Information Technology

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https://engineering.missouri.edu/academics/it/

Welcome to the Information Technology (IT) Program at Mizzou! Established in 2005, the IT program is home to more than 300 students studying a spectrum of industry topics. The program has two emphasis areas: (1) Software Engineering and Computer Management (mobile application development, computer programming, web development, networks and database management, system administration, cybersecurity, and project management). (2) Media Technology (video and audio post production, engineering, wireless broadcast systems, digital effects, virtual reality and game design).

The IT graduates have a great outlook in job market. According to the Bureau of Labor Statistic list of Computer Information Technology Occupations, the median salaries in 2017 are $103,560 for Software Developers, $95,510 for Information Security Analyst, $88,270 for Computer Systems Analysts, $81,100 for Network and Computer Systems Administrators, $70,530 for Multimedia Artists and Animators, $67,990 for Web Developers, and $58,210 for Film and Video Editors and Camera Operators. Our IT program prepares students to pursue a variety of IT-related careers in programming, software engineering, database and system administration, video and audio post-production, digital effects and virtual reality, web developers, IT implementation specialists, and business analysts, both in the public and private sector. Equipped with marketable skills, most graduates in our IT program got high-pay jobs, some of whom had six-figure starting salaries. Meanwhile, the program provides well-trained IT workforce for Missouri and beyond.

The IT program offers rich curricula and student learning experience. Every year some new courses are created in response to the trend of the industry. The course materials are also updated frequently to reflect the state of art. Some course sequences are established in media technology, software programming, system administration and security, etc. Some courses targeting cutting-edge technologies, such as cloud computing, virtual reality, and mobile App development are also offered. Many courses are offered online and in the summer. The teaching style of the IT program is highly hands-on, using experiential learning and challenge-based learning. The IT program also has a study-abroad program, with activities in both the summer and winter breaks.

The IT program is suitable to students with a wide range of background, including students transferred from many other degree programs. It also offers flexibility in career design, where required courses are fewer than other engineering programs so that students can pick and choose a basket of courses to tailor their career goals. In addition, the program offers a spectrum of collaborations, including a fast-track IT-MBA program with the Business School and a co-sponsored annual Reynolds Journalism Institute student competition, as well as numerous academic and social events by student organizations. Abundantly available and encouraged, students may seek research opportunities with faculty, and participate in internships for credit towards the program.

The IT program has distinguished faculty and state-of-the-art facilities. Our faculty are highly trained and experts in their teaching areas. They received various awards. The program has a number of IT-specific labs and classrooms, including Media and Software Development Lab and Classroom, Software Engineering Classroom, Networks and Security Lab, Virtual Reality Lab, Audio Engineering Lab and Studio, and Virtual Reality and Media Capture Lab. The equipment is upgraded frequently. The program also rents some IT and media equipment to students.

Faculty

Assistant Professor of Practice: R. Bazan, C. Gubera, B. Maurer, N. Wergeles
Associate Teaching Professor: D. Musser
Assistant Teaching Professor: F. Wang

* Graduate Faculty Member - membership is required to teach graduate-level courses, chair master's thesis committees, and serve on doctoral examination and dissertation committees.
** Doctoral Faculty Member - membership is required to chair doctoral examination or dissertation committees. Graduate faculty membership is a prerequisite for Doctoral faculty membership.

Undergraduate

- BS in Information Technology (http://catalog.missouri.edu/undergraduate/collegeofengineering/informationtechnology/bs-information-technology)
- Minor in Information Technology (http://catalog.missouri.edu/undergraduate/collegeofengineering/informationtechnology/minor-information-technology)

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This degree program is offered by the College of Engineering. Career opportunities include database administration, web design, cybersecurity, game development, film production, and more.

