

## COURSE OF DOCTORAL STUDIES

Course title	Field of science (branch) code	University / Faculty	Institute / Department
Coastal processes and morphology	Natural Sciences (Physical Geography) N 006	Nature Research Centre  Klaipėda University	Institute of Geology and Geography / Laboratory of Geoenvironmental Research  Marine Research Institute
Study methods	Number of credits allocated	Study methods	Number of credits allocated
Individual work	8	Practical work	1
Consultations	1		
Course annotation			
<p>The course aims introduce students to the coastal dynamic processes, the specifics of their investigation, and coastal zone management.</p> <p>Study object. Coastal zone: Main terminology, definitions and concepts. Fundamentals of coastal science and the main stages of its development. Coastal science in Lithuania.</p> <p>Coastal processes. <i>Hydrodynamics of the coastal zone</i>: seawater wave mechanics, wave refractions and shoaling, wave breaking, wave setup, wave run-up, cross-shore and longshore currents, nearshore circulation, and rip currents. Long and short term sea level fluctuations and changes and forcing factors affecting it. Eustatic and isostatic components of sea level fluctuations. Tides. Groundwater. <i>Aeolian processes</i>: winds and boundary layer processes; sand transport; sorting of the fine sediments; thresholds and initiation of sand transport for dry sand, beach surface roughness impact on the sand transport; sand deposition. <i>Lithodynamics</i>: sediments; longshore and cross-shore sediment transport; littoral sediment budget and littoral drift cells; accumulative and erosive zone formations. <i>Morphodynamics</i>: beach and nearshore sediments and morphology; equilibrium profile; physical processes responsible for their changes.</p> <p>Coastal morphology. <i>Coast elements</i>: shore, underwater slope, sandbar, beach, dune, cliff, spit, coastal barrier, cusps. <i>Coastal types</i>: types of coasts based on the formation process, structure, characteristics of the transverse profile and geodynamic. Baltic Sea coastal types. Curonian Spit.</p> <p>Human activity in coastal zone. Tourism and recreation, urban settlement, ports, shore protection, waste disposal, sea fisheries, militaristic-strategic.</p> <p>Coastal zone management. Object and objectives. Basic principles of coastal management policy formulation, planning and implementation of measures. Regional differences in coastal management policy, planning and practice.</p> <p>Coastal protection. Soft and hard coastal protection methods. Principles, requirements and impact of engineering structures on coastal processes. Wave breakers. Longshore sediment transport control. Coastal erosion induced by aeolian processes. Sand replenishment.</p> <p>Coastal monitoring. Coastal monitoring principles, Observations of water quality, coastal morphology and lithodynamics, ecosystem change. Coastal change measurements, assessment and forecasting. Identification of protective zones.</p> <p>Coastal management in Lithuania. Peculiarities and priorities of Lithuanian coastal zone management.</p>			
Required readings			
Alterman, R., Pellach, C. (Eds.). 2020. <i>Regulating Coastal Zones: International Perspectives on Land Management Instruments</i> . Routledge.			
Žaromskis R., Gulbinskas S. 2018. <i>Krantodara ir krantotvarka</i> . Klaipėda.			
Ramkumar, M., James, A., Menier, D., Kumaraswamy, K. (Eds.). 2018. <i>Coastal Zone Management: Global Perspectives, Regional Processes, Local Issues</i> . Elsevier.			
Davidson-Arnott R. 2010. <i>Introduction to coastal processes and geomorphology</i> . Cambridge University Press.			
Recommended reading			
Robert G. Dean R. G., Dalrymple R. A. 2002. <i>Coastal Processes with Engineering Applications</i> , Cambridge University Press.			
Bird E. C. F. 1996. <i>Beach management</i> , Chichester: Wiley.			

