

# INFORMATION SYSTEMS AND TECHNOLOGY (IN/IT)

## IN200: Data Governance - Policy and Ethics

This course looks at topics such as business process management, risk management, security, and data quality. You will develop a sample data governance plan. This course also looks at data ownership and the issues of rights, responsibilities, and privacy related to the ownership of data. Legal and ethical issues are also discussed. Quarter Credit Hours: 5 | Prerequisite: None

## IN200M1: Data Governance Roles

Examine the various roles involved in data governance. Quarter Credit Hours: 1 | Prerequisite: None

## IN200M2: Data Governance Plan

Formulate a data governance plan for a small data collection company. Quarter Credit Hours: 1 | Prerequisite: None

## IN200M3: Ethical Requirements for Collecting and Storing Data

Evaluate the ethical requirements when collecting and storing data. Quarter Credit Hours: 1 | Prerequisite: None

## IN200M4: Securing Collected and Stored Data

Describe the importance of securing collected and stored data. Quarter Credit Hours: 1 | Prerequisite: None

## IN200M5: Data Governance Policies

Synthesize the policies of data governance with standard business practices.

Quarter Credit Hours: 1 | Prerequisite: None

## IN203: Networking With Microsoft Technologies

This course provides an in-depth examination of the Microsoft operating system in a cloud environment. You will implement a network infrastructure to include virtualization and containers. You will learn about advanced network infrastructure in a cloud environment such as Azure.

Quarter Credit Hours: 5 | Prerequisite: IT273

## IN203M1: Server Implementation

Implement Windows servers in host and compute environments. Quarter Credit Hours: 1 | Prerequisite: IT273

## IN203M2: Virtualization and Container Technologies

Examine virtualization and container technologies. Quarter Credit Hours: 1 | Prerequisite: IT273

## IN203M3: Network Services

Analyze network services. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IN203M4: Identity Services and Features

Examine identity services and features. Quarter Credit Hours: 1 | Prerequisite: IT273

## IN203M5: Vulnerability Management

Assess endpoint protection and vulnerability management in the Windows environment. Quarter Credit Hours: 1 | Prerequisite: IT273

## IN205: Routing and Switching I

This course is the first of two routing and switching courses that prepare you to design, configure, and maintain network routing and switching. You learn the basic concepts, protocols, and functions of network routers and switches. Emphasis is placed on hands-on practice of configuration and troubleshooting using live and simulated labs. This course is designed, among other things, to provide you with the foundational knowledge necessary to pursue Cisco® Certified Network Associate (CCNA) certification. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified. Quarter Credit Hours: 5 | Prerequisite: None

## IN205M1: Network Routing and Switching Concepts

Explain network routing and switching concepts. Quarter Credit Hours: 1 | Prerequisite: None

## IN205M2: IP Addressing Concepts

Estimate an IP addressing scheme based on business needs. Quarter Credit Hours: 1 | Prerequisite: None

## IN205M3: Router and Switching Configurations

Apply router and switching configurations to meet business needs. Quarter Credit Hours: 1 | Prerequisite: None

## IN205M4: Network Routing Protocols

Investigate network routing protocols to meet business requirements. Quarter Credit Hours: 1 | Prerequisite: None

## IN205M5: VLAN Use

Use VLANs based on specific situations or configurations. Quarter Credit Hours: 1 | Prerequisite: None

## IN206: Bouting and Switching II

This course is the second of two routing and switching courses and explores more advanced topics. You will design, configure, reconfigure, and maintain network routing and switching devices. You will also learn advanced concepts in routing protocols, cloud, resource access, security, and disaster recovery. Emphasis is placed on planning, proposing, and securing network infrastructure.

Quarter Credit Hours: 5 | Prerequisite: IN205

## IN206M1: IP Addressing Schemes

Prepare an IP scheme for a network using IPv6. Quarter Credit Hours: 1 | Prerequisite: IN205

## IN206M2: Routing and Switching Configuration

Configure routing and switching devices per plans and specifications. Quarter Credit Hours: 1 | Prerequisite: IN205

## IN206M3: Advanced Routing and Switching Concepts

Explore advanced network routing and switching concepts, including security.

Quarter Credit Hours: 1 | Prerequisite: IN205

#### IN206M4: Disaster Recovery Plans

Create a disaster recovery plan for a routed infrastructure. Quarter Credit Hours: 1 | Prerequisite: IN205

#### IN206M5: Network Security and Cloud Access

Prepare for network security and cloud access. Quarter Credit Hours: 1 | Prerequisite: IN205



## **IN207: Penetration Testing Fundamentals**

This course covers standard methodologies in penetration testing techniques to plan, scope, develop, and execute a penetration testing plan given several scenarios. Topics covered include ethics, customer documents, laws and compliance, planning and scoping, tools for hands-on penetration techniques, remediation techniques, reporting, communications, and post-penetration testing activities. This course is designed to give you the fundamental knowledge necessary to continue your study for the CompTIA PenTest+ certification exam. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified.

Quarter Credit Hours: 5 | Prerequisite: IN203, IT273, IT275, and any 200 level programming course

#### IN208: Introduction to Critical Infrastructure

This course introduces concepts and definitions related to critical infrastructure cybersecurity. The course will explore National Institute of Standards and Technology (NIST) cybersecurity and Department of Homeland Security Science and Technology programs that support critical infrastructure security. The sixteen sectors of critical infrastructure, as defined by the Cybersecurity and Infrastructure Security Agency (CISA), will also be explored. This will include vulnerabilities, threats, mitigations, and possible solutions. The sectors include all aspects of civilian life, such as agriculture, communication, chemical and critical manufacturing, commercial facilities, public health and health care, dams, defense bases and defense industrial bases, energy, emergency services, financial, nuclear, water, information technology, and transportation. This course will explore why and how these sectors are noted as critical infrastructure to our society, including why protection and migration efforts are necessary from a cybersecurity perspective. This course will also explore who and what is involved in protecting and securing ongoing efforts with policy, processes, and procedures for critical infrastructure.

Quarter Credit Hours: 5 | Prerequisite: None

#### IN209: Cyber Practice I

This course will help prepare the next generation of cybersecurity professionals with outside class exposure to online content and quizzes via individual and team competitions. Materials in this course will include cyber research documents, labs, and tests that reflect content from certifications such as CompTIA's Security+ and EC-Council's Certified Ethical Hacking. Topics from these two certifications have been used in National Cyber League (NCL) where students can compete individually as well as within team settings while at the same time preparing for valid and high-paying certifications. These topics include cryptography, opensource intelligence, scanning, forensics, web application exploitation, log analysis, password cracking, network traffic analysis, and enumeration and exploitation.

Quarter Credit Hours: 5 | Prerequisite: Second term or permission from the Dean

#### IN210: Cyber Practice II

This course will cover all aspects of the Collegiate Cyber Defense Competition (CCDC). The CCDC is a regional competition offered across the U.S. to help cybersecurity students compete and prepare for a career in cybersecurity. Purdue Global students majoring in cybersecurity can participate in the Midwest regional competition of CCDC (MWCCDC). When participating in MWCCDC, every student participates on a team. CCDC Teams should possess the following skills and knowledge to be successful in a competition. The competitions are designed to measure these areas and general skills. The list is not comprehensive but highlights the core areas. Such areas include business communication and resume skills, design and architecture skills, legal framework skills, Linux and Windows skills, networking concepts and configuration skills, software installation and debugging skills, firewall devices and security tool skills, cryptography, and virtualization skills. Quarter Credit Hours: 5 | Prerequisite: IN209

#### IN212: Offensive and Defensive Concepts in Cybersecurity

This course will introduce the various terms and roles used throughout the offensive and defensive sides of the cybersecurity industry. You will receive hands-on experience utilizing various tools and techniques used by penetration testers and red teamers to establish a foothold on a targeted network. You will also receive experience collecting and viewing logs and utilizing other indicators of compromise to detect an attack. Finally, you will learn mitigation techniques to prevent common attacks. Quarter Credit Hours: 5 | Prerequisite: IN203 and IT275

#### IN220: Help Desk Support I

This course is the first of a series that aims to prepare you for a role as an entry-level help desk support specialist. In this course, you will be introduced to the world of information technology, or IT. You will learn about the different facets of information technology, like computer hardware, the internet, computer software, troubleshooting, and customer service. This course covers a wide variety of topics in IT that are designed to give you an overview of what is to come in this certificate program. This course is designed to provide a full overview of computer networking. The content will also cover everything from the fundamentals of modern networking technologies and protocols, to an overview of the cloud, to practical applications and network troubleshooting. Quarter Credit Hours: 5 | Prerequisite: None

#### IN221: Help Desk Support II

In this course, through a combination of video lectures, demonstrations, and hands-on practice, you will learn about the main components of an operating system and how to perform critical tasks like managing software and users and configuring hardware. This course will also transition you from working on a single computer to an entire fleet. Systems administration is the field of IT that is responsible for maintaining reliable computer systems in a multi-user environment. In this course, you will learn about the infrastructure services that keep all organizations, big and small, up and running. You will do a deep dive on cloud computing so that you understand everything from typical cloud infrastructure setups to cloud resource management. You will also learn how to manage and configure servers and how to use industry tools to manage computers, user information, and user productivity. Finally, you will learn how to recover your organization's IT infrastructure in the event of a disaster.

Quarter Credit Hours: 5 | Prerequisite: IN220



## IN222: Help Desk Support III

This course covers a wide variety of IT security concepts, tools, and best practices. It introduces threats and attacks and the many ways they can show up. You will gain some background of encryption algorithms and learn how they are used to safeguard data. Then, you will dive into the three areas of information security: authentication, authorization, and accounting. You will also cover network security solutions, ranging from firewalls to Wi-fi encryption options. You will round out the course by putting all these elements together into a multi-layered, in-depth security architecture, accompanied with your recommendations on how to integrate a culture of security into your organization or team. Finally, you will prepare for the Google IT Support Professional certification. Quarter Credit Hours: 5 | Prerequisite: IN220 and IN221

#### IN223: Data Analytics and Decision-Making

In this course, you will study the role of data in making everyday decisions in all industries. You will study versions of the data analysis process and the data life cycle that apply to the Google Data Analytics Certification process. In order to prepare data for decision making, you will learn important tools such as spreadsheets, visualization tools, Structured Query Language (SQL) queries, and certain programming languages that help with gathering and organizing data. In the process, you will also learn the four "Vs" of data: Volume, Variety, Velocity, and Veracity.

