



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Izbrana poglavja iz ekotoksikologije
Course title:	Selected topics in Ecotoxicology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski študij Ekološke znanosti, 3. stopnja		1. ali 2.; 1st or 2nd	1.- 4.; 1st-4th
Doctoral Study Ecological Sciences, 3rd degree			

Vrsta predmeta / Course type: Izbirni/Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
25	5				150	6

Nosilec predmeta / Lecturer: Julija Volmajer Valh

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

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

Poznavanje kemije in biokemije na ravni univerzitetnega programa.

Prerequisites:

Knowledge of chemistry and biochemistry at graduate level.

Vsebina:

Definicije v ekotoksikologiji

Tipi onesnaževanja okolja:

- Kovine
- Nekovine
- Organske snovi
- Organokovinske snovi

Načini vnosa določenih onesnaževal v ekosisteme.

Content (Syllabus outline):

Definitions in ecotoxicology

Different pollutants:

- Metals
- Non-metals
- Organic compounds
- Organometallic compounds

Entry of specific pollutants in ecosystems;
Study of mechanisms of some selected

Mehanizmi delovanja nekaterih izbranih onesnaževal.
Napredne analize metode v ekotoksikologiji in ocena tveganja za različne onesnaževalce nizkih koncentracij.
Biomarkerji in biosenzorji.

pollutans;
Advanced testing in ecotoxicology and risk assessment of chemicals of low doses;
Biomarkers and biosensors.

Temeljni literatura in viri / Readings:

Temeljna literatura:

Hoffman, D. J. (1995). *Handbook of ecotoxicology* (str. X, 755). Lewis.
(<https://plus.cobiss.net/cobiss/si/sl/bib/pefmb+ukm/8801#full>)

Dodatna literatura:

Moes, S., van Gestel, K., van Beek, G. (2024) Environmental toxicology Open Education Resource (OER) LibreTexts Project (<https://LibreTexts.org>)

Newman, M. C., & Unger, M. A. (2003). *Fundamentals of ecotoxicology* (2nd ed., str. 458). Lewis Publishers.

Manahan, S. E. (2022). *Environmental chemistry* (11th ed., str. XXXIII, 730). CRC Press, Taylor & Francis Group.

Colston, K. Rooney N. J., Cherbanich, N., Logunleko, M., Grande, J.M, Bueno, I. (2025) Pesticides and veterinary pharmaceuticals in neotropical avian carnivores: A scoping review, *Science of The Total Environment*, Volume 967, 178795, ISSN 0048-9697,
<https://doi.org/10.1016/j.scitotenv.2025.178795>.

(<https://www.sciencedirect.com/science/article/pii/S0048969725004309>)

Le Marechal, A. M., Krianec, B., Vajnhandl, S., Volmajer, J. (2012). Textile Finishing Industry as an Important Source of Organic Pollutants. V T. Puzyn, (ur.), *Organic Pollutants Ten Years After the Stockholm Convention - Environmental and Analytical Update* (str. 29–54). InTech.

<https://doi.org/10.5772/32272>

[Dekanić, T., Šaravanja, A., Pušić, T., Volmajer Valh, J.](#) (2024). Impact of Artificial Ageing on Microfibre Release from Polyester. V R. Rathinamoorthy & S.R. Balasaraswathi (ur.), *Microfibre Pollution from Textiles: Research Advances and Mitigation Strategies (1st ed.)* (str. 43-58). CRC Press. <https://doi.org/10.1201/9781003331995-3>

Cilji in kompetence:

Znati tipe onesnaževal, njihovo razporejanje v ekosistemih. Identificirati učinke onesnaženja v nizkih koncentracijah na populacije in ekosisteme. Razumeli oceno tveganja in delovanje biomarkerjev in biosenzorjev. Zmožnost izvedbe različnih testov toksičnosti.

Objectives and competences:

Know the types of pollutants and their distribution in ecosystems. Identify the effects of low-level pollution on populations and ecosystems. Understand risk assessment and the performance of biomarkers and biosensors. Be able to perform different toxicity tests.

