

### **Master's degree year 1 - semester 1**

Functional analysis 1 (6 ECTS)  
Probabilities and applications (6 ECTS)  
Modelling and partial derivative equation (6 ECTS)  
Digital tools (3 ECTS)  
Option (6 ECTS), choose between:  
\* Algebra and applications (6 ECTS)  
\* Differential geometry (6 ECTS)  
\* Free-choice class (6 ECTS)  
English (3 ECTS)

### **Master's degree year 1 - semester 2**

Complex and Fourier analyses (6 ECTS)  
Study and research (3 ECTS)  
Professional culture (3 ECTS)  
Options (18 ECTS), choose between:  
\* Functional analysis 2 (6 ECTS)  
\* Partial derivative equation in biology and physics (6 ECTS)  
\* Process and finance (6 ECTS)  
\* Wavelet and signal processing (6 ECTS)  
\* Statistics (6 ECTS)

### **Master's degree year 2 - semester 1**

Stochastic calculus (9 ECTS)  
Nonparametric statistic (9 ECTS)  
Option (12 ECTS), choose between:  
\* Degenerate parabolic equations and Hamilton–Jacobi equations (6 ECTS)  
\* Discrete curves and 3D image synthesis (6 ECTS)  
\* Big data and finance (6 ECTS)  
\* Risk measures in finance (6 ECTS)  
\* Great deviations (6 ECTS)  
\* Convergence to equilibrium of reversible diffusions (6 ECTS)

### **Master's degree year 2 - semester 2**

Internship (18 ECTS)  
Option (12 ECTS), choose between:  
\* Fourier analysis methods for non-homogeneous fluid study (6 ECTS)  
\* Multifractal analysis and signal and image processing (6 ECTS)  
\* Non-linear dispersive partial differential equations: introduction (6 ECTS)  
\* Optimal transport and applications (6 ECTS)  
\* Elliptic partial differential equations from geometry (0 ECTS)  
\* Interest rate models (6 ECTS)  
\* Malliavin calculus (6 ECTS)

- \* Jump process and application to the energy market (6 ECTS)
- \* Risk measures in finance (6 ECTS)
- \* Financial markets microstructure (6 ECTS)
- \* Counterparty and credit risks (6 ECTS)
- \* Numerical methods in actuarial finance (6 ECTS)
- \* Statistical forecasting (6 ECTS)
- \* Models selection (6 ECTS)
- \* Simulation and copula (6 ECTS)
- \* Limit theorems for processes (6 ECTS)