



COURSE INFORMATION

MATHEMATICS COURSES

MA 085A FUNDAMENTALS OF MATHEMATICS

FALL/SPRING/ALL YEARS

3 credit hours

MA085a-b is a two-semester sequence of courses that is a study of the fundamental concepts of high school mathematics, including arithmetic and algebra. Each course is lecture-based with laboratory sessions designed to provide the background necessary for advancement in mathematics. Each includes 3 lecture hours and 1.5 hours of laboratory for review /testing sessions weekly. MA085a includes whole, decimal and signed numbers, fractions, ratios, percent, operations, equations and inequalities. MA085b includes polynomials, factoring, rational and radical expressions, exponents and quadratic equations. A student may successfully complete either the MA085a~b sequence or the MA089 course for non-degree-units (NDUs), but may not receive NDUs for completion of both MA085a-b and MA089. Grades for students in MA085a must be C or better to enroll in MA085b. Grades for students in MA085b must be C or better to enroll in MA 110, MA 115, or MA 151. Prerequisite: Mathematics placement test.

MA 085B FUNDAMENTALS OF MATHEMATICS

FALL/SPRING/ALL YEARS

3 credit hours

MA085a-b is a two-semester sequence of courses that is a study of the fundamental concepts of high school mathematics, including arithmetic and algebra. Each course is lecture-based with laboratory sessions designed to provide the background necessary for advancement in mathematics. Each includes 3 lecture hours and 1.5 hours of laboratory for review /testing sessions weekly. MA085a includes whole, decimal and signed numbers, fractions, ratios, percent, operations, equations and inequalities. MA085b includes polynomials, factoring, rational and radical expressions, exponents and quadratic equations. A student may successfully complete either the MA085a~b sequence or the MA089 course for non-degree-units (NDUs), but may not receive NDUs for completion of both MA085a-b and MA089. Grades for students in MA085a must be C or better to enroll in MA085b. Grades for students in MA085b must be C or better to enroll in MA 110, MA 115, or MA 151. Prerequisite: Mathematics placement test.

MA 089 FUNDAMENTALS OF MATHEMATICS

FALL/SPRING/ALL YEARS

5 credit hours

This course is a study of the fundamental concepts of high school mathematics, including arithmetic and algebra. This course is lecture-based and designed to provide the background necessary for advancement in mathematics. It includes 5 lecture hours weekly. This is the combined course of MA085a-b. Students must earn a grade of C or higher to enroll in MA110, MA115, or MA151. Prerequisite: Mathematics Placement Test.

MA 110 BASIC MATHEMATICAL APPLICATIONS

FALL/SPRING/ALL YEARS

3 credit hours

This course explores the world of mathematical application for the management, life, and social sciences. It covers linear, quadratic, polynomial, exponential and logarithmic function and their applications to finance and economics. This course also provides an introduction to solving systems of linear equations, matrix operations, and a graphical treatment of linear programming. This course satisfies the GE requirement, but does not satisfy any prerequisite for higher level mathematics courses. It is intended for those students who have no further needs in mathematics. Prerequisite: Grade of C or better in MA-085b or MA-089, completed within the previous 3 semesters, or placement.

MA 115 INTRODUCTORY COLLEGE ALGEBRA

FALL/SPRING/ALL YEARS

3 credit hours

This course prepares students for MA161a-b or MA165. Topics include polynomial equations; radical expressions; systems of equations and inequalities; functions; inverse functions, graphing; rational, exponential, and logarithmic functions; and application problems. This course satisfies the GE requirement. It is intended for those students who continue their studies in mathematics after completing this course. Prerequisite: Grade of C or better in MA085b or MA089, completed within the previous 3 semesters, or placement.



