UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	EKOSISTEMSKA BIOLOGIJA
COURSE TITLE:	ECOSYSTEM BIOLOGY

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Varstvo okolja in ekotehnologije, 1. stopnja	/	1.	1.
Environmental Protection and Eco-technologies, 1st level	/	1st	1st

Vrsta predmeta / Course type	Obvezni predmet / Obligatory subject
Univerzitetna koda predmeta / University course code:	EB

Predavanja Lectures	Seminar Seminar	Sem. Vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	/	30	/	/	100	6

Nosilec predmeta / Lecturer:	doc. dr. Nataša Smolar-Žvanut / Nataša Smolar-Žvanut, Ph.D., Assist. Prof.

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Osnovno znanje iz biologije in ekologije.	Basic knowledge of biology and ecology.

Vsebina:	**Content (Syllabus outline):**
- **Značilnosti živih bitij** (življenjska pestrost, organizacija življenja, osnove taksonomije, organizmi v prostoru in času)	- **Characteristics of organisms** (life variety, organization of life, basics of taxonomy, organisms in space and time)
- **Dejavniki okolja** (neživi in živi dejavniki okolja, soodvisnost dejavnikov okolja, prilagoditev organizmov na okolje)	- **Environmental factors** (abiotic and biotic factors of the environment, interdependence of environmental factors, adaptation of organisms to the environment)
- **Značilnosti populacij** (ekološke značilnosti populacij, gostota, disperzija, nataliteta, mortaliteta, starostna in spolna struktura)	- **Population characteristics** (ecological characteristics of populations, density, dispersion, natality, mortality, age and sexual structure)
- **Vrstni in medvrstni odnosi med organizmi** (kompeticija, parazitizem, sožitje, ..)	- **Intraspecific and interspecific relationships among organisms** (competence, parasitism, coexistence, ..)
- **Zgradba in delovanje ekosistemov** (življenjska združba, življenjski prostor, analiza in primerjava združb, kroženje snovi in pretok energije, ekološka sukcesija)	- **The structure and function of ecosystems** (biocenosis, biotope, analysis and comparison of communities, circulation of substances and energy flow, ecological succession)
- **Ekološka različnost ekosistemov**	

(kopenski in vodni ekosistemi)

- **Vplivi človekovih dejavnosti na ekosisteme ter ukrepi za izboljšanje stanja ekosistemov** (onesnaževanje, hidrološke in morfološke obremenitve, biološke obremenitve, turizem)

- **The ecological diversity of ecosystems** (terrestrial and aquatic ecosystems)

- **The impacts of human activities on ecosystems and measures to improve the state of ecosystems** (pollution, hydrological and morphological pressures, biological pressures, tourism)

Temeljni literatura in viri / Textbooks:

Obvezna / Required:

1. Tarman, K. 1992. Osnove ekologije in ekologija živali. Državna založba Slovenije, Ljubljana.
2. Tome, D. 2006. Ekologija. Organizmi v prostoru in času. Tehniška založba Slovenije, Ljubljana.

Priporočena / Recommended:

3. Odum, E. P., Barrett, G. W., 2005. Fundamentals of Ecology – 5th edition.
4. Izbrani članki iz znanstvenih revij. Selected articles from scientific journals.

Cilji in kompetence:

Predmetno specifični cilji in kompetence:

- Študenta seznaniti z ekologijo kopenskih in vodnih ekosistemov, zgradbo in delovanjem ekosistemov ter vplivi človekovih dejavnosti na organizme in ekosisteme
- Študenta usposobiti za prepoznavanja obremenitev in vplivov na ekosisteme, iskanje rešitev ter ukrepov za izboljšanje stanja ekosistemov

Splošne kompetence:

- Sposobnost sinteze in povezovanja znanja s področja biologije in ekologije vodnih in kopenskih ekosistemov

Objectives and competences:

Specific competences:

- Students get acquainted with the ecology of terrestrial and aquatic ecosystems, the structure and function of ecosystems and impacts of human activities on organisms and ecosystems
- Qualify the students to be able to identify the pressures and impacts on ecosystems, to find solutions and measures to improve the state of ecosystems

General competences:

- Ability to summarise and integrate knowledge in the field of biology and ecology of aquatic and terrestrial ecosystems

Predvideni študijski rezultati:

<u>Znanje in razumevanje:</u>

- razumevanje zgradbe in delovanja terestričnih in vodnih ekosistemov
- razumevanje, analiza in sinteza živih in neživih dejavnikov okolja
- vrednotenje človekovih obremenitev na ekosisteme
- razumevanje spremenjenih procesov v ekosistemih, ki so pod vplivom antropogenih obremenitev
- poznavanje ukrepov za izboljšanje stanja ekosistemov

