Actuarial Science

The **actuarial science** major prepares students for a career as an actuary. Actuaries evaluate, measure, and manage risk. This career field is in high demand and is expected to grow at a higher than average rate according to the Bureau of Labor Statistics. The coursework required for this major gives students a well rounded background in mathematics and finance. The curriculum is based on the recommended curriculum of the Society of Actuaries and includes course offerings within both the math and business departments. This curriculum will help prepare students for successful completion of the first two actuarial exams – the probability exam and the financial mathematics exam.

See the Graduate section (http://catalog.mtmercy.edu/archives/2016-17/graduateprograms) of this *Catalog* for more information on Graduate programs offered at Mount Mercy.

Core requirements for all Business Majors

BA 203	Principles Of Law	3
BA 250	Technology & Communication In Business	3
BA 270	Business Statistics	3
BA 379	Financial Management	3
BA 435	Senior Seminar in Business	3
or BA 436	Applied Business Strategy	
BC 265	Principles Of Accounting I	3
BC 266	Principles Of Accounting II	3
BN 204	Principles Of Management	3
BK 208	Principles Of Marketing	3
EC 251	Macroeconomics Principles	3
EC 252	Microeconomic Principles	3
Select one of the following:		3
MA 130	Finite Mathematics	
MA 132	Basic Mathematical Modeling	
MA 139	Pre-Calculus	
MA 142	Mathematics Modeling	
MA 160	Business Calculus	
MA 164	Calculus I (Required for Actuarial Science Majors)	
Total Hours		36

Actuarial Science Major (Business Core plus 25 additional hours)

BA 101	Business 101	1
BA 344	Investments	3
EC 366	Money and Banking	3
CS 105	Fundamentals Of Computer Science	4
MA 165	Calculus II	4
MA 166	Calculus III	3
MA 202	Linear Algebra	4
Select one of the Following:		3
BA 360	Securities Analysis	
BA 350	Risk Management	
BA 420	Cases In Finance	
BA 425	Finance Internship	
CS 106	Data Structures	
MA 245	Differential Equations	
Total Hours		25

Academic Requirements for the Actuarial Science Major

All **actuarial science majors** must achieve a minimum grade of C-in all courses required for the major (BA 101 Business 101, BA 344 Investments, EC 366 Money and Banking, CS 105 Fundamentals Of Computer Science, MA 165 Calculus II, MA 202 Linear Algebra, and elective). This requirement applies equally to any course equivalents that may be accepted by transfer from any other college/university. **See Academic Requirements** for all business department majors and minors found in the (http://catalog.mtmercy.edu/archives/2016-17/curriculum/businessadministration) Business Administration (http://catalog.mtmercy.edu/archives/2016-17/curriculum/businessadministration) section of the *Catalog*.

BA Courses

BA 101 Business 101: 1 semester hour
In preparation for their entry into the business department, students will explore skills necessary for success in the business world. They will explore all the business majors offered here so students gain an overall understanding of careers and courses of different majors and minors. This course will define professionalism and employer expectations. They will write two business orientated communications: email and two-page research project using APA. They will write a resume for an internship and prepare an elevator speech. They will explore the skills of teamwork, goal setting, assertive communication, and time management necessary to establish success in college and in the business environment. There will be a brief overview of all business department majors and associated careers, presented by the major coordinator, as well as introduction to business clubs, organizations, and Mount Mercy University volunteer missions.

BA 203 Principles Of Law: 3 semester hours
This course provides a broad look at the American legal system. It includes a discussion of legal reasoning, the structure of the legal system, and several substantive areas of the law that are general practical interest. These specific topics include contracts, torts, administrative law, and agency law. Prerequisite: sophomore standing.

BA 240 Personal Financial Planning: 3 semester hours
This course examines basic financial skills which each of us must develop over our lifetime. Personal financial statements, calculating net worth, cash management tools, wise use of credit, and managing credit card debt are explored first. Also included is an overview of the federal tax system, tips to minimize the "tax bite", tax-deferred savings plans (IRA's and 401K's) and personal investing strategies for stocks, bonds, and mutual funds. In addition, topics will include the benefits of home ownership (tax savings and appreciation), use of escrow accounts, the benefits of mortgage and home equity debt, and the services a real estate broker can provide. The course also explores a variety of insurance products available (term life, permanent life, auto, medical), social security and retirement benefits, the basic provisions of a will, the use of trusts, and how to minimize gift/estate/inheritance taxes. The course may not be applied to any major or minor within the Business Administration Division.

