Podiplomskašola ZRCSAZU
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UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	GEOMORFOLOGIJA KRASA
Course title:	KARST GEOMORPHOLOGY

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	**Krasoslovje**	1	2
Earth and Environmental Sciences, Master study 2nd level	**Karstology**	1	2

Vrsta predmeta / Course type	Obvezni/Mandatory
Univerzitetna koda predmeta / University course code:	**MTK02**

Predavanja **Lectures**	**Seminar** **Seminar**	**Sem. vaje** **Tutorial**	**Lab. vaje** **Laboratory work**	**Teren. vaje** **Field work**	**Samost. delo** **Individ. work**	**ECTS**
40	20		15	20	130	**9**

Nosilec predmeta / Lecturer:	Nadja Zupan Hajna (asitentka: Astrid Švara)

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

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):**
• Površinske in podzemne reliefne oblike na krasu, • vloga kamnine, klime, prsti, vegetacije, gradienta in drugih dejavnikov pri nastanku in razvoju kraških površinskih in podzemnih oblik, • kraški procesi, • raztapljanje, transport, kemično odlaganje ter ohranitev snovi v krasu,	• Landforms on karst; • The role of rocks, climate, soil, vegetation, gradient and other factors in the creation and development of surface and underground karst forms; • Karst processes; • Dissolution, transport, chemical deposition and preservation of mass in karst; • Carbonate dissolution and precipitation from perspective of global carbon cycle;

• raztapljanje in odlaganje karbonatov kot del kroženja ogljika na Zemlji, • odnos med litologijo in tektoniko ter razvojem kraških oblik (strukturna geomorfologija krasa), • odnos med kraškim površjem in podzemljem, • aktivna kraška denudacija, podedovane in fosilizirane reliefne oblike na krasu, • kraški relief v Sloveniji, • vloga jam v geomorfnem sistemu, • datiranje sedimentov na krasu, • starost krasa in jam v Sloveniji ter po svetu, • planetarna geomorfologija krasa.	• The relationship between lithology and tectonics and the development of karst forms; • The relationship between the karst surface and underground (karst structural geomorphology); • Active karst denudation, inherited and fossilized forms in karst; • Karst in Slovenia; • Role of caves in geomorphic system; • Dating of the sediments in karst areas; • Age of karst and caves in Slovenia and around the world; • Planetary geomorphology of karst.

Temeljni literatura in viri / Readings:

- BLATNIK, M., CULVER, D. C., GABROVŠEK, F., KNEZ, M., KOGOVŠEK, B., KOGOVŠEK, J., LIU, H., MAYAUD, C., MIHEVC, A., MULEC, J., ALJANČIČ, M., OTONIČAR, B., PETRIČ, M., PIPAN, T., PRELOVŠEK, M., RAVBAR, N., SHAW, T. R., SLABE, T., ŠEBELA, S., ZUPAN HAJNA, N., KNEZ, M. (urednik), OTONIČAR, B. (urednik), PETRIČ, M. (urednik), PIPAN, T. (urednik), SLABE, T. (urednik). 2020. Karstology in the classical karst. Springer, XII, 222. Advances in karst science. DOI: 10.1007/978-3-030-26827-5.
- DE WAELE J., GUTIERREZ F., AUDRA P., (uredniki). 2015. Special Issue Karst Geomorphology: From Hydrological Functioning To Palaeoenvironmental Reconstructions. Part II. Geomorphology , 247, 75 str.
- FORD D. C., WILLIAMS P., 2007. Karst Hydrogeology and Geomorphology. Wiley, Chister: 562 str.
- GABROVŠEK F. (ur.), 2002. Evolution of Karst: From Prekarst to Cessation. Založba ZRC, Ljubljana: 448 str.
- GAMS I., 2004. Kras v Sloveniji v prostoru in času. Založba ZRC, Ljubljana: 515 str.
- GUNN J. (ur.), 2004. Encyclopedia of Caves and Karst Science. Fitzroy Dearborn, New York/London: 902 str.
- PALMER A. N., 2007. Cave Geology. Cave Books, Dayton, OH.: 454 str.
- PARISE, M., GABROVŠEK, F., KAUFMANN, G., RAVBAR, N. 2018. Advances in Karst Research: Theory, Fieldwork and Applications. Geological Society of London, 466.
- WHITE, W. B. (ur.), CULVER, D. C. (ur.), PIPAN, T. (ur.). 2019. Encyclopedia of caves. 3rd ed. London [etc.]: Academic Press, an imprint of Elsevier, 1225 str.
- ZUPAN HAJNA, N., MIHEVC, A., PRUNER, P., BOSÁK, P. 2008. Palaeomagnetism and magnetostratigraphy of Karst sediments in Slovenia, (Carsologica, 8). Ljubljana: Založba ZRC, ZRC SAZU: 266 str.
- ZUPAN HAJNA, N. 2019. Dinaric karst - geography and geology. V: WHITE, W. B. (ur.), CULVER, D. C. (ur.), PIPAN, T. (ur.). Encyclopedia of caves. 3rd ed. London [etc.]: Academic Press, an imprint of Elsevier, 353-362.

