**DOCTORAL (PHD) STUDIES**

**COURSE DESCRIPTION**

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| Course title | Field of science | Faculty | Institute |
| Probabilistic machine learning algorithms | Mathematics(N 001) | Faculty of Mathematics and Informatics | Institute of Applied Mathematics |
| Study method | Number of credits | Study method | Number of credits |
| Lectures | 0 | Consultations | 1 |
| Individual work | 4 | Seminars | 0 |

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| Course summary |
| Linear and non-linear dimension reduction techniques, regression models, regression trees, classification models, classification trees, support vector machines, artificial neural networks, error reduction techniques, cluster analysis, distance geometry.  |
| Main literature |
| 1. Izenman, Alan Julian. *Modern multivariate statistical techniques. Regression, classification and manifold learning*. Springer Science+Business Media New York, 2013. |
| 2. Murphy, Kevin P. *Machine learning: a probabilistic perspective*. MIT press, 2012. |
| 3. Shalev-Shwartz, Shai, and Shai Ben-David. *Understanding machine learning: From theory to algorithms*. Cambridge university press, 2014. |

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| Consulting teacher | Scientific degree | Pedagogical name | Main publications in the field of science of the last 5 year period |
| Jurgita Markevičiūtė | Dr. | Assoc. Prof. | 1. Markevičiūtė, Jurgita; Bernatavičienė, Jolita; Levulienė, Rūta; Medvedev, Viktor; Treigys, Povilas; Venskus, Julius. Impact of COVID-19-related lockdown measures on economic and social outcomes in Lithuania // Mathematics. Basel : MPDI. 2022, vol. 10, no. 15, art. no. 2734, p. [1-20].
2. Markevičiūtė, Jurgita; Bernatavičienė, Jolita; Levulienė, Rūta; Medvedev, Viktor; Treigys, Povilas; Venskus, Julius. Attention-based and time series models for short-term forecasting of COVID-19 spread // CMC-Computers, materials & continua. Henderson, NV : TECH Science Press. 2022, vol. 70, no. 1, p. 695-714.
3. Venskus, Julius; Treigys, Povilas; Markevičiūtė, Jurgita. Unsupervised marine vessel trajectory prediction using LSTM network and wild bootstrapping techniques // Nonlinear analysis : modelling and control. Vilnius : Vilniaus universiteto leidykla. ISSN 1392-5113. vol. 26, no. 4, p. 718-737.
4. Norkus, Zenonas; Markevičiūtė, Jurgita. New estimation of the gross domestic product in Baltic countries in 1913–1938 // Cliometrica. Heidelberg : Springer. 2021, vol. 15, iss. 3, p. 565-674.
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| Approved by Mathematics and Informatics Faculty board ........./2021. Protocol No. ...... |
| Board Chairman –  |