<u>Prenesljive/ključne spretnosti in drugi atributi:</u>

- upraba domače in tuje literature
- identifikacija obremenitev in reševanje problemov
- pisno in ustno poročanje o ukrepih za izboljšanje stanja v ekosistemih
- delo v manjših skupinah

Intended learning outcomes:

<u>Knowledge and Understanding</u>:

- understanding the structure and function of terrestrial and aquatic ecosystems
- understanding, analysis and synthesis of biotic and abiotic environmental factors
- the evaluation of human pressures on ecosystems
- understanding of modified processes in ecosystems that are under the impact of human pressures
- knowledge of measures to improve the state of ecosystems

<u>Transferable/Key Skills and other attributes:</u>

- the use of domestic and international literature
- identification of pressures and problem solving
- written and oral reporting on measures to improve the state of ecosystems
- work in small groups

Metode poučevanja in učenja:	Learning and teaching methods:
Oblike dela: - predavanja - terenske vaje - samostojno delo študentov **Metode dela:** - razlaga - dialog, razprava - aktivno delo v skupinah - preučevanje praktičnih primerov - ogled na terenu - vključevanje strokovnjakov za posamezna področja - priprava, predstavitev in zagovor seminarske naloge	**Forms of teaching:** - in-class lectures - field courses - individual work of students **Teaching methods:** - explanation - discussion, debate - teamwork - practical demonstration - practise in the field - involvement of experts in the specific fields - preparation, presentation of a seminar paper

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
- pisni izpit - priprava, predstavitev in zagovor seminarske naloge Na vajah je obvezna vsaj 90-odstotna prisotnost. Študent mora za pristop k izpitu izdelati in zagovarjati seminarsko nalogo. Ocenjevalna lestvica: ▪ zadostno 6: 60–67 % ▪ dobro 7: 68–75 % ▪ prav dobro 8: 76–83 % ▪ prav dobro 9: 84–90 % ▪ odlično 10: 91–100 %	**100**	- written exam - preparation, presentation and defence of seminar paper At least 90% attendance at courses is required. Students must first prepare, present and defence the seminar paper**,** which is a prerequisite for final written 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 :	Material conditions for subject realization:
- predavalnica z multimedijsko opremo - računalniška učilnica	- classroom with the multimedia equipment - computer classroom

Obveznosti študentov:	Student's commitments:
- Obvezna prisotnost na vajah - Izdelana seminarska naloga, predstavitev in zagovor	- Mandatory attendance at courses - Preparation, presentation and defence of seminar paper

Reference nosilca predmeta:	Lecturer's references:
1. Pedagoško delo: - nosilec in izvajalec predmeta na dodiplomskem študiju (Ekosistemska biologija – VŠVO) in podiplomskem študiju (Ekologija in varstvo voda – VŠVO) - mentor diplomantom na dodiplomskem študiju	1. Teaching: - Lecturer of subject at undergraduate level (Ecosystem biology – Environmental Protection College, Velenje) and postgraduate study (Ecology and Protection of Water - Environmental Protection College, Velenje)

2. Raziskovalno delo:
- Več kot 200 projektov
- Vodja in sodelavec v številnih raziskovalnih projektih:
- WWF Dinaric Arc Sustainable Hydropower Initiative (DASHI II), consultant service on "E-Flow (WWF European Policy, 2014-2015),
- BeWater: Making society an active participant in water adaptation to global change (EU 7th Framework, 2013-2017)
- AQUA-VET; Introducing Aquaponic in VET: Tools, teaching Units, and teacher training to implement the innovative instrument GLOBE (EU, Lifelong Learning Programme, 2012-2014)
- A EUROpean training and research network for environmental FLOW management in river basins (MARIE SKŁODOWSKA-CURIE ACTIONS (Innovative Training Networks (ITN) Call: H2020-MSCA-ITN-2017 (2017 – 2021))

3. Strokovno delo
- Vodja oddelka za varstvo in rabo voda na Direkciji Republike Slovenije za vodo
- Izdelava več kot 100 strokovnih študij s področja ekologije voda

4. Priznanja in sodelovanjev mednarodnih organizacijah
- Članica slovenske komisije za velike pregrade, Slovenija
- Članica komiteja za okolje (predstavnik slovenske komisije za visoke pregrade) pri svetovni organizaciji International Commission on Large Dams