Quarter Credit Hours: 5 | Prerequisite: None

#### **IN224: Relational Databases**

This course covers the basics of relational databases. The importance of proper relational database design is emphasized. Proper file naming techniques are evaluated and demonstrated. Then the preparation of the data is covered as the concepts of extract, transform, and load (ETL) are discussed. Once the data is ready the techniques of importing that data, in various formats, are explained. The role of the data analyst in these tasks is evaluated and the importance of positioning yourself in the data analyst community through networking is discussed. Quarter Credit Hours: 5 | Prerequisite: IN223

#### IN225: Modifying and Sharing Data for Decision-Making

This course examines the analysis process. Tools such as spreadsheets and Structured Query Language (SQL) are used to ensure that data is in the best form and format to make use of the data in the tasks of decision-making. Advanced spreadsheet concepts like VLookup and pivot tables are examined and advanced SQL commands such as joins and subqueries are studied. Once data is properly prepared, visualization tools are used to help share the story that the data tell. The importance of slideshows and presentations for the data analyst is discussed. Quarter Credit Hours: 5 | Prerequisite: IN224

#### IN226: Programming and Data and Ways to Share Data

After data is gathered data analysts use programming tools, such as R, to evaluate the data so as to make important information available to decision-makers. Understanding how to use these programming tools is critical to the data analyst's role. Once the data is evaluated these programming tools can be used to report out the results of the evaluation in various ways including visualizations. Data analysts also use networking and portfolio development as ways to share the results of their work. Additionally, this course examines the importance of the portfolio, the interview, and networking to the hiring of a data analyst. Quarter Credit Hours: 5 | Prerequisite: IN225

#### IN230: Starting the User Experience (UX) Design Process

In this course, you will cover foundational user experience (UX) design terminology and gain a deeper understanding of the role and responsibilities of a UX designer. You will be introduced to the kinds of jobs that you might pursue after completing this course. Additionally, you will complete the first phases of the design process for a project that you will include in your portfolio. You will also learn how to empathize with users by discussing their pain points, explaining user needs using problem statements, and exploring many ideas for solving user problems. Quarter Credit Hours: 5 | Prerequisite: None

#### IN231: Researching, Testing, and Prototyping UX Designs

In this course, you will work on designing a mobile app for your professional user experience (UX) portfolio. You will create storyboards and become familiar with the basics of drawing. Then, you will create paper wireframes and digital wireframes using a design tool. You will also create a paper prototype and a digital low-fidelity prototype in the design tool. To ensure these provide the beginnings of a good user experience, you will learn how to plan and conduct a usability study to gather feedback about your designs. Then, you will modify your low-fidelity designs based on insights from your research. Quarter Credit Hours: 5 | Prerequisite: IN230

## IN232: Creating High-Fidelity Designs and Prototypes

In this course, you will learn how to create high-fidelity designs, called mockups, for a mobile application and a responsive website. You will have the opportunity to work with various tools and systems for designing prototypes. These tools will help you turn those designs into interactive prototypes that work like a finished product. You will conduct research to collect feedback about your designs and use this information to make improvements. Finally, you will learn how to share designs with development teams, apply the designs to a professional portfolio, and learn how these can be used to help obtain a job in user experience (UX) design.

Quarter Credit Hours: 5 | Prerequisite: IN231

#### IN233: Creating a Responsive and Socially Aware Web Design

In this course, you will design a mobile app and complementary responsive website using a popular design tool. The complete design process is used including empathizing with users, defining their pain points, coming up with ideas for design solutions, creating wireframes and prototypes, and testing designs to get feedback. Your design will also focus on meeting a social good. This completed design will add to your professional user experience (UX) portfolio. Finally, you will learn skills to help you apply for your first job as a UX designer, including how to interview for entry-level UX design positions. Quarter Credit Hours: 5 | Prerequisite: IN232

Quarter Credit Hours: 5 | Prerequisite: IN2

#### IN240: Game Design and Mechanics

In this course you will study the role of the game designer. You will also study what goes into the game design process, including the role of mechanics in game design. Topics include the game design document and process, gameplay, player perspectives, player immersion, tools used within game design, game mechanics (e.g., movement, inventory, rampability), and storytelling. You will also investigate the game design business.

Quarter Credit Hours: 5 | Prerequisite: IT213 or IN251, and IT232 or IN255 (IT232 or IN255 may be taken concurrently)

#### IN240M1: Game Development Team Members

Define the roles of the game development team. Quarter Credit Hours: 1 | Prerequisite: IT213 or IN251, and IT232 or IN255 (IT232 or IN255 may be taken concurrently)



## IN240M2: Documentation, Form, and Function

Create a complete game design document based on a video game. Quarter Credit Hours: 1 | Prerequisite: IT213 or IN251, and IT232 or IN255 (IT232 or IN255 may be taken concurrently)

## IN240M3: Storyboards

Develop a significant part of a storyboard for a video game. Quarter Credit Hours: 1 | Prerequisite: IT213 or IN251, and IT232 or IN255 (IT232 or IN255 may be taken concurrently)

## IN240M4: Game Engines and Gameplay Controls

Use industry-recognized game mechanics in the development of a video game concept.

Quarter Credit Hours: 1 | Prerequisite: IT213 or IN251, and IT232 or IN255 (IT232 or IN255 may be taken concurrently)

## IN240M5: Game Design Concepts

Develop the gameplay for a video game concept. Quarter Credit Hours: 1 | Prerequisite: IT213 or IN251, and IT232 or IN255 (IT232 or IN255 may be taken concurrently)

## IN241: Game Programming

In this course you will install and learn to use the Unity game development engine. Using knowledge of the C# programming language and the Unity game development engine, you will develop a basic 2D video game. Topics covered include location events and trigger zones; creating and working with textures, movement, and gameplay; eventdriven coding; game progression and game rules; sound effects; the importance of documenting gameplay; and the use of a test plan in the continuous process of testing during game development. Quarter Credit Hours: 5 | Prerequisite: IN240

#### IN241M1: Game Programming Planning and Documentation

Create gameplay documentation for video game players. Quarter Credit Hours: 1 | Prerequisite: IN240

## IN241M2: Audio, Visual, and Art

Implement audio and visual effects in a video game. Quarter Credit Hours: 1 | Prerequisite: IN240

#### IN241M3: Programming Events

Employ event-driven coding in a video game. Quarter Credit Hours: 1 | Prerequisite: IN240

## IN241M4: Gameplay Programming and Optimizations

Develop a basic video game using an industry-standard game engine. Quarter Credit Hours: 1 | Prerequisite: IN240

## IN241M5: Game Deployment and Support

Create a testing plan in the development of a video game. Quarter Credit Hours: 1 | Prerequisite: IN240

#### IN242: Game Art and Animation

In this course you will study the process of adding artistic elements, such as animation, to a video game. You will use graphics software tools to apply visual effects to the video game design and development process. Topics covered include visualization, concept art, character design, world design, technical specifications, animation, and the 12 principles of animation from the Walt Disney Studios®.

Quarter Credit Hours: 5 | Prerequisite: IN241

## IN242M1: Art and Animation Principles and Planning

Apply concepts and principles of art and animation for use in video games.

Quarter Credit Hours: 1 | Prerequisite: IN241

#### IN242M2: Textures and 3D Models

Use graphics software to support game development. Quarter Credit Hours: 1 | Prerequisite: IN241

#### IN242M3: Texture Tiles and Game World Terrains

Create 3D game environments using game world design concepts. Quarter Credit Hours: 1 | Prerequisite: IN241

**IN242M4: Skinning, Rigging, and Animating 3D Models** Implement animation in a video game. Quarter Credit Hours: 1 | Prerequisite: IN241

**IN242M5: Heads-Up Displays (HUDs) and Game Enhancements** Implement video game enhancements related to art and animation. Quarter Credit Hours: 1 | Prerequisite: IN241

## IN250: Software Development Concepts Using Python

This course introduces the fundamentals of software development, demonstrating how the fundamentals are applied using the Python programming language. The core principles of programming are investigated. You will design, develop, debug, and test simple applications using the Python programming language. Quarter Credit Hours: 5 | Prerequisite: None

## IN250M1: Software Construction Core Concepts Using Python

Create fundamental programs using concepts such as declaring and initializing variables and constants.

Quarter Credit Hours: 1 | Prerequisite: None

## IN250M2: Decision Structures and Iteration Using Python

Create fundamental programs using concepts such as decision statements and iteration.

Quarter Credit Hours: 1 | Prerequisite: None

## IN250M3: Software Development History and Modeling for Python

Create plans for programs using an understanding of historical development of programming techniques and appropriate modeling techniques.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN250M4: Functions and Lists Using Python

Create fundamental programs using concepts such as functions and lists.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN250M5: Debugging and Testing Using Python

Apply the debugging and testing processes to programs containing fundamental concepts such as decision statements, iteration, functions, and lists.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN251: Software Development Concepts Using C#

This course introduces the fundamentals of software development, demonstrating how the fundamentals are applied using the C# programming language. The core principles of programming are investigated. You will design, develop, debug, and test simple applications using the C# programming language. Quarter Credit Hours: 5 | Prerequisite: None

#### IN251M1: Software Construction Core Concepts using C#

Create fundamental programs using concepts such as declaring and initializing variables and constants. Quarter Credit Hours: 1 | Prerequisite: None

#### IN251M2: Decision Structures and Iteration using C#

Create fundamental programs using concepts such as decision statements and iteration. Quarter Credit Hours: 1 | Prerequisite: None



## IN251M3: Software Development History and Modeling for C#

Create plans for programs using an understanding of historical development of programming techniques and appropriate modeling techniques.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN251M4: Functions and Arrays using C#

Create fundamental programs using concepts such as functions and arrays.

Quarter Credit Hours: 1 | Prerequisite: None

## IN251M5: Debugging and Testing using C#

Apply the debugging and testing processes to programs containing fundamental concepts such as decision statements, iteration, functions, and arrays.

Quarter Credit Hours: 1 | Prerequisite: None

## IN252: Software Development Concepts Using Java

This course introduces the fundamentals of software development, demonstrating how the fundamentals are applied using the Java programming language. The core principles of programming are investigated. You will design, develop, debug, and test simple applications using the Java programming language. Quarter Credit Hours: 5 | Prerequisite: None

## IN252M1: Software Construction Core Concepts Using Java

Create fundamental programs using concepts such as declaring and initializing variables and constants.

