

## COURSE OF DOCTORAL STUDIES

Course title	Field of science (branch) code	University / Faculty	Institute / Department
Mathematical statistical methods in geosciences	Natural Sciences (Physical Geography) N 006	Klaipėda University  Vilnius University / Faculty of Chemistry and Geosciences	Marine Research Institute  Institute of Geosciences / Department of Cartography and Geoinformatics
Study methods	Number of credits allocated	Study methods	Number of credits allocated
Lectures		Seminars	1
Individual work	8	Consultations	1
<b>Course annotation</b>			
<p>Aims of course. Mathematical statistical and geographical research methods comprise an integral part of doctoral studies in the field of Geography. The main focus is given to spatial data analysis and modelling techniques. Spatial data distribution patterns and relationships are analysed by attribute and location selection methods, various visualization tools, classical, multidimensional and spatial statistical methods.</p> <p>The aim of the subject – students know the most commonly used methods of statistical and spatial analysis, are able to select them properly for the given research task and are able to interpret the obtained results.</p> <p>Main topics.</p> <ul style="list-style-type: none"> <li>- Overview of statistical and geostatistical methods and models. Descriptive statistics. Distributions, their properties and types.</li> <li>- Univariate statistical methods: parametric and non-parametric statistical methods for hypothesis testing and relationship analysis, regression models, regression and classification trees.</li> <li>- Multidimensional statistical methods: cluster analysis, multidimensional scaling, principal components analysis, canonical correspondent analysis, redundancy analysis.</li> <li>- Geostatistical methods: analysis of spatial distribution, representation of point data on a continuous surface, local spatial statistics, interpolation, estimation and smoothing methods, verification of geostatistical model.</li> </ul>			
<b>Required readings</b>			
Acevedo M.F. 2012. Data Analysis and Statistics for Geography, Environmental Science, and Engineering. Taylor & Francis Group.			
Cressie N. 2015. Statistics for Spatial Data. Wiley-Interscience.			
Peter A.R. 2010. Statistical methods for geography: a student's guide. Thousand Oaks, CA, Sage.			
Zuur A.F., Ieno E.N., Walker, N.J., Saveliev, A.A. & Smith G. 2009. Mixed Effects Models and Extensions in Ecology with R. Springer, New York.			
Legendre P. and Legendre L. 2003. Numerical Ecology. 2nd Edition. Developments in Environmental Modelling 20. Amsterdam.			
Consulting lecturers name, surname	Degree	The most important works in the field of science (branch) have been published during the last 5 years	
Martynas Bučas	dr.	<p><b>Bučas</b>, M., Šaškov, A., Šiaulyš, A., Sinkevičienė, Z., 2016. Assessment of a simple hydroacoustic system for the mapping of macrophytes in extremely shallow and turbid lagoon. Aquatic Botany 134: 39–46.</p> <p>Sinkevičienė Z., <b>Bučas</b> M., Ilginė R., Vaičiūtė D., Kataržytė M. &amp; Petkuvienė J. 2017. Charophytes in the estuarine Curonian Lagoon: are there changes in diversity, abundance and distribution since late 1940s? Oceanol. Hydrobiol. St. 46(2): 186-198.</p> <p><b>Bučas</b> M., Sinkevičienė Z., Kataržytė M., Vaičiūtė D., Petkuvienė J. and V. Stragauskaitė, Ilginė R., 2018. How much can the occurrence and coverage of charophytes in an estuarine lagoon (Curonian Lagoon) be explained by environmental factors? Estuarine, Coastal and Shelf Science, 1-11.</p> <p>Kryzevicius Z., Mickuviene K., <b>Bucas</b> M., Vilkiene M., Zukauskaite A., 2020. Vertical distribution of polycyclic aromatic hydrocarbons in the brackish sea water column: ex situ experiment. PeerJ 8: 10087.</p>	

		<p>Stragauskaitė, V. <b>Bučas</b>, M., Martin, G. 2021. Distribution of Charophyte Oospores in the Curonian Lagoon and their relationship to Environmental Forcing. <i>Water</i> 13, 117.</p> <p>Vaičiūtė D., <b>Bučas</b> M., Bresciani M., Dabulevičienė T., Gintauskas J., Mėžinė J., Tiškus E., Umgiesser G., Morkūnas J., De Santi F., Bartoli M. 2021. Hot moments and hotspots of cyanobacteria hyperblooms in the Curonian Lagoon (SE Baltic Sea) revealed via remote sensing-based retrospective analysis. <i>Science of The Total Environment</i> 769.</p>
Giedrė Beconytė	dr.	<p><b>Beconytė G.</b>, Vasiliauskas D., Govorov M. 2020. Lietuvos policijos 2015–2019 m. registruotų įvykių erdvinė sklaida ir dinamika. <i>Filosofija. Sociologija</i>. 2020. 31(2), 175–185.</p> <p><b>Beconytė G.</b>, Budrevičius J.D., Ciparytė I., Balčiūnas A. 2019. Plants and animals in the oikonyms of Lithuania, <i>Journal of Maps</i>, 15(2), 726-732.</p> <p>Govorov M., <b>Beconytė G.</b>, Gienko G. 2019. Spatially Constrained Regionalization with Multilayer Perceptron. <i>Transactions in GIS</i>. 2019;00,1–30. DOI:10.1111/tgis.12557.</p> <p><b>Beconytė G.</b>, Snežko J., Balčiūnas A., Vidugirytė-Pakerienė I. 2019. Enhanced conceptual model for spatial references in works of fiction: mapping Vilnius literature. <i>The Cartographic Journal</i>. <a href="https://doi.org/10.1080/00087041.2018.1533292">https://doi.org/10.1080/00087041.2018.1533292</a></p> <p>Vasiliauskas D., <b>Beconytė G.</b> 2016. Cartography of crime: portrait of metropolitan Vilnius. <i>Journal of Maps</i>, 12(5), 1236–1241.</p>
Approved by the Doctoral Committee for Physical Geography (N006) on 9 <sup>th</sup> of March 2021, protocol no. (4.20 E) 610000-KT-24		
Committee Chairman assoc. prof. dr. D. Pupienis		