Study programme(s): Applied Mathematics (MAP)

Course title: INTRODUCTION TO MACHINE LEARNING (P506)

Lecturer(s): Nataša Krklec Jerinkić

Course status: compulsory on module: Data Analytics and Statistics

ECTS points: 5

Requirements: Probability

Learning Objectives

- Understanding basic methods of machine learning.
- Understanding the pros and cons of individual methods.
- The ability to choose the right method for a particular problem.
- Ability to implement in relevant software packages.

Learning Outcomes

The student acquires basic knowledge and understanding of machine learning methods, notions and concepts of training and testing methods, training and testing errors, and understanding the results/outcomes of various basic machine learning algorithms.

Syllabus

Theoretical instructions

Basic methods and concepts of machine learning, including the following: supervised and unsupervised learning, classification, regression and clustering, training error and testing error, overfitting, decision-making trees, Bayesian models, K nearest neighbors, K-means clustering, basics of data dimensionality reduction, fundamentals of neural networks.

Practical instructions

Introduction to selected software packages, machine learning libraries and applications to simple problems and small-dimensional structured data sets.

Literature

1. C. Bishop: **Pattern recognition and machine learning**, Springer, 2006
2. T. Hastie, R. Tibshirani and J. Friedman: **Elements of Statistical Learning**. Springer, 2009

Number of active classes	**Lectures: 2**	**Exercises: 2**

Teaching methods

Lectures; repetition; active participation of students in problem solving. Knowledge-tests, homework. Applications to simple problems with (real) structured data sets of small or moderate dimensions.

Grading (maximum number of points 100)

Pre-exam obligations	Points	**Final exam**	Points
Homework, mini project	**30**	Final exam	**70**