Quarter Credit Hours: 1 | Prerequisite: None

## IN252M2: Decision Structures and Iteration Using Java

Create fundamental programs using concepts such as decision statements and iteration.

Quarter Credit Hours: 1 | Prerequisite: None

## IN252M3: Software Development History and Modeling for Java

Create plans for programs using an understanding of historical development of programming techniques and appropriate modeling techniques.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN252M4: Functions and Arrays Using Java

Create fundamental programs using concepts such as functions and arrays.

Quarter Credit Hours: 1 | Prerequisite: None

## IN252M5: Debugging and Testing Using Java

Apply the debugging and testing processes to programs containing fundamental concepts such as decision statements, iteration, functions, and arrays.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN253: Software Development Concepts Using JavaScript and PHP

This course introduces the fundamentals of software engineering, demonstrating how the fundamentals are the same across multiple programming languages. The core principles found in every programming language are investigated. You will design, develop, debug, and test simple applications using the programming language options. Quarter Credit Hours: 5 | Prerequisite: None

# IN253M1: Software Construction Core Concepts Using JavaScript and PHP

Create fundamental programs using concepts such as declaring and initializing variables and constants. Quarter Credit Hours: 1 | Prerequisite: None

## IN253M2: Decision Structures and Iteration using JavaScript and PHP

Create fundamental programs using concepts such as decision statements and iteration.

Quarter Credit Hours: 1 | Prerequisite: None

# IN253M3: Software Development History and Modeling for JavaScript and PHP

Create plans for programs using an understanding of historical development of programming techniques and appropriate modeling techniques.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN253M4: Functions and Arrays using JavaScript and PHP

Create fundamental programs using concepts such as functions and arrays.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN253M5: Debugging and Testing using JavaScript and PHP

Apply the debugging and testing processes to programs containing fundamental concepts such as decision statements, iteration, functions, and arrays.

Quarter Credit Hours: 1 | Prerequisite: None

## IN254: Software Design and Development Concepts Using Python

This is an intermediate course in the design and development of programs offering you a choice of implementation and demonstrating how design and programming concepts are universal. You will apply software design techniques, software process models, object-oriented programming concepts, and secure data-handling techniques. In addition, you will design, develop, debug, and test intermediate-level applications using the Python programming language.

Quarter Credit Hours: 5 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN254M1: Software Process Models With Python

Explore various software process models.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN254M2: Advanced Design Techniques With Python

Compose software using advanced interface and program design techniques.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN254M3: Secure Data Handling Techniques With Python

Select appropriate secure data handling techniques.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN254M4: Design Requirements With Python

Construct a software test plan for validation and verification of design requirements.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN254M5: Object-Oriented Programming Concepts with Python

Examine object-oriented programming concepts.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253



## IN255: Software Design and Development Concepts Using C#

This is an intermediate course in the design and development of programs offering you a choice of implementation and demonstrating how design and programming concepts are universal. You will apply software design techniques, software process models, object-oriented programming concepts, and secure data-handling techniques. In addition, you will design, develop, debug, and test intermediate-level applications using the C# programming language.

Quarter Credit Hours: 5 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN255M1: Software Process Models With C#

Explore various software process models.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN255M2: Advanced Design Techniques With C#

Compose software using advanced interface and program design techniques.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN255M3: Secure Data Handling Techniques With C#

Select appropriate secure data handling techniques.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN255M4: Design Requirements With C#

Construct a software test plan for validation and verification of design requirements.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN255M5: Object-Oriented Programming Concepts With C#

Examine object-oriented programming concepts.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN256: Software Design and Development Concepts Using Java

This is an intermediate course in the design and development of programs using Java and demonstrating how design and programming concepts are universal. You will apply software design techniques, software process models, object-oriented programming concepts, and secure data-handling techniques. In addition, you will design, develop, debug, and test intermediate-level applications.

Quarter Credit Hours: 5 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN256M1: Software Process Models With Java

Explore various software process models.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN256M2: Advanced Design Techniques With Java

Compose software using advanced interface and program design techniques.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN256M3: Secure Data Handling Techniques With Java

Select appropriate secure data handling techniques.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN256M4: Design Requirements With Java

Construct a software test plan for validation and verification of design requirements.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN256M5: Object-Oriented Programming Concepts With Java

Examine object-oriented programming concepts.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

# IN257: Software Design and Development Concepts Using JavaScript and PHP

This is an intermediate course in the design and development of programs using JavaScript and PHP and demonstrating how design and programming concepts are universal. You will apply software design techniques, software process models, object-oriented programming concepts, and secure data-handling techniques. In addition, you will design, develop, debug, and test intermediate-level applications. Quarter Credit Hours: 5 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN257M1: Software Process Models With JavaScript and PHP

Explore various software process models.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN257M2: Advanced Design Techniques With JavaScript and PHP

Compose software using advanced interface and program design techniques.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN257M3: Secure Data Handling Techniques With JavaScript and PHP

Select appropriate secure data handling techniques.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

#### IN257M4: Design Requirements With JavaScript and PHP

Construct a software test plan for validation and verification of design requirements.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

# IN257M5: Object-Oriented Programming Concepts With JavaScript and PHP

Examine object-oriented programming concepts.

Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, or IN253

## IN300: Programming for Data Analysis (Python, R, and Java)

This course examines the use of Python, R, and Java to analyze data of all types. Fundamental programming concepts are covered for each language. These include data types, variables, introduction to regular expressions, decisions, iteration, and introduction to collections using arrays, lists, and key-value pairs. The importance of securing data is stressed throughout the course.

Quarter Credit Hours: 5 | Prerequisite: None

#### IN300M1: Data Expressions, Decisions, and Iteration

Implement expressions, decisions, and iteration in each language. Quarter Credit Hours: 1 | Prerequisite: None

## IN300M2: Data Collections

Apply data collections, including arrays, lists, and key-value pairs, in each language.

Quarter Credit Hours: 1 | Prerequisite: None



#### IN300M3: Methods for Securing Data

Recommend methods for securing data in each language. Quarter Credit Hours: 1 | Prerequisite: None

## IN300M4: Evaluating Large Datasets

Use each language to evaluate large datasets in each language. Quarter Credit Hours: 1 | Prerequisite: None

## IN300M5: Analyzing Large Datasets

Use each language to report specific analysis of large datasets. Quarter Credit Hours: 1 | Prerequisite: None

## IN301: Securing Data

This course covers multiple topics in the sophisticated use of databases and the awareness of database vulnerabilities and potential solutions to those vulnerabilities. Topics include indexing, inference and aggregation (especially with an eye on security), least privilege, activity monitoring, hashing and encryption, data access controls, and data security models versus common database machine administration (DBMA) vulnerabilities. Blockchain, as an advanced database concept, is also examined.

Quarter Credit Hours: 5 | Prerequisite: IT350

## IN301M1: Secure Database Development

Investigate methods for developing secure databases. Quarter Credit Hours: 1 | Prerequisite: IT350

## IN301M2: Data Access Controls and Data Encryption

Explain how to implement data access controls and data encryption. Quarter Credit Hours: 1 | Prerequisite: IT350

## IN301M3: Database Vulnerabilities

Evaluate database vulnerabilities in stand-alone and network environments.

Quarter Credit Hours: 1 | Prerequisite: IT350

## IN301M4: Countermeasure Design

Design countermeasures for common database vulnerabilities. Quarter Credit Hours: 1 | Prerequisite: IT350

## IN301M5: Blockchain Security Techniques

Evaluate whether blockchain security techniques can be applied broadly to database security. Quarter Credit Hours: 1 | Prerequisite: IT350

## IN302: Reporting and Visualization

This course focuses on how to prepare the collected and analyzed data for decision-making through the use of appropriate reporting formats including graphs, charts, diagrams, and so forth. Industry-wide data reporting and visualization tools are examined and evaluated. Quarter Credit Hours: 5 | Prerequisite: None

## IN302M1: Tools for Reporting and Visualizing Data

Examine industry-wide tools used for reporting and visualizing data. Quarter Credit Hours: 1 | Prerequisite: None

## IN302M2: Data Visualizing Techniques

Apply the appropriate visualizing techniques for specific reporting needs. Quarter Credit Hours: 1 | Prerequisite: None

#### **IN302M3: Deceptive Aspects of Data Visualization** Discuss how data visualization can deceive users.

Quarter Credit Hours: 1 | Prerequisite: None

## IN302M4: Formatting Tools for Data Visualization

Analyze the efficacy of formatting tools in visualizing data. Quarter Credit Hours: 1 | Prerequisite: None

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## IN302M5: Practical Application of Data Visualization and Reporting

Practice reporting and visualizing data with several industry-wide tools using large datasets.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN303: Data Mining and Data Warehousing

This course discusses the elements of pattern analysis (regular expressions) and machine learning (artificial intelligence and predictive analysis) involved in the concept of mining data. Hadoop, MapReduce, and Spark are examined as tools to aid in the manipulation of large amounts of data. Additional topics include simulation, clustering, high-dimensional data and locality-sensitive hashing, search spam, and data streams. Also, data warehousing and data lakes are shown as preparations for the tasks of analyzing data. Quarter Credit Hours: 5 | Prerequisite: None

#### IN303M1: Pattern Analysis and Machine Learning

Discuss the elements of pattern analysis and machine learning. Quarter Credit Hours: 1 | Prerequisite: None

## IN303M2: Data Mining and Warehousing Tools

Examine popular tools used for data mining and warehousing data. Quarter Credit Hours: 1 | Prerequisite: None

## IN303M3: Data Warehouses and Data Lakes

Compare the data warehouse and the data lake and their uses. Quarter Credit Hours: 1 | Prerequisite: None

## IN303M4: Entity Matching Methods

Discuss methods for identifying entity matching within multiple large datasets.

Quarter Credit Hours: 1 | Prerequisite: None

## IN303M5: Identifying and Fixing Anomalies and Outliers

Use data-mining techniques to identify and fix anomalies and outliers. Quarter Credit Hours: 1 | Prerequisite: None

## IN304: Advanced Programming for Data Analysis

This course continues the study of Python R and Java as tools for the analysis of all types of data. Pandas for Python are introduced as widely used tools for data wrangling. Emphasis is placed on gathering data and using these tools to solve scenario-based problems. Additionally, the Scala language is explored as a modern tool for data science. Quarter Credit Hours: 5 | Prerequisite: IN300

## IN304M1: Add-on Tools for Large Dataset Data Analysis

Use add-on tools to analyze data from large datasets. Quarter Credit Hours: 1 | Prerequisite: IN300

## IN304M2: Analysis Functions for Large Datasets

Use each language to create functions that analyze data from large datasets.