BA 250 Technology & Communication In Business: 3 semester hours
In this course, students will study technology, research and communication as it relates to the business environment. Students will be expected to demonstrate proficiency in the use of computer software including word processing, spreadsheet, database and presentation. In addition, students will be required to complete a research paper using a specified format and to make a professional presentation using presentation software (i.e. PowerPoint). Research using the Internet will be required. The various communication skills required of professionals in the business area will also be studied. This includes, but is not limited to, e-mail, team building, conducting a meeting and cooperative problem solving. This course is required of all business majors at Mount Mercy and must be taken at Mount Mercy. Prerequisites: Completion of the speech and freshman writing core curriculum requirements. Four-year Mount Mercy students take BA 250 during their sophomore year. All transfer students take BA 250 in their first semester at Mount Mercy or in the sophomore year if a freshman transfer.

BA 270 Business Statistics: 3 semester hours
This course studies descriptive and inferential statistics with an emphasis on business applications. Topics include: measures of central tendency, measures of dispersion, probability and probability distributions, confidence intervals, hypotheses testing, and an introduction to correlation and regression. Prerequisites: one year of high school algebra or MA 008 or departmental approval.

BA 300 Entrepreneurship: 3 semester hours
This course will teach students how to start and run their own business. Students will learn what constitutes an attractive investment opportunity, where to go for financing, how to keep accurate accounting records, and how to comply with state and federal tax laws. They will also learn about management, law, marketing, etc. Individual business owners will be utilized as speakers in the class. There will be a group project in which students will be required to develop a business plan. Prerequisites: BC 265, BC 266, BN 204, and BK 208.

BA 305 Employment Law and Labor Relations: 3 semester hours
This is a survey course that looks at the history and development of employment law in the United States. We will look closely at the current legal issues found in case law, statutory law and regulations. We will also study the labor relations and collective bargaining system addressing issues such as wages, benefits and grievance procedures. Formerly BA 205. Prerequisite: BA 203.

BA 310 Dispute Resolution: 3 semester hours
Conflict is a fact of life. How we resolve our differences with our friends, neighbors, bosses, employees, customers, government, spouse and children makes a difference. In this course we will look at the techniques of principled negotiation that will help reach a wise agreement that satisfies all parties. We will also discuss other dispute resolution processes such as litigation, mediation, and arbitration. Classes will include role-plays and group projects to practice the techniques studied. Formerly BA 210. Prerequisite: BA 203.

BA 320 Applied Financial Reporting: 3 semester hours
This course will teach students how to analyze financial statements in detail. The financial statements will be approached from the users' perspective rather than the preparers' perspective. The course will combine the case approach with the lecture approach so students can apply the concepts learned to real businesses. Prerequisites: BC 265 and BC 266.

BA 344 Investments: 3 semester hours
This course teaches students about a broad range of investment opportunities as well as how to analyze those opportunities. These opportunities are discussed in conjunction with investment goals. Additionally the course teaches students about various securities valuation techniques. Prerequisites: BC 265 and BC 266.

BA 350 Risk Management: 3 semester hours
This course involves an overview of the managerial and administrative processes designed to minimize loss and the impact on the organization. This includes general liability, product liability, property damage, and worker's compensation. In this course students also examine methods used to evaluate both business and personal risk with particular emphasis on which methods can be used to minimize such risk in a cost-effective manner. Prerequisite: sophomore standing.

BA 360 Securities Analysis: 3 semester hours
This course is intended to be a follow-up course to the Investments course. This course will involve a very hands-on approach to valuing entire entities. Students will learn how to assess the prospects and the risk of a company and they will learn to value companies using a variety of approaches such as discounted cash flow analysis and various valuation metrics. Prerequisite: BA 344.

BA 370 Quantitative Methods For Business: 3 semester hours
This course will expand on the material covered in the introductory course and introduce the topics of multiple regression and correlation, nonparametric methods of analysis, index numbers, time series analysis, decision making under uncertainty, and statistical quality control. Prerequisite: BA 270.

BA 373 Sports Law: 3 semester hours
This course focuses on covering topics of professional and non-professional sports law issues. It includes a focus on the regulatory nature of domestic and international sport to include interscholastic, intercollegiate and Olympic sports. Integrated topics will include governing bodies such as the NAIA, NCAA and professional level regulations related to the use of agents, gender-related issues surrounding Title IX, testing for performance enhancing drugs, labor unions and current topics in sporting law. Prerequisite: BA 203.

