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: Marjana Simonič

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Potrebno je predhodno osnovno znanje kemije	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 analizno kemijo v okolju
- Osnove instrumentalne analizne 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 analizni 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 analizne 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 the environment.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:	Knowledge and understanding:
Študent: • navesti sfere okolja • zapomniti si pomen in uporabnost analiznih metod za monitoring okolja, • prepoznati posamezne toksične ali potencialno nevarne spojine v okolju, • opisati pravilno vzorčenje vode in prsti • pomniti ustrezne analizne metodologije, • oceniti stanje okolja • pomniti mejne vrednosti za onesnažila v vodi • izračunati koncentracijo snovi v sferah okolja.	Student: • states the spheres in environment • remembers importance and applicability of analytical methods for environmental monitoring, • recognizes of toxic/potential toxic compounds in environment, • describe 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:	**Learning and teaching methods:**
• predavanja, • učilnica, opremljena z osnovnimi avdio-vizualnimi pripomočki, • vzorčenje vode, laboratorijske vaje.	• lectures, • lecture room, equipped with basic audio-visual equipment, • sampling, laboratory work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt) Izpit je opravljen, če so pozitivno opravljene vse naslednje obveznosti:		Type (examination, oral, coursework, project): Student has to pass successfully the following obligations:
• pisni izpit • pisni izpit iz vaj – pregled znanja laboratorijskega dela	70 30	• written examination, • written examination of laboratory work

Reference nosilca / Lecturer's references:

IVANOVSKI, Maja, ALATIČ, Kris, URBANCL, Danijela, SIMONIČ, Marjana, GORIČANEC, Darko, VONČINA, Rudi. Assessment of Air Pollution in Different Areas (Urban, Suburban, and Rural) in Slovenia from 2017 to 2021. *Atmosphere*. March 2023, vol. 14, no. 3, 578, 22 str., ilustr. ISSN 2073-4433. DOI: 10.3390/atmos14030578. [COBISS.SI-ID 146038787]

SIMONIČ, Marjana, SLAPNIČAR, Špela, TRČEK, Janja, BOGOVIČ MATIJAŠIĆ, Bojana, MOHAR LORBEG, Petra, VESEL, Alenka, FRAS ZEMLJIČ, Lidija, PERŠIN FRATNIK, Zdenka. Probiotic Lactobacillus paragasseri K7 nanofiber encapsulation using nozzle-free electrospinning. *Applied biochemistry and biotechnology*. 2023, 22 str., ilustr. ISSN 0273-2289. https://link.springer.com/article/10.1007/s12010-023-04416-x, DOI: 10.1007/s12010-023-04416-x. [COBISS.SI-ID 145394691]

VAJNHANDL, Simona, ŠKODIČ, Lidija, SIMONIČ, Marjana, LOBNIK, Aleksandra, VOLMAJER VALH, Julija. Enhanced photocatalytic oxidation of reactive dye using manganese catalyst complex. *Chemical industry & chemical engineering quarterly*. 2022, vol. 28, iss. 1, str. 73-84. ISSN 1451-9372. DOI: 10.2298/CICEQ201202019V. [COBISS.SI-ID 66992643]