

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Tehnična mineralogija
Course title:	Technical Mineralogy

Študijski programi in stopnja	Študijska smer	Letnik	Semestri
Geologija, druga stopnja, magistrski	Geookolje in geomateriali (modul)	1. letnik	Letni

Univerzitetna koda predmeta/University course code:

Predavanja	Seminar	Vaje	Klinične vaje	Druge oblike študija	Samostojno delo	ECTS
30	0	45	0	0	75	5

Nosilec predmeta/Lecturer:

Vrsta predmeta/Course type:

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Zaključen dodiplomski študij.	Completed undergraduate study.

Vsebina:	Content (Syllabus outline):
<p>OGNJEVZDRŽNI IN IZOLACIJSKI MATERIALI (4h) Delitev, uporaba, pridobivanje. Kisle, bazične, specialne. Mineraloške, kemične in fizikalne karakteristike. Surovine, tehnologija izdelave, kakovost izdelka. Oblikovane vrste gradiva, vlaknati materiali.</p> <p>STEKLO (2h) Tehnologija pridobivanja. Klasifikacija surovin, klasifikacija izdelkov. Vodno steklo. Glazure, emajli.</p> <p>KERAMIKA (2h) Kakovost surovine, tehnologija izdelovanja, klasifikacija in kakovost izdelkov. Mineraloške, kemične in fizikalne karakteristike. Gradbena keramika, gospodinska keramika, porcelan.</p> <p>NARAVNI KAMEN IN AGREGAT (4h) Delitev, mineraloške in fizikalne karakteristike, degradacijski produkti.</p> <p>CEMENTI IN OSTALA VEZIVA TER PIGMENTI (4h) Surovine, pridobivanje, kakovost izdelka. Mineraloške, kemične in fizikalne karakteristike.</p> <p>BETONI IN MALTE (4h) Mineraloške, kemične in fizikalne karakteristike. Hidratacija, kalcijevi silikat hidrati.</p> <p>SEKUNDARNE SUROVINE IN RECIKLAŽA (4h) Delitev, sestava, uporabna vrednost. Elektrofiltrski pepel, žindra, mikrosilika, mulji.</p> <p>ALTERNATIVNI MATERIALI, NANOMATERIALI (2h)</p>	<p>REFRACTORY AND INSULATING MATERIALS (4h) Classification, use, extraction. Acid, basic, special. Mineral, chemical and physical characteristics. Raw materials, production technology, product quality. Designed types of materials, fibrous materials.</p> <p>GLASS (2h) Technology of extraction. Classification of raw materials, product classification. Water glass. Glazings, enamels.</p> <p>CERAMICS (2h) Quality of raw materials, production technology, classification and product quality. Mineral, chemical and physical characteristics. Construction ceramics, household ceramics, porcelain.</p> <p>NATURAL STONE AND AGGREGATE (4h) Classification, mineralogical and physical characteristics, degradation products.</p> <p>CEMENTS AND OTHER BINDERS AND PIGMENTS (4h) Raw materials, extraction, product quality. Mineral, chemical and physical characteristics.</p> <p>CONCRETE AND MORTAR (4h) Mineral, chemical and physical characteristics. Hydration, calcium silicate hydrates.</p> <p>SECONDARY RAW MATERIALS AND RECYCLING (4h) Classification, composition, usable value. Fly ash, slag, microsilica, sludges.</p> <p>ALTERNATIVE MATERIALS, NANOMATERIALS (2h)</p>

<p>Tehnologije izdelave, mineraloške karakteristike. ABRAZIVI IN BRUSILA (1h) Delitev, uporabna vrednost, pridobivanje. Naravna in umetna.</p> <p>ARHEOMETRIJA IN KULTURNA DEDIŠČINA (3h) Mineralni materiali (steklo, žindra, dragi kamni, keramika, kamen, stenske poslikave, mozaiki), degradacijski produkti, zaščitni premazi in utrjevalci.</p>	<p>Production technologies, mineralogical characteristics. ABRASIVES AND GRINDERS (1h) Classification, usable value, extraction. Natural and artificial.</p> <p>ARCHAEOLOGY AND CULTURAL HERITAGE (3h) Mineral materials (glass, slag, precious stones, ceramics, stone, wall paintings, mosaics), degradation products, protective coatings and hardeners.</p>
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Temeljna literatura in viri/Readings:

<p>BILBIJA, N., MATOVIĆ, V., 2009, Primenjena petrografija : svojstva i primene kamena, 417 str. BROEKMANS, M.A.T.M, Pöllman, H., 2012, Applied Mineralogy of Cement & Concrete, MSA ,364 str. CARTER, C.B., NORTON, M.G., 2013, Ceramic Materials, 88 str. HEWLETT, P.C., 2004, Lea's chemistry of cement and concrete, Elsevier Butterworth-Heinmann, 1075 str. INGHAM, J.P.,2001, Geomaterials under the microscope : a colour guide : building stone, roofing slate, aggregate, concrete, mortar, plaster, bricks, ceramics, and bituminous mixtures; London: Manosn, 192 str. MUKHERJEE, S., 2012, Applied Mineralogy: Applications in Industry and Environment, Springer, 562 str. RICE, P.M., 1987, Pottery analyses: a sourcebook, Chicago; London : The University of Chicago Press, 559 str. SIDDIQUE,R., KHAN, M. I., 2011, Supplementary Cementing Materials, Springer, 287 str.</p>

Cilji in kompetence:

