

Mathematics and Information Technology

Department Chair

Donald Platte, Ph.D.

Faculty

Professors

Donald Platte, Ph.D.
Charles Redmond, Ph.D.

Associate Professor

Roger Griffiths, Ph.D.

Assistant Professors

Angela Berardinelli, Ph.D.
Patrick Kelly, M.A.
Lauren Williams, Ph.D.

Visiting Professor

Kevin Drees, Ph.D.

Introduction

The department offers degrees in Mathematics and Information Technology. The goal of the Mathematics/Information Technology Department at Mercyhurst is to provide a student with the knowledge essential to the pursuit of a career in government, industry, commerce or education, or for entrance into graduate school for further study.

Mission Statement

The Department of Mathematics and Information Technology is committed to:

- Preparing its mathematics graduates to pursue certification in secondary mathematics education or to succeed in graduate programs in mathematics, applied mathematics, statistics, operations research, and related disciplines;
- Preparing its information technology graduates for immediate employment in the technology sector or for continued graduate study in a computing-related discipline;
- Providing Mercyhurst University students in Biology, Biochemistry, Chemistry, Physics, Forensic Science, and Public Health the mathematics education and resources they need to be successful in their chosen fields;
- Providing Mercyhurst University students in Intelligence Studies computing education opportunities and resources related to their discipline;
- Providing Mercyhurst University students in Graphic Design, Art, Music, and Dance computing education opportunities and resources related to their disciplines;
- Providing all Mercyhurst students with opportunities to improve their basic mathematics and computing skills;
- Providing all Mercyhurst students with opportunities to broaden their appreciation of mathematics and computing;

- Contributing to the advancement of mathematics, statistics, and computer science through published research, conference presentation, and scholarly collaboration;
- Sharing educational innovation through publication and conference presentation.

Program Student Learning Outcomes

Mathematics Major

A graduate earning a B.A. in mathematics from Mercyhurst University must be able to:

- Derive equivalent algebraic and analytic expressions from other such expressions using sound mechanical technique;
- Set up and solve problems in mathematics modeling the physical world, with justification of each step in the process, and with a determination of the reasonableness of a solution.
- Effectively communicate mathematics, both orally and in writing, with clarity and precision, observing correct notation, syntax, and organization.
- Prove and disprove mathematical statements using an appropriate technique to create a formal, coherent, and well-structured argument supported by logic and the correct application of known theorems and definitions.

Information Technology Major

A graduate earning a B.A. in information technology from Mercyhurst University must be able to:

- Program in a high-level object oriented language.
- Query, modify, manage, and design databases.
- Analyze computer networks and solve networking problems.
- Construct well designed, usable websites with content, presentation, and functionality separated, adhering to web standards and web accessibility guidelines.

Majors and Minors

Majors: Mathematics, Information Technology

Minors: Mathematics, Information Technology

Mathematics Degree Requirements (Bachelor of Arts)

MATH	170	Calculus I	4 credits
MATH	171	Calculus II	4 credits
MATH	150	Linear Algebra	4 credits
MATH	233	Calculus III	4 credits
MATH	240	Differential Equations	3 credits
MATH	245	Geometry	3 credits
MATH	146	Programming I	4 credits
OR			
MIS	190	Algorithms	3 credits
MATH	265	Transition to Adv Mathematics	3 credits

MATH	280	Modern Algebra I	3 credits
MATH	281	Modern Algebra II	3 credits
MATH	291	Statistical Analysis	3 credits
MATH	370	Advanced Calculus	3 credits
MATH	400	Topics in Mathematics	3 credits

It is further recommended that the Mathematics major obtain a minor or (preferably) a major in an additional discipline. All Mathematics majors must maintain a mathematics GPA of 2.0 or higher. A student who does not satisfy this requirement may be dismissed from the major and/or prohibited from graduating with the major. A student who receives a C or below in MATH 233 Calculus III must have the department's permission to continue in the major or minor.