BA 375 Financing Sports Organizations: 3 semester hours
This course builds upon courses in finance and accounting with application to the financial management of a sporting organization related. This includes refining skills in fiduciary responsibility while covering topics in financial analysis, business analytics, environmental/economic scanning, and taxation to help in managing decisions. Prerequisite: BC 265 and BC 266.

BA 379 Financial Management: 3 semester hours
This is a decision-oriented course that emphasizes maximization of shareholder wealth. It includes a study of such concepts as cash flow, ratio analysis, financial forecasting, leverage, the time value of money, the capital budgeting process, and securities valuation. Prerequisites: BC 265 and BC 266.

BA 420 Cases In Finance: 3 semester hours
This course will teach students how to analyze financial cases. The case method of instruction simulates the "real world" by exposing students to actual situations where financial decisions must be made. Students must use their prior knowledge of finance and common sense to arrive at recommendations for each case. This process should enable students to sharpen their technical finance skills and enhance their ability to use subjective judgment in decision-making. Prerequisite: BA 344 and BA 379.

BA 425 Finance Internship: 3 semester hours

Students may take advantage of internship opportunities which become available in the field of finance. These internships include off-campus supervision at local businesses and periodic conferences with the on-campus instructor. The on-campus instructor will determine any further requirements on an individual basis. (Maximum of one semester credit for each 3 hours per week for the semester spent at an outside company up to a maximum of 6 semester hours).

BA 430 Selected Topics in Business: 3 semester hours

This course includes an examination of major issues or topics in business. Course content and subtitle will vary. The course may be repeated with consent of the instructor.

BA 435 Senior Seminar in Business: 3 semester hours

Capstone course designed to integrate knowledge of marketing, finance, economics, management, and accounting to be applied to various types of business and institutional situations. The method of instruction includes case studies, class discussion and readings. Prerequisites: BA 250, BA 379, BK 208, BN 204 and senior standing.

BA 436 Applied Business Strategy: 3 semester hours

This is a capstone course designed to assist the student to integrate and apply knowledge of marketing, finance, economics, management, and accounting in the student's field of interest. Students will develop strategic plans using theoretical and actual case studies. This course is the required capstone course in the Business major in the Advance program. Prerequisites: BN 204, BK 208, BA 379.

BA 445 Business Administration Independent Study: 3 semester hours

If a student wishes to do individual study and/or research of a particular topic, he/she should contact the appropriate member of the department as a supervising instructor, as well as register through and obtain consent of his/her advisor.

CS Courses

CS 101 Using Computers in Research Settings: 1 semester hour

The course is designed to make students fluent in the use of common office applications in professional settings. We will learn these skills in the context of the analysis and interpretation of real-world data sets that come from the research of the faculty and students of Mount Mercy University. Students who complete this course will be able to be more productive here at Mount Mercy, and more prepared to enter careers or to attend graduate school.

CS 103 Introduction To Web Site Development: 3 semester hours

In Introduction to Web Site Development, students will learn a wide arrange of web-based technologies and scripting languages that are used for the development of internet web sites. The tools discussed in the course will vary in order to stay current with the rapidly changing environment of web development. These tools could include (but are not limited to): wysiwyg html editors, html, css, xml, Flash, java script and dynamic web programming languages. The intent of the course is to give students a broad experience with a wide range of web-based technologies. This course is intended for non-majors who are interested in careers focused on the development of web sites. Computer Science majors may take the course as an elective, but it cannot be used to fulfill any CS graduation requirement or to complete an area of specialization.

CS 105 Fundamentals Of Computer Science: 4 semester hours

This course focuses on the concepts and constructs of computer programming, including program design and decomposition, data types, interactive and file input/output, control structures, and graphical user interface development. Formerly CS 175.

CS 106 Data Structures: 4 semester hours

This course introduces basic concepts of software development, elementary data structures (including sets, lists, stacks, queues, trees, and graphs), recursion, and elementary algorithm analysis. Formerly CS 205. Prerequisites: CS 105, MA 150 (the latter may be taken as a co-requisite).

CS 112 Introduction to Object Oriented Programming: 3 semester hours

This course teaches the concepts and skills of object oriented programming. Topics to be covered include inheritance, abstract fields, methods and classes, encapsulation and polymorphism. Demonstration of significant experience and skills in object oriented programming can be used to pass out of the course. Prerequisite: CS 105.

