

NAME OF THE COURSE		ENVIRONMENTAL RISK ASSESSMENT				
Code		Year of study	2., III.semester			
Course teacher	Roko Andricevic Full Professor	Credits (ECTS)	4.0			
Associate teachers	Vladimir Cvetkovic Full Professor, KTH Sweden	Type of instruction (number of hours)	L	S	E	F
			30		15	
Status of the course	compulsory	Percentage of application of e-learning	0%			
COURSE DESCRIPTION						
Course objectives	According to the labor market needs, the objectives of the course is to introduce the environmental risk assessment methodology that can be used in implementing risk assessment tasks related to the water resources and environmental engineering sector.					
Course enrolment requirements and entry competences required for the course	Undergraduate qualification (6th level of EQF or CROQF).					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<ul style="list-style-type: none"> • Understanding the key principles and methodologies in performing the environmental risk assessment • Very specific competence in conducting the contaminant exposure assessment in different environmental media • Ability to evaluate risk characterization for specific contaminant present in environmental media 					
Course content broken down in detail by weekly class schedule (syllabus)	<p>The course starts with the introduction and general definitions of risk assessment concept. The most common use is related to the human health risk assessment. The human health risk assessment entails the evaluation of scientific information on the hazardous properties of environmental agents and on the extent of human exposure to those agents. (4 hours)</p> <p>Besides the classical human health risk assessment this course is also dealing with the ecological risk assessment, the terminology which is getting more attention recently through different water resources regulations around the world (e.g., European Union Water Framework Directive). All of these terms and concepts have their own principles and methodologies, which are important to be understood and will be described in more details in this course together with few case studies. (4 hours)</p> <p>The main principles and methodology commonly used in the processes of assessing the environmental exposure to contaminants will be described covering following steps: (10 hours)</p> <ul style="list-style-type: none"> • Source assessment: characterization of the sources of contamination • Fate and transport: description of how a contaminant may be transported from the source to the potentially exposed population using different modeling techniques • Concentration estimation: using modeling or monitoring data, estimate concentration levels away from the source at location where population is located • Stochastic modeling principles in environmental risk assessment • Basic principles of risk management 					

	<p>The dose response assessment will be described through the following steps: (6 hours)</p> <ul style="list-style-type: none"> • Basics of eco-toxicology • Exposure assessments analyzing different processes contributing to the transport phenomena • Evaluation of concentrations impacts in the environment, • Risk characterization using probabilistic approach <p>Several case studies will be explained and described following all necessary steps in performing the environmental risk assessment. Finally, the risk management methods and principles will be addressed describing the regulatory action and options with social and economical influence on risk management decisions. (6 hours)</p>					
Format of instruction	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> <i>on line</i> in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work		<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			
Student responsibilities	Preparation of an assignment.					
Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Class attendance	1.0	Research		Practical training	
	Experimental work		Report			
	Essay		Seminar essay	1.0		
	Tests		Oral exam	1.0		
	Written exam	1.0	Project			
Grading and evaluating student work in class and at the final exam	Three written assignments (40%), seminar (10%), final examination – oral (50%).					
Required literature (available in the library and via other media)	Title			Number of copies in the library	Availability via other media	
	<i>Environmental Risk Assessment and Management</i> , ppt lecture materials, R. Andričević, 2009					
	US EPA, Ecological Committee on Risk Assessment Methods (ECOFRAM), 1999.					
	Risk Assessment: Managing the process, National Academy Press, Washington, D.C., 2000.					
	U.S. EPA, 1988, Methods used in United States for the Assessment and Management of Health Risk Due to Chemicals, Federal Register PB89-222707, National Research Council.					

Optional literature (at the time of submission of study programme proposal)	<p>Andričević, R. and V. Cvetković, Evaluation of risk from contaminants migrating by groundwater, <i>Water Resources Research</i>, 32 (3), 611-621, 1996.</p> <p>Andričević, R., J. Daniels, and R. Jacobson, Radionuclide migration using travel time transport approach and its application in risk analysis, <i>Journal of Hydrology</i>, 163, 125-145, 1994.</p> <p>Hamilton, L.D, R. Andričević, and R.L. Jacobson, Pilot study risk assessment for selected problems at three U.S. Department of Energy facilities, <i>Environmental International</i>, 20, 585-604, 1994.</p>
Quality assurance methods that ensure the acquisition of exit competences	<p>Quality assurance will be performed at three levels:</p> <p>(1) University level, through questionnaires; (2) Faculty level by Quality Control Committee; (3) Lecturer's level.</p>
Other (as the proposer wishes to add)	