Fall 2025 Math Courses

Featured Electives

MA 239 Linear Algebra (*Pre-Req: [MA 139](#) or [MA 139L](#)*)

This course includes topics on matrices, determinants, systems of linear equations and Gaussian elimination, vector spaces, linear independence, inner products, orthonormal bases, Gram-Schmidt process, QR-Factorization, the least-squares method, eigenvalues and eigenvectors. Applications to social and natural sciences as well as the connection with other mathematical disciplines is discussed.

Professor Ciccarelli   W | 11:00 AM - 1:50 PM

MA 243 Discrete Probability (*Pre-Req: Three credits of math*)
This course relates to problems of a probabilistic nature in business, economics, management science and the social sciences. It includes such topics as set notation, permutations, combinations, mutually exclusive and independent events, conditional probability, Bayes' Theorem, expectation and dispersion, Markov chains and decision-making. This course introduces the common discrete distributions: binomial, hypergeometric, geometric, negative binomial and Poisson. Simulation may be used where appropriate.

Professor Leen   Th | 8:00 AM - 10:50 AM

MA 263 Continuous Probability for Risk Management *(Pre-Req: [MA 139](#) and (GB 213 or [ST 113](#))*)
This course focuses on concepts and techniques of continuous probability and their applications to risk management in insurance and finance. Among other topics, the most commonly used single- and multi-variable continuous probability distributions are addressed. Concepts are illustrated with a large number of applied risk management problems.

Professor Steblovskaya   T/Th | 5:00 PM - 6:20 PM

MA 343 The Mathematics of Discrete Options Pricing (*Pre-Req: Six credits of math*)
This course is devoted to basic principles and techniques of no-arbitrage discrete derivative pricing. Using elementary probability and linear algebra, the binomial option pricing model is developed. No-arbitrage option pricing and hedging are addressed using binomial trees. Real-market data is used to explore the computational aspects of options pricing. The course should be of interest to strong math students who would like to see how fundamental mathematics is applied to a significant area of finance and to strong finance and economics students who would like to better understand the concepts behind the standard options pricing models.

Professor Steblovskaya   T/Th | 3:30 PM - 4:50 PM

ALL MATH COURSES OFFERED FALL 2025

MA 139 Calculus II (Pre-*Req: [MA 131](#) or [MA 131L](#)*)

This course is a continuation of [MA 131](#). It presents a thorough treatment of integral calculus. Integration is used to answer a wide variety of questions in probability, quantitative finance, risk management, economics, data science, and many other fields.

MA 139 is a crucial steppingstone towards developing mathematical skills and provides many benefits including:

- Completing MA139 allows you to take upper-level math courses such as
    - Continuous Probability for Risk Management ([MA263](#)),
    - Linear Algebra ([MA239](#)), and
    - Financial Calculus and Derivative Pricing ([MA 335](#)).
- MA 139 allows students to pursue the following programs:
    - Mathematical Sciences Major
    - Actuarial Science Major
    - Mathematics Minor
    - Actuarial Science Minor
- MA 139 provides a great preparation for students potentially interested in going to graduate school in programs such as quantitative finance, data science, and economics that require strong fundamental mathematics skills, including calculus.

Professor Bailey   M/W | 9:30 AM - 10:50 AM

MA 214 Intermediate Applied Statistics (Pre-*Req: GB 213 or [ST 113](#)*)
Context and Perspectives: Scientific Inquiry

Statisticians have assumed larger and more important roles in the modern world as corporate problems become more complex. Feedback from statisticians is used by managers at all levels, especially as data sets become larger. In MA214, you will be asked to conduct hypothesis tests on multiple populations, learn to analyze variance, see applications of multiple regression and analyze contingency tables. The statistical functions in EXCEL will be complemented by a higher-level statistical package. The course will focus on applications drawn from the primary business disciplines.

Professor Kim   T/F | 11:00 AM - 12:20 PM *OR* T/F | 12:30 PM - 1:50 PM
Professor Lautier   W | 6:30 PM - 9:10 PM

MA 233 Calculus III (Pre-*Req: [MA 139](#) or [MA 139L](#)*)

This course extends concepts from Calculus I & II ([MA 131](#) & [MA 139)](#) to situations with multiple variables including multivariable differentiation and integration, vector calculus, as well as sequences and series. Understanding multivariable calculus is fundamental to working with complex problems such as the Black-Scholes equation in quantitative finance, the Cobb–Douglas production function in economics, or joint probability calculations in mathematical statistics.

Completing MA 233 is a great way for students to develop their mathematical skills and to demonstrate to employers or graduate schools their ability to work with complex problems. Students who complete MA 233 will be able to take MA 352 Mathematical Statistics and will be well positioned to complete a Mathematical Sciences Major, an Actuarial Science Major or Minor, or a Mathematics Minor. This course is strongly recommended for students considering graduate school programs such as quantitative finance, data science, and economics that require strong fundamental mathematics skills.