Quarter Credit Hours: 1 | Prerequisite: IN300

#### IN304M3: Visualizing Data Analysis Results

Use each language to visualize results from data analysis of large datasets.

Quarter Credit Hours: 1 | Prerequisite: IN300

#### IN304M4: Data Collecting and Cleaning Data

Apply each language to data collecting and cleaning data. Quarter Credit Hours: 1 | Prerequisite: IN300

#### IN304M5: Exploring Scala

Explore Scala as an alternate language for data analysis. Quarter Credit Hours: 1 | Prerequisite: IN300



## IN311: Data Analytics in Action

This culminating course integrates data analytics concepts with your experiences and desired area of focus. The course emphasizes reflection on the application of the core data analytics knowledge that has been developed through the study of data analytics principles, and infuses these principles into specific areas of vocation or interest. The course is available as a 1 to 4 credit offering, and is required to fulfill the Professional Focus + Google Data Analytics Certificate. Quarter Credit Hours: 1 | Prerequisite: IN226 (May be taken concurrently)

## IN312: Data Analytics in Action

This culminating course integrates data analytics concepts with your experiences and desired area of focus. The course emphasizes reflection on the application of the core data analytics knowledge that has been developed through the study of data analytics principles, and infuses these principles into specific areas of vocation or interest. The course is available as a 1 to 4 credit offering, and is required to fulfill the Professional Focus + Google Data Analytics Certificate. Quarter Credit Hours: 2 | Prerequisite: IN226 (May be taken concurrently)

## IN313: Data Analytics in Action

This culminating course integrates data analytics concepts with your experiences and desired area of focus. The course emphasizes reflection on the application of the core data analytics knowledge that has been developed through the study of data analytics principles, and infuses these principles into specific areas of vocation or interest. The course is available as a 1 to 4 credit offering, and is required to fulfill the Professional Focus + Google Data Analytics Certificate. Quarter Credit Hours: 3 | Prerequisite: IN226 (May be taken concurrently)

#### **IN314: Data Analytics in Action**

This culminating course integrates data analytics concepts with your experiences and desired area of focus. The course emphasizes reflection on the application of the core data analytics knowledge that has been developed through the study of data analytics principles, and infuses these principles into specific areas of vocation or interest. The course is available as a 1 to 4 credit offering, and is required to fulfill the Professional Focus + Google Data Analytics Certificate. Quarter Credit Hours: 4 | Prerequisite: IN226 (May be taken concurrently)

#### IN331: UX Design in Action

This culminating course integrates user experience (UX) concepts with your experiences and desired area of focus. The course emphasizes reflection on the application of the core UX knowledge you have developed through the study of UX principles, and infuses these principles into specific areas of vocation or interest. The course is available as a 1 to 4 credit offering, and is required to fulfill the Professional Focus + Google UX Design Certificate.

Quarter Credit Hours: 1 | Prerequisite: IN233 (May be taken concurrently)

#### IN332: UX Design in Action

This culminating course integrates user experience (UX) concepts with your experiences and desired area of focus. The course emphasizes reflection on the application of the core UX knowledge you have developed through the study of UX principles, and infuses these principles into specific areas of vocation or interest. The course is available as a 1 to 4 credit offering, and is required to fulfill the Professional Focus + Google UX Design Certificate.

Quarter Credit Hours: 2 | Prerequisite: IN233 (May be taken concurrently)

#### IN333: UX Design in Action

This culminating course integrates user experience (UX) concepts with your experiences and desired area of focus. The course emphasizes reflection on the application of the core UX knowledge you have developed through the study of UX principles, and infuses these principles into specific areas of vocation or interest. The course is available as a 1 to 4 credit offering, and is required to fulfill the Professional Focus + Google UX Design Certificate.

Quarter Credit Hours: 3 | Prerequisite: IN233 (May be taken concurrently)

#### IN334: UX Design in Action

This culminating course integrates user experience (UX) concepts with your experiences and desired area of focus. The course emphasizes reflection on the application of the core UX knowledge you have developed through the study of UX principles, and infuses these principles into specific areas of vocation or interest. The course is available as a 1 to 4 credit offering, and is required to fulfill the Professional Focus + Google UX Design Certificate. Quarter Credit Hours: 4 | Prerequisite: IN233 (May be taken concurrently)

#### IN341: IT Support in Action

In this course, you will expand your understanding related to the application of the core IT help desk support knowledge that has been developed through the study of IT support professional principles. You will use these principles to provide recommendations for specific help desk training requirements for IT help desk personnel. The course is available as a 1 to 4 credit offering and is required to fulfill the Professional Focus + Google IT Support Professional Certificate. Quarter Credit Hours: 1 | Prerequisite: IN222 (May be taken concurrently)

#### IN342: IT Support in Action

In this course, you will expand your understanding related to the application of the core IT help desk support knowledge that has been developed through the study of IT support professional principles. You will use these principles to provide recommendations for specific help desk training requirements for IT help desk personnel. The course is available as a 1 to 4 credit offering and is required to fulfill the Professional Focus + Google IT Support Professional Certificate. Quarter Credit Hours: 2 | Prerequisite: IN222 (May be taken concurrently)

#### IN343: IT Support in Action

In this course, you will expand your understanding related to the application of the core IT help desk support knowledge that has been developed through the study of IT support professional principles. You will use these principles to provide recommendations for specific help desk training requirements for IT help desk personnel. The course is available as a 1 to 4 credit offering and is required to fulfill the Professional Focus + Google IT Support Professional Certificate. Quarter Credit Hours: 3 | Prerequisite: IN222 (May be taken concurrently)

#### IN344: IT Support in Action

In this course, you will expand your understanding related to the application of the core IT help desk support knowledge that has been developed through the study of IT support professional principles. You will use these principles to provide recommendations for specific help desk training requirements for IT help desk personnel. The course is available as a 1 to 4 credit offering and is required to fulfill the Professional Focus + Google IT Support Professional Certificate. Quarter Credit Hours: 4 | Prerequisite: IN222 (May be taken concurrently)



## IN350: Advanced Software Development Including Web and Mobility Using Python

This course focuses on advanced design and programming concepts and techniques, and demonstrating how advanced concepts apply in Python. You will develop advanced software, web, and mobile applications, while applying concepts related to data structures, algorithms, web services, graphics, mobile, and multimedia. You also learn how to create interactive applications across a variety of platforms (traditional applications, websites, and mobile applications).

Quarter Credit Hours: 6 | Prerequisite: IN254

## IN350M1: Programming Data Structures

Apply the common linear structures of lists, stacks, and queues. Quarter Credit Hours: 1 | Prerequisite: IN254

#### IN350M2: Recursion, Sorting, and Searching

Develop procedures to solve data structures and algorithm problems. Quarter Credit Hours: 1 | Prerequisite: IN254

## IN350M3: User Interface Development and Data Validation Analyze best practices for interactive user interface design.

Quarter Credit Hours: 1 | Prerequisite: IN254

## **IN350M4: Multitier Architecture**

Analyze client/server relationship. Quarter Credit Hours: 1 | Prerequisite: IN254

#### IN350M5: Web Services Development

Evaluate web services. Quarter Credit Hours: 1 | Prerequisite: IN254

## IN350M6: Mobility Development and Cross-Compiling

Design interactive web or mobile applications. Quarter Credit Hours: 1 | Prerequisite: IN254

## IN351: Advanced Software Development Including Web and Mobility Using C#

This course focuses on advanced design and programming concepts and techniques, and demonstrating how advanced concepts apply in C#. You will develop advanced software, web, and mobile applications, while applying concepts related to data structures, algorithms, web services, graphics, mobile, and multimedia. You also learn how to create interactive applications across a variety of platforms (traditional applications, websites, and mobile applications).

Quarter Credit Hours: 6 | Prerequisite: IN255

## IN351M1: Programming Data Structures

Apply the common linear structures of lists, stacks, and gueues. Quarter Credit Hours: 1 | Prerequisite: IN255

#### IN351M2: Recursion, Sorting, and Searching

Develop procedures to solve data structures and algorithm problems. Quarter Credit Hours: 1 | Prerequisite: IN255

## IN351M3: User Interface Development and Data Validation

Analyze best practices for interactive user interface design. Quarter Credit Hours: 1 | Prerequisite: IN255

#### IN351M4: Multitier Architecture and XML Analyze client/server relationship.

Quarter Credit Hours: 1 | Prerequisite: IN255

## IN351M5: Web Services Development

Evaluate web services. Quarter Credit Hours: 1 | Prerequisite: IN255

#### IN351M6: Mobility Development and Cross-Compiling

Design interactive web or mobile applications. Quarter Credit Hours: 1 | Prerequisite: IN255

## IN352: Advanced Software Development Including Web and Mobility Using Java

This course focuses on advanced design and programming concepts and techniques, and demonstrating how advanced concepts apply in Java. You will develop advanced software, web, and mobile applications, while applying concepts related to data structures, algorithms, web services, graphics, mobile, and multimedia. You also learn how to create interactive applications across a variety of platforms (traditional applications, websites, and mobile applications).

Quarter Credit Hours: 6 | Prerequisite: IN256

#### IN352M1: Programming Data Structures

Apply the common linear structures of lists, stacks, and queues. Quarter Credit Hours: 1 | Prerequisite: IN256

## IN352M2: Recursion, Sorting, and Searching

Develop procedures to solve data structures and algorithm problems. Quarter Credit Hours: 1 | Prerequisite: IN256

#### IN352M3: User Interface Development and Data Validation

Analyze best practices for interactive user interface design. Quarter Credit Hours: 1 | Prerequisite: IN256

## IN352M4: Multitier Architecture and XML

Analyze client/server relationship. Quarter Credit Hours: 1 | Prerequisite: IN256

## IN352M5: Web Services Development

Evaluate web services. Quarter Credit Hours: 1 | Prerequisite: IN256

## IN352M6: Mobility Development and Cross-Compiling

Design interactive web or mobile applications. Quarter Credit Hours: 1 | Prerequisite: IN256

## IN353: Advanced Software Development Including Web and Mobility Using JavaScript and PHP

This course focuses on advanced design and programming concepts and techniques, and demonstrating how advanced concepts apply in JavaScript and PHP. You will develop advanced software, web, and mobile applications, while applying concepts related to data structures, algorithms, web services, graphics, mobile, and multimedia. You also learn how to create interactive applications across a variety of platforms (traditional applications, websites, and mobile applications). Quarter Credit Hours: 6 | Prerequisite: IN257

#### IN353M1: Programming Data Structures

Apply the common linear structures of lists, stacks, and gueues. Quarter Credit Hours: 1 | Prerequisite: IN257

#### IN353M2: Recursion, Sorting, and Searching

Develop procedures to solve data structures and algorithm problems. Quarter Credit Hours: 1 | Prerequisite: IN257

#### IN353M3: User Interface Development and Data Validation

Analyze best practices for interactive user interface design. Quarter Credit Hours: 1 | Prerequisite: IN257

IN353M4: Multitier Architecture and XML Analyze client/server relationship.