CS 190 Computer Organization: 4 semester hours

This course covers various hardware aspects of computers. Topics to be covered include number representation, digital logic, Boolean algebra, memory technologies, and management techniques, interrupts, CPU structure, microprogramming, assembly language, and input/output devices. Prerequisite: CS 106.

CS 203 Information Ethics: 3 semester hours

In this course, students will learn to define and analyze ethical, moral, social, and professional issues related to computing and information technology. Topics to be discussed include ethical frameworks for decision making, regulation of the Internet, intellectual property, privacy, security, and codes of conduct. Prerequisite: sophomore standing or consent of instructor.

CS 226 Programming in Visual Basic: 4 semester hours

This course is an introduction to programming using Visual Basic and the .NET development environment. Topics to be covered include control structures, input/output, graphical user interfaces, and interface with other Microsoft Office applications. This course is for MIS majors. Computer Science majors may take the course as an elective, but it cannot be used to fulfill any CS graduation requirement or to complete an area of specialization.

CS 235 Systems Programming Concepts: 4 semester hours

This course explores topics related to operating systems and network programming, including shell programming, programming with operating systems calls, and programming using network sockets. Other topics include basic structure of operating systems and network software. Prerequisite: CS 190.

CS 302 Programming Languages: 4 semester hours

This course considers the evolution of programming languages. Topics to be discussed include language specification and analysis, syntax, semantics, parameter passing techniques, scope, binding, paradigms (including imperative, functional, and object-oriented), and translation techniques. Prerequisite: CS 190.

CS 315 Web Programming: 4 semester hours

This course explores the development of web-based applications and dynamic web pages using modern development tools and languages. Topics to be covered include basic web site design, scripting languages, web servers, use of databases and SQL in the development of dynamic web sites and web security. Prerequisite: CS 190.

CS 326 Information Systems Analysis: 3 semester hours

This course will focus on management issues in the creation and management of information systems. Broad topics will include system investigation, system and feasibility analysis, system design, system implementation, and system maintenance. Various approaches to systems analysis and design will be considered, as well as tools. Prerequisites: CS 106 for CS students or CS 226 and BN 204 for MIS students.

CS 388 Database Systems: 4 semester hours

This course emphasizes the concepts and structures necessary to design and implement a database management system. Topics to be covered include the evolution of database systems, the relational database model, query languages, triggers, constraints, views, and other advanced topics as time permits. Prerequisite: CS 326.

CS 389 Algorithm Analysis: 3 semester hours

This course is an introduction to advanced data structures and algorithm analysis techniques. Topics to be covered include asymptotic notation, empirical and theoretical analysis techniques, complexity classes, algorithmic approaches (divide and conquer, greedy), and advanced tree structures. Three hours lecture. Prerequisites: MA 150, CS 106.

CS 399 Special Topics in Computer Science: 3 semester hours

This course provides students the opportunity to take electives in an area of special interest in computer science. When possible, the course will be taught by experts from the field. Topics may include educational software development, artificial intelligence, robotics, embedded systems, bioinformatics, and cryptography. Prerequisite: permission of instructor.

CS 415 Field Experience: 3 semester hours

This course provides students the opportunity to take advantage of internship opportunities that become available. The internships include off-campus supervision at local employers and periodic conferences with the on-campus instructor. One semester hour of credit is assigned for each 45 hours of work per semester at the outside agency.

CS 420 Management Information Systems Senior Thesis: 3 semester hours

The MIS Senior Thesis is intended to be one option for the MIS capstone course specifically suited to students with significant professional experience as a team member on at least one large enterprise software development project. Students in this course will work with a faculty member to select a topic relevant to their education and professional experience, design a plan for researching the topic and produce a thesis that reviews and analyzes the research and integrates the research, the learning they have gained from their educational program and from their professional experience into a solution of the problem defined by the chosen topic.

CS 430 Senior Project: Management Information Systems: 4 semester hours

This is the capstone course for management information system majors. The student will complete a broad and deep software development project as part of a multi-disciplinary team as project managers. Prerequisites: CS 226, CS 326 and BN 377.

CS 435 Senior Project: Computer Science: 4 semester hours

This is the capstone course for computer science majors. The student will complete a broad and deep software development project as part of a multi-disciplinary team. Prerequisites: CS 235 and at least one 300-level CS course.