Mathematics Minor Requirements

MATH	170	Calculus I	4 credits
MATH	171	Calculus II	4 credits
MATH	233	Calculus III	4 credits
MATH	150	Linear Algebra	4 credits
MATH	265	Transition to Advanced Mathematics	3 credits

Choose Two (2) of the Following Courses:

MATH	146	Programming I	4 credits
MIS	190	Algorithms	3 credits
MATH	201	Technical Writing with LATEX	3 credits
MATH	240	Differential Equations	3 credits
MATH	245	Geometry	3 credits
MATH	280	Modern Algebra I	3 credits
MATH	281	Modern Algebra II	3 credits
MATH	291	Statistical Analysis	3 credits
MATH	370	Advanced Calculus	3 credits
PHYS	201	General Physics I & Lab	4 credits

Mathematics with Secondary Education Certification Program Director: Mr. Patrick Kelly

The Mathematics Education program at Mercyhurst University follows a two-step process designed to give students strong content knowledge before they master the pedagogical tools necessary to become expert teachers at the secondary level (grades 7-12). In completing this program, the student earns a master's degree in addition to the completion of a bachelor's degree. Students interested in the program will first pursue a B.A. in Mathematics by complying with the requirements outlined herein. Upon completion of the undergraduate mathematics degree, the student may then enroll in the Master of Science in Secondary Education: Pedagogy and Practice program (see Graduate Programs Catalog). Teaching certification is not earned until the completion of the master's degree.

A unique benefit of this program is that students intending to complete their undergraduate mathematics degree at Mercyhurst may seek enrollment in the 4+1 program, in which they can complete the master's degree under an

intensive, one-year curriculum. This 4+1 program allows students to earn a B.A. in Mathematics, earn an M.S. in Secondary Education, and become certified to teach at the secondary level, in a five-year period.

Students in the 4+1 program must maintain a G.P.A. of 3.0, complete a Sophomore Review, pass the PRAXIS I exam, and complete two education courses (EDUC 210 Comparative Issues in Education and WL 101 Culturally and Linguistically Diverse Learners) before acceptance into the graduate program. Each student will work with the program coordinator to successfully meet all of these goals during the established timeline. Students who have earned a mathematics degree from another institution will have their work evaluated against Mercyhurst's requirements for the B.A. in Mathematics before being accepted into the master's program.

Information Technology Major Requirements (Bachelor of Arts)

MIS	146	Programming I	3 credits
MIS	140	Computer Operations	3 credits
MIS	180	Linux/Operating Systems	3 credits
MIS	190	Algorithms	3 credits
MIS	226	Programming II	3 credits
MIS	260	Networks	3 credits
MIS	280	Introduction to Internet Programming	4 credits
MIS	350	Database Management	3 credits
MIS	370	Client-Side Programming	4 credits
MIS	150	Intro to Data Science	3 credits
MIS	224	Mobile Application Dev	3 credits
MIS	305	Game Programming	3 credits
MIS	380	Server-Side Programming	4 credits
MATH	201	Technical Writing with LATEX	3 credits
RIAP	325	Cyber Threat Analysis	3 credits

All Information Technology majors are encouraged to pursue an additional minor or (preferably) an additional major in another discipline. All Information Technology majors must maintain a GPA in the major of 2.0 or higher. A student who does not satisfy this requirement may be dismissed from the major and/or prohibited from graduating with the major.

Information Technology Minor

MATH	146	Programming I	4 credits
MIS	260	Networks	3 credits
MIS	350	Database Management	3 credits
Three Department Approved MIS electives			9 credits

An internship may be used for one or more of the above electives.

IA 332: Interior Design Studio V

This studio will emphasize the development of space planning and problem-solving skills related to institutional and governmental facilities. Studio experiences will be taught in the theory of the design process and an understanding of design research involving physical, social, and psychological factors and reflect a concern for the aesthetic qualities of the built environment. Emphasis will be placed on the program development for design of the following types of institutions: schools, colleges, universities, libraries, museums, city halls, courthouses, legislative, post offices, etc.

3 credits

IA 375: Business and Professional Practice for IA

This course provides students a thorough study of business practices and professionalism within the interior design industry. Emphasis is placed on business and professional practices including professional ethics, project management, project communication, financial management, industry relationships, and project assessment. Interior design organizations, legal recognition of the profession, and related professions and disciplines are examined in the context of current design practices.

