# Machine Learning
## *Laboratory*

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Academic Year 2023-2024

**Abstract**

The course topics are:

- Introduction: basic concepts.
- Learning theory:
  - Bias/variance tradeoff. Union and Chernoff/Hoeffding bounds.
  - VC dimension. Worst case (online) learning.
  - Practical advice on how to use learning algorithms.
- Supervised learning:
  - Supervised learning setup. LMS.
  - Logistic regression. Perceptron. Exponential family.
  - Kernel methods: Radial Basis Networks, Gaussian Processes, and Support Vector Machines.
  - Model selection and feature selection.
  - Ensemble methods: Bagging, boosting.
  - Evaluating and debugging learning algorithms.
- Reinforcement learning and control:
  - MDPs. Bellman equations.
  - Value iteration and policy iteration.
  - TD, SARSA, Q-learning.
  - Value function approximation.
  - Policy search. Reinforce. POMDPs.
  - Multi-Armed Bandit.

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