Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Izbrana poglavja iz speleobiologije**
Course title:	**Selected Topics in Speleobiology**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski študij Ekološke znanosti, 3. stopnja		**1. ali 2.; 1st or 2nd**	**1.- 4.; 1st-4th**
Doctoral Study Ecological Sciences, 3rd degree			

Vrsta predmeta / Course type	Izbirni/Elective
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
3	**3**		**5**	**9**	**160**	**6**

Nosilec predmeta / Lecturer:	**Peter KOZEL**

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski / Slovene
	Vaje / Tutorial:	slovenski / Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Poznavanje organizmov in ekologije na ravni univerzitetnega programa	Knowledge of organisms and ecology at graduate level

Vsebina:	**Content (Syllabus outline):**
Obravnavana so izbrana poglavja iz naslednjih sklopov. Podzemeljski habitati so naravne in umetne votline. S slovenskega ozemlja sta opisana prvi podzemeljski vretenčar, človeška ribica, ter prvi nevretenčar, hrošč drobnovratnik. Oris zgodovine speleobiologije, ki so jo zasnovali raziskovalci na slovenskem ozemlju. Pregled značilnih fizičnih razmer v podzemeljskih	Selected topics in the following chapters are discussed. Hypogean habitats are natural and artificiel cavities. In the terriotry of Slovenia, the first vertebrate: the olm, and the first avertebrate: the bittle slender-neck, have been described. A consize historical review of the speleobiology, which had started in the territory of Slovenia. The overview of general physical

habitatih ter pregled splošnih značilnosti podzemeljskih živih bitij. Ekološke razmere v posameznih podzemeljskih tipih habitatov (naravne in umetne votline, epikras). Troglokseni, troglofili, troglobionti; freatokseni, freatofili, freatobionti. Specifične ekološke, morfološke, fiziološke in citološke prilagoditve na podzemeljske habitate. Na terenu in v laboratoriju so prikazani vzori za ekološke raziskave podzemeljskih habitatov.	characteristics of the hypogean habitats, and the review of general characteristics of the hypogean organisms. Ecological circumstances in hypogean habitat types (natural and artificiel cavities, epikarst). Trogloxenes, troglophile, troglobionts; phreatoxenes, phreatofiles, phreatobiont. Specific ecological, morphological, physiological and cytological adaptation to hypogean habitats. In field and in the laboratory, some examples of ecological investigations in hypogean habitats are presented.

Temeljni literatura in viri / Readings:

- Culver, D. C., Pipan, T., 2019. The biology of caves and other subterranean habitats, second edition. Oxford Univ. Press, Oxford, New York.
- White, W. B., Culver, D. C., Pipan, T. (eds.), 2019. Encyclopedia of caves. Elsevier/Academic Press, Amsterdam/Boston.
- Moldovan, O. T., Kováč, L., Halse, S. (eds.) (2018). Cave ecology. Springer International Publishing. 545 str.
- Culver D. C., Christman M. C., Sket B., Trontelj P., 2004. Sampling adequacy in an extreme environment: species richness patterns in Slovenian caves. Biodiversity and Conservation, 13: 1209- 1229.
- Gunn, J., 2004: Encyclopedia of caves and karst science. Taylor & Francis Books Inc., New York/London.
- Juberthie, C. & V. Decu (eds.), 1992-1996: Encyclopaedia biospeologica I-III. Societé de biospéologie, Moulis, Bukarest.
- Sket B., Paragamian K., Trontelj P., 2004. A census of the obligate subterranean fauna of the Balkan peninsula. In: Griffiths H. I., B. Kryštufek (eds.): Balkan Biodiversity. Pattern and Process in Europe's Biodiversity Hotspot. Kluwer Academic Publishers: 309-322.

Cilji in kompetence:	**Objectives and competences:**
• Podati podroben pregled tipov in značilnosti podzemeljskih habitatov • Podati podroben pregled tipov in značilnosti podzemeljskih organizmov • Podrobno predstaviti zgodovino speleobiologije in modernih trendov v njej • Podrobno pojasniti osnovne ekološke razmere v podzemeljskih habitatih • Podrobno prikazati izbrane metode ekološkega vzorcevanja v jamah	• To give an advanced overview of typology and characteristics of hypogean habitats • To give an advanced overview of typology and characteristics of hypogean organisms • To present advanced knowledge about the history and modern trends in speleobiology • To explain in detail ecological circumstances in hypogean habitats

	• To present in detail selected ecological sampling methods in caves

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Poglobljeno razumevanje ekoloških znacilnosti podzemeljskih habitatov • Poglobljeno razumevanje biotskih znacilnosti podzemeljskih organizmov • Podrobna zgodovina speleobiologije in trendi modernih znanstvenih raziskav • Poglobljeno poznavanje vzorcevalnih metod v podzemeljskih habitatih	**Knowledge and understanding:** • Advanced understanding of ecological characteristics of hypogean habitats • Advanced understanding of biotic characterstics of hypogean organisms • Advanced history of speleobiology and modern trends of scientific investigations • Advanced knowledge about the elementary sampling methods in hypogean habitats
Prenesljive/ključne spretnosti in drugi atributi: • Podrobno repoznavanje troglomorfoznih znakov • Usposobljenost za zahtevno ekološko raziskovalno delo v podzemeljskih votlinah	**Transferable/Key Skills and other attributes:** • Advanced recognition of troglomorphoses • Capability of top-level ecological investigations in cavities

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja • Laboratorijske vaje • Terenske vaje • Individulano nacrtovanje izbrane raziskave	• Lectures • Laboratory excersises • Field excersises • Individual planning of a selected investigation

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
•Individualni raziskovalni projekt – pisni in ustna predstavitev •Pisni izpit	50 % 50%	•Individual project work – written, and oral presentation •Written exam

Reference nosilca / Lecturer's references:

Kozel, P., Pipan, T., 2020. Specialized aquatic subterranean communities are probably most

species-rich in the thickest epikarst. Limnologica, 81: 125756. doi: 10.1016/j.limno.2020.125756

Kozel, P., Delić, T., Novak, T., 2020. *Nemaspela borkoae* sp. nov. (Opiliones: Nemastomatidae), the second species of the genus from the Dinaric Karst. European Journal of Taxonomy 717: 90–107. doi: 10.5852/ejt.2020.717.1103

Kozel, P., Pipan, T., Mammola, S., Culver, D. C., Novak, T., 2019. Distributional dynamics of a specialized subterranean community oppose the classical understanding of the preferred subterranean habitats. Invertebrate biology, 00:e12254. doi: 10.1111/ivb.12254

Pipan, T., Culver, D. C., Papi, F., Kozel, P., 2018. Partitioning diversity in subterranean invertebrates : the epikarst fauna of Slovenia. PloS ONE 13(5), 1–19. doi: 10.1371/journal.pone.0195991.

Kozel, P., Pipan, T., Šajna, N., Polak, S., Novak, T., 2017. Mitigating the conflict between pitfall-trap sampling and conservation of terrestrial subterranean communities in caves. International Journal of Speleology 46(3): 359–368. Novak, T., Kozel, P., 2014. *Hadzinia ferrani*, sp. n. (Opiliones: Nemastomatidae), a highly specialized troglobiotic harvestman from Slovenia. Zootaxa 3841(1), 135−145.