Quarter Credit Hours: 1 | Prerequisite: IN257

#### IN353M5: Web Services Development Evaluate web services. Quarter Credit Hours: 1 | Prerequisite: IN257

## IN353M6: Mobility Development and Cross-Compiling Design interactive web or mobile applications.

Quarter Credit Hours: 1 | Prerequisite: IN257

# IN400: Artificial Intelligence (AI) - Deep Learning and Machine Learning

This course examines tools to store and analyze big data. Additionally, graph and column databases are examined. The concepts of artificial intelligence and machine learning are examined with a focus on deep learning. Statistical analysis is applied to real-world problems. Quarter Credit Hours: 6 | Prerequisite: IN300

## IN400M1: Comparison of Artificial Intelligence and Machine Learning

Compare artificial intelligence and machine learning.

## Quarter Credit Hours: 1 | Prerequisite: IN300

#### IN400M2: Development Tools for Artificial Intelligence and Machine Learning Applications

Examine specific tools used in developing artificial intelligence and machine learning applications.

Quarter Credit Hours: 1 | Prerequisite: IN300

## IN400M3: Tools for Managing Big Data

Use specific tools associated with collecting, storing, and analyzing "big data."

Quarter Credit Hours: 1 | Prerequisite: IN300

## IN400M4: Natural Language Processing

Discuss advances in natural language processing. Quarter Credit Hours: 1 | Prerequisite: IN300

## IN400M5: Artificial Intelligence and Machine Learning Case Studies

Evaluate case studies, in multiple industries, of artificial intelligence and machine learning applications.

Quarter Credit Hours: 1 | Prerequisite: IN300

## IN400M6: Artificial Neural Networks

Explain artificial neural networks. Quarter Credit Hours: 1 | Prerequisite: IN300

## IN401: Data Curation Concepts

This course examines the topic of data curation and the role of the data curator. Topics include extraction, transformation, and loading (ETL) of data from one source to another, and the integration, ingestion, and fusion of multiple sets of data from the perspective of the data curator. Quarter Credit Hours: 6 | Prerequisite: IN300

## IN401M1: Extracting, Transforming, and Loading Data

Examine the processes of extracting, transforming, and loading (ETL) data for different sources. Quarter Credit Hours: 1 | Prerequisite: IN300

#### **IN401M2: Curation Issues** Analyze the curation issues when scaling datasets.

Quarter Credit Hours: 1 | Prerequisite: IN300

## IN401M3: The Data Curator

Explain the role of the data curator. Quarter Credit Hours: 1 | Prerequisite: IN300

## IN401M4: Data Curation Tools

Evaluate tools, and their limitations, used in the process of data curation. Quarter Credit Hours: 1 | Prerequisite: IN300

## IN401M5: New Discoveries Through Data Curation

Discuss how data curation can lead to new discoveries in disparate data sets.

Quarter Credit Hours: 1 | Prerequisite: IN300

## IN401M6: Curation With Large Datasets

Investigate potential problems related to curating data from large datasets.

Quarter Credit Hours: 1 | Prerequisite: IN300

## IN402: Modeling and Predictive Analysis

This course discusses modeling techniques for both relational and nonrelational databases. Techniques for modeling, including conceptual, logical, and physical designs, along with entity-relationship diagrams (ERD), are examined and used to better understand current data so as to improve performance to provide competitive advantage. Regression techniques, machine learning, and other tools are used to examine data and conduct predictive analysis. Real-world case studies are examined. Quarter Credit Hours: 6 | Prerequisite: None

## IN402M1: Entity-Relationship Diagrams

Use entity-relationship diagrams (ERDs) to model data. Quarter Credit Hours: 1 | Prerequisite: None

## IN402M2: Large Datasets for Predictive Uses

Predict trends and seasonality using large datasets. Quarter Credit Hours: 1 | Prerequisite: None

## IN402M3: Modern Tools for Predictive Analysis

Examine modern tools for predictive analysis. Quarter Credit Hours: 1 | Prerequisite: None

## IN402M4: Predictive Analysis Practical Application

Study examples of predictive analysis in multiple industry applications. Quarter Credit Hours: 1 | Prerequisite: None

# IN402M5: Comparison of Predictive, Prescriptive, and Descriptive Analyses

Compare predictive analysis, prescriptive analysis, and descriptive analysis.

Quarter Credit Hours: 1 | Prerequisite: None

## IN402M6: Choosing a Data Model

Determine when and what type of data model is required for different situations.

Quarter Credit Hours: 1 | Prerequisite: None

## IN403: Deep Learning and Artificial Intelligence

This broader course is a subset of machine learning that will provide an overview of neural networks and advanced architectures including deep neural networks, convolutional networks, and recurrent networks. The course provides an overview of artificial intelligence achievements, including image, voice, and handwriting recognition, and natural language processing using core Python packages based on long short-term memory (LSTM), automatic speech recognition (ASR), and image classification methods (MNIST). Topics covered include unsupervised learning, random forests, and model training. Quarter Credit Hours: 6 | Prerequisite: None

## IN403M1: Deep Neural Networks

Create deep neural networks for application to the field of information technology.

Quarter Credit Hours: 1 | Prerequisite: None

#### IN403M2: Bayesian Machine Learning

Explore Bayesian machine learning. Quarter Credit Hours: 1 | Prerequisite: None

#### IN403M3: Deep Learning Models

Use a deep learning model to develop solutions to real-life problems. Quarter Credit Hours: 1 | Prerequisite: None

## IN403M4: Deep Learning Case Studies

Analyze multiple case studies involving deep learning. Quarter Credit Hours: 1 | Prerequisite: None





Develop a deep learning project. Quarter Credit Hours: 1 | Prerequisite: None

## IN403M6: Image Classification in Deep Learning

Examine image classification in deep learning. Quarter Credit Hours: 1 | Prerequisite: None

## IN404: Machine Learning

This course will provide an overview and understanding of key machine learning techniques, mathematical models, and algorithms. The complete process from datasets, features, algorithms, and modeling will be covered. Topics in supervised and unsupervised machine learning, including, but not limited to, linear regression, random forest, core Python packages, as well as descriptive, prescriptive, and predictive analytics, will be highlighted.

Quarter Credit Hours: 6 | Prerequisite: None

#### IN404M1: Automated Bots in Cyberwarfare

Examine the use of automated bots in cyberwarfare. Quarter Credit Hours: 1 | Prerequisite: None

## IN404M2: Machine Learning Case Studies

Analyze multiple case studies of practical use of machine learning. Quarter Credit Hours: 1 | Prerequisite: None

## IN404M3: Machine Learning Algorithms

Analyze different machine learning algorithms for a specified problem. Quarter Credit Hours: 1 | Prerequisite: None

## IN404M4: Kernel Learning and Time-Series Analyses

Explore kernel learning and time-series analyses. Quarter Credit Hours: 1 | Prerequisite: None

## IN404M5: Machine Learning Application

Develop a machine learning application using common machine learning tools.

Quarter Credit Hours: 1 | Prerequisite: None

## IN404M6: Classification and Regression Trees Algorithm

Apply classification and regression trees algorithm to make predictions on data.

Quarter Credit Hours: 1 | Prerequisite: None

## IN405: Blockchain, Cryptography, and Hashgraph

This course examines the concepts of blockchain technology. Hashgraph is also studied as an alternative to blockchain technology. The involvement of cryptocurrency and cryptography in both technologies is discussed.

Quarter Credit Hours: 6 | Prerequisite: None

#### IN405M1: Blockchain and Cryptocurrency Concepts

Describe the history, purpose, and long-term implications of blockchain and cryptocurrency.

Quarter Credit Hours: 1 | Prerequisite: None

## IN405M2: Cryptography Concepts

Examine the key concepts of cryptography. Quarter Credit Hours: 1 | Prerequisite: None

## IN405M3: Public Key Infrastructure (PKI) Concepts

Discuss public key infrastructure (PKI) and its implications. Quarter Credit Hours: 1 | Prerequisite: None

## IN405M4: Blockchain, Cryptography, and Hashgraph Case Studies

Explore multiple case studies in various industries discussing blockchain, cryptography, and hashgraph.

Quarter Credit Hours: 1 | Prerequisite: None

## IN405M5: Legal and Ethical Dimensions of Blockchain

Evaluate legal and ethical dimensions of blockchain. Quarter Credit Hours: 1 | Prerequisite: None

## IN405M6: Blockchain and Hashgraph

Compare blockchain and hashgraph. Quarter Credit Hours: 1 | Prerequisite: None

## IN406: Business Intelligence

This course examines the concepts of business intelligence and the tools often used to provide historical, current, and predictive analysis of the data provided. Best practices for reporting and visualizing data are analyzed. Real-world case studies are used for illustration purposes. Quarter Credit Hours: 6 | Prerequisite: None

# IN406M1: Decision Support Systems, Data Analysis, and Business Intelligence

Compare decision support systems, data analysis, and business intelligence.

Quarter Credit Hours: 1 | Prerequisite: None

## IN406M2: Business Intelligence Tools

Evaluate major tools used in business intelligence techniques. Quarter Credit Hours: 1 | Prerequisite: None

#### IN406M3: Business Intelligence Legal and Ethical Issues

Examine the legal and ethical issues involved in business intelligence activities.

Quarter Credit Hours: 1 | Prerequisite: None

## IN406M4: Business Intelligence Trends

Research current and future trends in business intelligence. Quarter Credit Hours: 1 | Prerequisite: None

#### IN406M5: Business Intelligence Reporting and Visualization Tools

Examine reporting and visualization tools used in business intelligence. Quarter Credit Hours: 1 | Prerequisite: None

#### IN406M6: Business Intelligence Solutions

Create a complete business intelligence solution to a real-world problem using a large dataset.

