

# FINANCIAL ENGINEERING, MS

*for the degree of Master of Science in Financial Engineering*

**Financial Engineering (FE)** is the application of quantitative methods to the analysis of financial markets and financial products. The quantitative techniques may include Mathematics, Statistics, Computer Science, Machine Learning, Neural Nets, and generalized Data Analytics. The applications include searching for opportunities as well as deriving solutions to financial problems. All financial markets are a subject for FE, from public exchanges to private over-the-counter markets. Similarly, all financial products, from equities, bonds and derivatives to bitcoins are candidates for quantification. An overarching theme for FE involves balancing reward against techniques for the measurement, management, and mitigation of risk.

## Admission

Applicants to the MSFE Program will have a Bachelor's degree with one year of calculus, one semester of linear algebra, one semester of programming (preferably in C/C++), and one semester of probability and statistics. Knowledge of basic finance and economics is helpful but not necessary. Given its technical emphasis, applicants to this program typically will have completed a Bachelor's degree in an engineering field, mathematics, physics, computer science, or economics that provides sufficient preparation to facilitate a fast-paced, in-depth learning environment.

All applicants are expected to have a minimum grade point average of at least 3.25 (A=4.00) for the last two years of undergraduate study and a 3.50 for any previous graduate work completed. Scores on the Graduate Record Examination (GRE) (<http://www.ets.org/>) general test are not required of applicants, but can be submitted. GMAT (<https://www.gmac.com/gmat-other-assessments/about-the-gmat-exam/the-gmat-advantage/>) scores will also be considered.

All applicants whose native language is not English are required to submit TOEFL (<http://www.toefl.org/>) or International English Language Testing System (IELTS) (<http://www.ielts.org/>) scores as evidence of English proficiency. Minimum admission requirements (<https://grad.illinois.edu/admissions/instructions/04c/>) are set by the Graduate College. Under certain circumstances applicants may be exempt (<https://grad.illinois.edu/admissions/instructions/04c/>) from the TOEFL/IELTS requirement.

*for the degree of Master of Science in Financial Engineering*

Covering topics in finance, economics, numerical methods, stochastic calculus, and computer programming, the MSFE is a rigorous, three-semester, 48-credit, resident degree program with a summer internship opportunity. Twelve courses each of 4 graduate credits are required for graduation; they are expected to be taken in sequence in the respective semesters.

For additional details and requirements refer to the program's website (<http://msfe.illinois.edu/>) and the Graduate (<http://www.grad.illinois.edu/>)

gradhandbook/) College (<http://www.grad.illinois.edu/gradhandbook/>) Handbook (<http://www.grad.illinois.edu/gradhandbook/>).

Code	Title	Hours
<b>Core Coursework</b>		<b>28</b>
FIN 500	Introduction to Finance	4
FIN 512	Financial Derivatives	4
FIN 516	Term Structure Models	2
FIN 553	Machine Learning in Finance	4
IE 522	Statistical Methods in Finance	4
IE 523	Financial Computing	4
IE 524	Optimization in Finance	2
IE 525	Stochastic Calculus & Numerical Models in Finance (2 times)	4
<b>Elective Coursework (approved by academic advisor)</b>		<b>16</b>
<b>Professional Development</b>		<b>4</b>
IE 527	MSFE Professional Development	0
IE 583	MSFE Practicum Project	4
or FIN 583	Practicum	
<b>Total Hours</b>		<b>48</b>

### Other Requirements

#### Requirement

A minimum of 36 credit hours must be taken from the University of Illinois Urbana-Champaign campus.

Minimum GPA: 2.75

*for the degree of Master of Science in Financial Engineering*

1. Comprehension of common financial engineering techniques (toolkit).
2. Ability to identify and apply the appropriate techniques (tools) to real financial engineering opportunities and problems.
3. Ability to minimally code to analysis.
4. Awareness & knowledge of the financial environment.
5. Ability to assess & articulate results to non-technical peers.

*for the degree of Master of Science in Financial Engineering*

**Department Head (Industrial & Enterprise Systems Engineering):** Jeff Shamma

**Department Head (Finance):** Louis Chan

Program Director: Liming Feng

Financial Engineering website (<http://msfe.illinois.edu>)

Financial Engineering faculty (<https://msfe.illinois.edu/about/faculty/>)

3252 Digital Computer Lab, 1304 W Springfield Ave, Urbana, IL 61801

(217) 300-7346

MSFE email ([msfe@illinois.edu](mailto:msfe@illinois.edu))

## Gies College of Business

Gies College of Business website (<https://giesbusiness.illinois.edu/>)

## Grainger College of Engineering

Grainger College of Engineering website (<https://grainger.illinois.edu/>)

## **Admissions**

Financial Engineering Admissions Requirements (<https://msfe.illinois.edu/admissions/>)

Graduate College Admissions & Requirements (<https://grad.illinois.edu/admissions/apply/>)

Financial Engineering Application Inquiries ([msfe-apply@illinois.edu](mailto:msfe-apply@illinois.edu))