



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Analizna kemija v okolju
Course title:	Environmental Analytical Chemistry

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

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		30 (15 LV, 15 TV)			120	6

Nosilec predmeta / Lecturer:

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

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

Potrebno je predhodno osnovno znanje kemije

Prerequisites:

Basic knowledge of chemistry is needed

Vsebina:

Content (Syllabus outline):

- Osnovni pojmi o okolju: ponovitev in poglobitev razumevanja lastnosti elementov in spojin v okolju ter reakcij, procesov in različnih ciklov v vseh medijih v okolju.
- Ravnotežja v homogenih in heterogenih sistemih, osnovni principi povezani z analizo kemijo v okolju
- Osnove instrumentalne analize kemije, pregled elektrokemijskih, spektroskopskih in kromatografskih metod in principov.
- Analizna kemija v okolju: vrste in značilnosti metod, uporabnost pridobljenih informacij, statistično ovrednotenje analiznih rezultatov in napake v analizi kemiji.
- Monitoring okolja: osnovni pojmi, postopki za vzpostavitev monitoringa, vrste monitoringa s primeri.
- Sredstva za oceno stanja in zakonodaja na področju okolja.
- Laboratorijske vaje z analizo ionov v vodi, merjenje pH prsti in vlažnosti zraka.

- Basic characteristics of the environment: repetition and deepening understanding of characteristics of elements and substances in the environment and reactions, processes and different cycles in media of the environment.
- Equilibrium in homogeneous and heterogeneous systems, basic principles in environmental analytical chemistry
- Instrumental analytical chemistry: basic principles of electrochemical, spectroscopic and chromatographic methods
- Environmental analytical chemistry: types and characteristics of methods, applicability of information, statistical evaluation and errors of analytical results.
- Environmental monitoring: basic characteristics, procedures for the development of monitoring, types of monitoring with examples.
- Means for estimation of the condition of the environment-and legislation.
- Laboratory ion analysis of water, determination of pH of soil and air humidity.

Temeljni literatura in viri / Readings:

- Simonič M., Analizna kemija v okolju, Zbrano gradivo, UM FKKT, 2018
- D.A. Skoog, F.J.Holler, S. R. Crouch, Principles of Instrumental Analysis, (Poglavja: Gravimetric methods of analyses, Titrimetric methods of analyses, Application of neutralization analyses, Application of Oxidation/Reduction analyses, An introduction to spectroscopic Methods, Atomic spectroscopy) 6.izdaja, Thomson Books/Cole,2007
- M. Kolar, Laboratorijske vaje iz Analizne kemije I, UM FKKT, 2003.

Cilji in kompetence:

Cilj predmeta je seznaniti študente z osnovnimi pristopi in postopki za

- uporabo analize kemije na področju okolja,
- analizo trenutnega stanja okolja,
- poznavanje in upoštevanje zakonodaje na področju okolja.

Objectives and competences:

The aim of the subject Environmental Analytical Chemistry:

- application of analytical chemistry in the environment,
- analysis of the current condition of the environment,
- legislation in the field of environment.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:**Študent:**

- loči sfere okolja
- pojasni pomen in uporabnost analiznih metod za monitoring okolja,
- prepozna posamezne toksične ali potencialno nevarne spojine v okolju,
- zna pravilno vzorčiti vodo in prst
- pomni ustrezne analizne metodologije,
- oceni stanje okolja
- pomni mejne vrednosti za onesnažila v vodi
- izračuna koncentracijo snovi v sferah okolja.

Knowledge and understanding:**Student:**

- differs the spheres in environment
- explains importance and applicability of analytical methods for environmental monitoring,
- recognizes of toxic/potential toxic compounds in environment,
- knows the sampling procedures for environmental samples
- remembers suitable analytical methodology,
- suggests the condition of the environment
- remembers the contaminant limit values in water
- calculates concentration of compounds in environmental spheres.

Metode poučevanja in učenja:

- predavanja,
- učilnica, opremljena z osnovnimi avdio-vizualnimi pripomočki,
- vzorčenje vode, laboratorijske vaje.

Learning and teaching methods:

- lectures,
- lecture room, equipped with basic audio-visual equipment,
- sampling, laboratory work.

Delež (v %) /

Weight (in %)

Načini ocenjevanja:**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)

Izpit je opravljen, če so pozitivno opravljene vse naslednje obveznosti:

- pisni izpit
- pisni izpit iz vaj – pregled znanja laboratorijskega dela

70

30

Type (examination, oral, coursework, project):

Student has to pass successfully the following obligations:

- written examination,
- written examination of laboratory work

Reference nosilca / Lecturer's references:

PETROVIČ, Aleksandra, SIMONIČ, Marjana. Effect of *Chlorella sorokiniana* on the biological denitrification of drinking water. *Environmental science and pollution research international*, ISSN 0944-1344. [Print ed.], 2015, vol. 22, issue 7, str. 5171-5183, doi: [10.1007/s11356-014-3745-3](https://doi.org/10.1007/s11356-014-3745-3). [COBISS.SI-ID [18204694](#)]

PETROVIČ, Aleksandra, SIMONIČ, Marjana. The effect of carbon source on nitrate and ammonium removal from drinking water by immobilised *Chlorella sorokiniana*. *International journal of environmental science and technology*, ISSN 1735-1472, 15. jan. 2015, vol. , issue , str. 1-14, doi: [10.1007/s13762-014-0747-0](https://doi.org/10.1007/s13762-014-0747-0). [COBISS.SI-ID [18378518](#)]

TEPUŠ, Brigita, SIMONIČ, Marjana. Uncertainty of the result of TOC determination in water samples. *Accreditation and quality assurance*, ISSN 0949-1775, Jul. 2007, vol. 12, no. 7, str. 357-364. <http://dx.doi.org/10.1007/s00769-007-0261-x>. [COBISS.SI-ID [11164438](#)]