MA 150 MATHEMATICS FOR ELEMENTARY SCHOOL TEACHERS

FALL ONLY/ALL YEARS

3 credit hours

This course is intended for prospective elementary school teachers. The course provides elements of the mathematical content knowledge needed to understand and teach mathematics in elementary school. The course covers problem solving; the development of the numbers systems and operations; fractions, decimals and percent; the use of various manipulatives in teaching elementary mathematics; probability; statistics. It primarily focuses on geometry. Prerequisites: MA115 and MA151.

MA 151 INTRODUCTORY STATISTICS

FALL/SPRING/ALL YEARS

3 credit hours

This course presents statistical method as applied to the description and display of data, and to drawing conclusions from statistical data, and introduces the basic probability theory needed to understand use the techniques of elementary statistics. Prerequisite: Grade of C or better in MA085b or MA089, completed within the previous 3 semesters, or placement.

MA 161A COLLEGE ALGEBRA AND TRIGONOMETRY

FALL/SPRING/ALL YEARS

3 credit hours

MA161a includes algebraic, exponential and logarithmic functions, systems of equations and inequalities. MA161b includes trigonometry, additional algebraic functions, sequences, series and probability. A student may receive credit for either the MA161a-b sequence or the MA 165 course, but not a combination of the two. Prerequisite: Grade of C or better in MA115 or Placement.

MA 161B COLLEGE ALGEBRA AND TRIGONOMETRY

FALL/SPRING/ALL YEARS

3 credit hours

MA161a includes algebraic, exponential and logarithmic functions, systems of equations and inequalities. MA161b includes trigonometry, additional algebraic functions, sequences, series and probability. A student may receive credit for either the MA161a-b sequence or the MA 165 course, but not a combination of the two. Prerequisite: Grade of C or better in MA161a.

MA 165 PRECALCULUS

FALL/SPRING/ALL YEARS

5 credit hours

Topics include algebraic, exponential and logarithmic functions; systems of equations and inequalities; trigonometry; sequences and series. A student may receive credit for either the MA161a-b sequence or the MA 165 course, but not a combination of the two. Prerequisite: Grade of C or better in MA115 or Placement.

MA 203 CALCULUS I

FALL/SPRING/ALL YEARS

5 credit hours

This is the first semester of a standard calculus course. Topics include limits; continuity; the definition of derivatives; derivatives of algebraic and transcendental functions; product, quotient, and chain rules; applications; and Riemann Sums. Prerequisite: Grade of C or better in MA161b or MA165 or placement or equivalent.

MA 204 CALCULUS II

FALL/SPRING/ALL YEARS

5 credit hours

This is the second semester of a standard calculus course. Topics include techniques and applications of integration, differential equations, power series, and Taylor series. Prerequisite: Grade of C or better in MA203.

MA 205 MULTIVARIABLE CALCULUS

FALL/SPRING/ALL YEARS

5 credit hours

This course covers the calculus of functions of several variables, including partial differentiation and multiple integration. It also covers introductory topics in vector calculus, including vector fields, line integration, Green's Theorem, curl and divergence, surface integrals, Stokes' Theorem, and the Divergence Theorem. Prerequisite: Grade of C or better in MA204.

MA 301 DIFFERENTIAL EQUATIONS

SPRING ONLY/ALL YEARS

3 credit hours

This course covers the study of the fundamental concepts of differential equations with applications. Prerequisite: Grade of C or better in MA204.

MA 302 FOUNDATIONS OF HIGHER MATHEMATICS

SPRING ONLY/ALL YEARS

3 credit hours

This course provides a careful introduction to mathematical reasoning using definitions and proofs. Topics covered include set theory, logic and mathematical induction. Prerequisite: Grade of C or better in MA205, or C or better in MA341, or A- or better in MA204.

MA 341 LINEAR ALGEBRA

FALL/SPRING/ALL YEARS

3 credit hours

Topics covered include vectors, systems of linear equations, matrices, eigenvalues and eigenvectors, vector spaces, determinants and linear transformations. Prerequisite: Grade of C or better in MA204, or A in MA203.

