Financial Engineering (MFE)

Courses

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MFE 230A Investments and Derivatives 2 or 3 Units

Terms offered: Spring 2015, Spring 2013, Spring 2007
The course discusses the basic theories of asset pricing. It begins with the standard discounted cash flow analysis, and generalizes this approach to develop the No Arbitrage Pricing Technique for security valuation. Topics will be fixed income securities, derivatives, contingent claims, basic principles of optimal portfolio theory, models of equilibrium asset pricing, including CAPM and related Factor Models.
Investments and Derivatives: Read More [+]
Hours & Format

Fall and/or spring: 8 weeks - 4-6 hours of lecture per week

Summer: 8 weeks - 4-6 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Investments and Derivatives: Read Less [-]

MFE 230D Derivatives: Quantitative Methods 2 Units

Terms offered: Summer 2008 10 Week Session, Summer 2007 10 Week Session, Summer 2006 10 Week Session
This course emphasizes the pricing of derivatives in continuous time, from the formulation of the pricing problem to the implementation of computational and numerical solution techniques.
Derivatives: Quantitative Methods: Read More [+]
Rules & Requirements

Prerequisites: 230A-230B

Hours & Format

Fall and/or spring: 8 weeks - 4 hours of lecture and 4 hours of lecture per week

Summer: 10 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Derivatives: Quantitative Methods: Read Less [-]

MFE 230E Empirical Methods in Finance 2 or 3 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
This course reviews probability and statistical techniques commonly used in quantitative finance. It includes a review of normal, lognormal, CEV distribution, estimation and nonparametric techniques commonly used in finance (MLE, GMM, GARCH). Students will be introduced to financial databases and estimation application software to estimate volatilities and correlations and their stability.
Empirical Methods in Finance: Read More [+]
Rules & Requirements

Prerequisites: Business Administration 230A-230B

Hours & Format

Fall and/or spring: 8 weeks - 4-6 hours of lecture and 1-1 hours of discussion per week

Summer: 8 weeks - 4-6 hours of lecture and 1-1 hours of discussion per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Empirical Methods in Finance: Read Less [-]

MFE 230G Equity and Currency Markets 2 Units

Terms offered: Fall 2015, Fall 2012, Fall 2006
This course reviews various aspects of equity and currency markets and their relative importance. It provides models of and historical evidence on the average returns and volatility of returns on equities, on the trade-to-trade equity price behavior, on trading volume and patterns, and primary financial risks. Determination of spot and forward rates and volatility, volume, high frequency dynamics and dealer behavior are examined.
Equity and Currency Markets: Read More [+]
Rules & Requirements

Prerequisites: Business Administration 230A-230B

Hours & Format

Summer: 7.5 weeks - 4 hours of lecture and 4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Formerly known as: Business Administration 230G

Equity and Currency Markets: Read Less [-]

MFE 230H Financial Risk Measurement and Management 2 Units

Terms offered: Fall 2015, Fall 2012, Fall 2008
This course examines risk measurement and management including market risk, credit risk, liquidity risk, settlement risk, volatility risk, kurtosis risk and other types of financial risks. Topics will include risk management techniques for different types of contracts and portfolios such as duration, portfolio beta, factor sensitivities, VAR, dynamic portfolio analysis and extreme value analysis and other risk management techniques.
Financial Risk Measurement and Management: Read More [+]
Rules & Requirements

Prerequisites: Business Administration 230A-230B

Hours & Format

Summer: 7.5 weeks - 4 hours of lecture and 4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Formerly known as: Business Administration 230H

Financial Risk Measurement and Management: Read Less [-]

MFE 230I Fixed Income Markets 2 or 3 Units

Terms offered: Summer 2007 10 Week Session, Summer 2006 10 Week Session, Summer 2005 10 Week Session
This course provides a quantitative approach to fixed income securities and bond portfolio management. Topics include fixed income security markets, pricing and uses for portfolio management or for hedging interest rate risk, bond mathematics, term structure measurement and theory, immunization techniques, and the modern theory of bond pricing, and derivative instruments.
Fixed Income Markets: Read More [+]
Rules & Requirements

