

COURSE OF DOCTORAL STUDIES

Course title	Field of science (branch) code	University / Faculty	Institute / Department
Petrology of igneous and metamorphic rocks	Natural Sciences (Geology) N 005	Vilnius University / Faculty of Chemistry and Geosciences	Institute of Geosciences /
Study methods	Number of credits allocated	Study methods	Number of credits allocated
Lectures		Seminars	
Individual work	11	Consultations	
Course annotation			
<p>Petrology is a science branch dealing with rocks, their composition, classification, origin and distribution in space and time. It studies geological processes, i.e., physical, and chemical characteristics of the deep Earth and its surface, what geological and tectonic processes were responsible for those characteristics, and variety of tectonic settings. Rock is studied as a source of information on the above processes, evolution of the entire Earth and its composition.</p> <p>Build-up of Solar system and planets. Relationship between composition of the Earth and distance from the Sun. Composition of meteorites and their importance for the Earth evolution. Classification of igneous rocks and major subdivision. Mineral and chemical composition of the major groups of igneous rocks. Melting of homogenous and heterogenous mantle, magma differentiation, and mechanisms of differentiation. Major, minor and trace elements in the igneous rocks, usage of classification and discrimination diagrams for rock origin and evolution. Radioactive and radiogenic isotope systems used for rock age determination.</p> <p>Classification of metamorphic rocks and their major groups. Mineral composition and variety of textures. Different source rocks and their response to the change of metamorphic conditions. Application of Gibbs' rule of phases. Metamorphic reactions. Investigation of metamorphic conditions, i.e., P and T parameters, geothermobarometry and phase modeling. Hydrothermal processes and metasomatism. Secondary alteration and rock weathering.</p> <p>Application of the knowledge on petrology in practice: for exploration of mineral deposits, sustainable resource usage, green economy etc.</p>			
Required readings			
Winter, John D., 2014. Principles of Igneous and Metamorphic Petrology. PEARSON, UK. 739 p.			
Philpotts, Anthony R., 2003. Petrography of igneous and metamorphic rocks. Waveland Press. 179 p			
Ridley, John, 2013. Ore deposits. Cambridge University Press. 398 p.			
Faure, G., 2001. Origin of Igneous Rocks: the Isotopic Evidence. Springer-Verlag. 495 p.			
Spear, F.S., 1993. Metamorphic phase equilibria and Pressure-Temperature-Time Paths. Springer-Verlag			
Sen, Gautam, . Petrology: Principles and Practise. Springer-Verlag. 368 p.			
Motuza, G., 2006. Magminių ir metamorfinių uolienų petrologija. Vilniaus universiteto leidykla.			
Consulting lecturers Name, surname	Degree	The most important works in the field of science (branch) have been published during the last 5 years	
Gražina Skridlaitė	Dr., assoc. prof.	Skridlaite G., Bogdanova S., Taran L. and Baginski B., 2014. Recurrent high grade metamorphism recording a 300 Ma long Proterozoic crustal evolution in the western part of the East European Craton. Gondwana Research, V 25 (2), 649-667	

		<p>Vejelyte, I., Bogdanova, S., Skridlaite, G., 2015. Early Mesoproterozoic magmatism in northwestern Lithuania: a new U-Pb zircon dating. <i>Estonian Journal of Earth Sciences</i>, 64, 3, 189-198.</p> <p>Bogdanova, S., Gorbatshev, R., Skridlaite, G., Soesoo, A., Taran, L., Kurlovich, D., 2015. Trans-Baltic Palaeoproterozoic correlations towards the reconstruction of supercontinent Columbia/Nuna. <i>Precambrian Research</i>, 259, 5-33</p> <p>Skridlaitė, G., Šiliauskas L., Prušinskienė S., Bagiński B. 2019. Petrography and mineral chemistry of the Varena Iron Ore deposit, southeastern Lithuania: implications for the evolution of carbonate and silicate rocks and ore mineralization. <i>Baltica</i>, 32 (1), 107–126</p>
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Laurynas Šiliauskas	Dr.	<p>Prusinskiene, S., Šiliauskas, L., Skridlaite, G., 2017. Varieties and chemical composition of magnetite in the Varėna Iron Ore deposits. <i>Chemija</i>, Vol. 28. No. 1, p. 39–57.</p> <p>Šiliauskas, L., Skridlaite, G., Bagiński, B., Whitehouse M. & Prusinskiene, S., 2018. What the ca. 1.83 Ga gedrite-cordierite schists in the crystalline basement of Lithuania tell us about the late Palaeoproterozoic accretion of the East European Craton, <i>GFF</i>, 140:4, 332-344,</p>
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Approved by the doctoral committee of Geology (N 005) on 1 st of December 2022 (No. (7.17 E) 15600-KT-467).		
Committee Chairman prof. dr. Sigitas Radzevičius		