MA 351 DISCRETE STRUCTURES

SPRING ONLY/ALL YEARS

3 credit hours

This course introduces the rigorous theoretical framework within which ideas about computer science can be expressed. Prerequisite: Grade of C or better in MA204.

MA 361 NUMBER THEORY

SPRING ONLY/EVEN YEARS

3 credit hours

This course covers the study of the properties of integers, congruencies, Diophantine equations, prime numbers and residue classes. Prerequisite: Grades of C or better in both MA205 and MA302.

MA 375 NUMERICAL METHODS AND SOFTWARE

SPRING ONLY/ODD YEARS

3 credit hours

This course is an introduction to such topics as interpolation, integration, solutions of linear systems of equations, solutions of linear and nonlinear equations, and solutions of ordinary differential equations. It includes the use of numerical software libraries. Prerequisite: Grade of C or better in MA204 and MA341, CS201 or CS202.

MA 385 APPLIED STATISTICS

FALL/SPRING/ALL YEARS

3 credit hours

This course covers: statistical inference, sampling theory, hypothesis testing, correlation, and non-parametric statistics as applied to the social, life and physical sciences and to business. Prerequisite: Grade of C or better in MA151 or equivalent course.



MA 387 STATISTICS FOR SCIENCES

FALL/SPRING/ALL YEARS

3 credit hours

The topics include exploring data in graphs and in numerical values, introducing basic probability theory for statistics, sampling distributions, estimation theory, testing hypothesis, correlation, linear regression, variance analysis, and non-parametric statistics. The course consists of three hours of lecture weekly. The lab, MA387L must be taken concurrently. Prerequisite: Grade C or better in MA161A or higher. Students enrolled in MA387 Statistics for Sciences for credit may not also earn credit for MA385 Applied Statistics.

MA 387L STATISTICS FOR SCIENCE LABORATORY

FALL/SPRING/ALL YEARS

1 credit hour

MA387L is the laboratory part of MA387 and MUST be taken concurrently. The purpose of lab is to reinforce concepts learned in lecture, with an emphasis on translating familiar statistical problems into SPSS tasks. It emphasizes the principles and criteria for selecting the appropriate statistical techniques as well as making proper conclusions. Students will get hands-on experience applying the topics covered to real datasets. Corequisite: Must take MA387 concurrently.

MA 392 LABORATORY TEACHING AND ASSISTING

FALL/SPRING/ALL YEARS

1 - 3 credit hours

This course provides for practical educational experiences in teaching and assisting with math classes. It may be taken more than once for credit. It may not be used for more than two upper division math elective credits. Prerequisite: Grade of B or better in MA203 or consent of instructor.

MA 411 INTRODUCTION TO ABSTRACT ALGEBRA I

FALL ONLY/ALL YEARS

3 credit hours

This course offers a study of modern algebra with topics from group theory and ring theory. Prerequisites: Grades of C or better in MA205, MA302 and MA341.

MA 411G INTRODUCTION TO ABSTRACT ALGEBRA I

FALL ONLY/ALL YEARS

3 credit hours

This course offers a study of modern algebra with topics from group theory and ring theory. Prerequisites: Grades of C or better in both MA205, MA302, and MA341.

MA 412 INTRODUCTION TO ALGEBRA II

SPRING ONLY/ALL YEARS

3 credit hours

This is the second course in a two-semester sequence of introductory courses in abstract algebra. Topics covered include field theory, Sylow theorems, introductory Galois Theory, and some of advanced group theory, module and ring theory. Prerequisites: Grades of C or better in MA411.

MA 412G INTRODUCTION TO ABSTRACT ALGEBRA II

SPRING ONLY/ALL YEARS

3 credit hours

This is the second course in a two-semester sequence of introductory courses in abstract algebra. Topics covered include field theory, Sylow theorems, introductory Galois theory, and some of advanced group theory, module and ring theory. Prerequisites: Grades of C or better in MA341 and MA411.