Graduate

While the College of Engineering does not offer a graduate degree specifically in Information Technology, it does offer a number of graduate degrees in closely related areas such as Computer Science (http://catalog.missouri.edu/undergraduate/collegeofengineering/computerscience/#graduatetext), and Computer Engineering (http://catalog.missouri.edu/undergraduate/collegeofengineering/computerengineering/#graduatetext). There is a Master of Engineering degree through the department. The University also offers a number of information technology degrees in its other Colleges, and through interdisciplinary programs such as Health Informatics (http://catalog.missouri.edu/undergraduate/interdisciplinaryacademicprograms/healthinformatics/#graduatetext), Health Administration (http://catalog.missouri.edu/undergraduate/interdisciplinaryacademicprograms/healthadministration/mha-health-administration), Informatics (http://catalog.missouri.edu/undergraduate/interdisciplinaryacademicprograms/informatics/#graduatetext), or Information Science and Learning Technology (http://
catalog.missouri.edu/undergraduategraduate/collegeofeducation/informationscienceandlearningtechnologies/#graduatetext).

A joint degree program administered through the School of Engineering and the Crosby MBA Program is available for students who wish to earn a Bachelor of Science in Information Technology (BS IT) and a Master of Business Administration (MBA) (http://catalog.missouri.edu/undergraduategraduate/collegeofbusiness/businessadministration/#graduatetext). Individuals interested in pursuing engineering and business will find that this program provides them with a valuable set of skills to excel in this rapidly growing field. If earned separately, the BS IT degree would take four years and the MBA degree would take two years. The dual degrees may be completed in five years assuming normal progress toward each degree.

Or you may browse a complete list of degree options (http://catalog.missouri.edu/degreesanddegreeprograms) at the University of Missouri.

INFOTC 1000: Introduction to Information Technology
This course introduces the field of Information Technology including foundation experiences and knowledge, the history of digital technologies, emphasis areas in the program, career opportunities, and ethical/social issues. Students participate in activities that introduce students to digital media, digital systems, and software engineering. Students learn to use distributed version control systems and how to work on collaborative teams.

Credit Hours: 3
Prerequisites: May be restricted to Information Technology majors during early registration

INFOTC 1001: Topics in Information Technology
Topics may vary from semester to semester. May be repeated upon consent of department.

Credit Hours: 3
Prerequisites: May be restricted to Information Technology majors during early registration

INFOTC 1040: Introduction to Problem Solving and Programming
An introduction to problem solving methods and programming concepts, providing experience in designing, developing, implementing, and testing programs. Cannot be taken for credit after CMP_SC 1050.

Credit Hours: 3

INFOTC 1610: Introduction to Digital Media Design
This project-based course is an introduction to the concepts and practices of audio design, graphic design, motion media design and basic video editing. Current technologies are employed to examine design fundamentals and applications of media design that apply to audio and video production and new media production.

Credit Hours: 3
Prerequisites: May be restricted to Information Technology majors during early registration

INFOTC 2001: Topics in Information Technology
Topics may vary from semester to semester. May be repeated upon consent of department. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: May be restricted to Information Technology majors during early registration

INFOTC 2040: Programming Languages and Paradigms
This course presents programming principles and their syntactical representation and implementation across languages including those that are compiled and interpreted. The course shows how to implement algorithms and data structures to solve problems while utilizing paradigms offered by the programming languages such as procedural, object-oriented, protocol-oriented, functional, and declarative. Language support for strong and weak typing and type safety are covered along with support for optional values. Provides experience in developing algorithms and determining their efficiency, designing application architecture, and developing applications. Building and using libraries/ application programming interfaces is covered. Git and GitHub are used for code versioning and collaboration. Integrated development environments (IDEs) are used for managing, building, debugging, and testing applications.

Credit Hours: 3
Prerequisites: INFOTC 1040 or CMP_SC 1050 , or prior experience with programming and consent of instructor

INFOTC 2600: Digital Systems
This course provides a foundation of knowledge of digital systems including terminology, concepts, architecture, processes, tools, hardware and software.

Credit Hours: 3

Prerequisites: May be restricted to information technology majors only during early registration

INFOTC 2610: Media Technology and Design I
This project-based course examines the fundamentals of media technology, from capture devices to the software and hardware that processes data. Through hands-on experience with capturing technology, audio recording devices, and the software and hardware components needed to manipulate the recordings, students will process big-data files to create meaningful manipulations in assembly, engineering, and colorization. Students will utilize a spectrum of camera equipment, recording devices and facilities to achieve an understanding of audio/video capture, project planning and implementation, hardware assessment, optimization practices through hardware acceleration, and video processing. This course also focuses on basic editing theory and industry trends. This is done through in-class demonstrations, online modules, and supplementary material hosted online.

