

# FINANCIAL ENGINEERING (MS)

NYSED: 19840 HEGIS: 0599.00 CIP: 27.0301

## Program Description

The Master of Science in Financial Engineering (FE) is a 33-credit program designed to provide students with the skills required to operate at the cutting-edge of financial engineering in today's financial services industry. The program is rigorous, demanding and selective. The M.S. in Financial Engineering is a well-established program with a diverse curriculum. Our faculty are recognized leaders in their fields, all with extensive practical expertise. They produce world-class research while teaching both introductory and advanced courses in small class settings. The financial and practical components of the educational program have been further strengthened by developing a large and versatile body of adjunct faculty consisting of leading financial market practitioners from major Wall Street firms as well as international affiliated faculty. These adjunct faculty members work closely with full-time faculty emphasizing both applied and theoretical research in bringing to financial engineering students a greater sensitivity to the needs and the demands of financial markets and the management of financial services and institutions.

## Admissions

Admission to graduate programs in the Tandon School of Engineering requires the following minimum components:

- Résumé/CV
- Statement of Purpose
- Letters of Recommendation
- Transcripts
- Proficiency in English

The NYU Tandon Graduate Admissions website (<https://engineering.nyu.edu/admissions/graduate/apply/requirements/>) has additional information on school-wide admission.

Some programs may require additional components for admissions.

See the program's How to Apply (<https://engineering.nyu.edu/admissions/graduate/how-apply/>) for department-specific admission requirements and instructions.

## Requirements

The Department receives a large number of applications every year. To be considered for admission into the M.S. in Financial Engineering program, students must have a Bachelor's Degree from an accredited institution and proven mathematical mastery of the following topics:

- Linear Algebra
- Probability Theory
- Multi-variable Calculus
- Applied Statistics
- Computer Programming

Applicants must submit official transcripts from each institution attended as well as GRE test scores. When applicable, applicants must also prove English language proficiency demonstrated by a TOEFL or IELTS score.

The FRE department does not accept change-of-major requests from students in other NYU programs. In all instances, students must formally apply to this M.S. FE program. Applicants must have demonstrated proficiency in the mathematical areas listed to be considered for admission.

## Program Requirements

The program requires the completion of 33 credits, comprised of the following:

Course	Title	Credits
<b>Boot Camp Courses</b>		
FRE-GY 5030	FRE Bootcamp III – From Brain Teasers to Black-Scholes	0
FRE-GY 5040	FRE Bootcamp IV - Econometrics and Machine Learning with Python	0
<b>Bloomberg Terminals</b>		
FRE-GY 5500	BLOOMBERG CERTIFICATION	0
<b>Core Courses</b>		
FRE-GY 6073	Introduction to Derivative Securities	3
FRE-GY 6083	Quantitative Methods in Finance	3
FRE-GY 6103	VALUATION FOR FINANCIAL ENGINEERING	3
Select two of the following:		6
FRE-GY 6023	FINANCIAL ECONOMICS	
FRE-GY 6123	FINANCIAL RISK MANAGEMENT	
FRE-GY 7773	MACHINE LEARNING IN FINANCIAL ENGINEERING	
<b>Electives</b>		
Select 13.5 credits of Elective coursework		13.5
<b>Laboratory Learning</b>		
Select one Lab course		1.5
<b>Capstone</b>		
Select three credits of Capstone		3
FRE-GY 5990	Capstone Assessment	0
<b>Total Credits</b>		<b>33</b>

## Vertically Integrated Projects

The Finance and Risk Engineering Department offers two sections in the Vertically Integrated Project series - VIP-GY 5000 Vertically Integrated Projects. These sections are:

- Merger & Acquisition Outcome Prediction (<https://engineering.nyu.edu/research-innovation/student-research/vertically-integrated-projects/vip-teams/merger-acquisition-outcome-prediction-gy-only/>)
- Active Portfolio Management with Machine Learning and Time Series Forecasting (<https://engineering.nyu.edu/research-innovation/student-research/vertically-integrated-projects/vip-teams/active-portfolio-management/>)

These are optional projects interested students may choose to take.

## Plan of Study

### Four-Semester Plus Summer Plan

Course	Title	Credits
<b>1st Semester/Term</b>		
FRE-GY 5030	FRE Bootcamp III – From Brain Teasers to Black-Scholes	0

FRE-GY 5040	FRE Bootcamp IV - Econometrics and Machine Learning with Python	0
<b>Credits</b>		<b>0</b>
<b>2nd Semester/Term</b>		
FRE-GY 5500	BLOOMBERG CERTIFICATION	0
Three Core Courses		9
<b>Credits</b>		<b>9</b>
<b>3rd Semester/Term</b>		
Two Core Courses		6
Elective		3
<b>Credits</b>		<b>9</b>
<b>4th Semester/Term</b>		
Internship		3
<b>Credits</b>		<b>3</b>
<b>5th Semester/Term</b>		
Lab course		1.5
Electives		6
<b>Credits</b>		<b>7.5</b>
<b>6th Semester/Term</b>		
FRE-GY 5990	Capstone Assessment	0
Capstone		3
Elective		1.5
<b>Credits</b>		<b>4.5</b>
<b>Total Credits</b>		<b>33</b>

### Three-Semester Plus Summer Plan

Course	Title	Credits
<b>1st Semester/Term</b>		
FRE-GY 5030	FRE Bootcamp III – From Brain Teasers to Black-Scholes	0
FRE-GY 5040	FRE Bootcamp IV - Econometrics and Machine Learning with Python	0
<b>Credits</b>		<b>0</b>
<b>2nd Semester/Term</b>		
FRE-GY 5500	BLOOMBERG CERTIFICATION	0
Three Core Courses		9
Elective		3
<b>Credits</b>		<b>12</b>
<b>3rd Semester/Term</b>		
Two Core Courses		6
Elective		1.5
<b>Credits</b>		<b>7.5</b>
<b>4th Semester/Term</b>		
Internship		3
<b>Credits</b>		<b>3</b>
<b>5th Semester/Term</b>		
FRE-GY 5990	Capstone Assessment	0
Capstone		3
Lab Course		1.5
Electives		6
<b>Credits</b>		<b>10.5</b>
<b>Total Credits</b>		<b>33</b>

### Learning Outcomes

1. Solve quantitative and data science interview type questions with Python code using NumPy and SciPy.
2. Use Pandas for data analysis and manipulation tasks and be able to apply and interpret ordinary linear regression and logistic regression models with Statsmodels.

3. Analyze time series data in Pandas and develop basic time series models.
4. Run basic machine learning algorithms using Scikit-Learn and critically analyze the use of hyperparameters, model validation and feature engineering in machine learning applications.

## Policies

### NYU Policies

University-wide policies can be found on the New York University Policy pages (<https://bulletins.nyu.edu/nyu/policies/>).

### Tandon Policies

Additional academic policies can be found on the Tandon academic policy page (<https://bulletins.nyu.edu/graduate/engineering/academic-policies/>).