



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta:	Osnove okoljske kemije
Course title:	Principles of Environmental Chemistry

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
Biologija / 1. stopnja	/	2. ali 3.	3. ali 4. ali 5. ali 6.
Biology / 1. level	/	2nd or 3rd	3rd or 4th or 5th or 6th

Vrsta predmeta (obvezni ali izbirni) /
Course type (compulsory or elective)

Izbirni

Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
30		AV LV RV			135	6
			15			

**Nosilec predmeta / Course
coordinator:**

Peter Krajnc

Jeziki /Languages:

Predavanja / Lectures: Slovenski /Slovene

Vaje / Tutorial: Slovenski /Slovene

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

Znanje splošne kemije.

**Prerequisites for enrolling in the course or for
performing study obligations:**

Proficiency in general chemistry.

Vsebina (kratek pregled učnega načrta):

Vsebina predmeta obravnava kemijske procese v okolju, s poudarkom na povezanosti med njimi in njihovimi vplivi na ekosisteme.

Poudarek je na naslednjih poglavjih:

- Kaj je okoljska kemija
- Kemija atmosfere
- Kemija hidrosfere
- Kemija pedosfere
- Onesnaževanje zraka, vode in tal
- Biogeokemijski cikli
- Globalne spremembe in fosilna goriva
- Trajnostno ravnanje z odpadki

Content (syllabus outline):

The content of the course is based on discussing and explaining the chemical processes in the environment, with the emphasis on their interconnectivity and their influence on the ecosystems. The focus is on the following chapters:

- What is environmental chemistry
- Atmospheric chemistry
- Hydrosphere chemistry
- Chemistry of pedosphere
- Air, water and soil pollution
- Biogeochemical cycles
- Global changes and fossil fuels

- Sustainable waste management.

Temeljni literatura in viri / Reading materials:

1. Jeffrey S. Gaffney, Nancy A. Marley: **Chemistry of Environmental Systems: Fundamental Principles and Analytical Methods**, Wiley, 2020.
2. Harrison, R. M. (Ed.): **Principles of Environmental Chemistry**, The Royal Society of Chemistry, 2007.

Cilji in kompetence:

- zna razložiti strukturne vplive spojin na reaktivnost in metabolizem v okolju
- zna predstaviti kemizem najpogostejših spojin, ki onesnažujejo okolje (polutantov)
- razume medsebojno povezanost ciklov elementov in njihov vpliv na ekosisteme

Objectives and competences:

- can explain the structural influences of compounds on the environment
- can present the chemistry of the most common pollutants
- understand the interconnectivity of element cycles and their influence on ecosystems

Predvideni študijski rezultati:

Znanje in razumevanje:
Študenti:

- poznajo in razložijo osnovne koncepte okoljske kemije,
- razlikujejo in opišejo biogeokemijske cikle in prepoznajo njihovo povezanost,
- prepoznajo polutante in toksine v okolju ter razložijo njihov vpliv na okolje,
- naštejejo in opišejo osnovne kemijske procese preoblikovanja molekul,
- identificirajo in interpretirajo kemijske procese v atmosferi, sladkih in slanih vodah ter v pedosferi,
- poznajo in uporabijo standardizirane enote uporabne v okoljski kemiji (npr. ppm, N°...),
- naštejejo in opišejo tehnike analize ozračja, hidrosfere in pedosfere.

Intended learning outcomes:

Knowledge and understanding:
Students:

- know and explain the basic concepts of environmental chemistry,
- distinguish and describe biogeochemical cycles and recognize their connection,
- identify pollutants and toxins in environment and explain their effects on the environment,
- are able to list and describe the basic concepts of chemical reactions,
- identify and interpret chemical processes in atmosphere, fresh and salt waters and in pedosphere,
- know and use standardized units useful in environmental chemistry (e.g. ppm, N°...),
- name and describe the techniques of atmospheric, hydrospheric and soil analysis.

Metode poučevanja in učenja:

- Predavanja
- Laboratorijske vaje

Learning and teaching methods:

- Lectures
- Laboratory work

Načini ocenjevanja:

Delež/Share (%) Assessment methods:

Pisni izpit Laboratorijske vaje	80 20	Written exam Laboratory course
------------------------------------	----------	-----------------------------------

Reference nosilca / Course coordinator's references:

1. HOBIGER, Viola, KOLER, Amadeja, KOTEK, Jiri, KRAJNC, Peter. Emulsion templated poly(thiol-enes): Selective oxidation improves mechanical properties. *Reactive & functional polymers*, 2023, vol. 186, str. 6.
2. RAVBAR, Miha, KOLER, Amadeja, PALJEVAC, Muzafera, KRAJNC, Peter, KOLAR, Mitja, ISKRA, Jernej. Reusable Pd-PolyHIPE for Suzuki–Miyaura Coupling. *ACS omega*, 2022, 4 str.
3. IVANOVIĆ, Milena, ALBREHT, Alen, KRAJNC, Peter, VOVK, Irena, ISLAMČEVIĆ RAZBORŠEK, Maša. Sustainable ultrasound-assisted extraction of valuable phenolics from inflorescences of *Helichrysum arenarium* L. using natural deep eutectic solvents. *Industrial crops and products*, 2021, vol. 160, str. 1-11.
4. ISLAMČEVIĆ RAZBORŠEK, Maša, IVANOVIĆ, Milena, KRAJNC, Peter, KOLAR, Mitja. Choline chloride based natural deep eutectic solvents as extraction media for extracting phenolic compounds from chokeberry (*Aronia melanocarpa*). *Molecules*, 2020, vol. 25, str. 1-14.
5. GOLUB, Doris, **KRAJNC, Peter**. Emulsion templated hydrophilic polymethacrylates. Morphological features, water and dye absorption. *Reactive & functional polymers*, 2020, vol. 149, str. 1-12.