EC Courses

EC 230 Humanistic Economics: 3 semester hours

Initially this course will focus on an elaboration of humanistic economic principles by describing an economy based on needs, material and otherwise how humanistic ideas differ from the orthodox: an economy based on wants. The remainder of the course will then explore some current attempts at outlining economic systems that are neither exclusively free market or centrally planned; these will be presented and evaluated in terms of humanistic principles.

EC 251 Macroeconomics Principles: 3 semester hours

An introduction to the study of economics along with some facts about the U.S. economic system; theoretical analysis of the determination of total output employment and price levels; use of monetary and fiscal policy weapons to influence economic activity, money and the banking system; economic growth and development; and international finance. Prerequisite: sophomore standing or First Year Honor Student.

EC 252 Microeconomic Principles: 3 semester hours

An analysis of the market system as it determines prices, output and employment of the individual products and resources, application of market theory to some current domestic economic issues and international trade. While not an absolute prerequisite, EC 251 is normally taken before EC 252. Prerequisite: sophomore standing or First Year Honor Student.

EC 366 Money and Banking: 3 semester hours

A study of the nature of money, role of banks and the central bank in the economy, central bank control of the supply of money, effect of money on the economy, Monetarist vs. Keynesian views on monetary and fiscal policies, and the role of money in international finance. This course will emphasize financial markets and monetary policy, not bank operation and management. Prerequisites: EC 251 and EC 252.

EC 376 International Economics: 3 semester hours

The course offers an introduction to the theory and practice of international trade and finance. It will evaluate the principle of comparative advantage of nations. Students will learn about International Trade Barriers, Trade Zones (such as NAFTA and the EU). Trade Agreements, The Balance of Payment and The Balance of Trade. The course will discuss the U.S. trade policy in light of the Free Trade VS Protectionism argument. The role of international trade institutions such as the IMF, WTO and foreign exchange markets will be evaluated. The course will discuss globalization and its impacts on Labor markets, Income Distribution, The Environment, and consumers, in the U.S. and abroad. Prerequisite: EC 251.

EC 445 Independent Study: 3 semester hours

The student will select a topic of interest for in-depth, individual study or research under the instructor's supervision. Prerequisites: EC 251 and EC 252, junior standing and consent of the instructor.

MA Courses

MA 004 Beginning Algebra: 1 semester hour
This course is designed to provide remedial work for those students who enter college poorly prepared in mathematics. Class will focus on basic computational skills, dimensional analysis, irrational numbers, scientific notation, interpretation of graphs, basic geometric concepts, and an introduction to basic algebra. Emphasis will be on problem solving and reading for math.

MA 006 Intermediate Algebra II: 2 semester hours
The class covers the topics of intermediate algebra including inequalities, linear equations, systems of linear equations, quadratic equations, exponents, ratio, proportion, variation, and graphing. Returning students who have not been in a math class for a number of years might find this course a good choice in preparation for their statistics or core curriculum mathematics course. It offers a review of mathematics concepts. For students placed in the class, it is a prerequisite for their core curriculum class choice.

MA 120 Mathematics In Arts And Humanities: 3 semester hours
Many mathematicians see their field not as a science, but as close kin, at least in part, to both philosophy and the arts. This course will include readings and appropriate mathematics, especially geometry, to portray mathematics as part of the liberal arts. Mathematically, the courses will focus on problem solving skills while introducing the field in a way other than algebraic: What is calculus? Why is mathematics so abstract? What do we mean by the beauty of mathematics? What is the relationship between non-Euclidean geometry and the art of the Renaissance? These are the kinds of questions considered in this course. Prerequisite: Two years of high school algebra or MA 006.

MA 125 Fundamentals Of Arithmetic & Logic: 3 semester hours
This course will introduce some key concepts of mathematics: sets, logic, and numbers. We will use these to understand the Hindu Arabic numeration system, arithmetic, and measurement. In particular, we look at how numbers and operations correspond to reality and why our computational algorithms work. This course is designed to cover ideas of interest to the elementary education major; it does not prepare a student for the computational portion of the GRE. Elementary Education majors are given preference in enrolling in this course. Prerequisite: Two years of high school algebra or MA 006.

MA 130 Finite Mathematics: 3 semester hours
Finite mathematics will look briefly at a variety of topics, including systems of linear equations, matrices, linear programming, combinatorics, probability, sequences and series, and interest on money. Prerequisite: Two years of high school algebra or MA 006.

