

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	FIZIKALNA SPELEOLOGIJA IN SPELEOGENEZA
Course title:	PHYSICAL SPELEOLOGY AND SPELEOGENESIS

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

Izbirni/Elective

Univerzitetna koda predmeta / University course code:

MIK05

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	15			25	80	6

Nosilec predmeta / Lecturer:

Franci Gabrovšek

Jeziki /

Predavanja / Lectures:

angleščina/English/slovenščina/Slovenian

Languages:

Vaje / Tutorial:

angleščina/English/slovenščina/Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Končan študijski program 1. stopnje ali dodiplomski študijski program za pridobitev univerzitetne izobrazbe, sprejet pred 11. 6. 2004 s področja naravoslovja.

Prerequisites:

First-cycle Bologna degree or a university degree in the natural sciences.

Vsebina:

- Prenos snovi in toplote v kraških masivih.
- hidravlika kraških kanalov,
- vreme in klima kraških jam,
- prenos sedimentov v kraških jamah,
- raztapljanje in izločanje sige,
- opazovanje parametrov jamskega okolja: vzpostavitev meritev, obdelava in interpretacija podatkov,

Content (Syllabus outline):

- Mass and heat transport in karst;
- Hydraulics of karst conduits;
- Weather and climate of karst caves;
- Sediment transport in caves;
- Dissolution and precipitation of calcite;
- Monitoring of cave environment: set-up of measurement system, data processing and interpretation;

- terensko delo v kraških jamah: interpretacija preteklega in današnjega jamskega okolja na osnovi opazovanja geometrije rovov in jamskih oblik,
- časovni razvoj jam (inicijacija, rast, stagnacija, propadanje),
- speleogenetski prostori (vadozni, epifreatični, freatični; epigeni, hipogeni, brakični-obmorski),
- osnove speleogenetskih procesov,
- dejavniki speleogenetskega prostora,
- oblike jamskih sistemov in mikrorelief jamskih rovov,
- modeliranje razvoja jam.

- Field work in caves: interpretation of recent and past environments by observation of channel geometry and forms.
- Evolution of caves (initiation, growth, stagnation, cessation);
- Speleogenetic environments (vadose, epiphreatic and phreatic zone; epigenic, hypogenetic and coastal settings);
- Fundamentals of speleogenetic processes;
- Controls/factors in speleogenetic environment;
- Cave patterns and micromorphology of caves;
- Modeling of speleogenesis.

Temeljni literatura in viri / Readings:

Temeljna knjiga/Basic textbook:

- Palmer, A.N., 2007: Cave Geology. Cave Books.

Izbrana poglavja iz monografij/Selected chapters from:

- Ford, D.C. & Williams, P., 2007: Karst Hydrogeology and Geomorphology. Wiley.
- Dreybrodt, W., 1988: Processes in Karst Systems, Springer.
- Clark, M.M., 2009: Transport modeling for environmental engineers and scientists. Wiley.

Cilji in kompetence:

- Razumevanje fizičnega okolja kraških jam,
- dojetanje jam kot del stičnega območja zemeljskih sfer, skozi in med katerimi poteka prenos snovi in toplote,
- uporaba temeljnih fizikalnih zakonov za razumevanje procesov in oblik v kraških jamah,
- opazovanje jamskega okolja: pridobivanje, obdelava in interpretacija terenskih podatkov,
- sklepanje o okolju in procesih na osnovi terenskih opazovanj.

Objectives and competences:

- Understanding of physical environment of caves;
- Understanding caves as a part of the boundary zone between different earth spheres and the heat and mass transport within;
- Use of basic physical laws to understand processes and forms in karst caves;
- Monitoring of cave environment: Field data acquisition and interpretation;
- Deducing processes and environments from the field observations.

Predvideni študijski rezultati:

Študent bo poglobil temeljno znanje o speleologiji in speleogenezi, pri čemer bo njegovo razumevanje temeljilo na fizikalnih načelih, ki jih bo tudi spoznal. Naučil se bo osnov opazovanja in merjenja v jamskem okolju ter obdelave in interpretacije merskih podatkov.

Intended learning outcomes:

The student will deepen basic knowledge of speleology and speleogenesis by learning and applying basic physical principles. Student will learn how and what to observe in caves and how to set-up measurements, process and interpret data.

Metode poučevanja in učenja:

- Predavanja,
- seminarji,
- terensko delo.

Learning and teaching methods:

- Lectures;
- Seminars;
- Field work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
- izpit,	90	- Exam;
- seminarska naloga.	10	- Written paper.

Reference nosilca / Lecturer's references:**Najpomembnejše delo/Major work:**

- DREYBRODT, W., **GABROVŠEK, F.**, ROMANOV, D., 2005: Processes of speleogenesis : a modeling approach. ZRC Publishing: 375 str.

Izbrani članki 2014-2020/Selected papers 2014-2020:

- **GABROVŠEK, F.**, HÄUSELMANN, P., AUDRA, P., 2014: 'Looping caves' versus 'water table caves' : the role of base-level changes and recharge variations in cave development. Geomorphology 204: 683-691.
- **GABROVŠEK, F.**, PERIC, B., KAUFMANN, G., 2018: Hydraulics of epiphreatic flow of a karst aquifer. Journal of Hydrology 560: 56-74.
- DREYBRODT W., **GABROVŠEK, F.**, 2019: Dynamics of wormhole formation in fractured limestones. Hydrology and earth system sciences 23/4: 1995-2014.
- COVINGTON, M., GULLEY, J. D., **GABROVŠEK, F.**, 2015: Natural variations in calcite dissolution rates in streams : controls, implications, and open questions. Geophysical research letters 42/8: 2836-2843.
- MILANOLO, S., **GABROVŠEK, F.**, 2015: Estimation of carbon dioxide flux degassing from percolating waters in a karst cave : case study from Bijambare cave, Bosnia and Herzegovina. Chemie der Erde 75/4: 465-474.
- GRM, A., ŠUŠTAR, T., RODIČ, T., **GABROVŠEK, F.**, 2017: A numerical framework for wall dissolution modeling : analysis of flute formation. Mathematical geosciences 49/5: 657-675.
- MAYAUD, C., **GABROVŠEK, F.**, BLATNIK, M., KOGOVSŠEK, B., PETRIČ, M., RAVBAR, N., 2019: Understanding flooding in poljes : a modelling perspective. Journal of Hydrology 575: 874-889.
- BRAITENBERG, C., PIVETTA, T., BARBOLLA, D. F., **GABROVŠEK, F.**, DEVOTI, R., NAGY, I., 2019: Terrain uplift due to natural hydrologic overpressure in karstic conduits. Scientific reports 9, art. no. 3934: 1-10.