



Univerza v Mariboru



Univerza v Mariboru

Fakulteta za naravoslovje in
matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

| | |
|----------------------|----------------------|
| Predmet: | Ekologija krasa |
| Course title: | <i>Karst Ecology</i> |

| Študijski program in stopnja Study programme and level | Študijska smer Study field | Letnik Academic year | Semester Semester |
|---|-------------------------------|-------------------------|----------------------|
| Biologija in ekologija z naravovarstvom, 2. stopnja | / | 1/2 | Poletni/ Zimski |
| Biology and Ecology with Nature Conservation, 2 nd Level | / | 1/2 | Summer/ Winter |

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

| Predavanja Lectures | Seminar Seminar | Sem. vaje Tutorial | Lab. vaje Laboratory work | Teren. vaje Field work | Samost. delo Individ. work | ECTS |
|------------------------|--------------------|-----------------------|------------------------------|---------------------------|-------------------------------|------|
| 15 | 15 | | | 15 | 135 | 6 |

Nosilec predmeta / Lecturer:

| | | |
|--------------------------------|-----------------------------------|-----------------------|
| Jeziki / Languages: | Predavanja / Lectures: | slovenski / Slovenian |
| | Vaje / Tutorial: | slovenski / Slovenian |

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

Poznavanje organizmov in ekologije na ravni univerzitetnega programa.

Knowledge of organisms and ecology at graduate level.

Vsebina:

Kras prekriva 10 do 15 odstotkov Zemeljine površine. Poznani in opisani so različni tipi kraških ekosistemov (npr. presihajoča jezera) ter podzemeljskih habitatov, npr. ponikalnice, globinske vode v freatični coni kraškega vodonosnega sistema ter ekotoni habitati (epikras, hipotelminornejik). Slušatelji se bodo seznanili z osnovami ekologije krasa, biologijo kraških površinskih in podzemeljskih habitatov ter z biodiverzitetno teh habitatov. Spoznali bodo biotske procese, značilne za kraške ekosisteme, vključno s procesi evolucije in adaptacije, kolonizacije in speciacije, vir energije v podzemeljskih habitatih, ekologijo združb, biogeografijo ter naravovarstvo.

Contents (Syllabus outline):

Karst terrain covers about 10 to 15 percent of the terrestrial Earth surface. Many different types of karst ecosystems and subterranean habitats have been described and sampled. Prominent among these are intermittent lakes, underflow streams, deep aquifers, and ecotones (epikarst, hypotelminorheic habitats). Students will be introduced into karst ecology, biology of karst epigean and subterranean habitats and their biodiversities. A range of biotic processes, including evolution and adaptation, colonization and speciation, ecosystem function, sources of energy in subterranean habitats, community ecology, biogeography, and nature conservation will be discussed.

Temeljna literatura in viri / Readings:

- Chapman, P., 1993: Caves and cave life. Harper Collins, London.
- Culver, D. C., T. C. Kane, D. W. Fong, 1995: Adaptation and Natural Selection in Caves. The Evolution of *Gammarus minus*. Harvard Univ. Press, Cambridge, MA.
- Culver, D. C., L. Deharveng, A. Bedos, J. J. Lewis, M. Madden, J.R. Reddell, B. Sket, P. Trontelj, D. White, 2005: The mid-latitude biodiversity ridge in terrestrial cave fauna. *Ecography* 29:120-128.
- Gibert, J., D. L. Danielopol, J. Stanford (eds.), 1994: Groundwater Ecology. Academic Press, San Diego.
- Gibert, J., J. Mathieu, F. Fournier (eds.), 1997: Groundwater/Surface Water Ecotones: Biological and Hydrological Interactions and Management Options. Cambridge University Press, Cambridge.
- Griffiths, H. I., B. Kryštufek, J. M. Reed (eds.) 2004: Balkan Biodiversity. Pattern and Process in the European Hotspot. Kluwer, Dordrecht, The Netherlands.
- Gunn, J. (ed.), 2004: Encyclopedia of Caves and Karst Science. Fitzroy-Dearborn, New York.
- Jeffery, W. R., 2006: Evolution of eye degeneration in cavefish: the return of pleiotropy. *Subterranean Biology* 3:1-12.
- Pipan, T., 2005: Epikarst – A Promising Habitat. ZRC Publishing, Karst Research Institute at ZRC-SAZU, Ljubljana, Slovenia.
- White W. B., D. C. Culver (eds.), 2012: Encyclopedia of Caves. Elsevier/Academic Press, Amsterdam.
- Wilkens, H., D. C. Culver, W. F. Humphreys (eds.), 2000: Subterranean Ecosystems. Elsevier, Amsterdam.