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

Ob koncu tega predmeta bodo študentje zmožni:

Ugotoviti učinke onesnaženja na populacije in ekosisteme. Sklepati o nekaterih mehanizmih v ekotoksikologiji. Zmožnost samostojne izvedbe zastavljenih testov toksičnosti. Pojasniti delovanje biomarkerjev in biosenzorjev.

Prenesljive/ključne spretnosti in drugi atributi:

- Spretnosti komuniciranja
- Reševanja problemov
- Aktivno sodelovanje pri predavanjih
- Spretnosti priprave seminarskih nalog in javnega nastopanja
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Intended learning outcomes:**Knowledge and understanding:**

By the end of this course, students will be able to Determine the effects of pollution on population ecotoxicology. Be able to independently perform biomarkers and biosensors.

Transferable/Key Skills and other attributes:

- Communication skills
- Problems solving ability
- Collaboration during lectures
- Active participation in lectures
- Ability to prepare a seminar work and public presentations

Metode poučevanja in učenja:

- Predavanja
- Seminar

Learning and teaching methods:

- Lectures
- Seminar work

Delež (v %) /

Weight (in %)

Načini ocenjevanja:**Assessment:**

- Pisni izpit
- Seminarska naloga

50%
50%

- Written exam
- Seminar paper

Reference nosilca / Lecturer's references:

1. ERJAVEC, Alen, PLOHL, Olivija, FRAS ZEMLIČ, Lidija, VOLMAJER VALH, Julija. Significant fragmentation of disposable surgical masks—enormous source for problematic micro/nanoplastics pollution in the environment. *Sustainability*. Oct. 2022, vol. 14, iss. 19 (12625), str. 1-20. ISSN 2071-1050. <https://www.mdpi.com/2071-1050/14/19/12625>, DOI: [10.3390/su141912625](https://doi.org/10.3390/su141912625). [COBISS.SI-ID [124689155](https://www.cobiss.si/urn:nbn:si:coibis:124689155)]
2. PLOHL, Olivija, ERJAVEC, Alen, FRAS ZEMLIČ, Lidija, VESEL, Alenka, ČOLNIK, Maja, ŠKERGET, Mojca, VAN FAN, Yee, ČUČEK, Lidija, TRIMMEL, Gregor, VOLMAJER VALH, Julija. Morphological, surface and thermal properties of polylactic acid foils, melamine-etherified resin, and polyethylene terephthalate fabric during (bio)degradation in soil. *Journal of cleaner production*. [Online ed.]. 1 Oct. 2023, [article no.] 138554, 16 str., ilustr. ISSN 1879-1786. <https://dk.um.si/lzpisGradiva.php?id=91923>, DOI: 10.1016/j.jclepro.2023.138554. [COBISS.SI-ID 162147075]
3. Lidija, ERJAVEC, Alen, SEP, Noemi, ČOLNIK, Maja, VAN FAN, Yee, ŠKERGET, Mojca,

VUJANOVIĆ, Annamaria, ČUČEK, Lidija, VOLMAJER VALH, Julija. Decomposition and fragmentation of conventional and biobased plastic wastes in simulated and real aquatic systems. Clean technologies and environmental policy. [Online ed.]. 2024, str. 1-16, ilustr. ISSN 1618-9558. <https://dk.um.si/IzpisGradiva.php?id=90530>, DOI: 10.1007/s10098-024-02972-2. [COBISS.SI-ID 206618115]

4. TUŠEK, Lidija, FRAS ZEMLIČ, Lidija, VONČINA, Bojana, VOLMAJER VALH, Julija. Application of the catalyst MnTACN onto cotton fabric as a novel approach in the H₂O₂/UV decolourisation process. Fibers and polymers. Published: 21 August 2022, str. 1-10, ilustr. ISSN 1229-9197. DOI: 10.1007/s12221-022-4337-3. [COBISS.SI-ID 121016579]