



Machine Learning: Theory and Application

Version	2020/1
Effective from (date of when the course was developed)	01/10/19

Course Credits given	4 ECTS
Level/Year	Bachelor, Master and PhD students
Teaching (contact) hours	44
Total learner managed hours (incl. self-work)	100
Total hours of student learning	144

Pre-requisites	The course is open for Bachelor, Master and PhD students with the background in Information Technology and Computer Science, Mathematical Science or equivalent skills and knowledge.
Alignment to graduate profiles	Bachelor (Undergraduate diploma) of Information Technology Specialist Diploma in Information Technology Master (Graduate diploma) in Information Technology
Course aim	The course introduces students to the theoretical foundations of machine learning and data science, as well as to the solution of real business problems with the help of computer vision, classification and regression algorithms. The optimal balance between theory and practice provides both a good foundation and the ability to apply knowledge in practice.
Indicative Course content	<ul style="list-style-type: none"> • Introduction to Artificial intelligence and Machine Learning; • Supervised and unsupervised learning; • Overfitting and underfitting; • Regularization in ML; • Model Validation metrics and tactics; • Machine learning algorithms classification; • Data processing techniques; • Machine learning application workflow; • Hyperparameters tuning tactics; • Binary classification and logistic regression; • Shallow Neural networks; • Deep Neural networks; • Convolutional Neural Networks; • Deep Sequential Neural Networks.

LEARNING OUTCOMES

On successful completion of this course students will be able to:	
1	Apply Machine Learning algorithms to solve classification and regression tasks
2	Work with a Machine Learning and Data Science teams
3	Understand all the basic topics of modern Machine Learning field
4	Manage the training process of ML models and improve their performance.

ASSESSMENTS

Basis of assessment	Achievement based assessment Final project: Real-World application Daily Quizzes
----------------------------	--



Methods of assessment	Learning Outcomes	Pass criteria (Minimum)	% Weightings
Final project	2,3	Error >85%	50%
Daily Quizzes	1,4	0.7	50%

REQUIREMENTS FOR SUCCESSFUL COURSE COMPLETION

Requirements	Mark of 70% or more in every summative assessment Gain a course result of C (50%) or higher
---------------------	--

RESULTS

Assessment results	Results for assessments are given in percentage marks
Course results	Jupyter notebook with final project & teachers review, theoretical materials, in-class practical applications.

LEARNING AND TEACHING

Learning and teaching approaches	<p>Learning process based on combining of 4 main types of materials:</p> <ul style="list-style-type: none"> • Theoretical lectures (Intuitions, ideas and algorithms description) • Workshops (review of realization of described concepts and practical tasks) • Self education (Learning of an extra academic materials, given by lecturers) + Squeezes for self-control • Final project (Based on learned materials and gained skills) <p>Learning process is based on presenting the materials by teachers, discussing the materials and answering to students questions</p>
Learning and teaching resources	Manuals, academic journals; use of Internet; software; platforms; individual consultations with lecturers
Learner managed activities	<ul style="list-style-type: none"> • Completion of course work, set assignments/projects • Reading of course materials • Homework • Discussions with colleagues/subject matter experts • Review application of information to course work • Practicing relevant practical and technical skills/methods/techniques • Self-evaluation of course work • Gathering relevant contextual information/ issues/ideas to build knowledge of the subject