

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	BIOLOGIJA PODZEMELJSKIH HABITATOV
Course title:	BIOLOGY OF SUBTERRANEAN HABITATS

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	Biodiverziteta, ekologija in evolucija		
Earth and Environmental Sciences, Master study 2nd level	Biodiversity, ecology and evolution		

Vrsta predmeta / Course type

Izbirni / Elective

Univerzitetna koda predmeta / University course code:

MIB02

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	30	15		15	135	9

Nosilec predmeta / Lecturer:

Tanja Pipan

Jeziki /

Predavanja / Lectures: angleščina, angleščina / Slovenian, English

Languages:

Vaje / Tutorial: angleščina, angleščina / Slovenian, English

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:

- Predstavitev zgodovine speleobiologije in modernih trendov v njej
- Osnovne ekološke razmere v posameznih podzemeljskih tipih habitatov
- Plitvi podzemeljski habitati: ekologija, evolucija, varovanje
- Adaptacije organizmov na podzemeljsko življenje
- Viri energije v podzemeljskih okoljih
- Ekološki in evolucijski pregled organizmov
- Biotske interakcije in struktura združb

Content (Syllabus outline):

- Historical review of speleobiology and modern trends
- General ecological conditions in different types of subterranean habitats
- Shallow subterranean habitats: ecology, evolution, conservation
- Adaptations to subterranean life
- Sources of energy in subterranean environments
- Ecological and evolutionary survey of organisms

- Kolonizacija in speciacija v podzemeljskih okoljih: alopatrična in parapatrična speciacija, vikarianca in disperzija
- Biogeografija
- Predstavitev izbranih metod za ekološke raziskave in ekološko vzorčenje podzemeljskih habitatov
- Varovanje in zaščita podzemeljskih habitatov ter organizmov

- Biotic interactions and community structure
- Colonization and speciation in subterranean environments: allopatric and parapatric speciation, vicariance and dispersal
- Biogeography
- Research methods for biological investigation and collecting of organisms in subterranean habitats
- Conservation and protection of subterranean habitats and organisms

Temeljni literatura in viri / Readings:

- Culver, D. C., & Pipan, T. (2014). Shallow Subterranean Habitats. Ecology, Evolution, and Conservation. Oxford University Press, Oxford, p. 229.
- Culver, D. C., & Pipan, T. (2019). The Biology of Caves and Other Subterranean Habitats. Oxford University Press, Oxford, p. 246.
- Wilkens, H., Culver, D. C., & Humphreys, W. F. (Eds.). (2000). Subterranean ecosystems. Amsterdam: Elsevier, chapters 2, 3, 8, 10, 13, 14, 16.
- Izbrani članki iz znanstvenih revij. / Selected articles from scientific journals.

Cilji in kompetence:

Osnovni cilj predmeta je podati študentom teoretična in praktična znanja k pravemu razumevanju biologije in ekologije podzemeljskih habitatov, s pomočjo predstavitev izbranih primerov organizmov in združb ter habitatov od koder izvirajo združbe organizmov, ter biotskih procesov, ki vladajo v tem edinstvenem ekosistemu. Poudarek je tudi na varovanju in upravljanju s kraškimi ekosistemi.

Objectives and competences:

The primary goal of this course is to provide students with theoretical and practical knowledge for understanding the biology and ecology of subterranean habitats, to present to them examples and case studies of organisms, communities and habitats, and biological processes occurring in these unique environments. Emphasis is also on conservation and management aspects.

Predvideni študijski rezultati:

Študenti bodo pridobili znanje o ekoloških značilnostih podzemeljskih habitatov, biotskih značilnostih podzemeljskih organizmov, zgodovini speleobiologije in trendih v sodobnih znanstvenih raziskavah. Spoznali se bodo z osnovnimi vzorčevalnimi metodami v podzemeljskih habitatih, prepoznali troglomorfoze ter se usposobili za ekološko raziskovalno delo v podzemeljskih habitatih. Študentje bodo spoznali raziskovalnih trendov v biologiji podzemlja.

Intended learning outcomes:

Students will obtain knowledge on ecological characteristics of subterranean habitats, biotic characteristics of subterranean organisms, history of speleobiology and trends in modern scientific research. They will master practical skills necessary for sampling in subterranean habitats, for ecological research work in subterranean habitats and identification of troglomorphic organisms. Student will get familiar with the research trends in subterranean biology.

Metode poučevanja in učenja:

- Predavanja
- Terenska predavanja in terenske vaje

Learning and teaching methods:

- Lectures
- Field lectures and field work

<ul style="list-style-type: none"> • Individualno delo na izbrani raziskavi in predstavitev v seminarski obliki 	<ul style="list-style-type: none"> • Individual work of a selected investigation and presentation as a seminar work
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Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment
<ul style="list-style-type: none"> • Kratka seminarska naloga, njena predstavitev • Izpit 	<p>50%</p> <p>50%</p>	<ul style="list-style-type: none"> • Short written seminar and its presentation • Examination

Reference nosilca / Lecturer's references:

1. **Pipan, T.**, Christman, M., Culver, D. C. (2020). Abiotic community constraints in extreme environments : epikarst copepods as a model system. *Diversity*, 12(7), 16 str.
2. Kozel, P., **Pipan, T.** (2020). Specialized aquatic subterranean communities are probably most species-rich in the thickest epikarst. *Limnologica*, 81, 1-9.
3. Pilotto, F., Kühn, I., Adrian, R., Alber, R., Alignier, A., Andrews, C., Bäck, J., Barbaro, L., Beaumont, D., Beenaerts, N., **Pipan, T.**, et al. (2020). Meta-analysis of multidecadal biodiversity trends in Europe. *Nature communications*, 11, 11 str.
4. **Pipan, T.**, & Culver, D. C. (2019). Wetlands in cave and karst regions. V: WHITE, William Blaine (ur.), CULVER, David C. (ur.), PIPAN, Tanja (ur.). *Encyclopedia of caves*. 3rd ed. London, Academic Press, Elsevier, 1156-1164.
5. Culver, D. C., & **Pipan, T.** (2019). Ecological and evolutionary classifications of subterranean organisms. V: WHITE, William Blaine (ur.), CULVER, David C. (ur.), PIPAN, Tanja (ur.). *Encyclopedia of caves*. 3rd ed. London, Academic Press, Elsevier, 376-379.
6. **Pipan, T.**, Petrič, M., Šebela, S., & Culver, D. C. (2019). Analyzing climate change and surface-subsurface interactions using the Postojna Planina Cave System (Slovenia) as a model system. *Regional environmental change*, 19(2), 379-389.
7. Mammola, S., Piano, E., Cardoso, P., Vernon, P., Domínguez-Villar, D., Culver, D. C., **Pipan, T.**, Isaia, M. (2019). Climate change going deep : the effects of global climatic alterations on cave ecosystems. *The anthropocene review*, 2019, 19 str.
8. Culver, D. C., & **Pipan, T.** (2019). *The biology of caves and other subterranean habitats*. Oxford University Press, USA.
9. **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.
10. Culver, D. C., & **Pipan, T.** (2014). *Shallow subterranean habitats: ecology, evolution, and conservation*. Oxford University Press.