Podiplomskašola
ZRCSAZU
Novi trg 2
1000 Ljubljana
T: +386 1 470 64 51

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	HIDROGEOLOGIJA KRASA
Course title:	KARST HYDROGEOLOGY

Študijski program in stopnja **Study programme and level**	**Študijska smer** **Study field**	**Letnik** **Academic year**	**Semester** **Semester**
Vede o Zemlji in okolju, magistrski študij 2. stopnje	**Krasoslovje**	2	1
Earth and Environmental Sciences, Master study 2nd level	**Karstology**	2	1

Vrsta predmeta / Course type	Obvezni/Mandatory
Univerzitetna koda predmeta / University course code:	**MTK03**

Predavanja **Lectures**	**Seminar** **Seminar**	**Sem. vaje** **Tutorial**	**Lab. vaje** **Laboratory work**	**Teren. vaje** **Field work**	**Samost. delo** **Individ. work**	**ECTS**
35	20		15	20	135	**9**

Nosilec predmeta / Lecturer:	Metka Petrič (tehnična sodelavka: Mateja Zadel)

Jeziki / Languages:	**Predavanja / Lectures:**	angleščina/English/slovenščina/Slovenian
	Vaje / Tutorial:	angleščina/English/slovenščina/Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Končan študijski program 1. stopnje ali dodiplomski študijski program za pridobitev univerzitetne izobrazbe, sprejet pred 11. 6. 2004 s področja naravoslovja.	First-cycle Bologna degree or a university degree in the natural sciences.

Vsebina:	**Content (Syllabus outline):**
• Vodni krog, • hidrogeološke značilnosti sedimentov in kamnin, vodonosnik, • voda v tleh in infiltracija, • napajanje vodonosnika, • tok podzemne vode, • praznjenje vodonosnika, izviri, • hidrogeokemija, • raziskovalne metode v hidrogeologiji,	• Hydrological circle; • Hydrogeological characteristics of sediments and rocks, aquifer; • Soil water and infiltration; • Aquifer recharge; • Groundwater flow; • Aquifer discharge, springs; • Hydrogeochemistry; • Research methods in hydrogeology;

• izraba podzemnih vod, • onesnaženje in zaščita podzemnih vod.	• Use of groundwater; • Water pollution and protection.

Temeljni literatura in viri / Readings:

- Ford, D. C., Williams, P., 2007: Karst Hydrogeology and Geomorphology. Wiley, Chichester: 562 str. (poglavje 5/chapter 5).
- Stevanović, Z. (ur.), 2015: Karst Aquifers – Characterization and Engineerin. Springer, Cham: 692 str. (poglavje 3/chapter 3).
- Izbrani članki iz revij/Selected articles from journals (Acta Carsologica, Geologija, Hydrogeology Journal, Journal of Hydrology; Water Resources Research).

Cilji in kompetence:	**Objectives and competences:**
Namen predmeta je seznaniti študente z značilnostmi pojavljanja in pretakanja podzemnih vod. Predstavljeni bodo osnovni pojmi, metode in raziskovalne teme v hidrogeologiji. Izpostavljena bo vloga podzemne vode v vodnem krogu in njene povezave z drugimi podsistemi. Obravnavani bodo različni tipi vodonosnikov, procesi njihovega napajanja in praznjenja. Študenti se bodo seznanili z vplivom geološke zgradbe na kemizem voda in spoznali pomen spremljanja fizikalnih, kemijskih in mikrobioloških parametrov za razumevanja izvora voda in značilnosti njihovega pretakanja. Predstavljene bodo vse pomembnejše metode hidrogeoloških raziskav. Poudarjen bo pomen podzemnih vod za oskrbo s pitno vodo in njihovega ustreznega varovanja pred onesnaženjem.	The purpose of the course is to familiarize the students with the characteristics of the occurrence and flow of underground water. The course will define basic concepts, methods and research topics in the field of hydrogeology. The emphasis will be on the role of groundwater in hydrological cycle and its connections with other subsystems. Various aquifer types, and the processes of their recharge and discharge will be presented. The students will learn about the influence of geological composition on water chemistry and about the importance of monitoring of physical, chemical and microbiological parameters for better understanding of the source of groundwater and characteristics of its flow. Methods of hydrogeological researches will be learned. The importance of groundwater for the drinking water supply and its proper protection against pollution will be emphasised.

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Poznavanje osnovnih pojmov hidrogeologije, • razumevanje značilnosti pojavljanja in pretakanja podzemnih vod, • poznavanje modernih raziskovalnih področij v hidrogeologiji, • razumevanje pomena podzemnih vodnih virov in poznavanje načinov za njihovo ustrezno rabo in varovanje, • sposobnost samostojnega ocenjevanja literature in virov.	• Knowledge of basic concepts of hydrogeology; • Understanding of characteristics of occurrence and flow of groundwater; • Knowledge of modern research topics in the field of hydrogeology; • Understanding of the importance of underground water resources and knowledge of the principles of their proper use and protection; • Capability of autonomous review and assessment of literature and sources).

Metode poučevanja in učenja:	**Learning and teaching methods:**

• Predavanja, • seminarji, • laboratorijske vaje, • terensko delo.	• Lectures; • Seminars; • Laboratory work; • Field work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment**
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
- izpit,	**70**	- Exam;
- seminarska naloga.	**30**	- Written paper.

Reference nosilca / Lecturer's references:

- **PETRIČ, M.**, RAVBAR, N., GOSTINČAR, P., KRSNIK, P., GACIN, M., 2020: GIS database of groundwater flow characteristics in carbonate aquifers : tracer test inventory from Slovenian karst. Applied geography, vol. 118: 8 str. doi: 10.1016/j.apgeog.2020.102191.
- MAYAUD, C., GABROVŠEK, F., BLATNIK, M., KOGOVŠEK, B., **PETRIČ, M.**, RAVBAR, N. Understanding flooding in poljes : a modelling perspective. Journal of Hydrology, Aug. 2019, vol. 575: 874-889. doi: 10.1016/j.jhydrol.2019.04.092.
- VIŽINTIN, G., RAVBAR, N., JANEŽ, J., KOREN, E., JANEŽ, N., ZINI, L., TREU, F., **PETRIČ, M.** Integration of models of various types of aquifers for water quality management in the transboundary area of the Soča/Isonzo river basin (Slovenia/Italy). Science of the total environment, 1. apr. 2018, vol. 619/620: 1214-1225. doi: 10.1016/j.scitotenv.2017.11.017.
- **PETRIČ, M.**, 2019: The use of artificial tracer tests in the process of management of karst water resources in Slovenia. V: YOUNOS, T. (ur.), et al. Karst water environment : advances in research, management and policy, (The handbook of environmental chemistry, vol. 68). Cham: Springer. cop. 2019: 133-156. doi: 10.1007/978-3-319-77368-1_5.
- KOGOVŠEK, Janja, **PETRIČ, Metka**. Solute transport processes in a karst vadose zone characterized by long-term tracer tests (the cave system of Postojnska Jama, Slovenia). Journal of Hydrology, Nov. 2014, vol. 519, part A, str. 1205-1213.