UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Zaščita in upravljanje podzemnih voda
Course title:	Protection and Management of Groundwater Resources

Študijski programi in stopnja	**Študijska smer**	**Letnik**	**Semestri**
Geologija, druga stopnja, magistrski	Aplikativna geologija (modul)	1. letnik, 2. letnik	Zimski

Univerzitetna koda predmeta/University course code: 722

Predavanja	**Seminar**	**Vaje**	**Klinične vaje**	**Druge oblike študija**	**Samostojno delo**	**ECTS**
30	15	30	0	0	75	5

Nosilec predmeta/Lecturer: Barbara Čenčur Curk

Vrsta predmeta/Course type: Izbirni / Elective

Jeziki/Languages:		
	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Znanje hidrogeologije.	Knowledge of Hydrogeology.

Vsebina:	**Content (Syllabus outline):**
Uvod: vodni viri in podzemne vode Pregled evropske in slovenske zakonodaje s področja zaščite in upravljanja podzemnih voda Upravljanje s podzemno vodo (okoljski cilji, varstvo voda, tveganje, raba voda, urejanje voda, načrt upravljanja, program ukrepov) Onesnaženje podzemne vode (specifični viri, vrste onesnaževal) Metodologija ocenjevanja vplivov na podzemne vode Ranljivost in ogroženost podzemne vode Zaščita vodnih virov Zaščita virov pitne vode - vodovarstvena območja Zaščita podzemne vode pri umetnem bogatenju Zaščita podzemne vode pri posebnih rabah (proizvodnja mineralnih vod, geotermalna raba) Analiza tveganja za onesnaženje podzemne vode z nevarnimi snovmi Načrtovanje ukrepov za zaščito podzemne vode Nadzor stanja okolja (monitoring podzemnih voda) Postopki sanacije	Introduction: water resources and groundwater Review of the European and Slovenian legislation in the field of groundwater protection and management The management of groundwater (environmental objectives, water protection, risk, use of water, water management, management plan, program of measures) Pollution of groundwater (specific sources, types of pollutants) Methodology for Assessing Impacts on groundwater Vulnerability and threat to groundwater Protection of water resources Protection of drinking water - water protection areas Protection of groundwater for artificial recharge Protection of groundwater for special uses (production of mineral water, geothermal use) Analysis of the risk of groundwater polution with dangerous substances Design of measures to protect groundwater Monitoring of the environment (groundwater monitoring) Procedures for remediation

Temeljna literatura in viri/Readings:

LOUCKS, D. P., van BEEKWATER, E., 2005, Water Resources Systems Planning and Management, An Introduction to Methods, Models and Applications, UNESCO Publishing, 676 p.
USDA, 2007, Technical Guide to Managing Ground Water Resources, United States Department of Agriculture, Forest

Service, Minerals and Geology Management, Watershed, Fish, Wildlife, Air, and Rare Plants Engineering, FS-881, 281 p.
LÜKENGA, W., 2015, Water Resource management, bookboon.com, 282 p.
European Commission, 2007, Common implementation strategy for the Water framework directive (2000/60/EC), Guidance on Groundwater in Drinking Water Protected Areas, Guidance Document No. 16, Office for Official Publications of the European Communities, 34 p.
European Commission, 2010, Common implementation strategy for the Water framework directive (2000/60/EC Guidance on risk assessment and the use of conceptual models for groundwater, Guidance document No. 26, Office for Official Publications of the European Communities, 67 p.
European Commission, 2008, Groundwater Protection in Europe, Office for Official Publications of the European Communities, 35 p.

Cilji in kompetence:	**Objectives and competences:**
CILJI: Študenta seznaniti z konceptom zaščite podzemne vode in vodnih virov pitne vode pred negativnimi vplivi povzročenimi s strani človekovih in drugih aktivnosti. KOMPETENCE: Študent bo sposoben samostojno načrtovati zaščitne ukrepe za preprečitev onesnaženja podzemne vode in virov pitne vode.	OBJECTIVES: Students acquainted with the concept of groundwater and drinking water sources protection from the negative effects caused by human and other activity. COMPETENCES: Students will be able to independently design protection measures to prevent pollution of groundwater and drinking water sources.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Pridobljeno temeljito poznavanje zaščite in upravljanja s podzemno vodo in drugih virov pitne vode.	Acquired a thorough knowledge of the protection and management of groundwater and other sources of drinking water.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja in seminar (30 in 15 ur) z uporabo prezentacij. Vaje potekajo kot vodene seminarske vaje (30 ur).	Lectures and seminar (30 and 15 hours) by using presentations. Rehearsals will take place as tutorials (30 hours).

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisni izpit: teoretična vprašanja	45,00 %	Written exam: theoretical questions
Seminarske vaje: predstavitev (15%) + seminar (35%)	50,00 %	Tutorial: presentation (15%) + seminar (35%)
Prisotnost na predavanjih in vajah	5,00 %	The presence at lectures and tutorials
Pogoji za pristop k izpitu: vsaj 75% prisotnost na predavanjih in vajah in pozitivno opravljene seminarske vaje (predstavitev in seminar). Ocenjevalna lestvica: 51-60% (6); 61-70% (7); 71-80% (8); 81-90% (9); 91-100% (10) ob upoštevanju Statuta UL in fakultetnih pravil.		Conditions for the exam: at least 75% attendance at lectures and tutorials and successfully done tutorials (presentations and seminar). Grading scale: 51-60% (6); 61-70% (7); 71-80% (8); 81-90% (9); 91-100% (10) having regard to the Statute of UL and faculty rules.

Reference nosilca/Lecturer's references:

SOUVENT, Petra, VIŽINTIN, Goran, CELARC, Sašo, ČENČUR CURK, Barbara. Ekspertni sistem za podporo odločanju na aluvialnih telesih podzemnih voda Slovenije = An expert system as a support to the decision making process for groundwater management of alluvial groundwater bodies in Slovenia. Geologija, 2014, vol. 57/2, str. 245-250, doi: 10.5474/geologija.2014.021.
ČENČUR CURK, Barbara, BOGARDI, I. WP7 Final report: [Water supply managment measures]. V: STEVANOVIĆ, Zoran (ur.), RISTIĆ, Vesna (ur.), MILANOVIĆ, Saša (ur.). Klimatske promene i njihov uticaj na vodosnabdevanje = Climate Change and Impacts on Water Supply. Beograd: Rudarsko-geolološki fakultet, Departman za hidrogeologiju: = Faculty of Mining & Geology, Department of Hydrogeology, 2012, str. 417-467.
VIŽINTIN, Goran, SOUVENT, Petra, VESELIČ, Miran, ČENČUR CURK, Barbara. Determination of urban groundwater pollution in alluvial aquifer using linked process models considering urban water cycle. Journal of Hydrology, 2009, vol. 377, str. 261-273, doi: 10.1016/j.jhydrol.2009.08.025.