Credit Hours: 3
Prerequisites: May be restricted to Information Technology majors during early registration; C- or higher in INFOTC 1610, or instructor content through course equivalencies

INFOTC 2620: Computer Modeling and Animation I
Introduction to the field of computer modeling and animation with an emphasis on tools. Learn programming methods for developing customized modeling and animation algorithms. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: May be restricted to Information Technology majors during early registration
INFOTC 2810: Fundamentals of Network Technology
This course includes an overview of networking and the common wireless standards. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: CMP_SC 1050. May be restricted to Information Technology majors during early registration

INFOTC 2830: Web Application Development I
(same as CMP_SC 2830). This course will attempt to provide a comprehensive understanding of the evolution, the technologies, and the tools of the Internet. In particular, issues pertaining to the World Wide Web and Multimedia (HTML, CGI, Web based applications) will be discussed in detail.

Credit Hours: 3
Prerequisites: CMP_SC 2050 with a C- or higher

INFOTC 2910: Cyber Security
This course covers numerous platform-independent security topics including threats, problem ports and services, theory and practice of defense in security, intrusion detection, data security, securing remote access, user education and support, designing a secure network and security management. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: CMP_SC 1050, INFOTC 2810. May be restricted to Information Technology majors during early registration

INFOTC 301: Topics in Information Technology
Topics may vary from semester to semester. May be repeated upon consent of department. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: May be restricted to Information Technology majors during early registration

INFOTC 3001: Topics in Information Technology
This course includes an overview of networking and the common wireless standards. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: CMP_SC 1050 with a C- or higher

INFOTC 3600: User Experience Design I
This course is a first in a series that focuses on User Experience (UX) Design for software applications. This course introduces the beginner to processes, techniques and methods of evaluation to design, model and evaluate application designs and user interfaces.

Credit Hours: 3
Prerequisites: May be restricted to Information Technology majors during early registration

INFOTC 3610: Media Technology and Design II
This project-based course builds upon the fundamentals of production and media processing learned in INFOTC 2610 and introduces industry standard advanced video and audio capture technology, software, and data management systems. The course is designed to provide further hands-on experience with digital video capturing technology, non-linear editing software, Digital Audio Workstations, and broadcast technology through three large-scale collaborative media projects. These projects build upon the principles of data management and software, while introducing project management, team management, and direct-to-market media strategies. Students will utilize a spectrum of industry standard camera equipment, recording devices and facilities to achieve a fuller understanding of audio/video capture and post production.

Credit Hours: 3
Prerequisites: C- or higher in INFOTC 2610. May be restricted to Information Technology majors during early registration. Instructor consent with approved equivalencies

INFOTC 3620: Computer Modeling and Animation II
This course covers advanced methods for modeling and animation with an emphasis on computer science theory and virtual reality. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: C- or higher in INFOTC 2620. May be restricted to Information Technology majors during early registration

INFOTC 3630: Introduction to Virtual Reality
This course will focus on using the recent consumer-grade equipment to develop skills. It will introduce students to the software, hardware, and concepts involved with the current state of the art in virtual reality. This course will focus on the tools of the Internet. In particular, issues pertaining to the World Wide Web and Multimedia (HTML, CGI, Web based applications) will be discussed in detail.

Credit Hours: 3
Prerequisites: CMP_SC 1050 with C- or higher. May be restricted to Information Technology majors during early registration

INFOTC 3640: Motion Graphics and Visual Effects Design I
This advanced media creation course is an introduction to the fundamentals of motion graphic design, 2-D animation, and visual effects creation. It is a project based course that requires understanding of NLEs, experience in media creation and design, understanding of basic audio/video compression, and understanding of basic media design and concepts. Computer programs designed for graphic design, motion graphics, 2-D animation, and visual effects are integrated throughout the course. Starting media will be provided for each project.

