

## UČNI NAČRT PREDMETA/COURSE SYLLABUS

<b>Predmet:</b>	Metamorfna petrologija 2
<b>Course title:</b>	Metamorphic Petrology 2

<b>Študijski programi in stopnja</b>	<b>Študijska smer</b>	<b>Letnik</b>	<b>Semestri</b>
Geologija, prva stopnja, univerzitetni	Ni členitve (študijski program)	2. letnik	

**Univerzitetna koda predmeta/University course code:** 11288

Predavanja	Seminar	Vaje	Klinične vaje	Druge oblike študija	Samostojno delo	ECTS
15	15	0	0	15	45	3

**Nosilec predmeta/Lecturer:** Mirijam Vrabec

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

<b>Jeziki/Languages:</b>	<b>Predavanja/Lectures:</b>	Angleščina, Slovenščina
	<b>Vaje/Tutorial:</b>	Angleščina, Slovenščina

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

Pogoji za vključitev v delo je vpis v 2. ali 3. letnik študija geologije.  
Priporočljivo - opravljeni izpiti iz Osnov geologije, Kristalografije in Mineralogije za pristop k izpitu.

### Prerequisites:

Condition for inclusion in the work is inscription to the 2nd or 3rd academic year.  
Recommended - passed exams from Introduction to Geology, Crystallography and Mineralogy to take an exam.

### Vsebina:

Definicija, pogoji in vrste metamorfizma  
Metamorfne kamnine  
Metamorfni procesi  
Metamorfni pogoji in stopnja metamorfoze  
Geotermometrija, geobarometrija in mineralne reakcije v trdnih raztopinah  
Mineralne reakcije, ki vključujejo H<sub>2</sub>O in CO<sub>2</sub>  
Tektonotermična zgodovina metamorfnih območij  
Delno taljenje med visoko stopnjo metamorfoze  
Snovni transport med metamorfozo  
P-T-t poti in prenos toplote med metamorfozo  
Deformacija in tekstura metamorfnih kamnin  
Izvirne kamnine  
Ultravisokotlačne metamorfne kamnine Pohorja

### Content (Syllabus outline):

Definition, Conditions and Types of Metamorphism  
Metamorphic Rocks  
Metamorphic Processes  
Metamorphic Conditions and Metamorphic Grade  
Geothermometry, Geobarometry, and mineral reactions among solid solutions  
Mineral Reactions involving H<sub>2</sub>O and CO<sub>2</sub>  
Tectonothermal History of Metamorphic Terranes  
Partial Melting during High-Grade Metamorphism  
Material Transport during Metamorphism  
P-T-t Paths and heat transfer during metamorphism  
Deformation and Texture of Metamorphic Rocks  
Parent Rocks  
Ultrahigh-pressure metamorphic rocks from Pohorje Mts.

### Temeljna literatura in viri/Readings:

BEST, M. G., 2003: Igneous and metamorphic petrology, Blackwell, 729 p.  
BURCHER, K. & FREY, M., 2002: Petrogenesis of Metamorphic Rocks, Springer-Verlag, Berlin, 341 p.  
COLEMAN, R. G. & WANG, X., 2003: Ultrahigh pressure metamorphism, Cambridge Univ. Press, Cambridge, 528 p.  
PHILPOTTS, A. R. & AUGÉ, J. J., 2009: Principles of Igneous and metamorphic Petrology, 2nd edition, Cambridge Univ. Press, Cambridge, 667 p.  
VERNON, R. H. & CLARKE, G. L., 2008: Principles of Metamorphic Petrology. Cambridge Univ. Press, Cambridge, 446 p.

**Cilji in kompetence:**

CILJI: Slušatelj pridobi razširjeno znanje o značilnostih in pogojih nastanka metamorfnih kamnin, njihovi sestavi in okoljih nastopanja.

KOMPETENCE: Slušatelj je usposobljen za prepoznavanje in klasifikacijo metamorfnih kamnin, interpretacijo pogojev njihovega nastanka in spremljajočih deformacij. Sposoben je določiti tektonometamorfne okvirje nastanka in pojavljanja metamorfnih kamnin ter razumeti verjetno globalno geodinamsko interpretacijo metamorfoze.

**Objectives and competences:**

OBJECTIVES: Students learn about the advanced characteristics and conditions of formation of metamorphic rocks, their composition and occurrences.

COMPETENCES: The student is able to identify and classify metamorphic rocks, and to interpret the conditions of their formation and deformation. He is able to determine tektonometamorphic frames of formation and occurrence of metamorphic rocks and to understand the possible global geodynamic interpretation of metamorphism.

**Predvideni študijski rezultati:**

Študent razume in prepozna značilnosti in pogoje nastanka metamorfnih kamnin. Sposoben je klasificirati metamorfne kamnine, procesirati in interpretirati mikrokemične analize metamorfnih kamnin in določiti P-T pogoje njihovega nastanka. Nauči se uporabljati računalniški program za modeliranje pogojev nastanka metamorfnih kamnin in interpretirati dobljene fazne diagrame (pseudosekcije). Pri delu je študent sposoben sodelovati s strokovnjaki iz ostalih področij in uporabljati domačo in tujo strokovno in znanstveno literaturo.

**Intended learning outcomes:**

Students will understand and recognize the characteristics and conditions of formation of metamorphic rocks. He is able to classify metamorphic rocks, to process and interpret the microchemical analysis of metamorphic rocks and determine the P-T conditions of their formation. Students learn how to use a computer program to model the conditions of formation of metamorphic rocks and interpret the observed phase diagrams (pseudosections). Students are able to work with professionals from other fields and apply domestic and international professional and scientific literature.

**Metode poučevanja in učenja:**

Predavanja, seminar in 2 dni terenskega dela. Študenti izdelajo terensko poročilo in seminarsko nalogo na dogovorjeno temo.

**Learning and teaching methods:**

Lectures, seminar and 2 days of fieldwork. Students will prepare a fieldwork report and seminar work on an agreed topic.

**Načini ocenjevanja:****Delež/Weight****Assessment:**

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni izpit in/ali oddane domače naloge	60,00 %	Written exam and/or given homework
Seminarska naloga	25,00 %	Seminar work
Poročilo terenskega dela	10,00 %	Fieldwork report
Aktivno sodelovanje pri predavanjih	5,00 %	Active participation in lectures

**Reference nosilca/Lecturer's references:**

VRABEC, Mirijam, JANÁK, Marian, FROITZHEIM, Nikolaus, DE HOOG, J.C.M. 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.

JANÁK, Marian, FROITZHEIM, Nikolaus, VRABEC, Mirijam, KROGH RAVNA, Erling J., HOOG, J.C.M. De. Ultrahigh-pressure metamorphism and exhumation of garnet peridotite in Pohorje, Eastern Alps. *J. metamorph. geol.*, 2006, vol. 24, no. 1, str. 19-31.

JANÁK, Marian, FROITZHEIM, Nikolaus, LUPTÁK, Branislav, VRABEC, Mirijam, KROGH RAVNA, Erling J. First evidence for ultrahigh-pressure metamorphism of eclogites in Pohorje, Slovenia : tracing deep continental subduction in the Eastern Alps. *Tectonics (Washington, D.C.)*, 2004, vol. 23, no. 5, loč. pag.(TC5014).