

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Strukturna geologija
Course title:	Structural Geology

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

Univerzitetna koda predmeta/University course code:

Predavanja	Seminar	Vaje	Klinične vaje	Druge oblike študija	Samostojno delo	ECTS
45	0	30	0	30	105	7

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:

Priporočljivo je, da študent pozna glavne kamninotvorne minerale in njihovo kristalno strukturo. Pozna glavne tipe kamnin v litosferi ter petrologijo sedimentnih in metamorfnih kamnin na nivoju prvostopenjskega študija. Pozna osnovno teorijo tektonike plošč in značilnosti glavnih tektonskih okolij na Zemlji. Obvlada delo z geološkim kompasom in osnovne geometrijske konstrukcije iz analize geoloških kart.

Prerequisites:

It is recommended that the student is familiar with major rock-forming minerals and their crystal structure, and can recognize major lithospheric rock types. A BSc-level competency is expected in petrology of metamorphic and sedimentary rocks, in fundamentals of plate tectonics theory, and in knowledge of major tectonic environments on Earth. Student should be comfortable with orientation measurements using geological compass and with basic geometrical techniques of geological map analysis.

Vsebina:

Osnove kinematske analize in analize deformacij. Deformacijski mehanizmi in mikrostrukture. Napetostna stanja, reologija kamnin in mehanika litosfere. Lomne deformacije: razpoke, splošne značilnosti prelomov, normalni prelomi, zmični prelomi, narivi. Gube in gubanje. Strukturiranost kamnin: klivaž, foliacije, lineacije. Strižne cone, miloniti, kinematski indikatorji. Kontrakcijska tektonska okolja, orogeni. Ekstenzijska tektonska okolja. Zmična tektonska okolja. Aktivna tektonika.

Content (Syllabus outline):

Fundamentals of kinematic analysis and deformation analysis. Deformational mechanisms and microstructures in rocks. States of stress, rock rheology, and mechanics of the lithosphere. Brittle deformation: fractures, general characteristics of faults, normal faults, strike-slip faults, thrusts. Folds and folding. Rock fabrics: cleavage, foliations, lineations. Shear zones, mylonites, kinematic indicators. Contractional tectonic environments, orogens. Extensional tectonic environments. Strike-slip tectonic environments. Active tectonics.

Temeljna literatura in viri/Readings:

FOSSEN, 2010: Structural geology. Cambridge University Press.
Rowland, Duebendorfer & Schiefelbein, 2007: Structural analysis and synthesis, 3rd ed. - Blackwell Publishing.

LISLE & LEYSHON, 2004: Stereographic projection techniques for geologists and civil engineers, 2nd ed. Cambridge University Press.

VRABEC, 2017: Študijska gradiva za predmet Strukturna geologija in tektonika (prosojnice s predavanj in vaj). Univerza v Ljubljani, Naravoslovnotehniška fakulteta.

Cilji in kompetence:

CILJI: Študenti spoznajo osnovne principe in mehanizme tektonskih deformacij (mehanika Zemljine litosfere, deformacijska teorija), geometrijske značilnosti tektonskih struktur in strukturnih stilov, ter razlago njihove geneze. Spoznajo osnovne zakonitosti tektonike v regionalnem merilu. Seznanijo se z glavnimi tektonskimi okolji na Zemlji, njihovo strukturo in časovnim razvojem. Spoznajo tudi osnovne značilnosti aktivnih tektonskih deformacij in metode njihovega preučevanja.

KOMPETENCE: Študenti znajo prepoznati in interpretirati tektonske strukture od mikroskopskega do regionalnega merila. Sposobni so zbirati strukturne podatke na terenu, jih obdelati in interpretirati.

Objectives and competences:

OBJECTIVES: Student gets acquainted with basic principles and mechanisms of tectonic deformation (lithospheric mechanics, deformation theory), with geometrical characteristics of tectonic structures and structural styles, and with interpretation of their origin. Student learns basic principles of regional tectonic deformation, and becomes familiar with major tectonic environments on Earth, their structure and evolution. Additionally, the student gets acquainted with fundamentals of active tectonic processes and methods of their investigation.

COMPETENCES: Student is able to recognize and interpret tectonic structures from microscopic to regional scale. Student is capable of field collection, processing and interpretation of structural data.

Predvideni študijski rezultati:

Študent spozna strukturnogeološko terminologijo. Pozna glavne geometrijske značilnosti geoloških struktur in jih je sposoben prepoznavati na terenu ter interpretirati njihovo geometrijo iz pomanjkljivih podatkov. Razume genezo posameznih struktur, more razlikovati deformacijske faze na ozemlju/izdanku/vzorcu in interpretirati generalne fizikalne pogoje, pri katerih so deformacije potekale. Nauči se terenskega opazovanja in popisovanja struktur, njihovega evidentiranja, merjenja orientacije strukturnih elementov, jemanja orientiranih vzorcev. Utrdi večino dela z geološkim kompasom. Terenska opažanja zna analizirati, generalizirati in interpretirati v lokalnem in širšem kontekstu, tako na podlagi lastnih opažanj kot uporabi literaturnih virov. Zna uporabljati računalniške programe za analizo strukturnogeoloških podatkov.

Intended learning outcomes:

Students learn the terminology of structural geology and tectonics. They are familiar with geometrical characteristics of geological structures and are capable to recognize them in the field and to reconstruct their geometry from incomplete field data. They understand the genesis of individual structures, and are able to distinguish phases of deformation in the region/outcrop/sample and to interpret general physical conditions during deformation. Students learn to observe and document structures in the field, to measure their orientation, and to take oriented samples. They master measurement skills with geological compass. They can analyze, generalize and interpret field observations both in local and regional context, using their own and published data. Students learn to use software for analyzing and processing of structural data.

Metode poučevanja in učenja:

Predavanja, kabinetne vaje, terenske vaje.

Learning and teaching methods:

Lectures, lab exercises, fieldwork.

Načini ocenjevanja:

	Delež/Weight	Assessment:
Pisni izpit	55,00 %	Written examination
Preizkus znanja reševanja praktičnih strukturnih problemov	30,00 %	Test of structural problem solving skills
Terensko poročilo	15,00 %	Field report

Reference nosilca/Lecturer's references:

ŽIBRET, Lea, VRABEC, Marko. Palaeostress and kinematic evolution of the orogen-parallel NW-SE striking faults in the NW External Dinarides of Slovenia unraveled by mesoscale fault-slip data analysis. *Geologia Croatica*, 2016, vol. 69, no. 3, str. 295-305.

VRABEC, Marko, PAVLOVČIČ PREŠEREN, Polona, STOPAR, Bojan. GPS study (1996-2002) of active deformation along the Periadriatic fault system in northeastern Slovenia: tectonic model. *Geol. Carpath.*, 2006, vol. 57, no. 1, str. 57-65.

ŽALOHAR, Jure, VRABEC, Marko. Kinematics and dynamics of fault reactivation: the Cosserat approach. *Journal of*

Structural Geology, 2010, vol. 32, str. 15-27.

KASTELIC, Vanja, VRABEC, Marko, CUNNINGHAM, Dickson, GOSAR, Andrej. Neo - Alpine structural evolution and present day tectonic activity of the eastern Southern Alps: the case of the Ravne Fault, NW Slovenia. J. struct. geol., 2008, vol. 30, iss. 8, str. 963-975.