MASTER

FINANCIAL ENGINEERING

EPFL

© Alain Herzog

Financial globalization and new market developments have given rise to new requirements in risk management, asset management, derivatives pricing, and hedging. Financial institutions require specialists with an understanding of complex financial strategies and modeling skills, with computational expertise and practical know-how. At the same time they need associates who can grasp the significance of financial operations in the bigger picture. Led by the Swiss Finance Institute @ EPFL, the Master in Financial Engineering is designed to meet these demands.

Intellectually stimulating and analytically minded

Taught by internationally renowned faculty, the MFE is a dynamic and intellectually stimulating two-year program that bridges the gap between industry practice and the latest academic thinking. It allows students with a Bachelor's degree in a technical discipline such as Mathematics, Physics, Computer science, Engineering, Economics or another scientific field to acquire broad skills in finance and financial engineering. The curriculum includes foundation and advanced courses as well as a wide range of electives through which students can tailor the program to their specific areas of interest. A mandatory 6-month internship in the financial industry combined with a master thesis concludes the program. The small class size of approximately 30 to 40 students enables stimulating discussions with the faculty and among students. Taught in English, the MFE is also built on the quality and diversity of students, whose broad range of experiences and backgrounds fosters a distinctively collaborative community culture. 75% of the class students are international and several nationalities are represented in the MFE program.

Audrey Barras
MFE 2010, Investment Analyst at Nestlé Capital Management Ltd.

"Linking engineering to finance while taking advantage of EPFL's reputation, the MFE at EPFL is recognized in the market as a cutting-edge Master's degree. Thanks to this MFE, I was able to find a great position at Nestlé Capital Management Ltd. and I am very confident for the future of my career."

Yankai Shao, MFE 2009, Quantitative Analyst at the Fixed Income and Currencies department at Lombard Odier Darier Hentsch & Cie.

"... the MFE has brought me much more than just a comprehensive understanding of quantitative finance; it has taught me powerful tools to solve complex financial problems and given me a solid theoretical base."

Industry footing, network and career

The MFE is taught by leaders who bring innovative ideas to the financial industry, insurance companies and to policy makers. To broaden practical relevance to the coursework, a Practitioner Seminar Series is organized with invited speakers from associated fields in the industry.

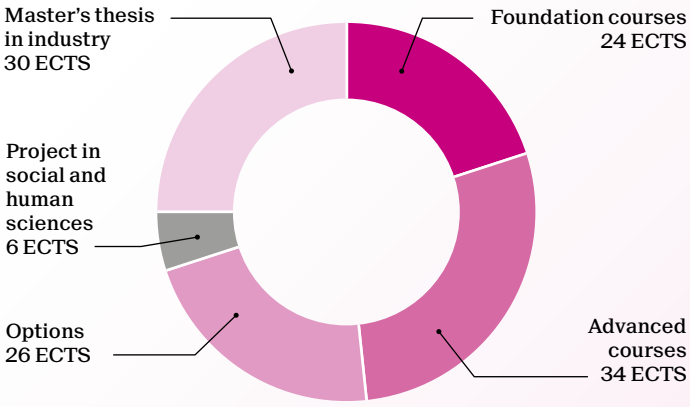
MFE graduates get to see the bigger picture and learn to think beyond short-term results of financial operations and models. While equipping students with cutting-edge techniques and skills to excel in a dynamic financial environment, our faculty also seeks to foster a wider understanding of the environment in which they will operate and of the potential consequences of their future business decisions.

MFE Graduates not only acquire the tools to create and navigate opportunities successfully throughout their career, but also benefit from the powerful EPFL alumni network and the strong links with Swiss financial institutions through the Swiss Finance Institute.

Master of Science in

FINANCIAL ENGINEERING

2-year program - 120 ECTS



Career prospects

At the end of their studies, MFE students have the perfect profile to start a career in a bank, a hedge fund, a rating or consulting company, an insurance company, a commodity trading firm, or an asset management company. The unique combination of knowledge in economics, finance, and artificial intelligence provided by the MFE also makes them attractive candidates for a broad range of high-tech companies and startups. They will be able to apply their knowledge of cutting-edge techniques and practical know-how to arrive at well-balanced, sound, and socially responsible financial decisions. For students interested in an academic career, the MFE is also an ideal stepping stone to join a top-level Ph.D. program in finance.

Admission requirements

- Bachelor's degree in a technical discipline such as Mathematics, Physics, Computer science, Engineering or Economics.
- Solid background in mathematical analysis, statistics and probability theory.
- Command of either one programming language such as C, C++ or Python or an interpreted one (Matlab or Mathematica).
- Fully at ease with computers and fluent in English.

	Credits
Foundation courses	**24**
Accounting for finance	2
Econometrics	4
Global business environment	4
Introduction to finance	6
Optimization methods	2
Probability and stochastic calculus	6
Advanced courses	**34**
Advanced derivatives	4
Derivatives	6
Ethical behavior in the financial industry	2
Interest rate and credit risk models	6
Investments	6
Machine learning in finance	6
Quantitative risk management	4
Options	**26**
Advanced machine learning	4
Advanced numerical analysis	5
Advanced risk management topics	2
Applied data analysis	8
Applied machine learning	4
Apprentissage et intelligence artificielle	4
Artificial neural networks /reinforcement learning	6
Causal inference	4
Cryptography and security	8
Data science for business	6
Deep learning	4
Financial applications of blockchains and distributed ledgers	3
Financial big data	3
Financial intermediation	4
Financial machine learning projects	3
Information security and privacy	8
Information: strategy and economics	4
Intelligent agents	6
Machine learning	8
Machine learning programming	2
Macrofinance	4
Mathematical modeling of behavior	5
Numerical analysis and computational mathematics	4
Numerical approximation of PDEs	5
Numerical integration of stochastic differential equations	5
Principles of microeconomics	4
Regression methods	5
Risk, rare events and extremes	5
Statistical inference and machine learning	4
Statistical machine learning	5
Time series	5
Venture capital	4

College of Management of Technology
go.epfl.ch/master-financial-engineering
contact: mfe@epfl.ch