3 credits

IA 380: Color and Light

A study of the technical and creative concepts of light and color for interior spaces. Human factors, space planning, materials specification and the behavior of light and color are explored. Energy efficiency and maintenance issues are also studied. Projects focus on development of interior lighting, color plans and specifications.

3 credits

IA 405: Technical Graphics III

This course builds on basic technical graphic skills through the introduction of computer-aided drafting, primarily by use of Revit 2016 and SketchUp Pro. The class will be taught through a combination of lecture instruction and lab activities to introduce the student to computer-based design, 3-D modeling, and rendering software. This will include a basic understanding of the software tools and applications to further develop the student's design skills and presentation methods.

3 credits

IA 340: Environmental Design I

This course addresses the interaction of the built environment with the natural environment, specifically in the context of how buildings affect the health, safety, and sustainability of man and nature. Students will explore and understand the design of the built environment in an ecological context using evidence-based research as well as traditional methods. Students will be provided with analytical tools with which to assess and make recommendations for environmental modifications to the built environment. Emphasis will be placed on design strategies that support and enhance sustainability.

3 credits

IA 406: Technical Graphics IV

As an endeavor into advanced graphics, this course will explore various design software and media to create a well-rounded approach to design conception, planning, implementation, and documentation. This course will be a guide line on how to present interior architecture project. Graphical visualization is the main scope of this course. This course builds on basic technical graphic skills

through the introduction of computer-aided drafting, primarily by use of Revit 2016 and SketchUp Pro and Lumion.

3 credits

LATN

LATN 101: Intro to Latin I

An introduction to the Latin language, including the development of the basic skills of readings and writing. Study and analysis of simple texts, as well as the fundamentals of Roman life and literature.

3 credits

LATN 102: Introduction to Latin II

Students continue the study of language skills to improve their reading and writing of Latin texts. The study and analysis of more complex texts, as well as an investigation of Roman life and literature.

Prerequisite: LATN 102 or equivalent

3 credits

LATN 203: Intermediate Latin I

An intensive study of the sophisticated grammatical patterns and idiomatic structures of Latin, designed to increase proficiency in reading and writing the language. Readings will focus on the history and culture of Rome during the early years of the Empire. The grammar concepts will include the complete conjugations of verbs, as well as constructions peculiar to Latin e.g. ablative absolute and indirect statements. This course should cover most of the grammar necessary for students to read the Latin of most Roman authors. For students with 3-4 years of prior study.

Prerequisite: LATN 202 or equivalent

3 credits

MATH

MATH 099: Basic Mathematics

This course emphasizes the acquisition and development of basic mathematical, geometric and algebraic skills. This course involves teaching the skills of problem solving; the skills for interpreting data involving graphs and tables; and the skills for working with basic algebra.

Credits do not count towards graduation

3 credits

MATH 102: Elementary Algebra

The course deals with the fundamental operations of algebra and the applications of these operations. Number systems, fractions, linear equations, linear inequalities, graphs, exponents and polynomial expressions are studied. No student with two or more years of secondary mathematics should take this course. Does not satisfy the Analytical Thought category of REACH.

3 credits

MATH 103: Math Preparation

This is a one credit course designed for students that would like to improve their placement score or quickly enhance their algebra skills in preparation for more

advanced coursework. This course will make use of ALEKS, a web based artificially intelligent assessment and learning system. ALEKS uses adaptive questioning to quickly and accurately determine exactly which topics a student has mastered, and which still need additional review. Specific topics covered in the course will include arithmetic, linear equations and inequalities, absolute value equations and inequalities, polynomials, factoring, functions and their properties, and rational expressions. Additional topics may be added based on individual student interest. Students will have an opportunity to retake the mathematics placement exam at the end of the course.

1 credit

MATH 110: Mathematics Applications

Mathematics Applications invites students to experience mathematics in the context of its relationship to a single field of application, such as Art, Music, Sports, or Politics and Elections. Specifically, we will discuss functions, graphs, trigonometry, probability, statistics, and logic. The goal is to help students see the extent to which mathematics is bound to areas of their interest and therefore awaken in them a new interest in the subject.

