Description of an Individual Course Unit

Study program	All		
Module			
Type and level of studies	PhD studies		
Course title	Chemical Kinetics		
Professor (for lectures)	Nedeljko Krstajić		
Professor/assistant (for practice)			
Professor/assistant (for LAB)			
Number of ECTS	5	**Type of the course (mandatory/elective)**	mandatory/elective
Prerequisit			
Objective of the course	1. Introducing to differential and integral forms of the rate laws of irreversible homogenous chemical reactions in the p, V = const. systems. ; 2. Study of the rate laws of complex chemical reactions, such as: consecutive, reversible, parallel and chain reactions. ; 3. Introducing to experimental physical and chemical methods of investigation of reaction kinetics, the experimental data processing and the methods for determination of the reaction order. ; 4. Introducing to the basic characteristics of chemical reaction in the solutions under the conditions of diffusion or kinetic control. ; 5. Acquiring the basic knowledge about the influence of temperature on the kinetics of chemical reactions, and introducing to theoretical concepts of reaction kinetics based on collision theory, transition state theory and the theory of monomolecular reactions. ;		
Learning outcomes of the course	Students have mastered the physical and chemical methods used to study the kinetics of complex chemical reactions and different methods for determination of reaction order. On the basis of the mechanism of chemical reactions they acquired necessary theoretical knowledge to carry out the differential and integral forms of the rate laws. They are trained to consider the influence of various parameters on the kinetics of complex chemical reactions by applying transition state theory.		
Course Contents			
Theoretical contents	1) Differential and integral forms of the rate laws of ireversible chemical reactions, ; 2) Differential and integral methods for determination of reaction order ; 3) Physical and chemical methods of study of the kinetics of chemical reactions ; 3) Rate laws of complex chemical reactions. ; 4) Influence of temperature on the rate of chemical reactions (the activation energy of complex reactions, and the dependence of the energy of activation on temperature) ; 5) Chemical reactions in the solutions (Kinetics of charged and uncharged particles and the influence of the chemical characteristics of the solvent) ; 6) Collision theory of bimolecular reactions ; 7) Transition-state theory and Catalysis.		
Practical part (practices, LAB, study research work)	Seminars:Integral forms of the rate law for the complex consecutive reaction by applaing the steady-state and quasi-reversible approximations.		
Literature			
1	Darko Šepa, Osnovi hemijske kinetike, Akademska misao, Beograd 2001.2.		
2	J.I.Steinfeld, J.S.Francisko W.L.Hase, Chemical Kinetics and Dynamics, Prentice Hall, Englewood Cliffs, New Jersey 1989.		
3	P.C.Jordan, Chemical Kinetics and Transport, Plenum Press, New York, 1979.		
4			
5			

Lessons per week				
Lectures	**Practices**	**LAB**	**Study research work**	**Other activities**
2				

Teaching Methods	Lectures, consultations and simulation of selected complex chemical reaction on the computer.

Grading methods (max. number of points is 100)			
Pre-exam assesments	**points**	**Final examination**	**points**
activity during lectures		**written exam**	
practical assesments		**oral exam**	50
mid-term exams			
seminars	50		