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 obvezni / obligatory

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: Lovrenc LIPEJ

Jeziki / Languages:		
	Predavanja / Lectures:	**Slovenski /Slovenian**
	Vaje / Tutorial:	**Slovenski /Slovenian**

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
-Jih ni	-No

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, mikrobna 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:

Lipej, L., R. Turk in T. Makovec (2006): *Ogrožene vrste in habitatni tipi v slovenskem morju/Endangered speciess and habitat types in the Slovenian Sea.* Zavod RS za varstvo narave, 2006.

Lipej, L, M. Orlando-Bonaca, V. Pitacco & B. Mavrič (2020): Biodiverziteta biogenih formacij : zakladnica narave slovenskega morja. Znanstvena monografija, Nacionalni inštitut za biologijo, Morska biološka postaja, 260 str.

Lipej, L., B. Mavrič, D. Trkov, M. Orlando-Bonaca & D. Ivajnšič (2022): Krčenje morskih travnikov v slovenskem morju zaradi vpliva podnebnih sprememb in drugih posrednih dejavnikov. V: Ivajnšič et al. (ur.); Primeri prostorskih analiz vplivov podnebnih sprememb. Univerza v Mariboru, Univerzitetna založba. DOI https://doi.org/10.18690/um.fnm.8.2022.7

Cilji in kompetence:	**Objectives and competences:**
• Podati razdelitev morskega ekosistema po pasovih (zonacija) • Razložiti abiotske in biotske dejavnike, ki vplivajo na razporeditev, abundanco in diverziteto 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	• 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 diveristy 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.

pretoka energije • Primerno predstaviti ekološke posebnosti v slovenskem morju (sluzenje morja, cvetenje morja, hipoksije in anoksije, masovna pojavljanja, tujerodne vrste)	• 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:	**Intended learning outcomes:**
Znanje in razumevanje: • Zonacija morskega ekosistema • Dejavniki, ki vplivajo na razporeditev, abundanco in diverziteto • 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	Knowledge and Understanding: • Zonation of the marine ecosystem • Biotic and abiotic factors affecting the distribution, abundance and diveristy 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:	**Learning and teaching methods:**
• Predavanja • Laboratorijske vaje • Terenske vaje	• Lectures • Laboratory excersises • Field excersises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
• Praktični izpit • Pisni izpit	25 % 75 %	• Practical examination • Written examination

Reference nosilca / Lecturer's references:

Orlando Bonaca, M., V. Pitacco & L. Lipej (2021): Loss of canopy-forming algal richness and coverage in the northern Adriatic Sea. Ecological Indicators, **V. 125, June 2021, 107501**

Ivajnšič, D., M. Orlando-Bonaca, D. Donša, V. J. Grujić, D. Trkov, B. Mavrič, L. Lipej (2022): Evaluating Seagrass Meadow Dynamics by Integrating Field-Based and Remote Sensing Techniques. Plants **2022**, 11, 1196. https://doi.org/10.3390/plants11091196

Lipej, L., M. Kovačić & J. Dulčić (2022): An Analysis of Adriatic Ichthyofauna—Ecology, Zoogeography, and Conservation Status. Fishes, Fishes 2022, 7, 58. https://doi.org/10.3390/fishes7020058

Pitacco, V., B. Mavrič & L. Lipej (2023): A preliminary study of soft bottom benthic communities in an area affected by intense maritime traffic (Slovenian Sea, Northern Adriatic). Marine Pollution Bullettin doi.org/10.1016/j.marpolbul.2023.114672

Lipej, L., D. Ivajnšič, V. Pitacco, D. Trkov, B. Mavrič & M. Orlando Bonaca (2023): Coastal Fish Fauna in the *Cystoseira s.l.* Algal Belts: Experiences from the Northern Adriatic Sea. *J. Mar. Sci. Eng.* **2023**, *11*(5), 888; https://doi.org/10.3390/jmse11050888