

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

<b>Predmet:</b>	Geokemija antropocena
<b>Course title:</b>	Geochemistry of the Anthropocene

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Okoljske in regionalne študije, doktorski študij 3. stopnje	4D Zemlja	/	/
Environmental and Regional Studies, doctoral study 3 <sup>rd</sup> cycle	4D Earth	/	/

**Vrsta predmeta / Course type** Izbirni / Elective

**Univerzitetna koda predmeta / University course code:** DIZ02

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	15	5			150	6

**Nosilec predmeta / Lecturer:** doc. dr. Miloš Miler  
(ostali izvajalci: dr. Mateja Gosar, dr. Špela Bavec, dr. Martin  
Gaberšek)

**Jeziki / Languages:** Predavanja / Lectures: slovenščina, angleščina/Slovene, English  
Vaje / Tutorial: slovenščina, angleščina/Slovene, English

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

Končana druga bolonjska stopnja ustreznih smeri ali univerzitetni študij VII stopnje.

**Prerequisites:**

Second-cycle Bologna degree in the relevant track or a university (level VII) degree

**Vsebina:**

1) Geokemija okolja:

- začetki in razvoj,
- pomen za človeka,
- sodobne usmeritve,
- trajnostni razvoj

2) Ocena tveganja:

- definicije in namen,
- primeri

3) Geokemični markerji antropocena

4) Urbana geokemija

**Content (Syllabus outline):**

1) Environmental geochemistry:

- beginnings and development,
- meaning for humans,
- modern orientations,
- sustainable development

2) Risk assessment:

- definitions and purpose,
- examples

3) Geochemical markers of the Anthropocene

4) Urban geochemistry

5) Metode prepoznavanja in opredelitve vplivov na okolje

6) Osnove okoljske forenzike

7) Osnove okoljske mineralogije

5) Methods of identifying and defining environmental impacts

6) Basics of environmental forensics

7) Basics of environmental mineralogy

#### **Temeljni literatura in viri / Readings:**

Izbrana poglavja iz knjig ter članki/Selected chapters from books and papers:

- Mcsween Jr., H.Y., Richardson, S.M., Uhle, M.E. 2003. Geochemistry: pathways and processes. Columbia University Press, 363 p., New York
- Andrews, J.E., Brimblecombe, P., Jickells, T.D., Liss, P.S., Reid, B. 2003. An Introduction to Environmental Chemistry. Wiley-Blackwell, 336 p., Malden-Oxford-Victoria
- Vaughan, D.J., Wogelius, R.A. 2000. Environmental Mineralogy, University textbook (EMU Notes in Mineralogy). Eotvos University Press, 434 p., Budapest
- Goudie, A. 2000. The Human Impact on the Natural Environment. MIT Press, 511 p., Cambridge
- Hester, R.E., Harrison, R.M. 2008. Environmental Forensics. The Royal Society of Chemistry, 175 p., Cambridge
- Fortescue, J.A.C. 1980. Environmental Geochemistry, A Holistic Approach. Springer, 342 p., New York

#### **Cilji in kompetence:**

Študentke oz. študenti se seznanijo s sodobnimi metodološkimi in analitskimi pristopi in tehnikami za zbiranje in interpretacijo podatkov o onesnaževalih v različnih okoljskih medijih. Naučijo se razlikovati med naravnimi in antropogenimi viri onesnaževal v okolju na podlagi kemične in mineralne sestave ter morfoloških lastnosti onesnaževal v okolju. Izurijo se v opisovanju različnih antropogenih vplivov, ki učinkujejo na ekosistem in opisovanju specifičnih dokazov, ki so lahko indikatorji antropogenih vplivov na lokalno okolje.

Na osnovi pridobljenega znanja bodo študenti sposobni reševati konkretne primere onesnaževanja in ocen tveganja. Pridobili bodo tudi sposobnost samostojnega raziskovanja okoljskih problemov in iskanja ustrezne literature in metod za rešitev problema.

