TOMSK POLYTECHNIC UNIVERSITY   ТОМСКИЙ ПОЛИТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

Machine learning

Field of Study: 09.03.04 Software Engineering

Programme name: Big Data Solutions

Level of Study: Master Degree Programme

Year of admission: 2018

Semester, year: 3,2

ECTS: 3
Total Hours: 144
Contact Hours: 48
- **Lectures:** 24
- **Labs:** 24
- **Practical experience:**

Assessment: exam

Department: Software Engineering

Head of Department   _____ M.A. Ivanov

Instructor(s)   _____ S.V. Axyonov

TOMSK
POLYTECHNIC
UNIVERSITY

Томский
Политехнический
Университет

Machine learning

Course Overview

Course Objectives	Course is aimed to formation of student's skills and abilities for professional machine learning.
Learning Outcomes	As a result of mastering the discipline, the student must achieve the following results: – Ability to design machine learning models. – Ability to create algorithms for data classification, regression, association tasks. – Ability to interpret the result of machine learning models. – Understanding the basics of the following technologies: Data Mining, Clustering, Classification, Assosiation.
Course Outline	1.Knowledge representation 2.Basics of data mining 3.Data preprocessing 4.Technologies of machine learning 5.Models of machine learning 6.Ensembles of machine learning models 7.Performance of models 8.Feature spaces optimization
Prerequisites (if available)	*Software Engineering, Statistics, Advanced Math, Expert systems*
Course Structure	*1.Knowledge representation* *2.Basics of data mining* *3.Data preprocessing* *4.Technologies of machine learning* *5.Models of machine learning* *6.Ensembles of machine learning models* *7.Performance of models* *8.Feature spaces optimization*
Facilities and Equipment	*Computer lab equipped by the following software: Microsoft Azure Machine Learning Workbench, Microsoft Visual Studio, Eclipse, R and Python compilers, Rapid Miner Studio*
Grading Policy	*In accordance with TPU rating system we use:* *Current assessment which is performed on a regular basis during the semester by scoring the quality of mastering of theoretical material and the results of practical activities (performance tests, perform tasks, problem solving). Max score for current assessment is 60 points, min – 40 points.*

	Course final assessment (exam/ credit test) is performed at the end of the semester. Max score for course final assessment is 40 points, min – 22 points. *The final rating is determined by summing the points of the current assessment during the semester and exam (credit test) scores at the end of the semester. Maximum overall rating corresponds to 100 points, min pass score is 80.*
Course Policy	*Class attendance will be taken into consideration when evaluating students' participation in the course / Students are expected to actively engage in class discussions about the assigned readings. / Attendance is strictly controlled. All classes is obligatory to presence.*
Teaching Aids and Resources	*Compulsory Readings:* 1. Rohit Kumar Machine Learning and Cognition in Enterprises: Business Intelligence Transformed Apress 2017. – 321 pages. ISBN: 978-1-4842-3069-5. 2. Kathryn Hulick Artificial Intelligence. Essential Library. 2016 -112 pages. ISBN: 978-1-6240-3916-3. 3. Raghu Nandan Sengupta and Aparna Gupta Decision Sciences: Theory and Practice. CRC Press 2016, 1026 pages. ISBN: 978-1-4665-6430-5. *4.* Andreas Wichert Intelligent Big Multimedia Databases World Scientific Publishing Co, 2015. – 322 pages. ISBN: 978-981-4696-64-7. *5.* Charu C. Aggarwal Data Mining: The Textbook. Springer, 2015. - 746 pages. ISBN 978-3-319-14141-1. *Additional Readings:* 1. Matthew Kirk Thoughtful Machine Learning O'Reilly, 2015 - 218 pages. ISBN: 978-1-449-37406-8 2. Sebastian Raschka Python Machine Learning. Packt Publishing, 2015. – 450 pages, ISBN: 978-1-78355-513-0 3. Computational Trust Modelsand Machine Learning. Ed: Xin Liu, Anwitaman Datta, Ee-Peng Lin. CRC Press. Taylor & Francis Group, 2015. – 225 pages. – ISBN: 978-1-4822-2667-6 4. Paul Gerrard, Raida M. Johnson Mastering Scientific Computing with R. Packt Publishing Ltd., 2015 – 425 pages. – ISBN: 978-1-78355-525-3. *5.* Yu-Wei Chiu Machine Learning with R Cookbook. Packt Publishing Ltd., 2015. - 1045 pages. – ISBN: 978-1-178-398-2042. *6.* Dr. Hari M. Koduvely Learning Bayesian Models with R. Packt Publishing Ltd., 2015. - 168 pages. – ISBN: 978-1-178-398-76-03. *Internet resources:* 1. http://machinelearning.ru/ – ресурс MachineLearning.ru, дата обращения 25.12.2016 г. 2. https://azure.microsoft.com/ru-ru/services/machine-learning/ - ресурс Microsoft, дата обращения 25.12.2016 г. 3. https://aws.amazon.com/ru/machine-learning/ - ресурс Amazon Machine Learning, дата обращения 25.12.2016 г. 4. http://www.sas.com/en_us/insights/analytics/machine-learning.html - ресурс SAS Machine learning, дата обращения 25.12.2016 г.

	5. , https://www.ml.cmu.edu/- ресурс Carnegie Mellon University Machine Learning, дата обращения 25.12.2016 г.
Instructor (-s)	*Axyonov Sergey Vladimirovich, PhD, Assistant professor, E-mail: axyonov@tpu.ru, Skype: axoenow.sergej, Mob. +79138874790*