

NAME OF THE COURSE		KARST HYDROLOGY				
Code		Year of study	2., III. or IV. semester			
Course teacher	Vesna Denić-Jukić, PhD, Full professor Ognjen Bonacci, PhD, Professor emeritus	Credits (ECTS)	4.0			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			20	10	15	
Status of the course	elective	Percentage of application of e-learning	/			
COURSE DESCRIPTION						
Course objectives	The overall objective of this course is to familiarize students with the basic concepts of hydrological processes and analyses of water circulation in the karst. Students are expected to understand and solve related engineering problems and projects.					
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)	The student will acquire an overview of formation processes, morphology and hydrology in karst, and learn practical aspects connected to karst hydrology. Student is able to use and deepen the basic knowledge about karst hydrology and specific characteristics of the structure and functioning of karst aquifers. Student becomes familiar with the significance and development of research methods in karst. They include methods which are fundamental for all hydrogeological studies (geological and geomorphological research, hydrological analysis, water balance, hydrochemistry and isotopic analysis, remote sensing, geophysics, modelling), but can be modified for the use in karst.					
Course content broken down in detail by weekly class schedule (syllabus)	Karst terminology and definitions. Soluble rocks as the basis of karstification processes. Geomorphologic characteristics of karst. Hydrological characteristic of karst. The phenomena of water in karst. Groundwater circulation in karst. Karst aquifer. Hydrological budget. Karst springs. Discharge curves. Karst spring hydrograph analysis. Determination of the catchment area in karst. Swallow holes (Ponors). Determination of swallow capacity of ponors. Natural streamflows in karst. Interaction between groundwater and water in the open streamflows in karst. Hydrological regime of rivers in karst. Water losses along the open streamflows in karst. Tracer tests in karst hydrogeology. Groundwater temperature in karst. Hydrologic characteristic of the Dinaric karst. Statistical methods and hydrological modelling.					
Format of instruction	<input checked="" type="checkbox"/> lectures <input 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 checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia <input type="checkbox"/> laboratory <input type="checkbox"/> work with mentor			
Student responsibilities	Regular attendance of classes. Preparation of written assignments.					

Screening student work (<i>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</i>)	Class attendance	2.0	Research		Practical training	
	Experimental work		Report			
	Essay		Seminar essay	1.0		
	Tests		Oral exam			
	Written exam	1.0	Project			
Grading and evaluating student work in class and at the final exam	Oral and written tests. Preparation of a written assignment. Oral and written exam.					
Required literature (available in the library and via other media)	Title			Number of copies in the library	Availability via other media	
	1. O. Bonacci, Karst Hydrology, Springer Verlag, Heidelberg, 1987.			15		
	O. Bonacci, T. Roje-Bonacci, Posebnosti krških vodonosnika, Građevni godišnjak '03/'04.			10		
Optional literature (at the time of submission of study programme proposal)	(1) P. Milanović, Hidrogeologija krša, Svjetlost, Sarajevo, 1979.; (2) W.B. White, Karst hydrology-concepts from the Mammoth Cave area. Van Nostrand Reinhold New York: 223-258. (3) Goldscheider, N. ; D. Drew , 2007: Methods in Karst Hydrogeology.- International Contributions to Hydrogeology, Taylor & Francis, 276 pp, London.					
Quality assurance methods that ensure the acquisition of exit competences	Quality assurance will be performed at three levels: (1) University level, through questionnaires; (2) Faculty level by Quality Control Committee; (3) Lecturer's level.					
Other (as the proposer wishes to add)						