

- Faculté des sciences économiques
- [www.unine.ch/seco](http://www.unine.ch/seco)

## Title : Elements of Statistical Learning

### Characteristics

- 3 ECTS credits
- Compulsory course for the master in statistics
- Spring Semester
- Lectures : 2 hours
- Prerequisite : knowledge of probability and statistical inference, regression, linear algebra.
- Evaluation : based on class participation and homework/projects

### Teaching Team

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### Objectives

- To learn some of the traditional as well as the more recent tools for classification and regression
- To understand these concepts from within a statistical decision theoretic framework
- To learn some of the statistical inference tools for model selection and inference.
- To get hands-on experience in using some of these techniques, through the homework assignments

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### Contents

- Overview of supervised learning
- Linear regression and related methods
- Linear methods for classification
- Basis expansions and regularization
- Generalized additive models
- Kernel smoothing
- Gaussian mixtures and EM algorithm
- Model assessment and selection

**Exercices:** The students will actively participate in the presentation and explanation of the concepts involved. The assimilation of the concepts and methods will be verified through homework/projects.

### Textbooks

- Hastie, Tibshirani, Friedman, *The Elements of Statistical Learning*, Springer, 2001
- C. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2006.