



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Izbrana poglavja iz ekologije podzemeljskih habitatov
Course title:	Selected Topics in Ecology of Hypogean Habitats

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. 2. ali 3. ; 1st, 2nd or 3rd
Doctoral Study Ecological Sciences, 3rd degree			

Vrsta predmeta / Course type

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
5				5	140	5

Nosilec predmeta / Lecturer:

Jeziki / Predavanja / Lectures:
Languages: Vaje / Tutorial:

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

Poznavanje organizmov in ekologije na ravni univerzitetnega programa

Prerequisites:

Knowledge of organisms and ecology at graduate level

Vsebina:

Obravnavana so izbrana poglavja iz naslednjih sklopov.
Podzemeljski habitati so naravne in umetne votline.
S slovenskega ozemlja sta opisana prvi podzemeljski vretenecar, cloveška ribica, ter prvi nevretenecar, hrošč drobnovratnik. Predavanja se začnejo s kratkim orisom zgodovine speleobiologije, ki so jo zasnovali raziskovalci na slovenskem ozemlju. Sledita pregled splošnih fizicnih razmer v podzemeljskih habitatih ter pregled splošnih značilnosti podzemeljskih živih bitij. Poudarek je na ekoloških razmerah v posameznih podzemeljskih

Content (Syllabus outline):

Selected topics in the following chapters are discussed.
Hypogean habitats are natural and artificial cavities. In the Slovenian territory, the first vertebrate: the proteus, as well as the first invertebrate: the bittle leprodirus, have been described. The lectures begin with a concise historical review of the speleobiology, which had started in the territory of Slovenia. The overview of general physical characteristics of the hypogean habitats, and the characteristics of the hypogean fauna follow. The discussions on the ecological circumstances in different hypogean habitat types (natural and artificial cavities, epikarst),

tipih habitatov (naravne in umetne votline, epikras) ter na obravnavi troglobiontov in freatobiontov. Na terenu in v laboratoriju so prikazani vzori za ekološke raziskave podzemeljskih habitatov.

and the troglobites and freatobies are in focus. In field and in the laboratory, some examples of ecological investigations in hypogean habitats are presented.

Temeljni literatura in viri / Readings:

- Bole, J., B. Drovenik, N. Mršič, B. Sket, 1993: Endemic animals in hypogean habitats in Slovenia. Naše jame, Ljubljana, 35(1): 43-55.
- 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.
- Culver, D. C., W. B. White (eds.), 2005: Encyclopedia of caves. Elsevier/Academic Press, Amsterdam/Boston.
- 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.
- Novak, T., 2005: Terrestrial fauna from cavities in Northern and Central Slovenia, and a review of systematically ecologically investigated cavities. Acta carsologica, 34(1): 169-210.
- Pipan, T., 2005: Epikarst – a promissing habitat. Carsologica, Založba ZRC, Ljubljana.
- 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.
- Vandel, A., 1964: Biospéologie. Guthier - Villars, Paris.

Cilji in kompetence:

- 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

Objectives and competences:

- 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:

- Znanje in razumevanje:
- Poglobljeno razumevanje ekoloških značilnosti podzemeljskih habitatov
 - Poglobljeno razumevanje biotskih značilnosti podzemeljskih organizmov
 - Podrobna zgodovina speleobiologije in trendi modernih znanstvenih raziskav
 - Poglobljeno poznavanje vzorcevalnih metod v podzemeljskih habitatih

Prenesljive/ključne spretnosti in drugi atributi:

Intended learning outcomes:

- Knowledge and Understanding:
- Advanced understanding of ecological characteristics of hypogean habitats
 - Advanced understanding of biotic characteristics of hypogean organisms
 - Advanced history of speleobiology and modern trends of scientific investigations
 - Advanced knowledge about the elementary sampling methods in hypogean habitats

Transferable/Key Skills and other attributes:

- Podrobno razpoznavanje troglomorfoznih znakov
- Usposobljenost za zahtevno ekološko raziskovalno delo v podzemeljskih votlinah

- 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

Delež (v %) /

Načini ocenjevanja:

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:

NOVAK, Tone, PERC, Matjaž, LIPOVŠEK DELAKORDA, Saška, JANŽEKovič, Franc. Duality of terrestrial subterranean fauna. *International journal of speleology*, ISSN 0392-6672, 2012, vol. 41, no. 2, str. 181-188, doi: 10.5038/1827-806X.41.2.5. [COBISS.SI-ID 19061512]

NOVAK, Tone, JANŽEKovič, Franc, LIPOVŠEK DELAKORDA, Saška. Contribution of non-troglobiotic terrestrial invertebrates to carbon input in hypogean habitats = Prispevek prezimujočih netroglobiontskih kopenskih nevretenčarjev k vnosu ogljika v podzemeljske habitate. *Acta carsologica*, ISSN 0583-6050, 2013, letn. 42, št. 2/3, str. 301-309, tabele. <http://ojs.zrc-sazu.si/carsologica/article/view/669/600>, doi: 10.3986/ac.v42i2-3.669. [COBISS.SI-ID 20238600]

LIPOVŠEK DELAKORDA, Saška, JANŽEKovič, Franc, NOVAK, Tone. Autophagic activity in the midgut gland of the overwintering harvestmen *Gyas annulatus* (Phalangidae, Opiliones). *Arthropod structure & development*, ISSN 1467-8039, 2014, str. 1-8, ilustr., doi: 10.1016/j.asd.2014.06.001. [COBISS.SI-ID 20696584]

NOVAK, Tone, ŠAJNA, Nina, ANTOLINC, Estera, LIPOVŠEK DELAKORDA, Saška, DEVETAK, Dušan, JANŽEKovič, Franc. Cold tolerance in terrestrial invertebrates inhabiting subterranean habitats. *International journal of speleology*, ISSN 0392-6672, 2014, vol. 43, no. 3, str. r39-r46. <http://dx.doi.org/10.5038/1827-806X.43.3.3>, doi: 10.5038/1827-806X.43.3.3. [COBISS.SI-ID 20595208]

NOVAK, Tone, KOZEL, Peter. *Hadzinia ferrani*, sp. n. (Opiliones: Nemastomatidae), a highly specialized troglobiotic harvestman from Slovenia. *Zootaxa*, ISSN 1175-5326, 2014, vol. 3841, no. 1, str. 135-145, ilustr. <http://biotaxa.org/Zootaxa/article/view/zootaxa.3841.1.8>, doi: 10.11646/zootaxa.3841.1.8. [COBISS.SI-ID 37430317]