Quarter Credit Hours: 1 | Prerequisite: None

## IN450: Advanced Software Development Using Python

This course addresses advanced software design and development concepts, demonstrating how the concepts apply using Python. You will apply analysis and benchmarking, database creation and usage, data in motion and data at rest security, threading, reentrancy, and advanced testing concepts. You will also learn how to package software for distribution.

Quarter Credit Hours: 6 | Prerequisite: IN350

**IN450M1: Distributed and Collaborative Development Concepts** Describe distributed and collaborative development concepts. Quarter Credit Hours: 1 | Prerequisite: IN350

## IN450M2: Database Schema Implementation

Implement a database schema with security and optimization. Quarter Credit Hours: 1 | Prerequisite: IN350

IN450M3: System Testing and Quality Assurance

Plan system testing and quality assurance activities. Quarter Credit Hours: 1 | Prerequisite: IN350

## IN450M4: Algorithms for Analysis and Optimization

Implement algorithms that allow analysis and optimization. Quarter Credit Hours: 1 | Prerequisite: IN350



## IN450M5: Software Development Best Practices

Integrate the best practices of software development. Quarter Credit Hours: 1 | Prerequisite: IN350

## IN450M6: Software Distribution

Prepare software for distribution. Quarter Credit Hours: 1 | Prerequisite: IN350

## IN451: Advanced Software Development Using C#

This course addresses advanced software design and development concepts, demonstrating how the concepts apply using C#. You will apply analysis and benchmarking, database creation and usage, data in motion and data at rest security, threading, reentrancy, and advanced testing concepts. You will also learn how to package software for distribution. Quarter Credit Hours: 6 | Prerequisite: IN351

## IN451M1: Distributed and Collaborative Development Concepts

Describe distributed and collaborative development concepts. Quarter Credit Hours: 1 | Prerequisite: IN351

## IN451M2: Database Schema Implementation

Implement a database schema with security and optimization. Quarter Credit Hours: 1 | Prerequisite: IN351

## IN451M3: System Testing and Quality Assurance

Plan system testing and quality assurance activities. Quarter Credit Hours: 1 | Prerequisite: IN351

**IN451M4: Algorithms for Analysis and Optimization** Implement algorithms that allow analysis and optimization. Quarter Credit Hours: 1 | Prerequisite: IN351

## IN451M5: Software Development Best Practices

Integrate the best practices of software development. Quarter Credit Hours: 1 | Prerequisite: IN351

## IN451M6: Software Distribution

Prepare software for distribution. Quarter Credit Hours: 1 | Prerequisite: IN351

## IN452: Advanced Software Development Using Java

This course addresses advanced software design and development concepts, demonstrating how the concepts apply using Java. You will apply analysis and benchmarking, database creation and usage, data in motion and data at rest security, threading, reentrancy, and advanced testing concepts. You will also learn how to package software for distribution.

Quarter Credit Hours: 6 | Prerequisite: IN352

**IN452M1: Distributed and Collaborative Development Concepts** Describe distributed and collaborative development concepts. Quarter Credit Hours: 1 | Prerequisite: IN352

## IN452M2: Database Schema Implementation

Implement a database schema with security and optimization. Quarter Credit Hours: 1 | Prerequisite: IN352

**IN452M3: System Testing and Quality Assurance** Plan system testing and quality assurance activities.

Quarter Credit Hours: 1 | Prerequisite: IN352

## IN452M4: Algorithms for Analysis and Optimization

Implement algorithms that allow analysis and optimization. Quarter Credit Hours: 1 | Prerequisite: IN352

## IN452M5: Software Development Best Practices

Integrate the best practices of software development. Quarter Credit Hours: 1 | Prerequisite: IN352

## IN452M6: Software Distribution

Prepare software for distribution. Quarter Credit Hours: 1 | Prerequisite: IN352

## IN453: Advanced Software Development Using JavaScript and PHP

This course addresses advanced software design and development concepts, demonstrating how the concepts apply using JavaScript and PHP. You will apply analysis and benchmarking, database creation and usage, data in motion and data at rest security, threading, reentrancy, and advanced testing concepts. You will also learn how to package software for distribution.

Quarter Credit Hours: 6 | Prerequisite: IN353

## IN453M1: Distributed and Collaborative Development Concepts

Describe distributed and collaborative development concepts. Quarter Credit Hours: 1 | Prerequisite: IN353

## IN453M2: Database Schema Implementation

Implement a database schema with security and optimization. Quarter Credit Hours: 1 | Prerequisite: IN353

## IN453M3: System Testing and Quality Assurance

Plan system testing and quality assurance activities. Quarter Credit Hours: 1 | Prerequisite: IN353

## IN453M4: Algorithms for Analysis and Optimization

Implement algorithms that allow analysis and optimization. Quarter Credit Hours: 1 | Prerequisite: IN353

## IN453M5: Software Development Best Practices

Integrate the best practices of software development. Quarter Credit Hours: 1 | Prerequisite: IN353

## IN453M6: Software Distribution

Prepare software for distribution. Quarter Credit Hours: 1 | Prerequisite: IN353

## IN489: Bachelor's-Level Analytics Internship

This course gives you practical job experience in the data analytics field. The internship provides you with an opportunity to learn about the data analytics career field through practical, real-world experiences and mentoring from a data analytics professional. This experience will enrich your technology skills and provide a better understanding of the level of expertise needed to be successful in your career. Internships must be preapproved by the Dean prior to the start of the term. Students who fail this course on the first attempt may not reenroll in this course without the Dean's approval.

Quarter Credit Hours: 5 | Prerequisite: Last term or permission from the Dean

## IN498: Bachelor's Capstone in Analytics

The Bachelor's Capstone in Analytics is designed to build on the concepts of all analytics courses you have taken as a part of your degree plan. The capstone project integrates problem-solving techniques and the development and implementation of viable, student-developed solutions to meet an identified data analytics need in a business or institutional environment.

Quarter Credit Hours: 5 | Prerequisite: Last term or permission from the Program Chair



## IT104: Introduction to Cybersecurity

Entities and organizations must be able to protect not only their network infrastructure, but also their personnel and customers from data loss and identity theft. This course introduces the topic of cybersecurity and how it has evolved over the last several decades. In this course, you will examine the concepts and challenges of cybersecurity from its evolution over the past decades to the increasing cyberthreats that exist today. Evolving trends that impact cybersecurity will be discussed, including the use of mobile devices, cloud computing, and the increased sophistication of attacks. You will study cybersecurity's role in physical and cyber incidents. Cybersecurity design is examined from a high level, as is the role of the cybersecurity professional in today's information technology environment. This course is designed, among other things, to provide you with the foundational knowledge necessary to pursue relevant certifications. While the course may provide you with the knowledge necessary to sit for an examination, the University cannot guarantee your eligibility either to take an exam or to become certified. Quarter Credit Hours: 5 | Prerequisite: None

#### IT104M1: Cybersecurity Overview

Examine the field of cybersecurity, including career opportunities and pathways to cybersecurity certifications. Quarter Credit Hours: 1 | Prerequisite: None

## IT104M2: Security Assessments

Discuss the role of security assessments. Quarter Credit Hours: 1 | Prerequisite: None

## IT104M3: Security Controls

Differentiate the roles of internal and external security controls. Quarter Credit Hours: 1 | Prerequisite: None

#### IT104M4: Operations and Personnel Security

Identify operations security and personnel cybersecurity issues. Quarter Credit Hours: 1 | Prerequisite: None

## IT104M5: Current Threats and Future Issues

Explain current cybersecurity threats and the future of cybersecurity. Quarter Credit Hours: 1 | Prerequisite: None

#### IT117: Website Development

In this course, you will explore website development and design. You will learn to use industry-appropriate tools and technologies for website planning and development. By creating a website using HTML, CSS, and JavaScript, you will develop relevant skills for working in the industry. This course will result in a finished website that can be used in a portfolio for self-promotion and demonstration of skills to an audience via the web. Quarter Credit Hours: 5 | Prerequisite: None

## IT117M1: Website Project Planning

Prepare a professional website page using industry-appropriate tools. Quarter Credit Hours: 1 | Prerequisite: None

## IT117M2: HTML and Images

Apply images and text content to create professional website pages. Quarter Credit Hours: 1 | Prerequisite: None

#### IT117M3: CSS and HTML

Construct a visually appealing website using HTML and CSS. Quarter Credit Hours: 1 | Prerequisite: None

## IT117M4: HTML Forms

Develop HTML forms with form-field validation. Quarter Credit Hours: 1 | Prerequisite: None

## IT117M5: Constructing Functional Websites

Construct a well-designed, accessible, and optimized website. Quarter Credit Hours: 1 | Prerequisite: None

#### IT133: Microsoft Office Applications on Demand

This course teaches you to use the current Microsoft Office suite of applications. Topics include an introduction to Word, Excel, PowerPoint, and cloud-based file management systems. You will also learn how to analyze appropriate software applications to address solutions within a profession.

Quarter Credit Hours: 5 | Prerequisite: None

#### IT133M1: Operating System and Services

Use the computer operating system and cloud-based services to set preferences and manage files.

Quarter Credit Hours: 1 | Prerequisite: None

## IT133M2: Word Processing Skills

Create documents using various functions of word processing software. Quarter Credit Hours: 1 | Prerequisite: None

## IT133M3: Spreadsheet Skills

Create spreadsheets using basic spreadsheet functions. Quarter Credit Hours: 1 | Prerequisite: None

## IT133M4: Computer Presentation Skills

Create computer-generated, on-screen presentations. Quarter Credit Hours: 1 | Prerequisite: None

## IT133M5: Software Solutions and Analysis

Analyze appropriate software application(s) to address solutions within a specific discipline.

Quarter Credit Hours: 1 | Prerequisite: None

## IT153: Spreadsheet Applications

This course examines spreadsheet concepts including calculations, formulas, built-in functions, and spreadsheet design. You will create spreadsheets and manipulate data to solve business problems. The course further explores topics such as charts, data tables, pivot tables, and what-if analysis.

