

**Learning outcomes**

This course introduces fundamental concepts in machine learning and presents some classical approaches and algorithms. The scikit-learn library is presented during the practical sessions. The course aims at providing fundamental basics for using machine learning techniques.

**Keywords**

Machine Learning, SVM, Decision Trees, Deep Learning, HMM

**Content**

- Basics of Machine Learning (learning settings, risks and generalization, loss functions, etc.)
- K-Nearest neighbors
- Decision trees and Random Forests
- Support Vector Machines
- Neural Networks and introduction to Deep Learning
- Hidden Markov Models
- Practical: Introduction to Scikit-learn

**Modes of study**

Course and project work, active participation

**Teaching methods**

Lectures (15h), tutorials (10h) and lab sessions (10h).

**Study materials**

- Statistical Learning Theory, V. Vapnik, 1989
- Machine Learning, Tom Mitchell, MacGraw Hill, 1997
- An Introduction to Support Vector Machines and Other Kernel-based Learning Methods, Nello Cristianini, John Shawe-Taylor, Cambridge University Press 2010: I-XIII, 1-189
- Pattern Recognition and Machine Learning, Christopher M. Bishop, Springer 2013
- On-line Machine Learning courses: <https://www.coursera.org/>

**Evaluation criteria**

(Written exam / written assignments / project work / ...)

1 theoretical examination (2h, 2/3), 1/3 practical assignments.

Scale to be defined

**Prerequisites**

- Basics of python programming
- Basics in algebra and statistics