MA 421 INTRODUCTION TO ANALYSIS I

FALL ONLY/ALL YEARS

3 credit hours

This is the first course in a two-semester sequence designed to provide an introduction to the rigorous study of the foundations of calculus. Topics covered include the completeness of the real numbers, elementary topology, continuous functions, and numerical sequences and series. Prerequisites: A grade of C or better in MA205 and MA302.

MA 422 INTRODUCTION TO ANALYSIS II

SPRING ONLY/ALL YEARS

3 credit hours

This is the second course in a two-semester sequence designed to provide an introduction to the rigorous study of the foundations of calculus. Topics covered include differentiation, integration, sequences and series of functions. Prerequisites: A grade of C or better in MA421.

MA 431 TOPICS IN ADVANCED MATHEMATICS

AS REQUIRED/AS REQUIRED

3 credit hours

This course offers selected topics in advanced mathematics such as topology, mathematical induction, non-Euclidean geometries. Different subject matter may be repeated for credit. Prerequisite: Grades of C or above in MA205 and MA302.

MA 431G TOPICS IN ADVANCED MATHEMATICS

SPRING ONLY/EVEN YEARS

3 credit hours

This course offers selected topics in advanced mathematics such as topology, mathematical induction, non-Euclidean geometries. With different subject matter may be repeated for credit. Prerequisite: Grades of C or above in MA205 and MA302.

MA 441 MODERN GEOMETRY

AS REQUIRED/AS REQUIRED

3 credit hours

This course treats non-Euclidean and advanced Euclidean geometry. Prerequisites: Grades of C or better in both MA205 and MA302.

MA 451 INTRODUCTION TO PROBABILITY THEORY

FALL ONLY/EVEN YEARS

3 credit hours

This course covers probability spaces; combinatorial analysis; independence and conditional probability; discrete and continuous random variables including binomial, Poisson, exponential and normal distributions; expectations; joint, marginal and conditional distribution functions; moment generating functions; law of large numbers; central line theorems. Prerequisites: MA-205.

MA 453 OPERATIONS RESEARCH MODELS

AS REQUIRED/AS REQUIRED

3 credit hours

Operations research models are designed to optimize, maximize, or minimize real world processes. Computer methods and packages are included for linear and dynamic programming, life and death processes, P.E.R.T.-C.P.M., trend analysis and queuing theory. Prerequisites: MA341 and either MA385 or MA387 and MA387L.

MA 460 NUMERICAL LINEAR ALGEBRA

AS REQUIRED/AS REQUIRED

3 credit hours

The course covers topics such as numerical solutions to systems of linear equations; linear least squares problems; eigenvalue and eigenvector problems. Methods include Gauss-Jordan elimination, Seidel iterating, the QR algorithm, and linear optimization. It includes the use of numerical software libraries. Prerequisites: Grades of C or better in MA205, MA302, and MA375.

MA 461G NUMERICAL ANALYSIS

FALL ONLY/ODD YEARS

3 credit hours

This course covers: root finding for non-linear equations, numerical integration, numerical methods for ordinary differential equations, interpolation theory, and approximation functions. The course makes use of numerical software libraries. Prerequisites: Grade of C or better in MA205 and MA302.

MA 472 FOURIER SERIES AND BOUNDARY VALUE PROBLEMS

FALL ONLY/EVEN YEARS

3 credit hours

This is the second course on the differential equations based on the multivariable calculus. Topics include Fourier series expansion, Fourier integral, and wave, heat and Laplace equations. Emphasis is placed on applications. Prerequisites: Grade of C or better in MA205 and MA301.

MA 500 INTRODUCTION TO R

FALL ONLY/ALL YEARS

1 credit hour

This course will help build an understanding of the basic syntax and structure of the R language for statistical analysis and graphics.

