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

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	GEOARHEOLOGIJA IN BIOARHEOLOGIJA
Course title:	GEOARCHAEOLOGY AND BIOARCHAEOLOGY

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	**Paleobiologija in sedimentarna geologija**		
Earth and environmental sciences, Master study 2nd level	**Palaeobiology and Sedimentary Geology**		

Vrsta predmeta / Course type	Izbirni/Elective
Univerzitetna koda predmeta / University course code:	MIP05

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	10	30			80	6

Nosilec predmeta / Lecturer:	Aleksander Horvat
Sodelavci predmeta / coworkers:	Irena Debeljak

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
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):**
1. del - Geoarheologija: ● Uvod v geoarheologijo ● Sedimentologija in stratigrafija ● Preperevanje, tla in paleotla ● Različna depozicijska okolja (rečna, jezerska, ledeniška, eolska, priobalna, kras) ● Procesi pri nastanku najdišč ● Postdepozicijski procesi	**Part 1 - Geoarchaeology:** ● Introduction to geoarchaeology ● Sedimentology and stratigraphy ● Weathering, soils and paleosols ● Specific depositional environments (fluvial, lacustrine, glacial, eolian, coastal, karst) ● Site formation processes ● Post-depositional processes

- Jamska geoarheologija
- Paleookoljske rekonstrukcije
- Kvartarna geokronologija in klimatologija
- Metode datiranja v kvartarju
- Geosurovine in tehnologija
  - Minerali, kamnine in kamena orodja
  - Analize keramike
  - Provenienca artefaktov in materialov
- Izotopske analize
- Geokemija slednih elementov

2. del - Bioarheologija:

- Uvod v arheobotaniko
- Mikrobotanični ostanki (pelod, fitoloiti, škrobna zrna)
- Makrobotanični ostanki (les, seme, plodovi …)
- Vegetacija, pokrajine in paleoekologija
- Uvod v arheozoologijo
- Kvartarni sesalci in človek
- Odzivi živali na spremembe habitata
- Mikrosesalci kot paleookoljski indikatorji
- Sezonskost
- Domestikacija
- Tafonomija
- Paleoekonomija; rekonstrukcija nekdanje prehrane
- Eksperimentalne in etnoarheološke študije
- Človeški vpliv na okolje; antropocen

Vaje:

- Raziskovalne tehnike pri analizi sedimentov iz arheoloških najdišč
- Laboratorijske analize artefaktov in drugih kulturnih ostankov
- Interpretacija geokemičnih podatkov
- Metode zbiranja in analiza arheobotaničnih vzorcev
- Identifikacija kosti in zob
- Prepoznavanje različnih sledov na kosteh

- Cave geoarchaeology
- Paleoenvironmental reconstructions
- Quaternary geochronology and climatology
- Quaternary dating methods
- Raw geomaterials and technology
  - Minerals, rocks and stone tools
  - Ceramic analyses
  - Sourcing artifacts and materials
- Isotopic analyses
- Trace element geochemistry

Part 2 - Bioarchaeology:

- Introduction to archaeobotany
- Microbotanical remains (pollen, phytoliths, starch grains)
- Macrobotanical remains (wood, seeds, fruits …)
- Vegetation, landscapes and paleoecology
- Introduction to archaeozoology
- Quaternary mammals and man
- Faunal responses to habitat change
- Micromammals as paleoenvironmental indicators
- Seasonality
- Domestication
- Taphonomy
- Palaeoeconomy; reconstruction of ancient diet
- Experimental and ethnoarchaeological studies
- Human impact on environment; Anthropocene

Tutorials:

- Analytical techniques for archaeological sediments
- Laboratory analysis of artifacts and other cultural materials
- Interpretation of geochemical data
- Methods of collection and analysis of archaeobotanical samples
- Identification of bones and teeth
- Identification of specific bone alterations

Temeljni literatura in viri / Readings:

Izbrana poglavja in članki iz / Selected chapters and papers from:

- Andrič, M., Tolar, T, Toškan, B.2016: Okoljska arheologija in paleoekologija. Založba ZRC, 1-259.

- Davis, S. J. M. , 1995: The Archaeology of Animals. – Yale University Press, 22-154.
- Dicauze, D. F., 2008: Environmental Archaeology: Principles and Practice. – Cambridge University Press, 620 pp.
- Garrison, E., 2003: Techniques in Archaeological Geology (Natural Science in Archaeology). – Springer, 320 pp.
- Goldberg, P. & Macphail, R. I., 2005: Practical and Theoretical Geoarchaeology. – Wiley-Blackwell, 468 pp.
- Pearsall, D. M., 2015: Paleoethnobotany: A Handbook of Procedures. – Left Coast press, 3rd ed., 600 pp.
- Rapp, H. & Hill, C., 2006: Geoarchaeology: The Earth-Science Approach to Archaeological Interpretation. – Yale University Press, 2nd ed., 368 pp.
- Journal of Archaeological Science; Elsevier
- Geoarchaeology; Wiley

Cilji in kompetence:

Namen tega predmeta je študente seznaniti s temeljnimi koncepti in raziskovalnimi metodami na področjih geoarheologije in bioarheologije in pokazati, kako tak interdisciplinarni pristop pomaga arheologu pri interpretaciji nastanka najdišča ter rekonstrukciji nekdanjega okolja in naše preteklosti. V prvem delu bo predmet zajel različne študije fizičnega okolja in kakšne materialne surovine so bile na voljo ljudem. V drugem delu, ki bo obravnaval bioarheološke ostanke, pa bodo študentje dobili širok pregled, katere rastlinske in živalske vrste so bile prisotne v različnih arheoloških obdobjih in kakšne so bile interakcije med njimi in ljudmi. Izvedeli bodo, kako rekonstruirati nekdanjo proizvodnjo hrane in nasploh rabo rastlin in živali. V obeh delih bodo izpostavljeni tudi metodološki problemi: strategije vzorčenja, priprava vzorcev, kvantifikacija, možnosti in omejitve pri interpretaciji dobljenih podatkov.