Credit Hours: 3
Prerequisites: CMP_SC 1050 with C- or higher. May be restricted to Information Technology majors during early registration

INFOTC 3650: Project and Team Management
This course focuses on the developmental tools, communication skills, and management techniques required to successfully lead personnel, meet deadlines, and create digital media projects in today's video production industry. From budgeting to crew management, leaders in the industry are required to be knowledgeable in all areas of a project's details. Explores the wide range of topics in the digital media industry. Additional areas of study include time management, legal complications, project conceptualization, fund raising techniques, sales tactics, marketing, and contingencies. Students will participate in pod-based learning to successfully manage simulated projects and meet deadlines that mirror the industry's rigor.

Credit Hours: 3
Prerequisites: C- or higher in INFOTC 1610. May be restricted to Information Technology majors during early registration

INFOTC 3650W: Project and Team Management - Writing Intensive
This course focuses on the developmental tools, communication skills, and management techniques required to successfully lead personnel, meet deadlines, and create digital media projects in today's video production industry. From budgeting to crew management, leaders in the industry are required to be knowledgeable in all areas of a project's details. Explores the wide range of topics in the digital media industry. Additional areas of study include time management, legal complications, project conceptualization, fund raising techniques, sales tactics, marketing, and contingencies. Students will participate in pod-based learning to successfully manage simulated projects and meet deadlines that mirror the industry's rigor.

Credit Hours: 3
Prerequisites: C- or higher in INFOTC 1610. May be restricted to Information Technology majors during early registration

INFOTC 3650W: Project and Team Management - Writing Intensive
This course focuses on the developmental tools, communication skills, and management techniques required to successfully lead personnel, meet deadlines, and create digital media projects in today's video production industry. From budgeting to crew management, leaders in the industry are required to be knowledgeable in all areas of a project's details. Explores the wide range of topics in the digital media industry. Additional areas of study include time management, legal complications, project conceptualization, fund raising techniques, sales tactics, marketing, and contingencies. Students will participate in pod-based learning to successfully manage simulated projects and meet deadlines that mirror the industry's rigor.
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**Credit Hours:** 3  
**Prerequisites:** C- or higher in INFOTC 1610. May be restricted to Information Technology majors during early registration

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**INFOTC 3660: Audio Engineering and Design**

This course is an intensive study of the techniques and art behind the use of audio in today's media design environments. From the theater to television, from tablet and mobile device to computer, this course will focus on the four major sound design areas: sound in cinema, sound creation, sound manipulation, and environmental sound layering. Each area focuses both on theory and practice, utilizing provided technology and studio resources, giving the student both an academic and vocational approach to sound engineering for media design. Students will become proficient in some of today's most standardized audio engineering platforms and software, and will study how sound manipulation can impact the viewer.

**Credit Hours:** 3  
**Prerequisites:** C- or higher in INFOTC 1610. May be restricted to Information Technology majors during early registration

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**INFOTC 3850: Computer System Administration**

This course will cover network management tools, network maintenance, data management, remote access management, management tasks, responsibilities and ethics, required plans and policies, design of a well-managed network. Some work will be done in both Windows and Linux environments. Graded on A-F basis only.

**Credit Hours:** 3  
**Prerequisites:** CMP_SC 2050, junior standing. May be restricted to Information Technology majors during early registration

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**INFOTC 3940: Internship in Information Technology**

Information Technology-related experience in business or industry jointly supervised by faculty and IT professionals. Students should apply one semester in advance for consent of the supervising professor. Graded on an S/U basis only.

**Credit Hour:** 1-6  
**Prerequisites:** Instructor Consent

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**INFOTC 4001: Topics in Information Technology**

Topics may vary from semester to semester. May be repeated upon consent of department. Graded on A-F basis only.

**Credit Hours:** 3  
**Prerequisites:** May be restricted to Information Technology majors during early registration

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**INFOTC 4001W: Topics in Information Technology - Writing Intensive**

Topics may vary from semester to semester. May be repeated upon consent of department. Graded on A-F basis only.

**Credit Hours:** 3  
**Prerequisites:** May be restricted to Information Technology majors during early registration

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**INFOTC 4085: Independent Projects**

A student interested in doing an independent study project should first choose an area and instructor to work with. The student and instructor decide on a suitable Information Technology topic. The student writes up a detailed description of the project, including references, deadlines and deliverables. The instructor and student decide on details for completing the project during the semester for a grade.

