
MA2500 Signal Processing and Sparsity

Professor : Gilles CHARDON

Language of instruction : ANGLAIS – **Number of hours :** 36 – **ECTS :** 3,0 - **Quota :**

Prerequisites :

Period : S8 elective 12 between february and june

Course Objectives

On completion of the course, students should be able to

- analyze and design linear filters
- analyze and process signals using appropriate representations (Fourier, DCT)
- apply simple signal processing techniques (filtering, denoising)

Course Contents

Deterministic signals:

- Fourier transform
- Discrete signals
- Filter analysis and synthesis
- Sampling theorem

Random signals:

- Autocovariance, power spectral density
- Wiener filter, linear prediction and application to speech processing

Audio and image processing

- Image compression
- Time-frequency representation, phase vocoder

Course Organization

Depending on the size of the group, this course will be taught as an inverted classroom.

Bibliography / Teaching Material and Textbooks

Foundations of signal processing, M. Vetterli, J. Kovacevic, V. Goyal

Probability, Random Variables, and Stochastic Processes, A. Papoulis

A Wavelet tour of signal processing, S. Mallat

Evaluation

- 3-hr written final exam (70%)
- Labs (30%)