MA 132 Basic Mathematical Modeling: 3 semester hours
A mathematical model is a simplification of reality that is mathematically manageable. This course examines some specific models that are widely useful, but most of its focus is on choosing or creating a model, using the model to draw conclusions and refining a model when it is not sufficiently useful. Hence, mathematics is used to solve real life problems. Technology (e.g. Excel) will be used frequently. While algebra skills are needed, additional mathematics will be developed within the course; in particular, difference equations are necessary and logarithms are useful. Prerequisite: high school algebra 2 or MA 006 Intermediate Algebra, or departmental approval.

MA 135 Basic Statistics: 3 semester hours
This course is an introduction to the basics of probability as well as descriptive and inferential statistics. Topics include measures of central tendency, measure of dispersion, histograms, the normal and binomial distributions, hypothesis testing, confidence intervals, chi-square distribution, correlation, and prediction. Prerequisite: two years of high school algebra, MA 006, or departmental approval.

MA 139 Pre-Calculus: 4 semester hours
Pre-Calculus is a collection of topics necessary for the successful completion of a year of calculus. Basically, a good knowledge of pre-calculus is a comfortable familiarity with the idea of function and with most of the basic functions, including polynomials, rational functions, exponential, logarithmic and trigonometric functions. This comfortable familiarity allows one to solve equations and inequalities involving these various functions and to produce function rules from graphs or graphs from function rules. Prerequisite: three years of high school mathematics (including Algebra 2 and Geometry), an A- in MA 006, or the consent of the instructor.

MA 142 Mathematics Modeling: 3 semester hours
A mathematical model is a simplification of reality that is mathematically tractable. This course does examine some specific models that are widely useful, but most of its focus is on choosing or creating a model, using the model to draw conclusions and refining a model that is not sufficiently useful. It briefly reviews, and then uses, the tools learned in Pre-calculus: functions and graphs, logarithms, and trigonometry. Prerequisite: MA 132 or MA 139, or its equivalent in high school, or consent of the instructor.

MA 145 History of Mathematics for Elementary Education: 3 semester hours
This is a combination of the mathematics that elementary education majors have already seen with the history of mathematics. The goal is for elementary teachers to have a sense of what mathematics is and how the skills they will teach connect to modern mathematics. The course will include a study of the evolution of mathematics from ad hoc empirical techniques to the Greek notion of mathematics as a theoretical structure which gives certain knowledge about reality, which in turn yielded to modern mathematics - an abstract construct, possibly consistent, which does not of necessity illuminate reality. Prerequisite: At least 18 hours of the mathematics required for the original endorsement in elementary mathematics.

MA 150 Discrete Mathematics: 3 semester hours
The purpose of this course is to present various mathematical topics that are applicable to computer science. Topics to be covered include non-decimal numeration systems; prefix and postfix notation; the basic operations of sets, relations, and functions; induction and recursion; equivalence and congruence relations; propositional logic, truth tables, logical equivalence, and implications; Boolean algebra and switching theory; matrices and determinants; permutations and combinations; graph theory and directed graphs. Prerequisite: MA 139 or equivalent, or permission of instructor.

MA 160 Business Calculus: 3 semester hours
Business Calculus is a course treating standard one-variable calculus and its applications for business students, as well as selected other business applications, and an introduction to multivariable calculus. Calculus topics include the derivative, methods of finding derivatives, applications of derivatives, the integral, methods of integration, applications of integration, and the calculus of the exponential and logarithmic functions. Multivariable calculus topics include partial derivatives and finding local extrema. The course stresses applications in business and economics, and is intended to give business students the appropriate conceptual and computational mathematical background for future study in business.

MA 164 Calculus I: 4 semester hours
Introduction to Calculus I begins with a review of analytical geometry and basic functions. It then introduces limits, continuity, the derivative, and the antiderivative. Also included are the techniques of differentiation and applications of the derivative. Prerequisite: grade of C or better in MA 139 or equivalent course or permission of instructor.

MA 165 Calculus II: 4 semester hours
This course introduces the definite integral and its applications along with the techniques of integration. It also includes logarithmic and exponential functions, the trigonometric functions, and their universes. Prerequisite: grade of C or better in MA 164.

MA 166 Calculus III: 3 semester hours
Calculus III includes the more advanced topics of basic calculus. Included are polar coordinates, approximate integrations, indeterminate forms and improper integrals, solid analytic geometry, infinite series and functions of several variables. Prerequisite: grade of C or better in MA 165.