Prerequisite: MATH Placement score of at least 30

3 credits

MATH 111: College Algebra

A course in algebra fundamentals, topics include sets, relations, functions, exponents and radicals, equations, inequalities, and polynomial and rational functions.

Prerequisite: MATH Placement score of at least 46

3 credits

MATH 112: Trigonometry and Functions

This course will include a further exploration of functions, exponential functions, logarithmic functions, trigonometry functions and additional topics in trigonometry. A student may take MATH 112 without taking MATH 111. The student must have knowledge of the topics listed in MATH 111.

Prerequisite: MATH 111 or MATH Placement score of at least 61

3 credits

MATH 118: Math for Natural Science

This course has been designed for students who wish to take calculus or physics, but who are not prepared for college calculus based on our mathematics placement score and department recommendation. This course is a one semester replacement for the two semester combination of College Algebra and Trigonometry and Functions. Topics will include fundamental concepts of college algebra, pre-calculus, and a preparation for calculus. More specifically; the topics will include factoring, integer and rational exponents, simplifying algebraic expressions, function notation, polynomial and rational functions. While many of the topics covered are similar to those in typical college pre-calculus courses, there is more theoretical coverage and emphasis, a faster pace is maintained, a greater depth of understanding is required and additional material on applications is taught.

Prerequisite: MATH Placement score of at least 54

4 credits

MATH 146: Programming I

An introduction to computer programming, with an emphasis on the development of good programming habits and skills utilizing Python. Topics will

include programming basics such as loops, decisions, lists, functions, file I/O, arrays, objects, classes.

Prerequisite: MATH Placement score of at least 46

4 credits

MATH 150: Linear Algebra

This course is an introduction to the algebra and geometry of Euclidean 3-space and its extensions to Euclidean N-Space. Topics included are systems of linear equations, determinants, vectors, bases, linear transformations and matrices.

Prerequisite: MATH 170

4 credits

MATH 160: Business/Applied Calculus

This is a one-semester course in calculus for non-science majors. Topics included are: functions, limits, continuity, derivatives and their applications, integrals and their applications, exponential and logarithmic functions.

Prerequisite: MATH Placement score of at least 61 or MATH 111

3 credits

MATH 170: Calculus I

This is the initial course in a sequence of courses on the fundamental ideas of the calculus of one variable intended for science and mathematics majors. It is here that truly significant applications of mathematics begin. Topics follow the early transcendentals path, included are functions, continuity, limits, derivatives, maxima and minima and antiderivatives and an introduction to integration.

Prerequisite: MATH 118 or MATH Placement score of at least 76

4 credits

MATH 171: Calculus II

Any student who has completed Calculus I should take Calculus II to obtain a complete study of the calculus of one variable. Topics follow the early transcendentals path, included are the integral, anti-derivatives, the Fundamental Theorem, integration techniques, interesting applications of integration, an introduction to differential equations, series, sequences.

Prerequisite: MATH 170

4 credits

MATH 201: Technical Writing with LaTeX

Students learn how to write technical documents, articles and theses using the LaTeX document preparation system. The course will progress from learning the basics of how LaTeX works and how to get started, to writing mathematical formulas, lists, tabular information, cross-referencing, creating and using illustrations and graphics, presentations, and troubleshooting LaTeX errors. Students are required to install LaTeX on a computer in order to complete assignments.

3 credits

MATH 209: Statistics II

This course is a continuation of Statistics I. Sampling methods, design of experiments, and multiple regression are the topics which will be the focus of the course.

Prerequisite: STAT 109

3 credits

MATH 233: Calculus III

This is an introduction to the calculus of several variables. Topics selected from polar coordinates, functions of several variables, partial derivatives, multiple integrals, line integrals, surface integrals, Green's theorem and Stokes' Theorem.