Carter R. W. G. 1988. Coastal environments, London: Academic press.		
Robert G. Dean R. G., Dalrymple R. A. 1991. Water Wave Mechanics for Engineers and Scientists, World Scientific		
Lietuvos Baltijos jūros krantų tvarkymo programa 2008-2013 m. 2007. <i>Ataskaita, (GGI)</i> . Vilnius		
Masselink G., Hughes M. G. 2003. <i>Introduction to coastal processes and geomorphology</i> . Edward Arnold.		
Žilinskas G., Jarmalavičius D., Minkevičius V. 2001. Eoliniai procesai jūros krante. Vilnius.		
Consulting lecturers name, surname	Degree	The most important works in the field of science (branch) have been published during the last 5 years
Darius Jarmalavičius	Dr.	<p><b>Jarmalavičius, D.</b>, Šmatas, V., Stankūnavičius, G., Pupienis, D., Žilinskas, G. 2016. Factors controlling coastal erosion during storm events. <i>Journal of Coastal Research</i> SI 75, 1112–1116.</p> <p>Pupienis, D., Buynevich, I., Ryabchuk, D., <b>Jarmalavičius, D.</b>, Žilinskas, G., Fedorovič, J., Kovaleva, O., Sergeev, A., Cichon-Pupienis, A. 2017. Spatial patterns in heavy-mineral concentrations along the Curonian Spit coast, southeastern Baltic Sea. <i>Estuarine, Coastal and Shelf Science</i>, 195, 41-50.</p> <p><b>Jarmalavičius, D.</b>, Žilinskas, G., Pupienis, D., Kriaučiūnienė, J. 2017. Subaerial beach volume change on a decadal time scale: the Lithuanian Baltic Sea coast. <i>Zeitschrift für Geomorphologie</i>, 61(2), 149-158.</p> <p><b>Jarmalavičius, D.</b>, Žilinskas, G., Pupienis, D. 2017. Geologic framework as a factor controlling coastal morphometry and dynamics. Curonian Spit, Lithuania. <i>International Journal of Sediment Research</i>, 32(4), 597-603.</p> <p>Žilinskas, G., <b>Jarmalavičius, D.</b>, Pupienis, D. 2018. The influence of natural and anthropogenic factors on grain size distribution along the southeastern Baltic spits. <i>Geological Quarterly</i>, 62(2), 375-384.</p> <p><b>Jarmalavičius, D.</b>, Pupienis, D., Žilinskas, G., Karaliūnas, V., Jukna, L. 2019. The development and stability of beach-dune system on the wave-dominated coast: A case study of the Curonian Spit, Lithuania. <i>Aeolian Research</i>, 41, 100542.</p> <p><b>Jarmalavičius, D.</b>, Pupienis, D., Žilinskas, G., Janušaitė, R., Karaliūnas, V. 2020. Beach-Foredune Sediment Budget Response to Sea Level Fluctuation. Curonian Spit, Lithuania. <i>Water</i>, 12(2), 583.</p> <p>Karaliūnas, V., <b>Jarmalavičius, D.</b>, Pupienis, D., Janušaitė, R., Žilinskas, G., Karlonienė, D. 2020. Shore nourishment impact on coastal landscape transformation: An example of the Lithuanian Baltic Sea coast. <i>In: Malvárez G., Navas F. (eds.), Global Coastal Issues of 2020. Journal of Coastal Research, Special Issue No. 95, pp. 840-844.</i></p> <p>Žilinskas, G., Janušaitė, R., <b>Jarmalavičius, D.</b>, Pupienis, D. 2020. The impact of Klaipėda Port entrance channel dredging on the dynamics of coastal zone, Lithuania. <i>Oceanologia</i>, 62(4), 489-500.</p>
Loreta Kelpšaitė-Rimkienė	Dr.	<p>Rukšėnienė, V., Dailidienė, I., <b>Kelpšaitė-Rimkienė, L.</b>, Soomere, T. 2017. Sea surface temperature variations in the south-eastern balticsea in 1960–2015, <i>Baltica</i>, 30 (2), pp. 75-85.</p> <p><b>Kelpšaitė-Rimkienė, L.</b>; Soomere, T.; Bagdanavičiūtė, I.; Nesteckitė, L., and Žalys, M., 2018. Measurements of long waves in Port of Klaipėda, Lithuania. <i>In: Shim, J.-S.; Chun, I., and Lim, H.S. (eds.), Proceedings from the International Coastal Symposium (ICS) 2018 (Busan, Republic of Korea). Journal of Coastal Research, Special Issue No. 85, pp. 761–765.</i></p> <p>Bagdanavičiūtė, I., <b>Kelpšaitė-Rimkienė, L.</b>, Galinienė, J., Soomere, T. 2019. Index based multi-criteria approach to coastal risk assessment, <i>Journal of Coastal Conservation</i>. 23 (4), 785–800.</p> <p>Borisenko, I.; Kondrat, V.; Valaitis, E.; <b>Kelpšaitė-Rimkienė, L.</b>, Olšauskaitė Urbonienė, R., 2020. Application of the spatial statistic methods to coastal zone management: SE Baltic sea coast case. <i>In: Malvárez, G. and Navas, F. (eds.), Global Coastal Issues of 2020. Journal of Coastal Research, Special Issue No. 95,</i></p>

	pp. 753–758.
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	