MATHEMATICAL FINANCE CURRICULUM

DEPARTMENT CHAIR
Fernando Zapatero

PHD PROGRAM LIAISON
Hao Xing

COURSE REQUIREMENTS

Year One

Fall

- **GRS EC 701** Microeconomic Theory
  Introduction to neo-classical general equilibrium theory.
- **QST FE 918** Doctoral Seminar in Finance
  Introduction to financial economics and asset pricing.
- **GRS MA 779** Probability Theory
  Measure theoretic probability.
- **GRS MA 711** Real Analysis
  Measure theory and integration on abstract measure spaces.

Spring

- **GRS EC 7031** Microeconomic Theory 2
  Non-cooperative game theory and the economics of information
- **QST FE 920** Advanced Capital Markets
  A comprehensive, in-depth treatment of modern asset pricing theories
- **GRS MA 780** Probability Theory 2
  Selected topics in probability, such as limit theorems, stable and infinitely divisible distributions, and martingale theory.
- **One of the following elective courses**
  (Based upon availability/student preference)
  - **GRS EC 708** Advanced Econometrics
  - **GRS EC 712** Time Series Econometrics
  - **GRS EC 794** Financial Econometrics
  - **GRS MA 751** Statistics of Machine Learning
  - **GRS MA 776** Partial Differential Equations
  - **GRS MA 783** Advanced Stochastic Processes
  - **QST MF 740** The Economics of Fintech
  - **QST MF 810** Advanced Data Structures and Programming Algorithms
  - **QST MF 815** Machine Learning in Finance
  - **QST MF 821** Algorithmic and High Frequency Trading

COURSE REQUIREMENTS

Year Two

Fall

- **GRS EC 702** Macroeconomic Theory
  Introduction to topics and tools in macroeconomics.
- **QST MF 922** Advanced Mathematical Finance
  Stochastic calculus and/or the mathematics of arbitrage and incomplete markets.
- **Two of the following elective courses** (based upon availability/student preference), or a course not listed below (subject to PhD liaison approval)
  - **GRS EC 745** Macroeconomics and Financial Markets
  - **GRS MA 776** Partial Differential Equations
  - **GRS MA 783** Advanced Stochastic Processes.
  - **QST MF 730** Portfolio Theory
  - **QST MF 770** Advanced Derivatives
  - **QST MF 850** Advanced computational Methods for Finance

Spring

- **QST MF 921** Dynamic Asset Pricing
  Topics in stochastic control and dynamic asset pricing.
- **GRS EC 704** Macroeconomic Theory
  Selected topics in Macroeconomic theory.
- **Two elective courses,** either taken from the list given in First Year: Spring, or another course subject to PhD liaison approval