Prerequisite: MATH 171

4 credits

MATH 240: Differential Equations

An introduction to the basic mathematical content of ordinary differential equations and their applications. This will include analytical, qualitative, and numerical methods for ordinary differential equations. Topics include first-order and second-order equations and applications, systems of differential equations, and matrix methods for linear systems.

Prerequisites: MATH 150, MATH 171, or Department Permission

3 credits

MATH 245: Geometry

Emphasis in this course will be an axiomatic approach to the familiar geometry of Euclid, and how that approach historically produced other geometries. Several of these geometries will be explored, including finite geometries, projective geometry, and non-Euclidean geometries. The following topics are integrated into the course: comparisons of various geometries, historical aspects of geometry, reading and writing of geometric proofs, and the use of dynamic software packages.

Prerequisite: MATH 265

3 credits

MATH 250: Numerical Methods

This course will teach the student how to use programming skills together with mathematical software to efficiently solve a variety of problems. The primary programming language will be using the MATLAB environment. This approach will prepare the student for occasions where programming is required as well as the ability to utilize software packages such as MATLAB. A secondary objective is learning to use the markup language LaTeX. Having a laptop computer is not required but may be of great benefit for this course.

Prerequisites: MATH 150, MATH 233, MATH 146

3 credits

MATH 265: Transition to Advanced Math

This course is designed to facilitate the mathematics student's transition to courses requiring a higher level of mathematical maturity. Emphasis will be on the reading and writing of proofs, and on communicating mathematically - both orally and in writing. Topics will include logic, set theory, functions, relations, and number theory.

Prerequisites: MATH 150, MATH 171

3 credits

MATH 280: Modern Algebra I

This is the first semester of a year-long sequence on the study of algebraic structures. Course topics include the properties of numbers, equivalence relations, groups, rings, fields, direct products, homomorphisms and isomorphisms, and the natural development of various number systems.

Prerequisites: MATH 150, MATH 233, MATH 265

3 credits

MATH 281: Modern Algebra II

This second semester course will build on material from Math 280, with a focus on integral domains, polynomial rings, and fields. Additional topics will include the Sylow theorems, finite simple groups, symmetry and patterns, and an introduction to Galois theory.

Prerequisite: MATH 280

3 credits

MATH 290: Probability Theory

An introduction to the mathematical theory of probability including continuous distributions. Topics included are sample spaces; events; the algebra of events; combinatorial theory; probability distributions; binomial, hypergeometric, and Poisson distribution; probability densities; uniform, exponential, gamma, and normal distribution; mathematical expectation; multivariate distribution; Chebyshev's Theorem; Law of Large Numbers.

Prerequisite: MATH 171

3 credits

MATH 291: Statistical Analysis

An introduction to statistical concepts and techniques with emphasis on the underlying probability theoretical basis. Topics included are sums of random variables; moment generating functions; sampling distributions; F- and t-distributions; chi-square; point estimation; interval estimation; testing hypotheses, theory, and application; regression and correlation; analysis of variance.

Prerequisites: MATH 150, MATH 233

3 credits

MATH 370: Advanced Calculus

This course introduces the fundamental concepts of a function of a real variable from a rigorous point of view. Topics included are completion of the rational numbers, theory of continuous functions, theory of differentiation, theory of the Riemann integral, sequences, series.

Prerequisites: MATH 150, MATH 233, MATH 265

3 credits

MATH 400: Topics in Mathematics

Additional studies in mathematics can be arranged through independent study. Some possible areas for further study are Abstract Algebra, Geometry, Topology, Real Analysis and Complex Variables. At least one topics course is desirable for anyone wishing to pursue mathematics in graduate school.

Prerequisite: MATH 265

3 credits

.....

MGMT

.....

MGMT 120: Principles of Management

An introduction designed to provide a basic understanding of the principles, concepts and functions of management: planning, organizing, leading and controlling with an emphasis on managing and being managed.

Offered Fall and Spring semesters

3 credits

MGMT 226: Human Behavior in Organizations

A study of the individual as a functioning member of groups and organizations. Topics include organizational culture, motivation, group dynamics, communication, leadership, and conflict.