**Credit Hour:** 1-6  
**Prerequisites:** Consent of instructor

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**INFOTC 4200: Software Engineering**

Software Engineering covers the principles, processes, and professional practices used to design, develop, test, deploy, and manage software systems in a team-based, collaborative environment. A range of software engineering methodologies are covered with an emphasis on agile software development using incremental methods of managing the development activities.

**Credit Hours:** 3  
**Prerequisites:** INFOTC 2040 or CMP_SC 2050 or permission of the instructor

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**INFOTC 4400: C#.NET Development**

Learn how to develop and debug multi-threaded Windows desktop applications based on the object-oriented (OO), Model-View-Controller (MVC), and Model View ViewModel (MVVM) paradigms using C#, .NET, Windows Presentation Foundations (WPF), and Visual Studio. Graded on A-F basis only.

**Credit Hours:** 3  
**Prerequisites:** CMP_SC 2050. May be restricted to Information Technology majors during early registration

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**INFOTC 4405: iOS App Development I**

This course focuses on developing iOS applications using Xcode and the Swift programming language on the macOS platform. The following topics are covered: Xcode integrated development (IDE), Interface Builder to design and create user interfaces, autoplayout constraints for implementation of interface designs, how to program using Swift, programming using object-oriented, functional, and protocol-oriented paradigms, use of Apple iOS APIs, debug iOS applications in Xcode, test iOS apps in simulator and hardware devices, and use git for managing projects and code versioning. Must own/have access to a computer running macOS to take this course and install Xcode on the computer.

**Credit Hours:** 3  
**Prerequisites:** INFOTC 1040 or CMP_SC 1050, or prior experience with programming and consent of instructor  
**Recommended:** Prior experience programming in any programming language. The student should understand basic language concepts such as variables, data structures, control structures, and functions
**INFOTC 4410: Android App Development I**
This is the first in a series of courses on developing Android applications using Android Studio and the Java and Kotlin programming languages.

*Credit Hours: 3
Prerequisites: INFOTC 1040 or CMP_SC 1050, or prior experience with programming and consent of instructor*

**INFOTC 4420: Android App Development II**
This is the second course in a series on developing Android applications using Android Studio and the Java and Kotlin programming languages. This course covers intermediate-level topics in application design, more complex UI implementations, and data persistence.

*Credit Hours: 3
Prerequisites: INFOTC 4410 or permission of the instructor*

**INFOTC 4425: iOS App Development II**
This is the second in a series of courses on developing iOS applications using Xcode and Swift programming language on the macOS platform. This course covers intermediate-level topics in application design, more complex UI implementations, and data persistence.

*Credit Hours: 3
Prerequisites: INFOTC 4405 or INFOTC 4500 or permission of the instructor*

**INFOTC 4440: Android App Development III**
This is a third in a series of courses on developing Android applications using Android Studio and the Java and Kotlin programming languages. This course covers advanced topics in application architecture, application design, data persistence, and client-server architecture.

*Credit Hours: 3
Prerequisites: INFOTC 4420 or permission of the instructor*

**INFOTC 4445: iOS App Development III**
This is the third in a series of courses on developing iOS applications using Xcode and Swift programming language on the macOS platform. This course covers advanced topics in application architecture, application design, data persistence, and client-server architecture.

*Credit Hours: 3
Prerequisites: INFOTC 4425 or permission of the instructor*

**INFOTC 4500: Team-Based Mobile Device Application Development**
(same as JOURN 4444). This is a multi-disciplinary, team-based course on developing applications for mobile devices. Teams will be comprised of students who are software developers and students who are designers. Graded on A-F basis only.

*Credit Hours: 3
Prerequisites: for Journalism majors (Designers), instructor's consent; for Computer Science or Information Technology majors (Developers), CMP_SC 2050 or permission of instructor. May be restricted to Information Technology majors during early registration*

**INFOTC 4600: User Experience Design II**
This course is the second in a series that focuses on User Experience (UX) Design for software applications. This course further develops the processes, techniques and methods of evaluation to design, model, and evaluate application designs and user interfaces.