Quarter Credit Hours: 5 | Prerequisite: None

#### IT153M1: Spreadsheets for Business

Create spreadsheets to solve business problems. Quarter Credit Hours: 1 | Prerequisite: None

#### IT153M2: Spreadsheet Formulas and Functions

Use formulas and functions to perform calculations. Quarter Credit Hours: 1 | Prerequisite: None

#### IT153M3: Spreadsheet Workbooks

Prepare workbooks to consolidate data. Quarter Credit Hours: 1 | Prerequisite: None

## IT153M4: Worksheet Macros

Create macros to automate worksheets. Quarter Credit Hours: 1 | Prerequisite: None

#### IT153M5: Spreadsheet Data Analysis

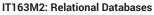
Analyze data using the scenario manager and other tools. Quarter Credit Hours: 1 | Prerequisite: None

## IT163: Database Concepts Using Microsoft Access

This course is an introduction to relational database management systems. You will use a relational database management system to create, maintain, and secure a database in order to analyze data. You will create filters, sorts, queries, forms, and reports. The course emphasizes the skills you need to meet user requirements. Quarter Credit Hours: 5 | Prerequisite: None

#### IT163M1: Effective Design Concepts

Synthesize database concepts needed to effectively design a database. Quarter Credit Hours: 1 | Prerequisite: None



Create relational databases with multiple entities and relationships. Quarter Credit Hours: 1 | Prerequisite: None

IT163M3: Database Forms

Create forms to input data. Quarter Credit Hours: 1 | Prerequisite: None

IT163M4: Structured Query Language

Use Structured Query Language (SQL) to manage data. Quarter Credit Hours: 1 | Prerequisite: None

IT163M5: Database Reports

Construct reports to retrieve data. Quarter Credit Hours: 1 | Prerequisite: None

## IT190: Information Technology Concepts

You will explore concepts of information systems, including common computing devices, hardware, software, and networks. You will gain a practical understanding of database concepts and structures. Topics include personal computer configuration and maintenance, along with the essentials of system software selection, installation, and administration, as well as ethics and security concepts and best practices. Quarter Credit Hours: 5 | Prerequisite: None

## IT190M1: Hardware Components

Describe hardware components. Quarter Credit Hours: 1 | Prerequisite: None

## IT190M2: Software Applications

Explain different types of software applications. Quarter Credit Hours: 1 | Prerequisite: None

#### IT190M3: Software

Discuss the functions of software. Quarter Credit Hours: 1 | Prerequisite: None

#### IT190M4: Computer Network Components

Describe the components of a computer network. Quarter Credit Hours: 1 | Prerequisite: None

## IT190M5: Computer and Network Security

Explain how to secure and protect computers and computer networks. Quarter Credit Hours: 1 | Prerequisite: None

## IT213: Software Development Concepts

This course introduces the fundamentals of software engineering, demonstrating how the fundamentals are the same across multiple programming languages. The core principles found in every programming language are investigated. You will design, develop, debug, and test simple applications using your choice from the programming language options.

Quarter Credit Hours: 5 | Prerequisite: None

#### IT213M1: Software Construction Core Concepts

Create fundamental programs using concepts such as declaring and initializing variables and constants.

Quarter Credit Hours: 1 | Prerequisite: None

## IT213M2: Decision Structures and Iteration

Create fundamental programs using concepts such as decision statements and iteration. Quarter Credit Hours: 1 | Prerequisite: None

#### IT213M3: Software Development History and Modeling

Create plans for programs using an understanding of historical development of programming techniques and appropriate modeling techniques.

Quarter Credit Hours: 1 | Prerequisite: None

## IT213M4: Functions and Arrays

Create fundamental programs using concepts such as functions and arrays.

Quarter Credit Hours: 1 | Prerequisite: None

## IT213M5: Debugging and Testing

Apply the debugging and testing processes to programs containing fundamental concepts such as decision statements, iteration, functions, and arrays.

Quarter Credit Hours: 1 | Prerequisite: None

## IT214: Website Implementation

This is a fast-paced course in web design. You will learn intermediate and advanced concepts of web page design. The course begins with a review of planning and design concepts. You will explore elements such as responsive website pages, Cascading Style Sheets (CSS) and JavaScript navigation bars, accessibility, multimedia, website page layouts, search engine optimization, and web security. You will create an individual portfolio for sharing and implement the current versions of Hypertext Markup Language (HTML), CSS, and JavaScript. Quarter Credit Hours: 5 | Prerequisite: IT117

## IT222: Introduction to Cloud Computing

This course is designed to provide you with the foundational knowledge necessary to pursue Cloud Essentials+ certification. Core concepts covered include cloud principles, cloud networking and storage, cloud needs assessment, cloud vendors, technical operations, governance, risk, compliance, and security in the cloud. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or to become certified.

Quarter Credit Hours: 5 | Prerequisite: None

#### IT222M1: Cloud Computing Concepts

Describe the key terminologies, fundamental concepts, and models that define the cloud computing paradigm. Quarter Credit Hours: 1 | Prerequisite: None

#### IT222M2: Moving to Cloud Computing

Investigate the business, economic, security, and productivity justifications and issues involved in moving to cloud computing. Quarter Credit Hours: 1 | Prerequisite: None

# IT222M3: Foundational Technologies and Architectures for Cloud Computing

Analyze the technologies and architectures that provide the foundation for cloud computing.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT222M4: Cloud Computing Design Patterns and Architecture

Examine basic and advanced cloud computing design patterns and architectures.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT222M5: Financial Considerations for Cloud Adoption

Use performance and cost metrics, as well as pricing models, to make decisions related to cloud adoption and management. Quarter Credit Hours: 1 | Prerequisite: None

#### IT227: Cloud Infrastructure Administration

You will learn about administering infrastructure in the cloud. You will compare and contrast administering on-premise environments and cloud environments. Finally, you will complete hands-on labs in a cloud environment.

Quarter Credit Hours: 5 | Prerequisite: IT222





#### IT227M1: Information Technology Infrastructures

Analyze different types of information technology infrastructures. Quarter Credit Hours: 1 | Prerequisite: IT222

#### IT227M2: Cloud Architecture Concepts

Summarize the cloud architecture as it relates to infrastructure. Quarter Credit Hours: 1 | Prerequisite: IT222

#### IT227M3: Cloud Orchestration Concepts

Summarize cloud orchestration versus locally managed systems. Quarter Credit Hours: 1 | Prerequisite: IT222

## IT227M4: Cloud-Based Analysis

Analyze information after performing hands-on activities in the cloud. Quarter Credit Hours: 1 | Prerequisite: IT222

#### IT227M5: Working With a Cloud Provider

Recommend a strategy when using a cloud provider. Quarter Credit Hours: 1 | Prerequisite: IT222

#### IT232: Software Design and Development Concepts

This is an intermediate course in the design and development of programs offering you a choice of implementation and demonstrating how design and programming concepts are universal. You will apply software design techniques, software process models, object-oriented programming concepts, and secure data-handling techniques. In addition, you will design, develop, debug, and test intermediate-level applications using your choice from the programming language options. Quarter Credit Hours: 5 | Prereguisite: IT213

#### IT232M1: Software Process Models

Explore various software process models. Quarter Credit Hours: 1 | Prerequisite: IT213

#### IT232M2: Advanced Design Techniques

Compose software using advanced interface and program design techniques.

Quarter Credit Hours: 1 | Prerequisite: IT213

## IT232M3: Secure Data Handling Techniques

Select appropriate secure data handling techniques. Quarter Credit Hours: 1 | Prerequisite: IT213

#### IT232M4: Design Requirements

Construct a software test plan for validation and verification of design requirements.

Quarter Credit Hours: 1 | Prerequisite: IT213

## IT232M5: Object-Oriented Programming Concepts

Examine object-oriented programming concepts. Quarter Credit Hours: 1 | Prerequisite: IT213

#### IT234: Database Concepts

This course prepares you to learn database programming. You will be exposed to more advanced concepts of database management systems and SQL programming language. This course will provide you with the business context in which data is used and how it is transformed into information. You will identify the information needs and general usage of data within the modern business context and link the use of relational database management systems to the data needs of the organization. Quarter Credit Hours: 5 | Prerequisite: IT163 or enrollment in the BS in Cloud Computing and Solutions or BS in Applied Computer Science degree programs

#### IT234M1: Database Management Concepts

Demonstrate the fundamental concepts of Database Management systems.

Quarter Credit Hours: 1 | Prerequisite: IT163 or enrollment in the BS in Cloud Computing and Solutions or BS in Applied Computer Science degree programs

## IT234M2: Data Definition Language

Explore data definition language (DDL) statements to define the database structure or schema.

Quarter Credit Hours: 1 | Prerequisite: IT163 or enrollment in the BS in Cloud Computing and Solutions or BS in Applied Computer Science degree programs

#### IT234M3: Data Manipulation Language

Explore data manipulation language (DML) statements to manage data within schema objects.

Quarter Credit Hours: 1 | Prerequisite: IT163 or enrollment in the BS in Cloud Computing and Solutions or BS in Applied Computer Science degree programs

## IT234M4: Advanced SQL

Discover more advanced SQL such as security commands and logins. Quarter Credit Hours: 1 | Prerequisite: IT163 or enrollment in the BS in Cloud Computing and Solutions or BS in Applied Computer Science degree programs

#### IT234M5: Analytical and Non-Relational Database Alternatives

Investigate analytical and nonrelational database alternatives. Quarter Credit Hours: 1 | Prerequisite: IT163 or enrollment in the BS in Cloud Computing and Solutions or BS in Applied Computer Science degree programs

#### IT244: Python Programming

This course examines basic programming concepts using the Python language as the tool. Concepts studied include variables, data types, decision making, logical and relational operators, iteration, arrays, and other data structures. Additional course topics include file management and security, classes and related topics, and modules and other built-in tools.

Quarter Credit Hours: 3 | Prerequisite: None

#### IT244M1: Python Programming Fundamentals

Apply the basic concepts of programming using the Python language. Quarter Credit Hours: 1 | Prerequisite: None

#### IT244M2: Python Functions and Classes

Analyze user-defined functions and classes in Python. Quarter Credit Hours: 1 | Prerequisite: None

#### IT244M3: Python Tools and Modules

Examine Python versions, available system interfaces, built-in tools, and user-defined modules.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT247: Fundamentals of Web Graphics

You will learn how to create appropriate web graphics using popular image editing tools. Throughout the course, you will create a collection of custom graphics that will be displayed in an e-Portfolio layout. Topics will include resizing, resolution, optimization, digital photo enhancement, custom banner and button creation, and more. Quarter Credit Hours: 5 | Prerequisite: IT214



## IT262: Certified Ethical Hacking I

This course covers the tools and procedures needed to perform ethical hacking. Ethical hacking, which is also known as penetration testing, is a procedure employed by organizations where the tester attempts to penetrate or compromise a computer or network. In so doing, organizational vulnerabilities are brought to light, which allows the organization to mitigate the vulnerabilities uncovered. This course is designed, among other things, to provide you with the foundational knowledge necessary to continue your studies for the EC-Council Certified Ethical Hacker certification. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified.