Offered Spring semester only

Prerequisite: MGMT120

3 credits

MGMT 405: Quality Leadership

The understanding of the leadership process is fundamental to being an effective manager in any organization. This course will focus on the different dimensions of leadership by focusing on historical leaders in business and society and the interactional framework of leadership to get a comprehensive understanding of the different dynamics of the process of being an effective leader in an organization. Historical and current leader profiles will highlight the different philosophies of leadership. Focus will be placed on not only the leader themselves but also the characteristics of the followers and the situation/environment in which the leadership takes place.

Offered Fall and Spring semesters

Prerequisites: MGMT 120, MGMT 226.

3 credits

MGMT 475: Management Internship

An individual work-study experience in an approved business institution. Placement of a qualified student in a business setting which involves an area of interest, provides training and on-the-job-learning, and prepares the student for business practice.

Junior standing, 2.75 GPA in required business courses, and written permission of the Associate Dean

3 credits

MIS

MIS 110: Advanced Computer Applications

This course focuses on the use of spreadsheets and databases to manage information. Topics studied include systems analysis, basic database design, and applications development using Microsoft Excel and Access.

Prerequisite: Word and Excel basics

3 credits

MIS 120: Introduction to Programming with 3D Animation

This course is an introduction to programming through 3D animation. Students will create their own elementary games and animations using the Alice language, and in the process they will learn the fundamentals of object-based programming. Topics include storyboarding, thinking in 3D, camera control, variables, functions, methods, logic, lists, events, interaction, and recursion. This course is open to all students. No prior programming experience is required.

3 credits

MIS 130: 3D Modeling and Animation I

An introduction to 3D character modeling, rigging and animation. Topics include box and polygonal modeling, shape keys, armatures, inverse kinematics, parenting and weight painting, lip syncing key framing, walk cycles, acting for

animation, and elementary video editing. Students will produce their own short animated movie.

3 credits

MIS 140: Computer Operations

This course introduces the basics of computer architecture and how the operating system enables it to function. Students will gain knowledge and skill in installing and configuring computer hardware components including drives, motherboards, memory, network/communications interfaces, printers and other peripherals. Students will work with latest Microsoft OS and be introduced to a Linux OS. Students will install and evaluate software. Students will use software utilities to do diagnostics, perform backups, and utilities for security and virus detection.

3 credits

MIS 150: Introduction to Data Science

An introduction to Microsoft Excel and Access in a data science context. The focus will be on machine learning techniques, including cluster analysis, Naïve Bayes, and ensemble methods.

3 credits

MIS 155: Bioinformatics Programming

An introductory course in Python programming with applications to biology, bioinformatics, and data science in general. Programming topics include functions, loops, if statements, recursion, lists, and dictionaries. Application topics include GC content of a DNA string, origin of pathogenicity, sequence alignment, phylogenetic trees, and genetic algorithms.

3 credits

MIS 180: Linux

Study of computer system administration using standalone and networked UNIX/Linux systems. Topics include system design and installation, file systems, BASH shell, user and process management, backup/restore, common administrative tasks, troubleshooting, and networking service administration. This course includes a lab intensive component.

3 credits

MIS 190: Algorithms

Introductory course surveying a variety of algorithm designs. Sorting algorithms, graph and tree algorithms, and asymptotic analysis of algorithm efficiency will be covered. Additional algorithm topics will be covered on a rotating basis, including matrix operation algorithms, combinatorial algorithms, cryptography algorithms, and computational complexity. No previous exposure to computer programming will be assumed.

3 credits

MIS 224: Mobile Application Development

In this course, students will learn to design, program, and publish mobile apps for iOS (mobile Apple devices) and Android using the Corona SDK.

3 credits

MIS 226: Programming II

This course focuses on object-oriented design and programming using data structures such as array-based lists, linked lists, stacks, queues, and trees implemented as abstract data types.

Prerequisite: MATH 146

3 credits

MIS 260: Networks

This is a course about the transmission and communication of data over a network. Topics include network hardware, the OSI reference model and TCP/IP working model, network protocols, Ethernet, IP addressing, data packets, subnets and virtual subnets, and sharing and management of network resources. Also included are the basics of cabling and wireless, and network design. The network software utilized includes the latest Microsoft server software, LDAP (active directory), TCP/IP client/server software, Linux network software and virtualization.

