



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Speleobiologija
Course title:	Speleobiology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni študijski program Ekologija z naravovarstvom, 1. stopnja		3	3 ali 4
Undergraduate university programme Ecology with Nature Conservation, 1st degree		3	3 or 4

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
15	10		4	16	135	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:

Jih ni.

Prerequisites:

No.

Vsebina:

- Uvod v speleobiologijo
- Jame, špranje, umetni rovi, podzemeljsko površinsko okolje, tla
- Izviri, intersticialno okolje, hipotelminoreik, jezerske in morske globine, morske jame
- Troglomorfoze: velikost trupa in okončin, anoftalmija, depigmentiranost, apterizem, fizogastrija, psevdofizogastrija
- Troglobionti, troglofili, troglokseni; freatobionti; stigobionti
- Pregled organizmov v podzemlju: prokarioti; glive; rastline; živali
- Porifera, Protozoa, Cnidaria, Turbellaria, Nemertea, Nematoda, Mollusca, Polychaeta, Oligochaeta, Hirudinea, Chelicerata, Crustacea, Myriapoda, Insecta, Vertebrata
- Geografska razširjenost podzemeljskih živali
- Fiziologija in etologija podzemeljskih živali
- Evolucija podzemeljskih živali
- Slovenija kot država z največjo diverzitetno podzemeljskih taksonov v svetovnem merilu
- Pregled najvažnejših podzemeljskih živali
- Vpliv turizma na podzemeljsko favno
- Zaščita in varovanje podzemeljskih habitatov

Content (Syllabus outline):

- Introduction to speleobiology
- Caves, fissures, artificial tunnels, shallow subterranean environments, soils
- Springs, interstitial environment, hypothelminoreic environment, deep lake and deep sea regions, marine caves
- Troglomorphoses: body and appendages size, anophthalmy, apterism, physogastry, pseudophysogastry
- Troglobionts, troglophiles, trogloxenes; freatobionts; stygobionts
- Review of organisms in the subterranean environments: Procaryota, Fungi, Plants, Animals
- Porifera, Protozoa, Cnidaria, Turbellaria, Nemertea, Nematoda, Mollusca, Polychaeta, Oligochaeta, Hirudinea, Chelicerata, Crustacea, Myriapoda, Insecta, Vertebrata
- Geographical distribution of the hypogean organisms
- Physiology and ethology of the subterranean organisms
- Evolution of the subterranean organisms
- Slovenia as the state with the highest diversity of the subterranean organisms in the World
- Review of the most prominent subterranean animals
- Impact of tourism on subterranean fauna
- Protection and conservation of subterranean fauna

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:

- Podati pregled tipov in značilnosti podzemeljskih habitatov
- Podati pregled tipov in značilnosti podzemeljskih organizmov
- Predstaviti poseben status Slovenije glede diverzitete podzemeljskih taksonov

Objectives and competences:

- To give an overview of typology and characteristics of subterranean habitats
- To give an overview of typology and characteristics of subterranean organisms
- To present the prominent position of Slovenia for the diversity of the subterranean taxa

Predvideni študijski rezultati:

Znanje in razumevanje:

- Ekološke značilnosti podzemeljskih habitatov
- Biotske značilnosti podzemeljskih organizmov
- Zgodovina speleobiologije in trendi modernih znanstvenih raziskav
- Poznavanje osnovnih vzorčevalnih metod v podzemeljskih habitatih
- Prepoznavanje troglomorfov in troglomorfnih organizmov
- Usposobljenost za biološko raziskovalno delo v podzemeljskih votlinah

Intended learning outcomes:

Knowledge and understanding:

- Ecological characteristics of subterranean habitats
- Biotic characteristics of subterranean organisms
- The history of speleobiology and modern trends of scientific investigations
- Knowledge about the elementary sampling methods in subterranean habitats
- Recognition of troglomorphoses and troglomorphotic organisms
- Capability of biological investigations in cavities

Metode poučevanja in učenja:

- Predavanja
- Laboratorijske vaje
- Terenske vaje
- Seminar

Learning and teaching methods:

- Lectures
- Laboratory work
- Field work
- Seminar

Načini ocenjevanja:	Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
• Seminarska naloga	20	• Seminar
• Pisni izpit	80	• 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., Deliđ, 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: 359–368. doi: 10.5038/1827-806X.46.3.2123
- Novak, T., Kozel, P., 2014. *Hadzinia ferrani*, sp. n. (Opiliones: Nemastomatidae), a highly specialized troglobiotic harvestman from Slovenia. *Zootaxa* 3841(1), 135–145. doi: 10.11646/zootaxa.3841.1.8