

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

<b>Predmet:</b>	PALEOBOTANIKA IN PALINOLOGIJA
<b>Course title:</b>	PALAEOBOTANY AND PALYNOLOGY

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	Paleobiologija in sedimentarna geologija		
Environmental and Regional Studies, PhD studies	Palaeobiology and Sedimentary Geology		

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

**Univerzitetna koda predmeta / University course code:** DIP05

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	10	20			120	6

**Nosilec predmeta / Lecturer:** Doc. dr. Maja Andrič

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

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

Vpis v 1. Letnik.

**Prerequisite:**

Inscription to the 1<sup>st</sup> academic year.

**Vsebina:**

**PALINOLOGIJA & PALEO/ARHEO BOTANIKA**

- **Raziskovalne metode:** tafonomija, izbira najdišča in vzorčenje, laboratorijska priprava vzorcev, identifikacija peloda in rastlinskih makrofosilov, kronologija (datiranje in časovni modeli, dendrokronologija), multidisciplinarne raziskave
- **Paleoekologija:** dolgoročne spremembe okolja in okoljski procesi, vpliv klime, ekoloških dejavnikov in človeka na sestavo vegetacije
- **Kvartarna vegetacija:** razvoj in sestava nekdanjega gozda, požarni režimi in vpliv človeka na vegetacijo in odprtost

**Content (Syllabus outline):**

**PALYNOLOGY & PALAEO/ARCHAEO BOTANY**

- **Research methods:** taphonomy, selection of study sites and sampling, laboratory treatment of samples, identification of pollen and plant macrofossils, chronology (dating and age-depth modelling, dendrochronology), multidisciplinary research
- **Palaeoecology:** long-term changes of the environment and ecological processes, the impact of climate, ecological factors and people on the vegetation
- **Quaternary vegetation:** the composition and development of forests, fire regimes and human impact on the vegetation and

pokrajine v različnih arheoloških in geoloških obdobjih, migracije kvartarnih drevesnih vrst

- **Paleoekonomija:** prehranske navade in gospodarstvo v arheoloških obdobjih
- **Paleoklimatologija:** kvartarna klima, primerjava ledenih, globokomorskih in kopenskih paleookoljskih arhivov, vpliv podnebnih nihanj na vegetacijo
- **Paleolimnologija:** sedimentacijski procesi, nekdanje hidrološke razmere,
- **Varstvo narave:** uporaba znanja o dolgoročnih spremembah okolja pri načrtovanju naravovarstvenih ukrepov in renaturacije

landscape openness in various archaeological and geological time periods, migrations of Quaternary tree taxa

- **Palaeoeconomy:** food and economy in archaeological time periods
- **Palaeoclimatology:** Quaternary climate, comparison of ice, marine and terrestrial palaeoenvironmental archives, the influence of climatic fluctuations on the vegetation
- **Palaeolimnology:** sedimentological processes, palaeohydrological conditions
- **Nature protection:** knowledge about long-term environmental changes can help us to better plan nature protection/restoration measures

#### Temeljna literatura in viri / Readings:

##### Osnovna literatura/Basic literature:

- Moore P. D., Webb J. A. & Collinson M. E. 1991. *Pollen Analysis*. Blackwell Science, Oxford.
- Pearsall D. M. 2000. *Paleoethnobotany* (A Handbook of Procedures). Academic Press, London.
- Smol J. P., Birks H. J., Last W. M. (eds.) 2012. *Tracking Environmental Changes Using Lake Sediments*. Kluwer Academic Publishers, Dordrecht.
- Andrič M., Tolar T. & Toškan B. 2016. *Okoljska arheologija in paleoekologija: palinologija, arheobotanika in arheozoologija*. Založba ZRC in Inštitut za arheologijo ZRC SAZU, Ljubljana.

##### Identifikacijski ključ / ID keys:

- Moore et al. 1991. (glej zgoraj /see above)
- Reille M. 1992. *Pollen et spores d'Europe et d'Afrique du Nord*, Laboratoire du Botanique Historique et palynologie, Marseille
- Beug H.-J. 2004. *Leitfaden der Pollenbestimmung*, Verlag Dr. Friedrich Pfeil, München.
- Cappers R. T. J., Neef R. & Bekker R. M. (ed.) 2009. *Digital Atlas of Economic Plants (3 vol.)*. Groningen Archaeological Studies 9, Groningen, Barkhuis & Groningen University Library.
- Neef R., Cappers R. T. J. & Bekker R. M. (ed.) 2012. *Digital Atlas of Economic Plants in Archaeology*. Groningen, Barkhuis and Groningen University Library.
- Schweingruber F. H. (ed.) 1978/1990. *Mikroskopische Holzanatomie*. Birmensdorf, Swiss Federal Institute for Forest, Snow and Landscape Research.
- **Članki v revijah/papers in:** *The Holocene, Quaternary Science Reviews, Quaternary Research, Journal of Quaternary Science, Palaeogeography, Palaeoclimatology, Palaeoecology, Vegetation History and Archaeobotany, Journal of Archaeological Science*

##### Znanstvena metoda:

- Booth W. C., Colomb G. G. & Williams J. M. 1995. *The Craft of Research*. The University of Chicago Press, Chicago.

