

Course Unit Descriptor

Study Programme: Doctoral Academic Studies in Environmental Protection			
Course Unit Title: Environmental Quality Control (advanced course)			
Course Unit Code: DZZS-605			
Name of Lecturer(s): Full professor Dr Ivana Ivančev-Tumbas and Assistant Professor Dr Malcolm Watson			
Type and Level of Studies: PhD degree			
Course Status (compulsory/elective): elective			
Semester (winter/summer): winter			
Language of instruction: English/Serbian			
Mode of course unit delivery (face-to-face/distance learning): Face-to-face and distance learning			
Number of ECTS Allocated: 15			
Prerequisites: student has to have knowledge of Analytical Chemistry, Instrumental analysis or Environmental Quality Control (courses at BSc and MSc studies)			
Course Aims: To enhance the knowledge in the field of environmental quality assessment and quality control.			
Learning Outcomes:			
<ul style="list-style-type: none"> to demonstrate broad knowledge of environmental quality control methods among optical, spectrometric, electrochemical and chromatographic methods. to independently develop and critically evaluate analytical method . 			
Syllabus:			
<i>Theory-</i> Selection of analytical procedures and development of analytical methods in the field of analysis of pollutants in environmental samples.			
<i>Practice-</i> Development of the method validation plan.			
Required Reading:			
Internal lecture material, E-material developed within ERASMUS+ NETCHEM project: GC/MS Method validation plan (I. Ivančev-Tumbas), Matrix interferences in the flame atomic absorption spectrofotometry (S. Maletić, I. Ivančev-Tumbas) and Method optimisation for analysis of anions by ion chromatography (S. Maletić i I. Ivančev-Tumbas), http://mdl.netchem.ac.rs/course/view.php?id=25 , Standard methods for environmental analysis			
Additional literature, selected chapters from:			
1. M. Csuros Environmental Sampling and Analysis Lab Manual, Lewis Publishers, 1994.			
2. H. Small: Ion Chromatography, Plenum Press, New York and London, 1990.			
3. Grob R.L. Modern Practice of Gas Chromatography, 4thedition, Wiley-Interscience, 2004			
4. Loon J.C. Van Selected methods of Trace Metal Analysis, biological and environmental samples, Wiley-Interscience 1985.			
5. Reemstma T., Jekel M.: Organic Pollutants in the Water Cycle, properties, occurrence, analysis and environmental relevance of polar compounds, WILEY-ICH, 2006.			
6. Methods http://www.epa.gov/osw/hazard/testmethods/sw846/online/index.htm			
4. Selected Applications notes and scientific papers			
6. A. Tubić (2019), TOC analysis of water, http://mdl.netchem.ac.rs/course/view.php?id=19			
Weekly Contact Hours: 10	Lectures: 5	Practical work: 5	
Teaching Methods: Lectures, independent research work- seminar with literature search (internet and library sources), video files use (http://mdl.netchem.ac.rs/course/view.php?id=25), use of Cmap, research work related to analytical method validation that requires written report and consultations, selected remote lectures and exercises (http://netchem.ac.rs/remote-acces)			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Seminar	30	written exam	40
		oral exam	30