# Signal Processing/ Hilbert spaces and Wavelets

**ECTS**
3 crédits

**Hourly volume**
69h

# Introducing

## Description

## Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

-Hilbert Spaces: definition, Hilbertian basis, projection on a convex set, Fourier analysis
-Wavelets: Haar wavelets, connection coefficients/regularity
-Approximation of functions in Hilbert Spaces

At the end of this module, the student should be able to:

-Provide examples of Hilbert spaces
-Give examples of Hilbertian basis
-Fourier analysis of a 1d and 2d signal
-Use and analyze the results of Fast Fourier Transform
-Use and analyse the results of Wavelet transform
-Understand the decomposition of a function in a basis of wavelets.

## Necessary prerequisites

Python: numpy, scipy, matplotlib
Fourier Analysis: Fourier Series, Fourier Transform, L^2 space.

## Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

# Practical info

## Location(s)

Toulouse