MA 501 DATA SCIENCE BRIDGE

SUMMER/ALL YEARS

3 credit hours

The bridge course will cover calculus, linear algebra and statistics topics for data science courses. It does not count towards MS in Data Science degree. Prerequisite: MA-203

MA 505 INTRODUCTION TO SAS

FALL ONLY/ALL YEARS

1 credit hour

This course introduces students to basic knowledge in programming, data management, and exploratory data analysis using SAS software. Topics covered include data import and export, data cleaning and validation, basic statistical analysis, and data visualization.

MA 510 PYTHON FOR DATA SCIENCE

SPRING ONLY/ALL YEARS

2 credit hours

In this course, students will learn the basic syntax and data structures of the Python language required for Data Science, and how to utilize Numpy and Pandas for data analysis and statistical processing. Additionally, students will learn basic SQL for manipulating data in databases.

MA 541 REGRESSION MODELS AND APPLICATIONS

FALL ONLY/EVEN YEARS

4 credit hours

This course includes: linear models, including t-tests, ANOVA, regression, and multiple regression. Residual analyses, transformations, goodness of fit, interaction and confounding. Introduction to generalized linear models: mixed, hierarchical and repeated measures. Binary regression, extensions to nominal and ordinal multicategory responses, count data, Poisson and negative binomial regression, log-linear models. Prerequisites: MA-341 and MA387, BI412 or BI507.

MA 551 INTRODUCTION TO PROBABILITY THEORY

FALL ONLY/EVEN YEARS

3 credit hours

This course covers probability spaces; combinatorial analysis; independence and conditional probability; discrete and continuous random variables including binomial, Poisson, exponential and normal distributions; expectations; joint, marginal and conditional distribution functions; moment generating functions; law of large numbers; central line theorems. Prerequisite: MA-205.



MA 552 INTRODUCTION TO MATHEMATICAL STATISTICS

SPRING ONLY/ODD YEARS

3 credit hours

This course covers the theory and practical applications of the theory of sampling, statistical inference, including sufficiency, estimation, and testing. Topics include common statistical distributions, sampling, maximum likelihood and moment estimators, unbiased estimators, hypothesis testing, and Bayesian inference. Prerequisites: MA-551 and instructor's consent.

MA 564 MULTIVARIATE ANALYSIS

SPRING ONLY/ODD YEARS

3 credit hours

An introduction to multivariate statistical analysis, such as Multivariate ANOVA, Principal Component analysis, factor analysis, cluster analysis, discriminant analysis, possibly structural equation modeling (SEM). Prerequisites: MA-541 and instructor's consent.

MA 571 STATISTICAL RESEARCH AND CONSULTING

FALL/SPRING/ALL YEARS

1 - 3 credit hours

This course is designed to teach students the skills and techniques needed to conduct statistical research and provide statistical consulting services. Students will learn how to design studies, collect and analyze data, and communicate results effectively to clients. Through campus-wide consulting program, students will work with researchers from various disciplines providing recommendations for statistical methodologies appropriate for their research: analyzing client data, preparing written reports and manuscripts.

MA 581 MACHINE LEARNING FOR DATA SCIENCE

FALL ONLY/ODD YEARS

3 credit hours

This course focuses on the practical applications of machine learning techniques to real-world problems. Students will gain knowledge on how to apply and evaluate different machine learning algorithms, including linear models, k-means, support vector machines, decision trees, random forests, neural networks, and more. They will also learn how to analyze and manipulate real-world datasets, design learning algorithms, train, and assess machine learning models. Prerequisite: MA-541.

MA 594 SS: PYTHON FOR DATA SCIENCE

SUMMER/SUMMER ONLY

2 credit hours

MA 694 TIME SERIES ANALYSIS

FALL/SPRING

3 credit hours

This course covers foundational methods of time series analysis and forecasting. Topics include stationary and nonstationary processes, ARMA and seasonal ARIMA models, spectral analysis, state-space models, and multivariate time series. Emphasis is placed on model identification, estimation, diagnostic checking, and forecasting. Students will apply these methods to real-world data using the R statistical software.