

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: EKOLOGIJA IN VARSTVO VODA
Course title: ECOLOGY AND WATER PROTECTION

| Študijski program in stopnja Study programme and level | Študijska smer Study field | Letnik Academic year | Semester Semester |
|---|--------------------------------|-------------------------------------|----------------------|
| Varstvo okolja in ekotehnologije, 2. stopnja | Modul: Varstvo narave | 1. in 2. | / |
| Environmental Protection and Eco-technologies, 2 nd level | Module: Nature conservation | 1 st and 2 nd | / |

Vrsta predmeta / Course type Modularni predmet / Modular course

Univerzitetna koda predmeta / University course code: EVV

| Predavanja Lectures | Sem. vaje Tutorial | Lab. vaje Laboratory work | Teren. vaje Field work | Samost. delo Individ. work | ECTS |
|------------------------|-----------------------|------------------------------|---------------------------|-------------------------------|------|
| 20 | 10 | / | 10 | 80 | 4 |

Nosilec predmeta / Lecturer: prof. dr. Mateja Germ

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

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

Pogojev ni.

Prerequisites:

No formal prerequisites.

Vsebina:

Poglavitne teme:

- -Zgradba in delovanje vodnih ekosistemov
- Abiotski dejavniki v vodnih ekosistemih
- Biotski dejavniki v vodnih ekosistemih
- Raznolikost vodnih habitatov
- Prilagoditve vodnih organizmov na vodno okolje
- Tujerodne invazivne vrste v vodnih ekosistemih
- Vpliv globalnih sprememb na vodne ekosisteme s poudarkom na rastlinah
- Pritiski in obremenitve na vodne ekosisteme, njihove posledice na vodne ekosisteme ter primeri ukrepov
- Upravljanje z vodami

Content (Syllabus outline):

Main topics:

- -Structure and function of aquatic ecosystems
- Abiotic parameters in aquatic ecosystems
- Biotic parameters in aquatic ecosystems
- Diversity of aquatic habitats
- Adaptation of aquatic organisms to the aquatic environment
- Alien invasive species in aquatic environments
- The impact of global change on aquatic ecosystems with a focus on plants
- Pressures and impacts on aquatic ecosystems, their consequences on aquatic ecosystems and examples of measures
- Water management plan

Temeljna literatura in viri / Textbooks:

Obvezna / Required:

1. Tome D. Ekologija organizmi v prostoru in času, Tehniška založba Slovenije, 2006
Wetzel R.G. 2001. Limnology, Lake and River Ecosystem.
Begon M./ Harper J.L./ Townsend, C.R., 2006: Ecology: from individuals to ecosystems, Blackwell Publishing
Dodds W. K. in M.R. Whiles, 2020. Freshwater Ecology Concept and environmental applications of limnology. Third Edition. Academic press, Elsevier. 981 pages. ISBN: 978-0-12-813255-5

Priporočena / Recommended:

- Susan L. Woodward, 2003. Biomes of Earth: Terrestrial, Aquatic, and Human-Dominated
Smith R.L./T.M. Smith, 2001. Ecology and field biology, Addison Wesley Longman: Benjamin Cummings

Cilji in kompetence:**Predmetno specifični cilji in kompetence:**

- Cilj predmeta je študente seznaniti s procesi v vodnih ekosistemih, prilagoditvami organizmov, s posledicami antropogenega vpliva na ekološko ravnovesje v vodnem ekosistemu ter jih usposobiti za iskanje rešitev za izboljšanje stanja voda.

Splošne kompetence:

- Cilj je seznaniti študente s splošnimi zakonitostmi vodnih ekosistemov in aktualnih tem v času in prostoru.

Objectives and competences:**Specific competences:**

- The aim of the course is to familiarize students with processes in aquatic ecosystems, adaptations of organisms, the consequences of anthropogenic impact on the ecological balance in aquatic ecosystems, and to train them to find solutions to improve the state of water.

General competences:

- The goal is to familiarise students with the general processes of aquatic ecosystems and current topics in time and space.