- Mentor to graduate students

2. Research work:
- more than 200 projects
- manager and co-worker in many international projects:
- WWF Dinaric Arc Sustainable Hydropower Initiative (DASHI II), consultant service on "E-Flow (WWF European Policy, 2014-2015),
- BeWater: Making society an active participant in water adaptation to global change (EU 7th Framework, 2013-2017)
- AQUA-VET; Introducing Aquaponic in VET: Tools, teaching Units, and teacher training to implement the innovative instrument GLOBE (EU, Lifelong Learning Programme, 2012-2014)
- A EUROpean training and research network for environmental FLOW management in river basins (MARIE SKŁODOWSKA-CURIE ACTIONS (Innovative Training Networks (ITN) Call: H2020-MSCA-ITN-2017 (2017 – 2021))

3. Professional work:
- Managing the Department for Protection and Use of Water at Slovenian Water Agency
- Preparing more than 100 projects from the field of water ecology

4. Awards and participation in international organisations
- Member of Slovenian Committee of Large Dams, Slovenia

Member of Committee on Environment (representative of Slovenian Committee of Large Dams at International Commission on Large Dams)

Pomembnejša raziskovalna dela / Selected scientific publications:

SMOLAR-ŽVANUT, Nataša, MADDOCK, Ian P., VRHOVŠEK, Danijel. Evaluation and application of environmental flows for running waters in Slovenia. Int. j. water resour. dev., 2008, letn. 24, št. 4, str. 609-619, ilustr. [COBISS.SI-ID 4268897],

SMOLAR-ŽVANUT, Nataša, MIKOŠ, Matjaž. The impact of flow regulation caused by hydropower dams on the periphyton community in the Soča River, Slovenia. *Hydrological sciences journal*, ISSN 0262-6667. [Printed.], 2014, letn. 59, št. 5, str. 1032-1045.

KRIVOGRAD-KLEMENČIČ, Aleksandra, SMOLAR-ŽVANUT, Nataša, ISTENIČ, Darja, GRIESSLER BULC, Tjaša. Algal community patterns in Slovenian bogs along environmental gradients. Biologia, 2010, vol. 65, no. 3, str. 422-437.

SMOLAR-ŽVANUT, Nataša, KRIVOGRAD-KLEMENČIČ, Aleksandra. Sprememba sestave fitobentosa po odvzemu vode za hidroelektrarne na Kokri in Selški Sori v slovenskih Alpah = Change in phytobenthos composition after water abstraction for hydroelectric power plants on the Kokra and the Selška Sora rivers in the Slovenian Alps. *Natura Sloveniae*, ISSN 1580-0814. [Tiskana izd.], 2011, letn. 13, št. 1, str. 5-23. http://web.bf.uni-lj.si/bi/NATURA-SLOVENIAE/pdf/NatSlo_13_1_1.pdf. [COBISS.SI-ID 4212843]

VRHOVŠEK, Danijel, KOSI, Gorazd, KRIVOGRAD-KLEMENČIČ, Aleksandra, SMOLAR, Nataša. Monografija sladkovodnih in kopenskih alg v Sloveniji = Monograph on freshwater and terrestrial algae in Slovenia. Ljubljana: Založba ZRC, ZRC SAZU: Limnos, 2006. 172 str. ISBN 961-6568-48-5. ISBN 978-961-6568-48-7. [COBISS.SI-ID 228750080]

SMOLAR-ŽVANUT, Nataša, KRIVOGRAD-KLEMENČIČ, Aleksandra. The impact of altered flow regime on periphyton. In: MADDOCK, Ian P. (Ed.), et al. *Ecohydraulics : an integrated approach*. Chichester: Wiley Blackwell, 2013, p. 229-243, ilustr., doi: 10.1002/9781118526576.ch13. [COBISS.SI-ID 4612203]

VERKERK, Pieter Johannes, SÁNCHEZ, Anabel, LIBBRECHT, Steven, BROEKMAN, Annelies, BRUGGEMAN, Adriana, DALY-HASSEN, Hamed, GIANNAKIS, Elias, JEBARI, Sihem, KOK, Kasper, KRIVOGRAD-KLEMENČIČ, Aleksandra, MAGJAR, Manca, MARTINEZ DE ARANO, Inazio, ROBERT, Nicolas, SMOLAR-ŽVANUT, Nataša, VARELA, Elsa, ZOUMIDES, Christos. A participatory approach for adapting river basins to climate change. *Water*, ISSN 2073-4441, dec. 2017, letn. 9, št. 12, str. 1-28