 20 points), - Final exam: (0 - 50 points).
Special remarks	
Comment	

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points