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

- Študent bo ob zaključku tega predmeta sposoben prepoznati, oceniti in ovrednotiti stanje različnih vodnih ekosistemov ter predlagati ukrepe za izboljšanje stanja.
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Prenosljive/ključne spretnosti in drugi atributi:

- -iskanje in poznavanje domače in tuje literature
- zbiranje in interpretacija podatkov o stanju vodnega ekosistema
- poznavanje ekološkega ravnovesja in ekoloških procesov kroženja in pretoka snovi v vodnih ekosistemih
- identifikacija in reševanje problemov pri sanaciji degradiranih vodnih ekosistemov
- podajanje in ovrednotenje rezultatov bo omogočeno v okviru seminarских nalog
- delo v skupinah

Intended learning outcomes:**Knowledge and understanding:**

- At the completion of this course, the student will be able to recognise, assess and evaluate the status in different aquatic ecosystems and propose measures to improve the state.

Transferable/key skills and other attributes:

- -searching and knowledge slovene and foreign literature
- collecting and interpretation data on aquatic ecosystem status
- knowing ecological balance and ecological processes of circulation and transport of substances in aquatic ecosystems
- identification and solving the problems in the process of rehabilitation of degraded aquatic ecosystems
- passing and evaluation of results will be available at seminars and individual work
- work in a team

Metode poučevanja in učenja:**Oblike dela:**

- Predavanje
- Seminarske naloge
- Terensko delo

Metode dela:

- Interaktivna predavanja, kjer bodo študenti vključeni v razpravo in kjer bodo podajali mnenja o tekoči snovi in predlagali rešitve problemov

Learning and teaching methods:**Forms of teaching:**

- Lectures
- Tutorial
- Field work.

Teaching methods:

- Interactive lectures, where students will be involved in the discussion and where they will give opinions on the lecture topic and propose solutions to problems

Delež (v %) /

Weight (in %)

Načini ocenjevanja:**Assessment:**

Pogoj za pristop k izpitu: Udeležba na večini predavanj, opravljen seminar in udeležba na terenskih vajah.

Končna ocena pri predmetu je sestavljena iz predstavitve seminarskega dela, poročila s terenskih vaj in izpita.

Ocenjevalna lestvica:

- zadostno 6: 60–67 %
- dobro 7: 68–75 %
- prav dobro 8: 76–83 %
- prav dobro 9: 84–90 %
- odlično 10: 91–100 %

A prerequisite for access to the exam: Attendance at most lectures, completed seminar and participation in field work.

Final evaluation consists of consists of a seminar presentation, a fieldwork report, and an exam.

Grading scale:

- Sufficient D (6): 60–67%
- Good C (7): 68–75%
- Very good B (8): 76–83%
- Very good B+ (9): 84–90%
- Excellent A (10): 91–100%

Materialni pogoji za izvedbo predmeta :

- Računalniška učilnica
- Terenska oprema

Material conditions for subject realization:

- Computer classroom
- Fieldwork equipment

Obveznosti študentov:

Obvezna prisotnost na večini predavanj, obvezna prisotnost na terenskih vajah in seminarjih, izdelana seminarska naloga

Student's commitments:

Obvious presence at the majority of lectures, mandatory attendance at field work and seminars, completed seminar paper

Reference nosilca predmeta:**Pedagoško delo:**

- M Germ je bila mentorica trem doktorskim študentom, več kot 20 magistrskim študentom in 8 diplomskim študentom. Trenutno je mentorica eni mladi raziskovalki.

Lecturer's references:**Pedagogic activities:**

- M Germ has mentored three PhD students, over 20 MSc students and 8 graduate students.
- She is currently mentoring one young researcher. She encourages students to conduct research, involves them in research, and publishes research

- Spodbuja študente pri raziskovalnem delu, jih vključuje v raziskovalno delo in objavlja s študenti raziskave. Vzpodbuj mlade raziskovalce in razvoj njihove znanstvene odličnosti.

Znanstveno-raziskovalno delo:

M. Germ objavlja članke v mednarodno pomembnih revijah, ima visok h indeks – 29 ter se udeležuje mnogih vabljenih predavanj v tujini.

