Podiplomskašola ZRCSAZU
Novi trg 2
1000 Ljubljana
T: +386 1 470 64 51

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	SISTEM ZEMLJA
Course title:	THE EARTH SYSTEM

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Vede o Zemlji in okolju, magistrski študij 2. stopnje	Vsi	1	
Earth and Environmental Sciences, Master study 2nd cycle	all	1	

Vrsta predmeta / Course type	Obvezni/Mandatory
Univerzitetna koda predmeta / University course code:	MT002

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	30	30			180	9

Nosilca predmeta / Lecturers:	Aleksander Horvat, Adrijan Košir

Jeziki / Languages:	Predavanja / Lectures:	Slovenščina, angleščina/Slovenian, English
	Vaje / Tutorial:	Slovenščina, angleščina/Slovenian, English

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisits:
Končan študijski program 1. stopnje ali dodiplomski študijski program za pridobitev univerzitetne izobrazbe, sprejet pred 11. 6. 2004 s področja naravoslovja.	First-cycle Bologna degree or a university degree in the natural sciences.

Vsebina:	Content (Syllabus outline):
• Zemlja kot sistem: koncept sistemov v geoznanostih • Geosfera, hidrosfera, atmosfera in biosfera • Globalno kroženje energije • Cirkulacija atmosfere, oceanov in trdne Zemlje • Nastanek Zemlje in življenja; • Minerali in kamnine • Tektonika plošč, klima in življenje • Geološka časovna lestvica in osnove stratigrafije	• Earth as a system: system concepts in geosciences • Geosphere, hydrosphere, atmosphere and biosphere • Global energy balance • Circulation of atmosphere, oceans and the solid Earth • Origin of Earth and of Life • Rocks and rock-forming minerals • Plate tectonics, climate and life

- Korelacija in datiranje kamnin
- Zgodovina življenja v fanerozoiku
- Množična izumiranja: vzroki in posledice;
- Globalni cikli in spremembe: ogljikov cikel; silicijev cikel, dušikov cikel, recikliranje elementov
- Veliki dogodki v Zemljini zgodovini
- Prispevek sedimentologije in paleontologije k znanosti o sistemu Zemlja
- Klimatske spremembe
- Antropocen: človekov vpliv na sistem Zemlja

- Geologic time scale and concepts of stratigraphy
- Correlation and dating the rock record
- History of life in Phanerozoic
- Mass extinctions: causes and consequences
- Major global cycles and changes: carbon cycle, silicon cycle, nitrogen cycle, recycling of elements
- Major events in Earth history
- Contribution of sedimentology and palaeontology to Earth system science
- Climate changes
- Anthropocene: human impact on Earth system

Temeljni literatura in viri / Readings:

- Cockell, C. 2008: An introduction to Earth-Life System. Cambridge Uni. Press, 319 pp.
- Cowen, R. 2013: History of Life. 5th Edition. Blackwell Science, 312 pp., Oxford.
- Kump, L. R., Kasting, J. F. & Crane, R. G. 2009: The Earth System, 3rd Edition. Prentice Hall, 434 pp.
- Prothero, D. R. & Dott, R. H. 2004: Evolution of the Earth. McGraw Hill Comp., 524 pp.
- Stanley, S. M. 2005: Earth system history. W. H. Freemann & Co., 567 pp.

Cilji in kompetence:

Namen predmeta je študentkam in študentom brez predhodnega znanja geoloških ved omogočiti temeljno razumevanje kompleksnega sistema planeta Zemlja. Predmet obravnava ključna vprašanja znanosti o sistemu Zemlja, ki združuje multidisciplinarna področja ter poudarja njihovo vlogo v paleobiologiji in sedimentarni geologiji. Poseben poudarek bo namenjen povezovanju sodobnih procesov na Zemlji s stratigrafskim zapisom velikih dogodkov v geološki preteklosti.

Splošne kompetence:

- Razumevanje in uporaba znanstvenih konceptov v naravoslovju.
- Sposobnost interdisciplinarnega povezovanja znanja.
- Kritično mišljenje in uporaba podatkov iz različnih naravoslovnih disciplin.

Predmetno-specifične kompetence:

- Razumevanje Zemlje kot povezanega sistema sfer.