#### **Objectives and competences:**

The students become familiar with modern methodological and analytical approaches and techniques for collecting and interpreting data on pollutants in various environmental media. They learn to distinguish between natural and anthropogenic sources of pollutants in the environment based on the chemical and mineral composition and morphological properties of pollutants in the environment. They are trained in describing various anthropogenic impacts that affect the ecosystem and in describing specific evidence that can be used as indicators of anthropogenic impacts on the local environment.

Based on the acquired knowledge, students will be able to solve concrete pollution cases and risk assessments. They will also acquire the ability to research environmental problems independently and find relevant literature and methods to solve the problem.

#### **Predvideni študijski rezultati:**

Študenti oz. študentke se bodo seznanili s področjem geokemije okolja in njeno povezavo z drugimi vedami. Predvidoma bodo sposobni razumeti dinamiko onesnaževal v okolju, njihovih transportnih poti od virov do ponorov v

#### **Intended learning outcomes:**

Students will learn about the field of environmental geochemistry and its connection with other sciences. They should be able to understand the dynamics of pollutants in the environment, their transport routes from sources

različnih naravnih in antropogenih sferah okolja ter procese, ki vplivajo na lastnosti onesnaževal v času od njihovega nastanka do odložitve v okolju. Pridobili bodo sposobnost uporabe različnih ocenjevalnih metodologij za prepoznavanje in ocenjevanje človekovih vplivov na okolje. Študentke in študenti bodo spoznali metode in tehnike za prepoznavanje in interpretacijo antropogenih vplivov na okolje in procesov, ki vplivajo na prenos onesnaževal v okolju.

to sinks in various natural and anthropogenic spheres of the environment, and the processes that affect the properties of pollutants from their formation to deposition in the environment. They will acquire the ability to use different assessment methodologies to identify and assess human impacts on the environment. Students will learn about methods and techniques for identification and interpretation of anthropogenic impacts on the environment and processes that affect the transfer of pollutants in the environment.

**Metode poučevanja in učenja:**

- Predavanja
- Laboratorijske vaje
- Terensko delo
- Seminar
- Individualne naloge
- Konzultacije
- e-izobraževanje

**Learning and teaching methods:**

- Lectures
- Lab work/tutorials
- Field work
- Seminar
- Independent work assignments
- Consultations
- e-Learning

**Načini ocenjevanja:**

Seminarska naloga z zagovorom

Delež (v %) /  
Weight (in %)

100

**Assessment:**

Seminar paper with defense

**Reference nosilca / Lecturer's references:**

- **MILER, Miloš, GOSAR, Mateja.** Assessment of contribution of metal pollution sources to attic and household dust in Pb-polluted area. Indoor air. 2019, vol. 29, no. 3, str. 487-498.
- **MILER, Miloš.** Airborne particles in city bus: concentrations, sources and simulated pulmonary solubility. Environmental geochemistry and health. 2021, vol. 43, str. 2757-2780.
- ZUPANČIČ, Marija, **MILER, Miloš, ŽIBRET, Gorazd.** The relationship between the inhalation bioaccessibility of potentially toxic elements in road dust from a heavily polluted industrial area and the source of their pollution. Environmental pollution. 2024, vol. 361, 13 str.
- KOS, Saša, ZUPANČIČ, Nina, **GOSAR, Mateja, MILER, Miloš.** Solid carriers of potentially toxic elements and their fate in stream sediments in the area affected by iron ore mining and processing. Minerals. 2022, vol. 12, 22 str.
- ZUPANČIČ, Marija, ŠUŠTERŠIČ, Mojca, **BAVEC, Špela, GOSAR, Mateja.** Oral and inhalation bioaccessibility of potentially toxic elements in household dust from former Hg mining district, Idrija, Slovenia. Environmental geochemistry and health. 2021, vol. 43, iss. 9, str. 3505-3531.
- **GOSAR, Mateja, BAVEC, Špela, MILER, Miloš, GABERŠEK, Martin.** Vsebnosti potencialno strupenih elementov v sedimentih in vodah reke Meže in njenih pritokov, ki odvodnjavajo odlagališča rudarskih odpadkov = Contents of potentially toxic elements in sediments and waters of the Meža river and its tributaries draining mine waste deposits. Geologija. 2024, vol. 67, no. 1, str. 41-61.