Prerequisites: 230D

Hours & Format

Fall and/or spring: 8 weeks - 3-4 hours of lecture per week

Summer: 8 weeks - 3-4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Fixed Income Markets: Read Less [-]

MFE 230J Financial Innovation with Data Science Applications 1 - 2 Units

Terms offered: Fall 2015, Fall 2008, Fall 2006
This course will stress financial innovation in the traditional financial markets, and innovation opportunities in the newer disciplines of long and short term economic markets. Some examples of the later include livelihood insurance, home-equity insurance, inequality insurance, intergenerational social security, international agreements, and individual pension investment strategies.
Financial Innovation with Data Science Applications: Read More [+]
Rules & Requirements

Prerequisites: Business Administration 230A-230B

Hours & Format

Fall and/or spring: 10 weeks - 1-3 hours of lecture per week

Summer: 8 weeks - 2-6 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Financial Innovation with Data Science Applications: Read Less [-]

MFE 230K Dynamic Asset Management 2 Units

Terms offered: Spring 2015, Spring 2010, Spring 2009
This course reviews portfolio theory and pricing models. It includes: risk models for international portfolio returns, models of optimal allocation of funds, exchange rate uncertainty and criteria for judging the performance of managers and models; different types of portfolios/instruments, different types of applications, and strategies to achieve various investment objectives.
Dynamic Asset Management: Read More [+]
Rules & Requirements

Prerequisites: Business Administration 230A-230B

Hours & Format

Summer: 7.5 weeks - 4 hours of lecture and 4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Formerly known as: Business Administration 230K

Dynamic Asset Management: Read Less [-]

MFE 230M Asset-Backed Security Markets 2 Units

Terms offered: Fall 2015, Spring 2015, Spring 2010
This course extends the study of fixed income securities to advanced topics on mortage and other asset-backed securities. Topics will include basic mechanics of structuring deals for mortgage-related securities, credit cards, leases, and other debt markets and the risk management techniques employed in the securitization process for these assets. The valuation of pooled assets and derivative bonds using Monte Carlo and option pricing techniques, and trading strategies are also evaluated.
Asset-Backed Security Markets: Read More [+]
Rules & Requirements

Prerequisites: Business Administration 230D and 230I

Hours & Format

Summer: 7.5 weeks - 4 hours of lecture and 4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Formerly known as: Business Administration 230M

Asset-Backed Security Markets: Read Less [-]

MFE 230N Applied Finance Project 0.0 Units

Terms offered: Fall 2015, Fall 2012, Fall 2008
Students will be required to complete an applied quantitative finance project that explores a quantitative finance problem that might be met in practice and involves the development or use of quantitative financial technique.
Applied Finance Project: Read More [+]
Rules & Requirements

Prerequisites: Participation requires prior approval of the supervising faculty

Hours & Format

Summer: 7.5 weeks - 6 hours of lecture and 6 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade. This is part one of a year long series course. A provisional grade of IP (in progress) will be applied and later replaced with the final grade after completing part two of the series.

Formerly known as: Business Administration 230N-230O

Applied Finance Project: Read Less [-]

MFE 230O Applied Finance Project 1 - 3 Units

Terms offered: Spring 2015, Spring 2010, Spring 2009
Students will be required to complete an applied quantitative finance project that explores a quantitative finance problem that might be met in practice and involves the development or use of quantitative financial technique.
Applied Finance Project: Read More [+]
Rules & Requirements

Prerequisites: Participation requires prior approval of the supervising faculty

Hours & Format

Summer: 7.5 weeks - 6 hours of lecture and 6 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade. This is part two of a year long series course. Upon completion, the final grade will be applied to both parts of the series.