Objectives and competences:

The aim of the course is to provide students without prior knowledge of geosciences with a foundational understanding of the Earth as a complex system. The course addresses key topics in Earth system science, a multidisciplinary field, and emphasizes their relevance to palaeobiology and sedimentary geology. Special attention will be given to linking present-day Earth processes with the stratigraphic record of major events in Earth's geological history.

General competences

- Understanding and application of scientific concepts in the natural sciences.
- Ability to integrate interdisciplinary knowledge.
- Critical thinking and the ability to work with data from various natural science disciplines.

Subject-specific competences

- Understanding the Earth as an interconnected system of spheres.
- Knowledge of the fundamental processes that shape Earth’s surface and interior.

• Poznavanje temeljnih procesov, ki oblikujejo Zemljino površje in notranjost. • Razumevanje dinamike tektonike plošč in evolucije planeta Zemlje.	• Understanding the dynamics of plate tectonics and the evolution of planet Earth.

Predvideni študijski rezultati:	Intended learning outcomes:
Po uspešno opravljenem predmetu bodo študentke in študenti: • pridobili temeljno razumevanje koncepta geološkega časa ter raznolikosti časovnih in prostorskih meril pri geoloških procesih v preteklosti in sodobnosti, • razumeli osnovne značilnosti sistemske povezanosti med geosferami in njihovo vlogo v globalnih spremembah, • znali utemeljiti, kako sodobni procesi na Zemlji omogočajo razlago geološke zgodovine, zlasti s pomočjo stratigrafskega zapisa, • prepoznali vlogo paleobiologije in sedimentarne geologije pri razumevanju preteklih okoljskih sprememb.	Upon successful completion of the course, students will: • gain a fundmental understanding of geological time and the variability of temporal and spatial scales in both ancient and modern geological processes, • understand the key principles of systemic interactions among Earth's spheres and their role in global change, • be able to explain how present-day Earth processes inform the interpretation of the geological past, particularly through the stratigraphic record, • recognize the relevance of palaeobiology and sedimentary geology in understanding past environmental changes.

Metode poučevanja in učenja:	Learning and teaching methods:
☒Predavanja ☒Laboratorijske vaje ☒Terensko delo ☒Seminar ☒Konzultacije ☒e-izobraževanje	☒Lectures ☒Lab work/tutorials ☒ Field work ☒Seminar ☒Consultations ☒e-Learning

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Daljši pisni izdelki	30	Long written assignments
Končno ocenjevanje (pisni/ustni izpit)	70	Final examination (written/oral)

Reference nosilca / Lecturer's references:

- Moro, A., Velić, I., Mikuž, V., **Horvat, A**. 2018: Microfacies characteristics of carbonate cobble from Campanian of Slovenj Gradec (Slovenia) : implications for determining the *Fleuryana adriatica* De Castro, Drobne and Gušić paleoniche and extending the biostratigraphic range in the Tethyan realm. Mining-Geology-Petruleum Engineering Bull.,42, 1-13. DOI:10.17794/rgn.2018.4.1.
- Goričan, Š., Žibret, L., **Košir, A**., Kukoč, D., **Horvat, A**. 2018: Stratigraphic correlation and structural position of Lower Cretaceous flysch-type deposits in the eastern Southern Alps (NW Slovenia). – International Journal of Earth Sciences, 107/8, 2933-2953.
- Bartol, M., Mikuž, V., **Horvat, A.** 2014: Palaeontological evidence of communication between the Central Paratethys and the Mediterranean in the late Badenian/early Serravalian. – Palaeogeography, Palaeoclimatology, Palaeoecology, 394, 144-157.

- Torromé Sanz, D., Martín-Pérez, A,. **Košir A.**, Aurell, M. 2024: Insights on the controls of carbonate deposition and microbialite formation in distal alluvial systems (Campanian, Iberian Basin). Geologica Acta 22: https://10.1344/GeologicaActa2024.22.12
- Zamagni, J., Mutti, M., Ballato, P., **Košir, A.** 2012: The Paleocene–Eocene thermal maximum (PETM) in shallow-marine successions of the Adriatic carbonate platform (SW Slovenia): Geological Society of America Bulletin, 124, 1071–1086.
- Zamagni, J., Mutti, M., **Košir, A.** 2012: The evolution of mid Paleocene - early Eocene coral communities: How to survive during rapid global warming: Palaeogeography Palaeoclimatology Palaeoecology, v. 317-318, p. 48-65.