Description of an Individual Course Unit

Study program	All		
Module			
Type and level of studies	PhD studies		
Course title	Advanced Analytical Chemistry		
Professor (for lectures)	Ljubinka V. Rajaković		
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 object of this course is to identify the challenges faced by Analytical Chemistry as a metrological science that develops, optimizes and applies material, methodological and strategic tools of widely variable nature which materialize in measurement processes intended to derive quality chemical information (presence or concentration of analyte species) in space and time in order to solve scientific, technical and social problems.		
Outcomes of the course	The outcome of the subject is the knowledge related with separation, identification (qualitative analysis), and determining the relative amount of components in the sample (quantitative analysis). Development of analytical chemistry related with the development of new analytical technique/method and its application in science, medical, industry.		
Course Contents			
Theoretical contents	Analytical chemistry today, developments and applications. Classifications. ; Analytical properties. Chemical metrological hierarchy: uncertainty and trueness, errors, accuracy, representativeness, precision, sensitivity, selectivity, expeditiousness, cost-effectiveness. ; Traceability: reference materials. The integral concept of traceability. Traceability of methods, instruments, equipment, aliquot, results. Analytical chemical standards. ; The measurement process in chemistry. General steps of a chemical measurement process, preliminary operations, sample treatments, the choice of a proper method of investigation. measurement and transducing of the analytical signal. ; Qualitative aspects of analytical chemistry ; Quantitative aspects of analytical chemistry ; The analytical problems. The integral definition of the analytical problem, steps of the analytical problem-solving process. ; Analytical chemistry and quality. A general approach to quality, quality system in the analytical laboratory, analytical quality control. assessment of analytical quality.		
Practical part (practices, LAB, study research work)			
Literature			
1	M.Varcarcel, Principles of Analytical Chemistry, A textbook, Springer, Heidelberg, 2000		
2	R.Kellner, Analytical Chemistry-A Modern Approach to Analytical Science, John Wiley & Sons, New York, 2004		
3	Lj. Rajaković, Analytical Chemistry-Problems and Solutions, TMF, Belgrade, 2005		
4	G.Schwedt, The Essential Guide to Analytical Chemistry, John Wiley & Sons, New York, 2004		
5	J. Savić, M. Savić, Analytical Chemistry, Svjetlost, Sarajevo, 1990		

Number of ECTS 5				
Lectures	**Practices**	**LAB**	**Study research work**	**Other activities**
3				
Teaching Methods	Teaching methods: lectures (classical methodology, power point (PPT) presentations), essays, tests, homeworks.			

Grading methods (max. number of points is 100)			
Pre-exam assesments	**points**	**Final examination**	**points**
Activity during lectures, PPT presentation	20	**Written exam**	50
Practical assesments		**Oral exam**	
Mid-term exams	10		
Seminars	20		