Formerly known as: Business Administration 230N-230O

Applied Finance Project: Read Less [-]

MFE 230P Financial Data Science 2 Units

Terms offered: Fall 2015
This course proposes a guided tour through optimization models arising in practical finance. These problems include ones that are traditionally associated with optimization, including asset and liability management, asset pricing, and portfolio optimization. We also describe optimization models arising in model calibration, predication and estimation, and risk analysis. The course includes some recent approaches to the analysis of other kinds of financial data, such as text (financial news) data.
Financial Data Science: Read More [+]
Hours & Format

Summer: 6 weeks - 5 hours of lecture and 5 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Financial Data Science: Read Less [-]

MFE 230Q Stochastic Calculus with Asset Pricing Applications 2 Units

Terms offered: Spring 2018, Spring 2015, Spring 2007
The course introduces the students to techniques from stochastic analysis employed in mathematical finance. Topics include: stochastic processes, brownian motion, stochastic integral, differentials and Ito's formula; martingales.
Stochastic Calculus with Asset Pricing Applications: Read More [+]
Hours & Format

Summer: 8 weeks - 4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Stochastic Calculus with Asset Pricing Applications: Read Less [-]

MFE 230R Advanced Computational Finance 2 Units

Terms offered: Fall 2008, Fall 2006, Fall 2005
This course builds on the techniques learned in 230D, Quantitative Methods for Derivative Pricing. The focus is to gain a deeper analysis of numerical and computational issues in pricing and calibration. The orientation of the course is hands-on, with heavy use of computational techniques applied to case projects. The primary objective of this course is to prepare students to tackle the latest challenges in quantitative pricing that they are likely to encounter in cutting-edge financial institutions.
Advanced Computational Finance: Read More [+]
Rules & Requirements

Prerequisites: 230D

Hours & Format

Summer: 8 weeks - 2-4 hours of lecture and 2-4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Advanced Computational Finance: Read Less [-]

MFE 230S Behavioral Finance 1 or 2 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Over the last 25 years, psychologists have come to better understand the processes by which people make judgements and decisions. They have identified common judgement and decision heuristics and the biases associated with these. An understanding of one's own decision biases and those of others is an important tool for managers. Behavioral Decision Theory has also contributed to our understanding of financial markets. This course will discuss the common biases and heuristics.
Behavioral Finance: Read More [+]
Rules & Requirements

Prerequisites: 230D

Hours & Format

Fall and/or spring: 8 weeks - 4 hours of lecture, 4 hours of lecture, 1 hour of discussion, and 1 hour of discussion per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Behavioral Finance: Read Less [-]

MFE 230T Topics in Financial Engineering 1 - 5 Units

Terms offered: Spring 2015, Summer 2013 10 Week Session, Fall 2012
Advanced study in the field of finance engineering that will address current and emerging issues. Topics will vary with each offering and will be announced at the beginning of each term.
Topics in Financial Engineering: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1-6 hours of lecture per week

Summer: 8 weeks - 2-12 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: The grading option will be decided by the instructor when the class is offered.

Topics in Financial Engineering: Read Less [-]

MFE 230V Credit Risk Modeling 2 Units

Terms offered: Fall 2008, Fall 2005, Fall 2004

Focuses on the techniques currently used to model credit risk. The course will cover default probabilities, loss given default, correlation, credit portfolio analytics, bond valuation, loan valuation, and credit derivative valuation. Emphasis will be placed on model building, model validation, and interpreting model output. Students will be required to do some high-level programming in a package such as Matlab. Some empirical testing exercises will also be part of the project work.

Credit Risk Modeling: Read More [+]

Hours & Format

Summer: 8 weeks - 4 hours of lecture and 4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Credit Risk Modeling: Read Less [-]

MFE 230VA Credit Risk: Economic Concepts 1 Unit

Terms offered: Spring 2010, Summer 2006 10 Week Session

Introduction to credit risk modeling and conceptual overview of current techniques. Covers default probabilities, loss given default, correlation, credit portfolio analytics, bond valuation, loan valuation, and credit derivative valuation. Prepares students who are interested in a second course that will focus on model building. Students not interested in the technical details of modeling but who desire an understanding of how credit risk modeling is used in practice will benefit from taking this course.

