COURSE OF DOCTORAL STUDIES

Course title	Field of science (branch) code	University / Faculty	Institute / Department
GIS in geosciences	Natural Sciences (Physical Geography) N 006	Vilnius University / Faculty of Chemistry and Geosciences	Institute of Geosciences / Department of Cartography and Geoinformatics

Study methods	Number of credits allocated	Study methods	Number of credits allocated
Lectures		Seminars	
Individual work	9	Consultations	1

Course annotation

Aims of course. To broaden and deepen the knowledge on Geographic Information Science and application of modern Geographic Information Systems (GIS) in geosciences domains.

Main topics. Geographic Information Science and Technology – main concepts and definitions. Importance of geographic (spatial) information. Spatial data models: raster, vector, grid, TIN data. Applications of different data models. Data formats and transformations. Spatiotemporal data. Topological relationships in spatial data. Commercial and open source GIS software. Methods of spatial data mining. Spatial analysis – principles and operations. Selection and editing of spatial data. Vector and raster analysis. Interpreting the results of analysis. Modelling in GIS. Location based services. Organisational, legal and ethical aspects of spatial data management. Public spatial information and the EU INSPIRE Directive. Spatial information infrastructures and spatial data portals. Lithuanian spatial information infrastructure and geoportal.lt. Environmental information systems and public spatial data. Crowdsourced spatial data, collaboration using web GIS. Spatial data and maps: map layers, co-ordinate systems, principles of cartographic visualization. Interactive maps. Multiscale maps. Spatial data services. Specific applications of GIS in environmental research.

Essay, including a study of possibilities of application of GIS methods in doctoral research. Discussion. Three open questions.

Required readings

Ezra Dessers. Spatial Data Infrastructures at Work: Analysing the Spatial Enablement of Public Sector Processes. Leuven University Press 2014. ISBN 13:9789058679376

Tian, Bai. GIS technology applications in environmental and earth sciences. Taylor & Francis;CRC Press 2017. ISBN 13: 9781498776059

Hamid Reza Pourghasemi, Candan Gokceoglu (eds.). Spatial Modeling in GIS and R for Earth and Environmental Sciences. Elsevier 2019. ISBN: 9780128152263.

Patrick McHaffie, Cassie Follett. GIS: An Introduction to Mapping Technologies. CRC Press; 1st edition (October 31, 2018). ISBN-10 : 1498740235

Menno-Jan Kraak, Ferjan Ormeling. Cartography Visualization of Geospatial Data. CRC Press; 4th edition (July 29, 2020). ISBN-10 : 1138613959

Ian Masser (Editor). Geographic Information Systems to Spatial Data Infrastructures-A Global Perspective. CRC Press 2019. ISBN 13:9780429000249

Consulting lecturers name surname	Degree	The most important works in the field of science (branch) have been published during the last 5 years
Giedrė Beconytė	dr.	**Beconytė G.**, Vasiliauskas D., Govorov M. 2020. Lietuvos policijos 2015–2019 m. registruotų įvykių erdvinė sklaida ir dinamika. Filosofija. Sociologija. 2020. 31(2), 175–185. **Beconytė G.**, Budrevičius J.D., Ciparytė I., Balčiūnas A. 2019. Plants and animals in the oikonyms of Lithuania, Journal of Maps, 15(2), 726-732. Govorov M., **Beconytė G.**, Gienko G. 2019. Spatially Constrained Regionalization with Multilayer Perceptron. Transactions in GIS. 2019;00,1–30. **Beconytė G.**, Snežko J., Balčiūnas A., Vidugirytė-Pakerienė I. 2019. Enhanced conceptual model for spatial references in works of fiction: mapping Vilnius literature. The Cartographic Journal.

		Vasiliauskas D., **Beconytė G**. 2016. Cartography of crime: portrait of metropolitan Vilnius. Journal of Maps, 12(5), 1236–1241.
Approved by the Doctoral Committee for Physical Geography (N006) on 9th of March 2021, protocol no. (4.20 E) 610000-KT-24.		
Committee Chairman assoc. prof. dr. D. Pupienis		