Description of an Individual Course Unit

Study program	All		
Module			
Type and level of studies	PhD studies		
Course title	Chemical Thermodynamics		
Professor (for lectures)	Jelena Miladinović		
Professor/assistant (for practice)			
Professor/assistant (for LAB)			
Number of ECTS	5	**Type of the course (mandatory/elective)**	elective
Prerequisit			
Objective of the course	The main course goal is for students to master the knowledge and skills referring to chemical thermodynamics of processes and phenomena of the material systems.		
Learning outcomes of the course	Students are capable for independently and creatively solve the specific and concrete practical problems and assignments such as estimation of the equilibrium composition, analysis and using of phase diagrams, prediction and calculations of thermodynamic parameters of interest for designing technological processes, establishing and determining the energy and mass balance.		
Course Contents			
Theoretical contents	Students are introduced to basic thermodynamic properties, fundamental equations and Maxwell relations for systems subjected to constant or variable external field (electrical, magnetic and gravitational) taking into account surface effects. They gain knowledge about ideal solution model and nonideal solutions-thermodynamic potentials, Especially, students are introduced to: phenomena appearing at surfaces and interfaces; conditions of equilibrium and general criteria for stability; equilibrium in chemical reacting systems; determination of the equilibrium composition for homogeneous and heterogeneous systems with competing reactions-method by Kandiner and Brinkley and Gibbs Energy Minimization Method; monovariant equilibrium in non-reactive and reactive systems, basics of phase diagram theory with the application to binary and multicomponent systems.		
Practical part (practices, LAB, study research work)			
Literature			
1	S. I. Sandler, Chemical and Engineering Thermodynamics, John Wiley and Sons, 1989.		
2	C.H.P. Lupis, Chemical Thermodynamics of Materials, North Holland, 1989.		
3	C. J. Adkins, Equilibrium Thermodynamics, Cambridge Univer. Press. 1986.		
4	J.G. Kirkwood and I. Oppenheim, Chemical Thermodynamics, McGraw-Hill Book Company, Inc. 1961.		
5	M.D. Koretsky, Engineering and Chemical Thermodynamics, John Wiley and Sons, Inc. 2004.		

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

Teaching Methods	Lectures

Grading methods (max. number of points is 100)			
Pre-exam assesments	**points**	**Final examination**	**points**
activity during lectures		**written exam**	
practical assesments		**oral exam**	60
mid-term exams	2x20		
seminars			