*Credit Hours: 3
Prerequisites: INFOTC 3600*

**INFOTC 4610: Advanced Multimedia Design and Technology**
Students in this course are immersed in upper level study of media technology, software, and trends in the industry, with focus on advanced media design, motion media capture techniques, portfolio development, and industry standard technology and software. Students will work both independently and in small focus groups to produce industry results in narrative, non-fiction, and commercial media design projects. Students will further develop proxy-based editing, cinema raw video processing, optic, and lighting techniques. Students will also complete micro research papers during the course, focusing on technology, image processing, software and other developments of the multimedia industry. This course may be taught over the summer or winter intersessions as a study abroad program. The location and course schedule are announced prior to registration, and the research fields are announced prior to departure.

*Credit Hours: 3
Prerequisites: C- or higher in INFOTC 2610. May be restricted to Information Technology majors during early registration*

**INFOTC 4610W: Advanced Multimedia Design and Technology - Writing Intensive**
Students in this course are immersed in upper level study of media technology, software, and trends in the industry, with focus on advanced media design, motion media capture techniques, portfolio development, and industry standard technology and software. Students will work both independently and in small focus groups to produce industry results in narrative, non-fiction, and commercial media design projects. Students will further develop proxy-based editing, cinema raw video processing, optic, and lighting techniques. Students will also complete micro research papers during the course, focusing on technology, image processing, software and other developments of the multimedia industry. This course may be taught over the summer or winter intersessions as a study abroad program. The location and course schedule are announced prior to registration, and the research fields are announced prior to departure.

*Credit Hours: 3
Prerequisites: C- or higher in INFOTC 2610. May be restricted to Information Technology majors during early registration*

**INFOTC 4630: Game Development**
This class will focus on the theory, design, and implementation of games using the industry standard game development tools. Students will learn about the workflow for designing, creating and implementing vital components for modern games, with respect to data structures, algorithms, content, development tools and practice of game development. The final project is a fully functional, your own custom game.

*Credit Hours: 3
Prerequisites: INFOTC 3630 or CMP_SC 2050 with C- or higher. May be restricted to Information Technology majors during early registration*

**INFOTC 4640: Motion Graphics and Visual Effects Design II**
This course builds on fundamentals of digital motion picture effects technology learned in Digital Effects I. Computer programs designed
for digital visual special effects in film and broadcast are integrated throughout the course.

**Credit Hours:** 3  
**Prerequisites:** C- or higher in INFOTC 3640. May be restricted to Information Technology majors during early registration

**INFOTC 4650: Shader Programming**  
The focus of this course is modern computer graphics algorithms and programming, with an emphasis on games, shader languages, (GLSL and Cg) and Graphical Processor Units (GPUs).

**Credit Hours:** 3  
**Prerequisites:** CMP_SC 2050, INFOTC 2620. May be restricted to Information Technology majors during early registration

**INFOTC 4830: Web Application Development II**  
(same as CMP_SC 4830; cross-leveled with CMP_SC 7830). This course will study the science and engineering of the World Wide Web. We will study the languages, protocols, services and tools that enable the web. Emphasis will be placed on basics and technologies.

**Credit Hours:** 3  
**Prerequisites:** CMP_SC 2830 with a C- or higher

**INFOTC 4970W: Senior Capstone Design - Writing Intensive**  
This course is an opportunity for you to demonstrate that you have achieved the goals established by the Information Technology (IT) program. You will do this through a series of writing exercises, class activities, and a team-based project. You will demonstrate your ability to synthesize various methods and skills, apply them to new, novel, complex, and integrated project requirements in real-world IT problems. Graded on A-F basis only.

**Credit Hours:** 3  
**Prerequisites:** C- or higher in CMP_SC 4320 and senior standing. Restricted to INFOTC majors

**INFOTC 4990: Undergraduate Research in Information Technology**  
A student interested in doing undergraduate research should first choose an area and professor. The student will work with the professor on a specific area of research. The professor and student decide on details for completing research during the semester for a grade.

**Credit Hour:** 1-6  
**Prerequisites:** Instructor's consent

**INFOTC 4995: Undergraduate Research in Information Technology - Honors**  
A student interested in doing undergraduate research should first choose an area and professor. The student will work with the professor on an independent investigation to be presented as an undergraduate honors thesis.

**Credit Hour:** 1-6  
**Prerequisites:** Instructor's consent