



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Ekologija morja
Course title:	Principles of Marine Ecology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Ekologija z naravovarstvom, 1. stopnje		3	6
Ecology with nature protection, 1st. degree			

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
30			15	15	60	120/4

Nosilec predmeta / Lecturer:

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

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

Prerequisites:

Vsebina:

Content (Syllabus outline):

V okviru predmeta se bodo slušatelji seznanili z morsko ekologijo. Spoznali bodo biotske in abiotske dejavnike, ki vplivajo na razporeditev živih organizmov v morskem ekosistemu in na njihovo številčnost ter vrstno pestrost. Seznanili se bodo z osnovami ekologije planktona, bentosa in nektona in spoznali prilagoditve planktonskih, bentoških in nektonskih živih organizmov.

Posebna pozornost bo posvečena ekološkim interakcijam v morskem svetu (razne simbioze, prehranjevalni splet, mikroba zanka). Slušatelji se bodo seznanili tudi z osnovnimi pojmi iz historične in recentne morske biogeografije ter z uvodom v bentoško bionomijo.

In the framework of marine ecology students will have the opportunity to achieve knowledge of biotic and abiotic factors, involved in the distribution, abundance and species diversity of living organisms inhabiting the marine realm. They will get basic information on the principles of plankton, benthos and nekton ecology and on typical adaptations of plankton, benthic and nekton organisms. Special emphasis will be given to the ecological interactions in the marine realm (varieties of symbiosis, food web, microbial loop). They will also achieved some basic knowledge of the historical and recent marine biogeography and benthic bionomy.

Temeljni literatura in viri / Readings:

- Nybakken, J. W., 1997: Marine Biology: An Ecological Approach. 4th Edition. Addison-Wesley Educational Publ. Inc.
- Pérès, J-M., H. Gamulin Brida, 1973: Biološka oceanografija. Bentos. Bentoska bionomija Jadranskog mora. Školska knjiga, Zagreb.
- Tarman, K., 1992: Osnove ekologije in ekologija živali. DZS, Ljubljana.
- Thurman, H. V., H. H., Webber, 1984: Marine Biology. Scott, Foresman and Co., Glenview, London.

Cilji in kompetence:

- Podati razdelitev morskega ekosistema po pasovih (zonacija)
- Razložiti abiotske in biotske dejavnike, ki vplivajo na razporeditev, abundanco in diverzitetu živega sveta
- Pojasniti različne ekološke procese v morju
- Pojasniti osnove morske biogeografije s posebnim ozirom na bentoško bionomijo
- Primerno predstaviti prilagoditve planktonskih, bentoških in nektonskih organizmov
- Primerno predstaviti morske vire
- Razložiti kompleksnost prehranjevalnih verig in prehranjevalnega spleta ter pretoka energije
- Primerno predstaviti ekološke posebnosti v slovenskem morju (sluzenje morja, cvetenje morja, hipoksije in anoksije, masovna pojavljanja, tujerodne vrste)

Objectives and competences:

- To give the overview of the zonation of the littoral in different stages.
- To explain the biotic and abiotic factors, which affect the distribution, abundance and diversity of the living organisms.
- To explain different ecological processes in the sea.
- To explain the principles of marine biogeography and especially benthic bionomy.
- To present the ecological adaptations of planktonic, benthic and nektonic species.
- To present the most representative living resources.
- To explain the complexity of energy transfer through food chains and food web.
- To present the special ecological features in the Slovenian sea (mucus aggregates, algal blooming, hypoxia and anoxia phenomena, massive swarming and others).

Predvideni študijski rezultati:**Znanje in razumevanje:**

- Zonacija morskega ekosistema
- Dejavniki, ki vplivajo na razporeditev, abundanco in diverzitetu
- Ekološki procesi in interakcije v morju
- Osnovna morska biogeografija s temelji bentoške bionomije

Prenesljive/ključne spretnosti in drugi atributi:

- Prepoznavanje obalnih pasov.
- Določanje po dihotomnem ključu.
- Razumevanje vloge ekoloških dejavnikov na procese v morju
- Sposobnost prepoznavanja prilagoditev živih organizmov

Intended learning outcomes:**Knowledge and Understanding:**

- Zonation of the marine ecosystem
- Biotic and abiotic factors affecting the distribution, abundance and diversity of the living organisms
- Ecological processes and interactions
- Knowledge about the principles of marine biogeography and benthic bionomy

Transferable/Key Skills and other attributes:

- Recognition of littoral stages.
- Determination with dichotomic keys.
- Capability of understanding the role of ecological factors on the processes in marine realm.
- Capability of recognition of adaptations of living organisms.