Cilji in kompetence:

Objectives and competences:

- Predstaviti značilnosti kraških ekosistemov ter podzemeljskih habitatov
- Pojasniti vir energije v podzemeljskih habitatih
- Predstaviti biodiverzitetu v izbranih kraških habitatih
- Pojasniti biotske interakcije in strukturo združb
- Predstaviti prilagoditve za življenje v podzemlju
- Pojasniti naseljevanje in nastajanje novih vrst v podzemlju
- Podati geografijo podzemeljske favne
- Predstaviti varovanje in zaščito kraškega okolja

Predvideni študijski rezultati:

- To present special characteristics of karst ecosystems and subterranean habitats
- To explain sources of energy in subterranean environments
- To present biodiversity of selected karst habitats
- To explain biotic interactions and community structure
- To present adaptations to subterranean habitats
- To explain colonization and speciation in subterranean environments
- To give geography of subterranean biodiversity
- To present conservation and protection of karst environment

Intended learning outcomes:

Znanje in razumevanje:

- Ekologija kraških ekosistemov in podzemeljskih habitatov ter njihova biodiverzitetu
 - Biotski procesi v kraških ekosistemih
 - Ekologija združb in biogeografija
 - Trajnostni razvoj
- Prenesljive/ključne spretnosti in drugi atributi:

- Usposobljenost za analitično vrednotenje in interpretiranje kraških ekosistemov
- Razumevanje energijskih, strukturnih in funkcionalnih povezanosti med komponentami kraških ekosistemov ter posledice antropogenega vpliva

Metode poučevanja in učenja:

Knowledge and Understanding:

- Ecology of karst ecosystems and subterranean habitats and biodiversity
 - Karst ecosystem function
 - Community ecology and biogeography
 - Sustainable development
- Transferable/Key Skills and other Attributes:

- Capability of analytical assessment and interpretation of karst ecosystems
- Understanding of energetic, structural and functional relations between ecosystem components and anthropogenic impact

Learning and teaching methods:

- Predavanja
- Seminar
- Terenske vaje
- Individulano načrtovanje izbrane raziskave

- Lectures
- Seminar
- Field work
- Individual planning of a selected investigation

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

| | | |
|---|------------------|--|
| <ul style="list-style-type: none"> • Individualni projekt • pisni izpit | <p>50 50</p> | <ul style="list-style-type: none"> • Individual project • written exam |
|---|------------------|--|

Reference nosilca / Lecturer's references:

Pipan, T., 2005: Epikarst – A Promising Habitat. ZRC Publishing, Karst Research Institute at ZRC-SAZU, Ljubljana, Slovenia.

Culver, D.C., Pipan, T., 2011: Redefining the extent of the aquatic subterranean biotope-shallow subterranean habitats. *Ecohydrology*, 4(5), 721-730.

Bonacci, O., Pipan, T., Culver, D.C., 2009: A framework for karst ecohydrology. *Environ. geol. (Berl.)*, 56(5), 891-900.

Culver, D.C., Pipan, T., 2009: *The biology of caves and other subterranean habitats*, (Biology of habitats). New York: Oxford University Press, XVI, 254 str.