Professor Ciccarelli M/Th | 12:30 PM - 1:50 PM

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Professor Ciccarelli W | 11:00 AM - 1:50 PM

MA 243 Discrete Probability (Pre-*Req: Three credits of math*)

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Professor Leen   Th | 8:00 AM - 10:50 AM

MA 243 Discrete Probability (Honors) (Pre-*Req: Three credits of math*)

An introduction to discrete probability and its application to functional areas in which risk is an inherent aspect of operation. This includes business, especially finance and actuarial science, as well as the social and physical sciences. Topics include the rules of probability, conditional probability, permutations, combinations, random variables and their probability functions, and expectation. We will use these techniques to explore Bernoulli and Poisson processes as well as Markov chains.

Professor Roth   T/F | 9:30 AM - 10:50 AM

MA 252 Regression Analysis (Pre-*Req: (*MA 131* or MA131L) and *MA 214*)

This course focuses on the statistical concepts that form the basis for advanced topics in regression analysis, notably the construction of multiple regression models, time-series models and an analysis of the residuals. Students apply these concepts to large, multi-dimensional data sets using advanced software such as SAS or SPSS, and gain experience in becoming more informed decision-makers through the interpretation of the software results. Emphasis is also placed on being able to communicate the statistical results to a general audience.

Professor Predescu M/W | 9:30 AM - 10:50 AM *OR* M/Th | 11:00 AM - 12:20 PM

MA 255 Design of Experiments (Pre-*Req:* *MA 252*)
Context and Perspectives: Scientific Inquiry

The course addresses the design and analysis of experiments, with a focus on management applications. The differences, advantages and disadvantages of various designs are discussed with a special emphasis on factorial and fractional factorial designs. These popular designs allow for two or more factors to be systematically and simultaneously varied while the experimenter tries to determine not only the (main) effect of each factor, but also how the level of one factor influences the impact of another factor (aka interaction). Students will extend the long history of successes of the (fractional) factorial design into the field of management inquiry. Specific applications will stress cost savings and policy making; multiple examples will be drawn from the marketing disciplines.

Professor Vaughan M/W | 5:00 PM - 6:20 PM

MA 263 Continuous Probability for Risk Management (Pre-*Req:* *MA 139* and (GB 213 or *ST 113*)

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Professor Steblovskaya   T/Th | 3:30 PM - 4:50 PM

MA 346 Data Science (Pre-*Req: (GB 213 or ST 113) and CS 230*)
Context and Perspectives: Scientific Inquiry

Working with and finding value in data has become essential to many enterprises, and individuals with the skills to do so are in great demand in industry. The required skill set includes the technical programming skills to access, process and analyze a large variety of data sets, and the ability to interpret and communicate these results to others. Anyone with these abilities will provide benefit to their organization regardless of their position. This course presents the essentials of this skill set.

Professor Carter   Th | 8:00 AM - 10:50 AM or W | 11:00 AM - 1:50 PM

MA 347 Data Mining (Pre-*Req: MA 252*)
Context and Perspectives: Scientific Inquiry

This course will introduce participants to the most popular data-mining techniques, with an emphasis on getting a general understanding of how the method works, how to perform the analysis using suitable available software, and how to interpret the results in a business context. Topics will include linear regression models, logistic regression models, association rules analysis (also known as market basket analysis), cluster analysis, k-nearest neighbors, decision tree analysis, and Naïve Bayes. Additional techniques may be introduced if time allows.

Professor Liu   M/W | 3:30 PM - 4:50 PM

MA 376 Advanced Long Term Actuarial Mathematics (Pre-*req: MA 375*)

This course further develops knowledge and mastery of fundamental actuarial mathematics, focused on long-term insurance, health, and annuity contracts. We begin with survival models for multiple state contingent cash flows and use them to calculate premiums and policy values for long-term coverages. Then we consider joint life insurance and annuity contracts and their profit metrics. Finally, we explore how retirement benefits are accrued, valued, and funded. This course is designed to help a motivated student prepare for the Society of Actuaries (SOA) ALTAM examination.

Professor Roth   T/F | 11:00 AM - 12:20 PM

MA 380 Introduction to Generalized Linear Models and Survival Analysis in Business (Pre-*Req: MA 252)*
Context and Perspectives: Scientific Inquiry

The course is designed for students interested in analyzing data with advanced regression modeling. It introduces generalized linear models (GLMs) and survival analysis with a focus on business applications. It includes GLMs with various linking functions: logistic models, Poisson models, and others. It particularly emphasizes the applications of these functions in real world data analysis and includes the use of professional statistical packages. Survival analysis is an important method for analyzing hazard and survival time in areas such as health care, finance, marketing and management. The course will focus on applications of survival models and the interpretation of simple survival models using Kaplan-Meier curves.

Professor Schirmacher   T/F | 9:30 AM - 10:50 AM