Metode poučevanja in učenja:

- Predavanja
- Laboratorijske vaje
- Terenske vaje

Learning and teaching methods:

- Lectures
- Laboratory excersises
- Field excersises

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

<ul style="list-style-type: none"> • Praktični izpit • Pisni izpit 	50 % 50 %	<ul style="list-style-type: none"> • Practical examination • Written examination
--	--------------	--

Reference nosilca / Lecturer's references:

LIPEJ, L., TURK, R., MAKOVEC, T. 2006. *Ogrožene vrste in habitatni tipi v slovenskem morju = Endangered species and habitat types in the Slovenian sea*. Ljubljana: Zavod RS za varstvo narave, 264 str., ilustr. ISBN 961-91505-4-6. [COBISS.SI-ID [226668288](#)]

LIPEJ, L., DULČIĆ, J. 2010. *Checklist of the Adriatic sea fishes*, (Zootaxa, 2589). Auckland: Magnolia Press, 2010. 92 str. ISBN 978-1-86977-575-9. [COBISS.SI-ID [2315599](#)]

LIPEJ, L., ORLANDO-BONACA, M., MAKOVEC, T. 2008. *Jadranske babice*. Piran: Nacionalni inštitut za biologijo, Morska biološka postaja, 208 str., ISBN 978-961-92543-0-1. [COBISS.SI-ID [242119936](#)]

LIPEJ, L., ORLANDO-BONACA, M., MAKOVEC, T. 2004. *Raziskovanje biodiverzitet v slovenskem morju*. Piran: Morska biološka postaja, Nacionalni inštitut za biologijo, 2004. 136 str., ISBN 961-90363-5-2. [COBISS.SI-ID [219521536](#)]

LIPEJ, L., DULČIĆ, J. 2004. The current status of Adriatic fish biodiversity. V: GRIFFITHS, Huw I. (ur.), KRYŠTUFEK, Boris (ur.), REED, Jane M. (ur.). *Balkan biodiversity : pattern and process in the European hotspot*. Dordrecht; London: Kluwer Academic, Str. 291-306. [COBISS.SI-ID [1453647](#)]

- LIPEJ, L. 1999. Razred: hrustančnice = Chondrichthyes. V: JANŽEKOVIČ, Franc (ur.), KRYŠTUFEK, Boris (ur.). *Ključ za določanje vretenčarjev Slovenije*. Ljubljana: DZS, str. 18-46, ilustr. [COBISS.SI-ID [485455](#)]
- LIPEJ, L., MAVRIČ, B., ORLANDO-BONACA, M., MALEJ, A. 2012. State of the art of the marine non-indigenous flora and fauna in Slovenia. *Medit. Mar. Sci.*, vol 13, str. 243-249. [COBISS.SI-ID [2632783](#)], [JCR]
- LIPEJ, L., MAVRIČ, B., REŠEK, S., CHERIF, M., CAPAPÉ, Ch. 2011. Food and feeding habits of the blackspotted smooth-hound, *Mustelus punctulatus* (Elasmobranchii: carcharhiniformes: Triakidae), from the Northern Adriatic. *Acta Ichthyologica et Piscatoria*, vol. 41, no. 3, str. 171-177. [COBISS.SI-ID [2440783](#)],
- LIPEJ, L., MAVRIČ, B., PALISKA, D., CAPAPÉ, Ch. 2013. Feeding habits of the pelagic stingray *Pteroplatytrygon violacea* (Chondrichthyes: Dasyatidae) in the Adriatic Sea. *J. Mar. Biol. Assoc. U.K.*, vol. 93, issue 2, str. 285-290, [COBISS.SI-ID [2546255](#)], [JCR]
- MAVRIČ, B., URBANIČ, G., LIPEJ, L., SIMBOURA, N. 2013. Influence of sample size on ecological status assessment using marine benthic invertebrate-based indices. *Mar. ecol. (Berl.)*, 2013, vol. 34, issue 1, str. 72-79, doi: [10.1111/j.1439-0485.2012.00526.x](https://doi.org/10.1111/j.1439-0485.2012.00526.x). [COBISS.SI-ID [2605903](#)], [JCR]
- ORLANDO-BONACA, M., LIPEJ, L., ORFANIDIS, S. 2008. Benthic macrophytes as a tool for delineating, monitoring and assessing ecological status: the case of Slovenian coastal waters. *Mar. Pollut. Bull.*, vol. 56, št. 4, str. 666-676. <http://dx.doi.org/10.1016/j.marpolbul.2007.12.018>. [COBISS.SI-ID [1827663](#)], [JCR, WoS]
- DULČIĆ, J., GRBEC, B., LIPEJ, L., BEG PAKLAR, G., SUPIĆ, N., SMIRČIĆ, A. 2003. The effect of the hemispheric climatic oscillations on the Adriatic ichthyofauna. *Fresenius environ. bull.*. [Print ed.], str. 293-298. [COBISS.SI-ID [1362255](#)], [JCR]
- LIPEJ, L., ORLANDO-BONACA, M., ŠIŠKO, M. 2003. Coastal fish diversity in three marine protected areas and one unprotected area in the Gulf of Trieste (Northern Adriatic). *Mar. ecol. (Berl.)*, letn. 24, št. 4, str. 259-273. [COBISS.SI-ID [1331023](#)], [JCR, WoS]