Title	**ENVIRONMENTAL CHEMISTRY**
Code	ZDOB04
Study Program	Postgraduate Interdisciplinary University Study Nature and Environment Protection
Semester	I.
ECTS	6
Status	Obligatory
Professors	Doc. dr. sc. Valentina Pavić, Asisstant professor
Colaborators	-
Enterance conditions	-
Aim	Provide a chemical foundation for understanding the contemporary environmental challenges with interdisciplinary approach. Learning basic chemical features and interactions of chemical compounds and the environment. Involve students with sources, reactions, effects and transportation of various pollutants in the soil, water and air. Provide interdisciplinary research training for understanding the underlying mechanisms by which physical, chemical and biological agents cause changes in the ecosystem's integrity.
Learning Outcomes	1. Define the term ecosystem and understand the chemical properties of the ecosystem 2. realize the span and chemistry of hydrosphere, lithosphere and atmospheric compounds 3. Understand the importance of interactions between chemical compounds and the environment in the development of biological system homeostasis 4. Describe sources of heavy metals and radionucids in the environment 5. Describe important chemical reactions in the atmosphere, including the formation of smog, ozone and acid rain 6. Understanding chemical methods for solving environmental problems 7. Acquire the skills of collecting samples in the environment and designing sampling protocols 8. Acquire the laboratory skills required for the common quantification methods of pollutants in environmental matrices 9. Link the theoretical knowledge gained in lectures and develop an understanding of security responsibility by working on environmental issues

Connection between Learning Outcomes, Curricular and Student Activities

Student activity	ECTS	Learning Outcomes	Curricular Activities	Methods of Assessment	Credits*	
					min	max
Attendance at lectures		1-5	Lectures	Record	5	10
Presence at seminars, preparation of seminar work		6	Seminars	Record, Evaluation of Seminar Work	15	40
Attendance in practices with the active participation		7-9	Practices	Record, evaluiation	15	20
Preparation for the oral part of		1-9	Examination	Oral exam	15	30

	the exam (or partial exams)						
	Total	**6**				**50**	**100**
	Final grade: 60-69,9 points: grade 2 70-79,9 pointsa: grade 3 80-89,9 points: grade 4 90-100 points: grade 5.						

Consultations	According to the agreement with the students		
Teaching form	**Lectures**	**Seminars**	**Practices**
No. of hHours	15	5	5
Contents	**LECTURES:** Ecosystem, Life Cycle and Energy Role. Sources of pollutants in the environment: natural and artificial. Transport processes and chemical reactions that determine the fate of chemical substances in the environment. Chemistry of lithosphere, hydrosphere and atmosphere. Conventional Groundwater and Soil Pollution. Biogeochemical cycles. Toxic Organic Chemicals. Traces of heavy metals and radionuclides, speciation and interaction with biotics. Atmospheric chemistry of acid rain, greenhouse gases and ozone. **SEMINARS:** Alternative energy sources. Review of compounds with hormone-disruptive effect. Molecular basis of greenhouse effect. Toxic Pollution. Redox reactions and microbial processes. Influence of toxic compounds in the environment: natural and artificial. **PRACTICES:** Quantification methods for pollutants in environmental matrices. Collection of samples in the environment. Designing sampling protocols.		
Compulsory literature	1. vanLoon, G.W., Duffy, 2011: S. J. Environmental Chemistry: A global perspective 3rd Edition, Oxford University Press: Oxford. 2. Lollar, B.S. (Ed.), 2005: Environmental Geochemistry, Elsevier, Amsterdam. 3. Girard, J.E., 2005: Principles of Environmental Chemistry 1st Edition, Jones and Bartlett Publishers, Inc.: Sudbury. 4. Buell, P., Girard J.E., 2003: Chemistry Fundamentals: An Environmental Perspective 2nd Edition, Jones and Bartlett Publishers, Inc.: Sudbury.		
Optional literature	Relevant review articles and scientific monographs		
Completion condition	Participation in classes		
Exam form	Active participation involving the creation and presentation of seminar work brings 70% of the final grade and the oral part of the exam is 30% of the final grade. Prior to the oral part of the exam, students are required to make and present the seminar work.		
Possible teaching languages	Croatian, English		
Quality Monitoring	Survey questions and the possibility of oral or written reviews after lectures, seminar presentations or oral exams.		