Prerequisites: MATH 146, MIS 140

3 credits

MIS 280: Introduction to Internet Programming

Students will learn HTML5, and CSS. All students will build syntactically valid websites on a live server with these two technologies, adhering to W3C standards while learning the web-development cycle. This course is taught as a programming course, not as web design. A complete coverage of HTML5 and a comprehensive coverage of the latest snapshot of CSS will allow students to hand code several sophisticated web projects that they can add to their department online portfolio.

4 credits

MIS 281: Internet Programming II

A continuation of MIS 280 with a further exploration of HTML5 and CSS. This will include the HTML5 DOM API's and many of the new CSS modules. Other topics will include CSS preprocessors, further responsive web design, CSS framework blueprints and examples, and scalar and modular architecture for CSS. Certain advanced topics, such as CSS frameworks, designing to a grid, CSS3, and web graphics may also be covered.

Prerequisite: MIS 280

3 credits

MIS 305: Game Programming

A first course in game programming with Unity. Topics include 3D concepts, scripting basics, environments, characters, interaction, collisions, triggers, rigid bodies, particle systems and animation.

Prerequisite: MIS 120 or MATH 146

3 credits

MIS 350: Database Management

This is a study of the concepts, procedures, design, implementation and maintenance of a relational data base management system. Topics include normalization, database design, entity-relationship modeling, performance measures, data security, concurrence, integrity and Structured Query Language. MySQL will be the database management system used in this course.

Prerequisite: MATH 146

3 credits

MIS 370: Client-Side Programming

In this course, students will learn the fundamentals of client-side web programming, creating programs executed by the web browser to make dynamic and interactive web pages. Separation of content, presentation, and behavior will be a major theme of the course, along with a review of object oriented programming. JavaScript will be the language of choice, and much of the course will be focused on its basics. Topics will include statements and commands, data types and variables, arrays, strings, functions, and programming logic. Later in

the course, we will experiment with modern JavaScript frameworks, libraries, and APIs.

Prerequisite: MIS 280

4 credits

MIS 380: Server-Side Programming

In this course, students will learn the fundamentals of server-side web programming, writing scripts and managing databases that generate dynamic web sites. The first part of the course will be focused on a server side scripting language and its basics. PHP will be the language of choice, and topics will include syntax, variables, strings, arrays, functions, logic, HTML forms, and includes. In the next part of the course, the students will learn the basics of SQL using the MySQL database, and in the last part of the course, PHP and MySQL will be used together. Topics will include e-commerce, security, cookies, and sessions. By the end of the course the students will have built complete applications on a live sever as part of their ongoing department online portfolio.

Prerequisites: MIS 280, MIS 350

4 credits

MIS 403: Senior Project

This is a capstone course. Emphasis will be on present-day productivity tools. Students will construct complete operational systems using a database environment whenever appropriate.

Prerequisites: Senior IT Majors, Department permission

3 credits

MIS 462: Datavisual with Javascript

This course will explore several modern libraries specifically created for data visualization on the web. Students will create interactive, animated, and well-designed graphics that accurately and effectively depict a data set. JavaScript libraries studied are subject to change, but students will learn to create basic charts and graphs, radar charts, trees, word clouds, cartographs, and several other styles of visualization that complement their data.

3 credits

MKTG

MKTG 162: Principles of Marketing

A broad study of the field of marketing from a managerial and analytical perspective. Emphasis is on demand analysis, need satisfaction, strategic planning, product development, distribution channels, promotions, and price determination.

Offered Fall and Spring semesters

3 credits

MKTG 200: International Marketing Management

This course deals with opportunities and challenges associated with the increasing globalization of markets. Topics covered include the environmental and cultural differences which shape the needs and preferences of global consumers, the impact of foreign political and economic factors on the marketing mix, the assessment of foreign markets, entry strategies, channel management, promoting internationally, and transfer pricing.

Prerequisites: ECON 105, MKTG 162

Offered Spring semester only

3 credits