<p>CILJI: Spoznavanje mineraloških, strukturnih in teksturnih značilnosti naravnih in umetnih mineralnih in amorfnih materialov. Spoznati najpomembnejše industrijske minerale.</p> <p>KOMPETENCE: Določanje uporabne vrednosti surovin in postopkov pridobivanja naravnih in umetnih mineralnih materialov. Preverjanje in ocena njihove kakovosti, ter možnosti za izboljšavo. Prepoznavanje sekundarnih surovin in njihove uporabne vrednosti.</p>	<p>OBJECTIVES: To get familiar with mineralogical, structural and textural characteristics of natural and artificial mineral and amorphous materials. To learn the most important industrial minerals.</p> <p>COMPETENCES: Determining the usable value of raw materials and the processes of obtaining natural and artificial mineral materials. Checking and evaluating their quality, and options for improvement. Recognition of secondary raw materials and their useful value.</p>
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Predvideni študijski rezultati:

<p>Razumevanje reakcij, ki potečejo med termično in/ali hidrotermalno predelavo mineralnega materiala. Razumevanje parametrov, ki definirajo obnašanje mineralnega materiala med termično in /ali hidrotermalno predelavo. Študent mora biti sposoben sinteze znanja o mineralogiji vhodnega mineralnega materiala, ter uporabno vrednostjo oz. kakovostjo mineralnega izdelka. Povezava med mineraloškiimi karakteristikami surovine, tehnološkimi postopki predelave in uporabno vrednostjo končnega izdelka.</p>	<p>Intended learning outcomes: Understanding the reactions that occur between thermal and/or hydrothermal processing of mineral material. Understanding the parameters that define the behavior of mineral material during thermal and/or hydrothermal processing. The student must be able to synthesize knowledge about the mineralogy of the input mineral material, and the useful value or the quality of the mineral product. The link between the mineralogical characteristics of the raw material, the technological process of processing and the useful value of the finished product.</p>
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Metode poučevanja in učenja:

<p>Predavanja z uporabo prezentacij. Vaje potekajo kot vodene seminarske vaje.</p>	<p>Learning and teaching methods: Lectures using presentations. Exercises take place as guided tutorials.</p>
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Načini ocenjevanja:

	Delež/Weight	Assessment:
ustni ali pisni kolokvij	30,00 %	oral or written colloquium
seminarska naloga	20,00 %	seminar work
ustni ali pisni izpit	50,00 %	oral or written exam
Ocene: 6-10 (pozitivno) ob upoštevanju Statuta UL in fakultetnih pravil.		Grades: 6-10 (positive) according to the UL Statute and faculty rules.

Reference nosilca/Lecturer's references:

VAVRIČUK, Anja, BOKAN-BOSILJKOV, Violeta, KRAMAR, Sabina. The influence of metakaolin on the properties of natural hydraulic lime-based grouts for historic masonry repair. *Construction & building materials*, ISSN 0950-0618. [Print ed.], May 2018, vol. 172, str. 706-716, ilustr., doi: 10.1016/j.conbuildmat.2018.04.007.

ŠMUC, Andrej, DOLENEC, Matej, KIKELJ, Martina L., LUX, Judita, PFLAUM, Miran, ŠEME, Blaž, ŽUPANEK, Bernarda, GALE, Luka, KRAMAR, Sabina. Variety of black and white limestone tesserae used in ancient mosaics in Slovenia. *Archaeometry*, ISSN 0003-813X. [Tiskana izd.], 2017, vol. 59, iss. 2, str. 205-221, doi: 10.1111/arc.12250.

KRAMAR, Sabina, ŠAJNA, Aljoša, DUCMAN, Vilma. Assessment of alkali activated mortars based on different precursors with regard to their suitability for concrete repair. *Construction & building materials*, ISSN 0950-0618. [Print ed.], Oct. 2016, vol. 124, str. 937-944, ilustr.

<http://www.sciencedirect.com/science/article/pii/S0950061816312818>, doi: 10.1016/j.conbuildmat.2016.08.018.

VRABEC, Mirijam, JANÁK, M., FROITZHEIM, N. Phase relations during peak metamorphism and decompression of the UHP kyanite eclogites, Pohorje Mountains (Eastern Alps, Slovenia). *Lithos*, 2012, vol. 144-145, str. 40-55, doi: dx.doi.org/10.1016/j.lithos.2012.04.004.

LESKOVAR, Blaž, VRABEC, Mirijam, DOLENEC, Matej, NAGLIČ, Iztok, DOLENEC, Tadej, DERVARIČ, Evgen, MARKOLI, Boštjan. Temperature-initiated structural changes in FeS₂ pyrite from Pohorje, Eastern Alps, North-Eastern Slovenia = S temperaturo povzročene strukturne spremembe FeS₂ pirita iz Pohorja, vzhodne Alpe, severovzhodna Slovenija. *Materiali in tehnologije*, ISSN 1580-2949. [Tiskana izd.], 2017, letn. 51, št. 2, str. 259-265, ilustr. <http://mit.imt.si/Revija/izvodi/mit172/leskovar.pdf>, doi: 10.17222/mit.2015.328.

ROGAN ŠMUC, Nastja, SERAFIMOVSKI, Todor, DOLENEC, Tadej, DOLENEC, Matej, VRHOVNIK, Petra, VRABEC, Mirijam, JAČIMOVIČ, Radojko, LOGAR ZORN, Vesna, KOMAR, Darja. Mineralogical and geochemical study of Lake Dojran sediments (Republic of Macedonia). *Journal of geochemical exploration*, ISSN 0375-6742. [Print ed.], 2015, vol. 150, str. 73-83, doi: 10.1016/j.gexplo.2014.12.019.