MA 202 Linear Algebra: 4 semester hours
This course introduces the basic topics and techniques of linear algebra. Topics include linear systems, matrices, determinants, general vector spaces, subspaces, basic and dimension, inner product spaces, orthonormal bases, changing bases, linear transformations and their properties, eigenvalues, eigenvectors, diagonalization. Students will gain mathematical maturity in writing proofs. Prerequisite: MA 164.

MA 210 Introduction To Graph Theory: 3 semester hours
This course introduces concepts of graph theory and some of the most interesting and important theoretical results in the field. Concepts discussed include directed and undirected graphs, trees and general graphs, planarity in graphs, graph colorings, network flow and connectivity, matching and independent sets, and graph algorithms and applications. Prerequisite: MA 150.

MA 214 Probability And Statistics: 3 semester hours
The basic concepts of probability theory and mathematical statistics will be examined. Topics to be discussed include probability spaces, random variables, multivariate distributions, expectation, random sampling, central limit theorem, and confidence intervals. Prerequisite: MA 165 and MA 150 or MA 202.

MA 245 Differential Equations: 3 semester hours
Methods of solution for the first-order as well as higher order differential equations will be discussed. Other topics to be covered include problems in mechanics, rate problems, series solutions, and systems of linear differential equations. Corequisite: MA 166.

MA 266 Introduction To Numerical Methods: 3 semester hours
The purpose of this course is to introduce the numerical techniques used in the solution of mathematical problems. Topics include interpolation, non-linear equations, systems of linear equations, error analysis and norms, matrix inversion, differentiation, integration, and curve fitting. Prerequisite: MA 165.

MA 323 Foundations Of Modern Geometry: 3 semester hours
This course aims at showing the student the need for a rigorous, abstract, deductive treatment of geometry. It includes a study of geometry developed without using a parallel postulate and goes on to show how separate geometrics evolve when different parallel postulates are added, in turn, to common body definitions, axioms, and theorems. Prerequisites: Grade of C or better in MA 202.

MA 364 Modern Algebra: 3 semester hours
Modern algebra introduces the student tot groups, rings, integral domains, and fields using as examples the ring of integers and the fields of rational, real, and complex numbers. Also included are isomorphisms and homomorphism. Prerequisite: grade of C or better in MA 202.

MA 374 Analysis I: 3 semester hours
Analysis develops the theoretical underpinnings of calculus. The key idea is a precise definition of limit, one which never used the words "infinitely close" or infinitely small." Using this fundamental definition, we revisit the ideas of calculus: continuity, the derivative and the integral. In addition, we consider sequences and the topology of the real numbers. Prerequisite: grade of C or better in MA 202.

MA 380 Senior Seminar in Mathematics: 3 semester hours
This course will give an account of how mathematics, one of the oldest of all intellectual instruments, has developed over the past 5000 years. The content will be basically chronological, beginning with the origins of mathematics in the great civilizations of antiquity and progressing through the first few decades of this century. The emphasis will be on mathematics-how its various branches like geometry, trigonometry, algebra, and calculus developed and became interwoven and how famous mathematicians including Pythagoras, Euclid, Fibonacci, Descartes, Newton, Leibniz, Pascal, and Gauss contributed to the development. Prerequisite: senior standing and at least 27 semester hours of math major credit or 14 semester hours of math minor credit.

MA 399 Special Topics: Mathematics: 3 semester hours
This course gives students the opportunity to take electives in areas of special interest to them since the topic covered varies from one semester to the next. Topics selected from both pure and applied mathematics such as real analysis, complex analysis, number theory, set theory, optimization theory, graph theory, coding theory, fractals, and operations research will be taught. This course may be taken more than once provided a different topic is being taken each time. Prerequisite MA 166 and MA 202 or permission of the instructor. (Offered every year).

MA 425 Internship in Mathematics: 3 semester hours
Special opportunities may be available with area businesses for an internship involving topics in mathematics. These internships include off-campus supervision at the business and periodic meetings with the on-campus instructor who will also determine any additional requirements on an individual basis. (Maximum of one semester credit for each forty hours worked at the business, up to a maximum of 6 semester hours, a maximum of 3 of which can count for a mathematics major elective.).

MA 445 Independent Study: 3 semester hours
Study topics will be negotiated by the student and his/ her advisor.