#### Cilji in kompetence:

#### Objectives and competences:

Študenti bodo pridobili osnovna znanja o kvartarnem okolju (s poudarkom na vegetaciji) v Evropi/Sloveniji, človekovem vplivu na okolje in ekonomiji v različnih arheoloških obdobjih ter se seznanili z osnovnimi raziskovalnimi metodami na tem področju. Poudarek bo na individualnem raziskovalnem delu študentov. Obravnavane teme bodo izbrane za vsakega študenta posebej in prilagojene njegovim/njenim raziskovalnim željam in potrebam. Študenti, katerih glavna raziskovalna tema doktorske disertacije bodo palinološke oz. arheobotanične raziskave, se bodo usposobili za samostojno raziskovalno delo na omenjenih področjih.

Students will acquire basic knowledge about the Quaternary environment (especially vegetation) in Europe/Slovenia, human impact on the environment and economy in various archaeological time periods, and the main research methods in this field of research. This course will be largely based on supervised research. The selection of topics will be adapted individually according to student's research interests. Students with palynology or archaeobotany as the main topic of their research will qualify to independently carry out palynological or archaeobotanical research.

#### Predvideni študijski rezultati:

Znanje in razumevanje:

- **Za študente, katerih glavna raziskovalna tema ne bo palinološka / paleo(arheo)botanična raziskava:**

Glavni cilj predmeta je usposobiti študente za razumevanje okoljskih procesov in vzrokov za spremembe nekdanjega in današnjega okolja. Pridobljena znanja jim bodo omogočila kritično branje, analizo in interpretacijo znanstvene literature, zavedanje možnosti in omejitev različnih paleoekoloških raziskovalnih metod in interpretativnih teorij, komuniciranje s strokovnjaki drugih ved ter sodelovanje pri interdisciplinarnih temeljnih in aplikativnih raziskovalnih projektih.

- **Za študente, katerih glavna raziskovalna tema bo palinološka/paleo(arheo)botanična raziskava:**

Poleg vsega zgoraj naštetega zna študent samostojno izvesti palinološko/paleo(arheo)botanično raziskavo, vključno z izbiro najdišča in vzorčenjem na terenu, laboratorijsko pripravo vzorcev, identifikacijo peloda /rastlinskih makrofosilov, analizo in interpretacijo rezultatov in objavo rezultatov raziskave.

#### Intended learning outcomes:

Knowledge and understanding:

- **For students, where the main topic of their research is not palynology / palaeo(archaeo)botany:**

Students will be able to understand the main environmental processes and causes for changes of past and current environment. This knowledge will enable them to critically read, analyse and interpret the literature and be aware of possibilities and limitations of selected research methods and theories, as well as to communicate with the experts from other fields of research, and to take part in interdisciplinary basic and applied research projects.

- **For students with palynology / palaeo(archaeo)botany as the main topic of their research:**

In addition to knowledge/understanding stated above, the student is able to independently carry out palynological /palaeo(archaeo)botanical research, including selection of study site, fieldwork, laboratory treatment of samples, identification of pollen grains/plant macrofossils, analysis and interpretation of the data and publication of the results.

**Metode poučevanja in učenja:**

- Predavanja
- e-učenje
- Seminarji
- Terensko in laboratorijsko delo

**Learning and teaching methods:**

- Lectures
- e-learning
- Seminars
- Fieldwork and laboratory work

**Načini ocenjevanja:**Delež (v %) /  
Weight (in %)**Assessment:**

<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt)</p> <p>Načini ocenjevanja bodo prilagojeni raziskovalnim željam in potrebam vsakega posameznega študenta.</p> <ul style="list-style-type: none"> <li>• pisni ali ustni izpit</li> <li>• seminarska naloga /članek</li> </ul>	<p>50</p> <p>50</p>	<p>Type (examination, oral, coursework, project):</p> <p>Assessment will be adapted individually according to student's research interests.</p> <ul style="list-style-type: none"> <li>• Written or oral exam</li> <li>• written essay /paper</li> </ul>
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**Reference nosilca / Lecturer's references:**

1. Andrič, M., Sabatier, P., Rapuc, W., Ogrinc, N., Dolenc, M., Arnaud, F., Grafenstein, U., Šmuc, A. 2020: 6600 years of human and climate impacts on lake-catchment and vegetation in the Julian Alps (Lake Bohinj, Slovenia). *Quaternary Science Reviews*, 2020, 227, 1-18. DOI: [10.1016/j.quascirev.2019.106043](https://doi.org/10.1016/j.quascirev.2019.106043).
2. Rapuc, W., Sabatier, P., Andrič, M., Crouzet, C., Arnaud, F., Chapron, E., Šmuc, A., Develle, A.-L., Wilhelm, B., Demory, F., Reyss, J.-L., Régnier, E., Daut, G., Grafenstein, U. 2018: 6600 years of earthquake record in the Julian Alps (Lake Bohinj, Slovenia). *Sedimentology*, 65, 1777-1799. DOI: [10.1111/sed.12446](https://doi.org/10.1111/sed.12446).
3. Filipović, D., Challinor, D., Andrič, M. 2017: Vinča tell in southeast Europe : multi-proxy palaeobotanical evidence from Late Neolithic levels and the implications for the environment and economy. *Quaternary international*, 429, 13-23. DOI: [10.1016/j.quaint.2014.09.059](https://doi.org/10.1016/j.quaint.2014.09.059).
4. Andrič M., Tolar T. & Toškan B. 2016. *Okoljska arheologija in paleoekologija: palinologija, arheobotanika in arheozoologija*. Založba ZRC in Inštitut za arheologijo ZRC SAZU, Ljubljana, 1-259.
5. Andrič, M. 2016: Human impact on the vegetation of the western Ljubljansko barje in late prehistory (ca. 1000-50 cal. BC) : case study: Vrhnika (Dolge njive). *Arheološki vestnik*, 67, 259-275.