Cilji in kompetence:	**Objectives and competences:**

Namen predmeta je uvajanje študentov v samostojno spoznavanje kraške geomorfologije to je prepoznavanje kraških oblik in procesov. Predmet seznani študente z naravnimi procesi na krasu, intenzivnostjo raztapljanja v različnih okoljih, z dejavniki, ki vplivajo na razvoj kraškega površja ter jam in s starostjo krasa ter kraških jam v Sloveniji ter po svetu. V okviru predmeta se študentje seznanijo z osnovnimi značilnostmi kraškega površja podzemlja ter različnimi raziskovalnimi in datacijskimi metodami. Poleg tega študentje spoznajo še kraške oblike na površju, jame, njihovo neživo vsebino. Študenti spoznajo odnos med litologijo, tektoniko, klimo in vegetacijskim pokrovom s poudarkom na spoznavanju vloge karbonatne kamnine pri oblikovanju krasa z raztapljanjem z ogljikovo kislino, ki je na krasu dominanten proces, ter razvojem kraškega površja in jam.	The purpose of the course is to introduce students to independent recognition of karst geomorphology that is recognitions of karst forms and processes. The subject familiarises students with natural karst processes, with the dissolution rates in various environments, with agents that influence the evolution of karst surface and caves, and with the age of the karst and karst caves in Slovenia and of the world. During the course, students familiarize themselves with the basic morphology of karst surface and underground and with various research and dating methods. In addition, students learn about karst forms on the surface, caves and their lifeless content. Students learn the relationship between lithology, tectonics, climate and vegetation cover, with an emphasis on understanding the role solution by carbonic acid, which is a karst the dominant process and with the development of karst surface and caves.

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Poznavanje metod in konceptov v geomorfologiji krasa, • sposobnost prepoznavanja in interpretacije površinskih in podzemnih kraških oblik ter procesov, • poznavanje modernih raziskovalnih metod v geomorfologiji (na terenu kot tudi v laboratoriju).	• Knowledge of methods and concepts in karst geomorphology; • Ability to recognize and interpret of the surface and underground karst forms and processes; • Knowledge of modern research methodologies in geomorphology (on the field as well as in laboratory).

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja, • seminarji, • laboratorijsko delo, • terensko delo.	• Lectures; • Seminars; • Laboratory work; • Field work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment**
Način (pisni izpit, ustno izpraševanje, naloge, projekt): - izpit, - seminarska naloga.	 **90** **10**	Type (examination, oral, coursework, project): - Exam; - Written paper.

Reference nosilca / Lecturer's references:

- **ZUPAN HAJNA, N.** 2003. Incomplete solution : weathering of cave walls and the production, transport and deposition of carbonate fines, (Carsologica, [3]). Postojna: Inštitut za raziskovanje krasa ZRC SAZU; Ljubljana: Založba ZRC: 167 str.
- **ZUPAN HAJNA, N.**, MIHEVC, A., PRUNER, P., BOSÁK, P. 2008. Palaeomagnetism and magnetostratigraphy of Karst sediments in Slovenia, (Carsologica, 8). Ljubljana: Založba ZRC, ZRC SAZU: 266 str.
- **ZUPAN HAJNA, N.**, MIHEVC, A., PRUNER, P., BOSÁK, P. 2010. Palaeomagnetic research on karst sediments in Slovenia. International journal of speleology, 39, no. 2: 47-60. DOI: http://dx.doi.org/10.5038/1827-806X.39.2.1
- **ZUPAN HAJNA, N.** 2015. What is karst?. V: ZUPAN HAJNA, N. (ur.), et al. Life and water on Karst : monitoring of transboundary water resources of Northern Istria. Ljubljana: Založba ZRC: 6-14.
- HÄUSELMANN, P., MIHEVC, A., PRUNER, P., HORÁČEK, I., ČERMÁK, S., HERCMAN, H., SAHY, D., FIEBIG, M., **ZUPAN HAJNA, N.**, BOSÁK, P. 2015. Snežna jama (Slovenia): interdisciplinary dating of cave sediments and implication for landscape evolution. Geomorphology, 247, 10-24, DOI: 10.1016/j.geomorph.2014.12.034.
- **ZUPAN HAJNA, N.** 2019. Dinaric karst - geography and geology. V: WHITE, W. B. (ur.), CULVER, D. C. (ur.), PIPAN, T. (ur.). Encyclopedia of caves. 3rd ed. London [etc.]: Academic Press, an imprint of Elsevier, 353-362.
- **ZUPAN HAJNA, N.**, BOSÁK, P., PRUNER, P., MIHEVC, A., HERCMAN, H., HORÁČEK, I. 2020. Karst sediments in Slovenia: Plio-Quaternary multi-proxy records. Quaternary international, 546, 4-19. DOI: 10.1016/j.quaint.2019.11.010.
- **ZUPAN HAJNA, N.**, OTONIČAR, B., PRUNER, P., CULIBERG, M., HLAVÁČ, J., MANDIĆ, O., SKÁLA, R., BOSÁK, P. 2019. Late Pleistocene lacustrine sediments and their relation to red soils in the Northeastern margin of the Dinaric Karst. Acta carsologica, 48, no. 2: 153-171. DOI: 10.3986/ac.v48i2.7080.
- BLATNIK, M., CULVER, D. C., GABROVŠEK, F., KNEZ, M., KOGOVŠEK, B., KOGOVŠEK, J., LIU, H., MAYAUD, C., MIHEVC, A., MULEC, J., ALJANČIČ, M., OTONIČAR, B., PETRIČ, M., PIPAN, T., PRELOVŠEK, M., RAVBAR, N., SHAW, T. R., SLABE, T., ŠEBELA, S., **ZUPAN HAJNA, N.**, KNEZ, M. (ur.), OTONIČAR, B. (ur.), PETRIČ, M. (ur.), PIPAN, T. (ur.), SLABE, T. (ur.). 2020. Karstology in the classical karst. Springer, XII, 222. Advances in karst science. DOI: 10.1007/978-3-030-26827-5.