



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

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

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Izobraževalna kemija, 1. stopnja		2. ali 3.	zimski ali poletni
Educational Chemistry, 1 st degree			

Vrsta predmeta / Course type

Izbirni/elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	15		30		105	6

Nosilec predmeta / Lecturer:

Peter Krajnc

Jeziki /

Languages:

Predavanja / Slovenski/Slovenian

Lectures:

Vaje / Tutorial: Slovenski/Slovenian

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

Jih ni.

Prerequisites:

Vsebina:

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

Content (Syllabus outline):

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

- 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

- 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.
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:

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

Intended learning outcomes:

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

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

<ul style="list-style-type: none"> • Pisni izpit (ali kolokviji) • Laboratorijske vaje 	<p>80</p> <p>20</p>	<ul style="list-style-type: none"> • Written exam (or partial exams) • Lab work
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Reference nosilca / Lecturer's references:

- HUŠ, Sebastjan, KOLAR, Mitja, KRAJNC, Peter. Microcellular open-porous polystyrene-based composites from emulsions = Mikrocelični odprtoporozni polistirenski kompoziti iz emulzij. *Materiali in tehnologije*, ISSN 1580-2949, 2014, let. 48, št. 3, str. 403-407, ilustr. <http://mit.imt.si/Revija/>. [COBISS.SI-ID [17826326](#)]
- SEVŠEK, Urška, BRUS, Jiří, JEŘÁBEK, Karel, KRAJNC, Peter. Post polymerisation hypercrosslinking of styrene/divinylbenzene poly(HIPE)s : creating micropores within macroporous polymer. *Polymer*, ISSN 0032-3861. [Print ed.], Jan. 2014, vol. 55, iss. 1, str. 410-415, doi: [10.1016/j.polymer.2013.09.026](https://doi.org/10.1016/j.polymer.2013.09.026). [COBISS.SI-ID [17174294](#)]
- JERENEC, Simona, ŠIMIĆ, Mario, SAVNIK, Aleš, PODGORNIK, Aleš, KOLAR, Mitja, TURNŠEK, Marko, KRAJNC, Peter. Glycidyl methacrylate and ethylhexyl acrylate based polyhipe monoliths : morphological, mechanical and chromatographic properties. *Reactive & functional polymers*, ISSN 1381-5148. [Print ed.], 2014, vol. 78, str. 32-37, doi: [10.1016/j.reactfunctpolym.2014.02.011](https://doi.org/10.1016/j.reactfunctpolym.2014.02.011). [COBISS.SI-ID [17661718](#)]
- PODGORNIK, Aleš, SMREKAR, Vida, KRAJNC, Peter, ŠTRANCAR, Aleš. Estimation of methacrylate monolith binding capacity from pressure drop data. *Journal of chromatography. A*, ISSN 0021-9673, 11. Jan. 2013, vol. 1272, str. 50-55, doi: [10.1016/j.chroma.2012.11.057](https://doi.org/10.1016/j.chroma.2012.11.057). [COBISS.SI-ID [16493846](#)]
- KOVAČIČ, Sebastijan, MATSKO, Nadejda B., JEŘÁBEK, Karel, KRAJNC, Peter, SLUGOVC, Christian. On the mechanical properties of HIPE templated macroporous poly(dicyclopentadiene) prepared with low surfactant amounts. *Journal of materials chemistry. A, Materials for energy and sustainability*, ISSN 2050-7488. [Print ed.], 2013, vol. 1, iss. 3, str. 487-490, doi: [10.1039/C2TA00546H](https://doi.org/10.1039/C2TA00546H). [COBISS.SI-ID [16512022](#)]