



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

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	/	1	Poletni Spring

Vrsta predmeta / Course type:

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	10		30	5	105	6

Nosilec predmeta / Lecturer:

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

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

Znanje splošne kemije.

Prerequisites:

Proficiency in general chemistry.

Vsebina:

Content (Syllabus outline):

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
- 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

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
- 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., Brimblecombe, P., Jickells, T. D., Liss, P. S.: **An Introduction to Environmental Chemistry**, Blackwell Science, 2003.
2. Connell, D. W.: **Basic Concepts of Environmental Chemistry**, Lewis Publishers, 2005.
3. Harrison, R. M. (Ed.): **Principles of Environmental Chemistry**, The Royal Society of Chemistry, 2007.

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

Intended learning outcomes:

Knowledge and understanding:

- Recognition of pollutants and toxins in environment
- Basic concepts of chemical reactions

- Razumevanje povezanosti kemijskih ciklusov okolja
- Razumevanje kemijskih procesov v atmosferi, sladkih in slanih vodah ter v pedosferi

- Understanding of environmental elemental cycles
- Understanding of chemical processes in atmosphere, fresh and salt waters and in pedosphere.

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	Laboratory course

Reference nosilca / Lecturer's references:

1. KOLER, Amadeja, GORNIK, Tjaša, KOSJEK, Tina, JEŘÁBEK, Karel, **KRAJNC, Peter**. Preparation of molecularly imprinted copoly(acrylic acid-divinylbenzene) for extraction of environmentally relevant sertraline residues. *Reactive & functional polymers*, 2018, vol. 131, str. 378-383.
2. HUŠ, Sebastjan, KOLAR, Mitja, **KRAJNC, Peter**. Separation of heavy metals from water by functionalized glycidylmethacrylate poly (high internal phase emulsions). *Journal of chromatography A*, 2016, vol. 1437, str. 168-175.
3. PALJEVAC, Muzafera, JEŘÁBEK, Karel, **KRAJNC, Peter**. Crosslinked poly(2-hydroxyethyl methacrylate) by emulsion templating : influence of crosslinker on microcellular structure. *Journal of polymers and the environment*, 2012, vol. 20, iss. 4, str. 1095-1102.
4. PULKO, Irena, KOLAR, Mitja, **KRAJNC, Peter**. Atrazine removal by covalent bonding to piperazine functionalized PolyHIPEs. *Science of the total environment*, 2007, vol. 386, iss. 1/3, str. 114-123.
5. PULKO, Irena, **KRAJNC, Peter**. High internal phase emulsion templating - a path to hierarchically porous functional polymers. *Macromolecular rapid communications*, 2012, vol. 33, iss. 20, str. 1731-1746.