Objectives and competences:

The purpose of this course is to familiarize students with basic concepts and research methods in the fields of geoarchaeology and bioarchaeology, and to show how such an interdisciplinary approach helps the archaeologist to interpret a site formation and reconstruct paleoenvironment and our prehistory. In the first part, the course will involve various studies of the physical environment and what material resources would have been available to people. In the second part, during which bioarchaeological remains will be discussed, students will get a broad overview of what plant and animal species were present in different archaeological periods and how people interacted with them. They will learn how to reconstruct prehistoric food production, plant and animal use. Methodological issues will be addressed in both parts as well: sampling strategies, sample processing, quantification, potentials and limitations in interpreting the data.

Predvideni študijski rezultati:

Znanje in razumevanje:
Študentje bodo:

- seznanjeni s pomenom pridobivanja geoarheoloških in bioarheoloških podatkov za paleookoljske in paleoekološke rekonstrukcije

Intended learning outcomes:

Knowledge and understanding:
Students will:

- be aware of the importance of acquiring geoarchaeological and bioarchaeological data for palaeoenvironmental and palaeoecological reconstructions

● vedeli, kako lahko koncepte in metode iz geoznanosti uporabijo pri arheoloških problemih ● sposobni osnovnih sedimentoloških in petroloških opažanj ● poznali pravilne postopke vzorčenja ● pridobili temeljne kompetence za sortiranje oz. identificiranje bioarheoloških ostankov ● seznanjeni z različnimi pristopi pri analizi rastlinskih in živalskih ostankov iz arheoloških najdišč, da bi pojasnili izkoriščanje in spreminjanje nekdanjega okolja ● bolje razumeli kompleksnost interakcij med človekom in okoljem ● poznali znanstveno in tehnično terminologijo, ki se običajno uporablja v geoarheologiji in bioarheologiji ● sposobni kritične uporabe literature s teh področij	● know how concepts and methods from the geosciences can be applied to archaeological problems ● be able to make basic sedimentological and petrologic observations ● know the proper sampling procedures ● have basic competence in sorting and identification of bioarchaeological remains ● be familiar with various approaches to the analysis of plant and animal remains from archaeological sites to explain how the environment was exploited and modified in the past ● better understand the complexity of past human-environment interactions ● be familiar with scientific and technical terms commonly used in geoarchaeology and bioarchaeology ● have the ability to critically use literature from these fields

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, diskusije, seminarji, praktične vaje, terensko delo	Lectures, discussions, seminars, practical sessions, field work

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
● Izpit – teoretični del	40	● Exam – theoretical part
● Izpit – praktični del	40	● Exam – practical part
● Seminar	20	● Seminar

Reference nosilca / Lecturer's references:

1. **Horvat, A**. 2018 Petrology and provenance of the raw material of stone artefacts from the Most na Soči Iron Age settlement. In: Dular, J., Tecco Hvala, S. (Eds). The Iron Age settlement at Most na Soči. Opera Instituti archaeologici Sloveniae, 34, 349-360.
2. Bohinc, T., **Horvat, A**., Andrić, G., Pražić Golić, M., Kljajić, P., Trdan, S. 2018: Comparison of three different wood ashes and diatomaceous earth in controlling the maize weevil under laboratory conditions. Journal of Stored Products Research, 79, 1-8. DOI: 10.1016/j.jspr.2018.06.007.
3. **Horvat, A**. 2016: Distephanopsis concavus Horvat : a revised silicoflagellate species from the middle miocene of the Central Paratethys. Horvat. Geologija, 59/2, 233-241. DOI: 10.5474/geologija.2016.014.

4. Rojht, H., **Horvat, A**., Athanassiou, C. G., Vayias, B. J., Tomanović, Ž., Trdan, S. 2010: Impact of geochemical composition of diatomaceous earth on its insecticidal activity against adults of Sitophilus oryzae (L.) (Coleoptera: Curculionidae). – Journal of pest science, 83/4, 429-436.
5. Turk, J., **Horvat, A**. 2009: Sedimentological method for determination of palaeoenvironmental conditions at the Ljubljansko barje. Case study: Stare gmajne. – Opera Instituti Archaeologici Sloveniae, 16, 35-48.
6. Rame, H.-M., Martindale, R. C., Ettinger, N. P., Bodin, S., **Debeljak, I.**, Vasseur, R., Lathuilière, B., Kabiri, L. 2019: Stratigraphic distribution and paleoecological significance of Early Jurassic (Pliensbachian-Toarcian) lithiotid-coral reefal deposits from the Central High Atlas of Morocco. Palaeogeography, Palaeoclimatology, Palaeoecology, 514, 813-837.
7. **Debeljak, I.,** 2014: The age and sex structure of the cave bear population from Križna jama (Slovenia). – Mitt. Komm. Quartärforsch. Österr. Akad. Wiss. 20, 97-108, 97-108, Wien.
8. **Debeljak, I.,** 2007: Fossil population structure and mortality of the cave bear from the Mokrica cave (North Slovenia). – Acta carsologica, 36/3, 475-484.