Credit Risk: Economic Concepts: Read More [+]

Hours & Format

Fall and/or spring: 6 weeks - 3 hours of lecture and 3 hours of lecture per week

Summer: 8 weeks - 4 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Credit Risk: Economic Concepts: Read Less [-]

MFE 230VB Credit Risk: Quantitative Modeling 1 Unit

Terms offered: Fall 2006

Focuses on the techniques currently used to model credit risk. The course will cover default probabilities, loss given default, correlation, credit portfolio analytics, bond valuation, loan valuation, and credit derivative valuation. Emphasis will be placed on model building, model validation, and interpreting model output. Students will be required to do some high-level programming in a package such as MATLAB. Some empirical testing exercises will also be part of the project work.

Credit Risk: Quantitative Modeling: Read More [+]

Hours & Format

Summer: 6 weeks - 3 hours of lecture and 3 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Credit Risk: Quantitative Modeling: Read Less [-]

MFE 230W Accounting and Taxation of Derivatives 1 Unit

Terms offered: Summer 2007 10 Week Session, Summer 2006 10 Week Session, Summer 2005 10 Week Session

This course provides a framework to allow students the understanding of the accounting and tax issues related to derivatives and hedging. It also fulfills the needs of students seeking jobs in the corporate sector and/or seeking securities-structuring assignments in the financial services sector. A basic understanding of financial accounting is required.

Accounting and Taxation of Derivatives: Read More [+]

Hours & Format

Summer: 8 weeks - 2.5 hours of lecture and 2.5 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Accounting and Taxation of Derivatives: Read Less [-]

MFE 230X High Frequency Finance 1 or 2 Units

Terms offered: Spring 2015
This course introduces basic concepts of high frequency finance and discusses recent developments in market microstructure, electronic trading, and high frequency data modeling. Topics include trading basics and price discovery, distributional properties of financial time series, tick data analysis, trade direction algorithms, trading benchmarks, sources of risk, and trading strategies (including back-testing challenges, benchmark and hedging strategies, and arbitrage and program trading).
High Frequency Finance: Read More [+]
Hours & Format

Fall and/or spring: 10 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

High Frequency Finance: Read Less [-]

MFE 230Y Ethics and Regulation in Financial Markets 1 Unit

Terms offered: Prior to 2007
This course is an introduction to the legal rules which govern financial markets and institutions in general but also, specifically related to derivatives. The main purpose of legal rules and regulations is to ensure a smooth functioning of financial markets, as well as the safety and soundness of the overall financial system. We will examine the main areas of law and regulation, as they pertain to the centralized exchanges and the over the counter markets and the role of regulatory arbitrage. We will specifically focus on Dodd-Frank and Basel III and how these rules came about as a response to the financial crisis. We will also explore the role of ethics in filling in the gaps that the law fails to fill.
Ethics and Regulation in Financial Markets: Read More [+]
Hours & Format

Fall and/or spring: 6 weeks - 3 hours of lecture per week

Summer: 6 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Ethics and Regulation in Financial Markets: Read Less [-]

MFE 293 Individually Supervised Study for Graduate Students 1 - 5 Units

Terms offered: Fall 2015, Spring 2015, Fall 2012
Individually supervised study of subjects not available to students in the regular schedule, approved by faculty adviser as appropriate for the students' programs.
Individually Supervised Study for Graduate Students: Read More [+]
Rules & Requirements

Prerequisites: Graduate standing

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Summer: 8 weeks - 1-5 hours of independent study and 1-5 hours of independent study per week

Additional Details

Subject/Course Level: Masters in Financial Engineering/Graduate

Grading: Letter grade.

Individually Supervised Study for Graduate Students: Read Less [-]