Strokovno delo in izbrane strokovne publikacije:

- GERM, Mateja, GOLOB, Aleksandra, ZELNIK, Igor, HOLCAR, Matej, OJDANIČ, Nik. *Izvedba monitoringa in analize stanja invazivne tujerodne vrste zahodna račja zel (*Elodea nuttallii*) v letu 2021 : elaborat*. Ljubljana: Ljubljana, nov. 2021
- GERM, Mateja, GOLOB, Aleksandra. *Izvajanje monitoringa ekološkega stanja rek in jezer na podlagi makrofitov v letu 2024 : končno poročilo*. Ljubljana: Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za biologijo, 2025. 33 str., ilustr. [COBISS.SI-ID [264494083](#)]
- GERM, Mateja, GOLOB, Aleksandra. *Izvajanje monitoringa ekološkega stanja rek na podlagi makrofitov v letu 2023 : končno poročilo*. Ljubljana: Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za biologijo, 2024. 28 str., ilustr. [COBISS.SI-ID [198386691](#)]

with students. It encourages young researchers and the development of their scientific excellence.

Scientific and research work:

- M. Germ publishes articles in internationally important journals, has a high h-index of 29, and attends many invited lectures abroad.

Professional work and selected professional publications:

- GERM, Mateja, GOLOB, Aleksandra, ZELNIK, Igor, HOLCAR, Matej, OJDANIČ, Nik. *Izvedba monitoringa in analize stanja invazivne tujerodne vrste zahodna račja zel (*Elodea nuttallii*) v letu 2021 : elaborat*. Ljubljana: Ljubljana, nov. 2021
- GERM, Mateja, GOLOB, Aleksandra. *Izvajanje monitoringa ekološkega stanja rek in jezer na podlagi makrofitov v letu 2024 : končno poročilo*. Ljubljana: Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za biologijo, 2025. 33 str., ilustr. [COBISS.SI-ID [264494083](#)]
- GERM, Mateja, GOLOB, Aleksandra. *Izvajanje monitoringa ekološkega stanja rek na podlagi makrofitov v letu 2023 : končno poročilo*. Ljubljana: Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za biologijo, 2024. 28 str., ilustr. [COBISS.SI-ID [198386691](#)]

Izbrani znanstveni članki / Selected scientific papers:

- GERM, Mateja, GOLOB, Aleksandra, ZELNIK, Igor, KLINK, Agnieszka, POLECHOŃSKA, Ludmiła. Contents of metals in sediments and macrophytes differed between the locations in an Alpine lake revealing human impacts : a case study of Lake Bohinj (Slovenia). *Water*. . 2023, 15, 7, [1]-14, ilustr., zvd. ISSN 2073-4441. <https://doi.org/10.3390/w15071254>,
- GERM, Mateja, TERTINEK, Žiga, ZELNIK, Igor. Diversity of macrophytes and macroinvertebrates in different types of standing waters in the Drava field. *Water*. 2024, 168, . 1-19, . ISSN 2073-4441. DOI: 10.3390/w16081130.
- SVITOK, Marek, ZELNIK, Igor, BUBÍKOVÁ, Kateřina, GERM, Mateja, GABERŠČIK, Alenka, KOCHJAROVÁ, Judita, OŤAHEĽOVÁ, Helena, PALÓVE-BALANG, Peter, HRIVNÁK, Richard. Comparative diversity of aquatic plants in three Central European regions. *Frontiers in plant science*. 2025, 16, . 1536731, . 1-11, ilustr. ISSN 1664-462X. DOI: 10.3389/fpls.2025.153673
- MAGALHÃES, Tatiana Lobato-de, MURPHY, Kevin, A. DAVIDSON, Thomas A., GARCÍA-GIRÓN, Jorge, EFREMOV, Andrey, CHEPINOVA, Victor, MOLINA-NAVARRO, Eugenio, FRANCESCHINI, Celeste, GERM, Mateja, KUHAR, Urška, et al. Fine-scale patterns and drivers of ploidy state in lentic and lotic macrophyte assemblages across the world. *Aquatic botany*. [Print ed.]. 2026, vol. 179, article 103943, str. 1-12. ISSN 0304-3770. DOI: 10.1016/j.aquabot.2025.103943.