



Univerza v Mariboru

**FAKULTETA ZA NARAVOSLOVJE
IN MATEMATIKO**

Koroška cesta 160
2000 Maribor, Slovenija
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UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Osnove okoljske kemije
Course title:	Principles of Environmental Chemistry

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Ekologija z naravovarstvom / 1. stopnja	/	1	Poletni Spring
Ecology with Nature Conservation / 1. level	/		

Vrsta predmeta / Course type

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
30	10		30	5	105	6

Nosilec predmeta / Lecturer:

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

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

Vsebina:
Content (Syllabus outline):

Najprej so utrdijo osnovni pojmi splošne kemije, ki so nujno potrebni za razumevanje okoljskih kemijskih procesov, v drugem delu predmeta pa je več povedano o kemiji procesov v okolju. Poudarek je na naslednjih poglavjih:

- Kaj je okoljska kemija
- Človeški vplivi na biogeokemijske cikle
- Sestava atmosfere, urbana atmosfera
- Učinki onesnaženja zraka
- Procesi čiščenja zračnih polutantov
- Kemija stratosfere
- Mehanizmi kemijskega staranja materialov zaradi okoljskih procesov
- Organski polutanti
- Kemija celinskih in oceanskih voda
- Globalne spremembe

Firstly, basic principles and laws of general chemistry, which are needed for the understanding of the environmental chemistry, are explained. In the continuation of the course, the emphasis is on the chemistry of environmental processes.

The emphasis is on the following:

- What is environmental chemistry
- Human effects on biogeochemical cycles
- Effects of air pollution
- Processes of air purification
- Stratosphere chemistry
- Mechanisms of chemical weathering
- Organic pollutants
- Chemistry of continental waters and oceans
- Global changes

Temeljni literatura in viri / Readings:

1. Andrews, J. E., P. Brimblecombe, T. D. Jickells, P. S. Liss, 2003: An Introduction to Environmental Chemistry, Blackwell Science.
2. Connell, D. W., 2005: Basic Concepts of Environmental Chemistry, Lewis Publishers.
3. Lazarini, F., J. Brenčič, 1984: Splošna in anorganska kemija, DZS, Ljubljana.
4. Pine, S., 1996: Organic Chemistry 5th edition, McGraw Hill.
5. Tišler, M., 1982: Organska kemija, DZS, Ljubljana.

Cilji in kompetence:

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

Objectives and competences:

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

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:

- Prepoznavanje polutantov in toksinov v okolju
- Razumevanje osnovnih kemijskih procesov preoblikovanja molekul
- Razumevanje povezanosti kemijskih ciklusov okolja

Prenesljive/ključne spretnosti in drugi atributi:

- Prepoznavanje spojin v okolju in njihovega pomena
- Jemanje vzorcev tal, vode in zraka za analizo
- Poznavanje in predvidevanje vpliva sintetičnih spojin na okolje

Knowledge and understanding:

- Recognition of pollutants and toxins in environment
- Basic concepts of chemical reactions
- Understanding of environmental elemental cycles

Transferable/Key Skills and other attributes:

- Recognition of compounds in the environment and their impact
- Sample collection for chemical analysis
- Prediction of the influence of synthetic compounds on the environment

Metode poučevanja in učenja:

- Predavanja
- Seminar
- Laboratorijske vaje
- Terensko delo

Learning and teaching methods:

- Lectures
- Seminar
- Laboratory work
- Field work

Načini ocenjevanja:Delež (v %) /
Weight (in %)**Assessment:**

Pisni izpit (ali kolokviji)	80	Written exam (or partial exams)
Laboratorijske vaje	20	Lab work

Reference nosilca / Lecturer's references:

1. KOVAČIČ, Sebastijan, JEŘÁBEK, Karel, KRAJNC, Peter, SLUGOVC, Christian. Ring opening metathesis polymerisation of emulsion templated dicyclopentadiene giving open porous materials with excellent mechanical properties. *Polymer chemistry*. [Print ed.], Feb. 2012, vol. 3, iss. 2, str. 325-328, doi: 10.1039/c2py00518b.
2. PALJEVAC, Muzafra, JEŘÁBEK, Karel, KRAJNC, Peter. Crosslinked poly(2-hydroxyethyl methacrylate) by emulsion templating : influence of crosslinker on microcellular structure. *Journal of polymers and the environment*, Dec. 2012, vol. 20, iss. 4, str. 1095-1102, doi: [10.1007/s10924-](https://doi.org/10.1007/s10924-012-0109-2)

012-0524-4.

3. KOVAČIČ, Sebastijan, FERK, Gregor, DROFENIK, Mihael, KRAJNC, Peter. Nanocomposite polyHIPEs with magnetic nanoparticles : preparation and heating effect. *React. funct. polym.*. [Print ed.], Available online 11 May 2012, doi: 10.1016/j.reactfunctpolym.2012.05.001.

4. PULKO, Irena, KRAJNC, Peter. High internal phase emulsion templating - a path to hierarchically porous functional polymers. *Macromol. rapid commun.*, 2012, vol. 33, issue 20, str. 1731-1746, doi: [10.1002/marc.201200393](https://doi.org/10.1002/marc.201200393).

5. PULKO, Irena, SANDHOLZER, Martina, KOLAR, Mitja, SLUGOVČ, Christian, KRAJNC, Peter. Removal of an olefin metathesis catalyst using 4-nitrophenyl acrylate based polymer supports. *Tetrahedron lett.*. [Print ed.], 2010, vol. 51, issue 44, str. 5827-5829, doi: 10.1016/j.tetlet.2010.08.114.

Projekti/Projects:

L2—2008 Makroporozne polimerne membrane za separacijo biomakromolekul

L2—2283 Vpliv sestave polimerizacijske mešanice na latnosti poroznih monolitov

J2—1176 Separacija in formulacija biološko aktivnih snovi izoliranih iz rastlinskih materialov