Quarter Credit Hours: 5 | Prerequisite: None

#### IT262M1: Network and Reconnaissance Results

Interpret network and reconnaissance results. Quarter Credit Hours: 1 | Prerequisite: None

#### IT262M2: Enumeration, Scanning, and Packet Capture

Describe steps and techniques to perform enumeration, scanning, and packet capture.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT262M3: Network and Web Server Attacks

Produce network and web server attacks. Quarter Credit Hours: 1 | Prerequisite: None

## IT262M4: Wireless Attacks and Malware

Produce wireless attacks and malware. Quarter Credit Hours: 1 | Prerequisite: None

IT262M5: Encryption and Social Engineering Attacks

Explain encryption and social engineering attacks.

Quarter Credit Hours: 1 | Prerequisite: None

## IT273: ONetworking Concepts

This course introduces the concepts behind today's networks. It outlines current network design, explaining the OSI Model and the methods of carrying data over wired and wireless media. Other topics include network design components, such as cloud models and services, network topologies and access methods, administration of network operating systems, common security concepts, and troubleshooting methods for data transmission and recovery.

Quarter Credit Hours: 5 | Prerequisite: None

## IT273M1: Networking Concepts

Analyze networking concepts such as the OSI Model; network cabling; ports and protocols; IPv4 and IPv6 addressing; and cloud models and services.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT273M2: Networked Environments

Evaluate network devices, routing and switching, virtualization, and wireless technologies.

Quarter Credit Hours: 1 | Prerequisite: None

## IT273M3: Network Policies and Configuration Management

Analyze policies, best practice, appropriate documentation, and diagrams to manage the network.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT273M4: Network Defense

Analyze security concepts, common network attacks, and techniques for hardening network devices. Quarter Credit Hours: 1 | Prerequisite: None

#### IT273M5: Network Troubleshooting

Practice network troubleshooting across various network technologies. Quarter Credit Hours: 1 | Prerequisite: None

#### IT275: Linux System Administration

This Linux course prepares you for the Linux Professional Institute's LPIC-1: System Administrator certification. You will learn to install, configure, administer, and secure the Linux operating system. Command-line instructions are heavily emphasized. Emphasis is placed on applied skills that address real-world challenges such as managing file structure, network services, and system security. Quarter Credit Hours: 5 | Prerequisite: IT273

## IT275M1: Linux Software Packaging System

Use the command line and the Linux software packaging system. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IT275M2: Configuring the Linux Operating System

Configure the key features of the Linux operating system. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IT275M3: Modifying Files

Modify the files in Linux. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IT275M4: Creating Accounts

Create user and group accounts within Linux. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IT275M5: Configuring Security

Configure security within the Linux operating system. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IT277: Certified Information Systems Security Professional I

This course covers the essential material comprising the four study domains in the Certified Information Systems Security Professional (CISSP) Common Body of Knowledge (CBK). Domain 1 is about Security and Risk Management; Domain 2 is about Asset Security; Domain 3 is Security Architecture and Engineering; and Domain 5 is Identity and Access Management. The information covered is vital in gaining a threshold understanding of the field of cybersecurity. These four domains will enable you to learn the essentials of security governance, risk management, business continuity planning, laws, regulations and compliance, and the secure control and protection of assets. This course is designed, among other things, to provide you with the foundational knowledge necessary to pursue CISSP certification. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified.

Quarter Credit Hours: 5 | Prerequisite: None

## IT277M1: The Pillars of Cybersecurity

Examine the three pillars of cybersecurity: confidentiality, integrity, and availability.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT277M2: Information and Asset Classification

Explain information and asset classification. Quarter Credit Hours: 1 | Prerequisite: None

#### IT277M3: Data Security Controls

Differentiate multilevel data security controls. Quarter Credit Hours: 1 | Prerequisite: None

#### IT277M4: Cybersecurity Security Models

Distinguish access control, integrity, and information flow security models.

Quarter Credit Hours: 1 | Prerequisite: None



## IT277M5: Security Evaluation Criteria

Differentiate various security evaluation criteria. Quarter Credit Hours: 1 | Prerequisite: None

#### IT278: Windows Administration

This course covers using the latest Windows Server operating system available. In this course, you will cover the installation, storage, and support roles with the Windows Server operating system. You will also cover the configuration of containers, supporting virtual machines using Hyper-V, as well as arranging network load balancing and maintaining cluster failovers across multiple Windows servers. In addition, monitoring and updating Windows servers will be covered. Quarter Credit Hours: 5 | Prerequisite: IT273

#### IT278M1: Windows Operating Systems

Examine the features, roles, and installation methods of a network operating system.

Quarter Credit Hours: 1 | Prerequisite: IT273

## IT278M2: Windows Storage

Administer server roles and features, including storage options and file and folder permissions. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IT278M3: Container Configuration

Configure containers and images. Quarter Credit Hours: 1 | Prerequisite: IT273

## IT278M4: Virtual Machine Configuration

Configure Hyper-V and virtual machines. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IT278M5: Virtualization Management

Manage clustering and network load balancing for servers. Quarter Credit Hours: 1 | Prerequisite: IT273

#### IT279: Certified Information Systems Security Professional II

This course covers the essential material comprising three study domains in the Certified Information Systems Security Professional (CISSP) Common Body of Knowledge (CBK): Domain 3 Security Architecture and Engineering; Domain 4 Communications and Network Security; and Domain 8 Software Development Security. The information covered is vital in gaining a threshold understanding of the field of cybersecurity, and will enable you to assess the vulnerabilities of security solutions, design secure communication channels, and apply security controls in the software development environment. This course is designed, among other things, to provide you with the foundational knowledge necessary to pursue CISSP certification. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified.

Quarter Credit Hours: 5 | Prerequisite: None

#### IT279M1: Engineering Processes and Secure Design

Examine engineering processes and secure design principles. Quarter Credit Hours: 1 | Prerequisite: None

#### IT279M2: Cryptosystem Fundamentals

Analyze symmetric and asymmetric cryptosystem fundamentals. Quarter Credit Hours: 1 | Prerequisite: None

#### IT279M3: Secure Network Architecture

Apply secure design principles to network architecture. Quarter Credit Hours: 1 | Prerequisite: None

## IT279M4: Network Attacks and Mitigation

Identify network attacks and mitigation responses. Quarter Credit Hours: 1 | Prerequisite: None

## IT279M5: Security in the Software Development Life Cycle

Describe security in the software development life cycle. Quarter Credit Hours: 1 | Prerequisite: None

#### IT286: Network Security Concepts

This course introduces you to the essential knowledge required to secure today's networks. You will learn to identify threats and vulnerabilities and to apply effective strategies to prevent data breaches. The course discusses topics such as risk assessment; compliance and operational security; access control and authorization management; intrusion detection; application hardening; malicious attacks; and cryptography. It outlines a security professional's responsibilities and discusses the skills needed to protect an organization's data and network infrastructure. Quarter Credit Hours: 5 | Prerequisite: None

#### IT286M1: Risk Assessment and Network Monitoring

Examine the process of risk assessment and network monitoring. Quarter Credit Hours: 1 | Prerequisite: None

#### IT286M2: Device and Infrastructure Security

Investigate device and infrastructure security, access control, authentication, and authorization. Quarter Credit Hours: 1 | Prerequisite: None

#### IT286M3: Protections Measures

Explain the protection of wireless networks and cloud services, and the hardening of hosts and applications. Quarter Credit Hours: 1 | Prerequisite: None

#### IT286M4: Cryptography

Examine cryptography methods, vulnerabilities, threats, and malicious attacks.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT286M5: Security Awareness and Enforcement

Explore social engineering, security administration, disaster recovery, and incident response.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT288: Security+ Certification Prep

This course extends the preparation necessary for CompTIA's Security + Certification exam. While the course may provide you with the foundational knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified.

Quarter Credit Hours: 5 | Prerequisite: IT286 or permission of the Department Chair

#### IT296: Associate's-Level Information Technology Internship

This course gives associate's-level students practical job experience in the information technology field. The externship provides you an opportunity to learn about the IT career field through practical, real-world experiences and mentoring from an IT professional. This experience will enrich your technology skills and provide a better understanding of the level of expertise needed to be successful in your career.

Quarter Credit Hours: 5 | Prerequisite: Last term or permission from the Dean



#### IT299: Associate's Capstone in Information Technology

This course is designed to build on the concepts of all information technology courses you have taken as a part of your degree plan. The capstone course integrates problem-solving techniques and implementation solutions studied in the information technology courses. You will research particular problems or issues you select, analyze the major concerns, and recommend viable information technology solutions to resolve or improve the problems or issues.

Quarter Credit Hours: 5 | Prerequisite: Last term or permission from the Dean

#### IT301: Project Management I

The course introduces project management principles and performance domains. You will gain knowledge of project planning and explore the different project performance domains. Topics include working with project stakeholders and teams, identifying project approaches, and planning project work and delivery.

Quarter Credit Hours: 6 | Prerequisite: None

#### IT301M1: Project Management Principles and Domains

Analyze project management principles and performance domains. Quarter Credit Hours: 1 | Prerequisite: None

#### IT301M2: Project Initiation and Leadership

Distinguish between stakeholder and team performance domains and their interactions with other performance domains. Quarter Credit Hours: 1 | Prerequisite: None

IT301M3: Project Lifecycle and Scope Planning

Explore project development approach and life cycle performance domain.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT301M4: Project Performance Management

Create project artifacts that support the project planning performance domain.

Quarter Credit Hours: 1 | Prerequisite: None

## IT301M5: Managing Project Execution

Explain why ethics and integrity are important to the field of IT. Quarter Credit Hours: 1 | Prerequisite: None

## IT301M6: Managing Global Projects

Practice global interconnectedness as it applies to your field of study. Quarter Credit Hours: 1 | Prerequisite: None

#### IT302: Human Computer Interaction

This course introduces you to the field of human computer interaction (HCI). You will survey HCI history and theory, and examine standard principles that are necessary to produce effective interface designs for the consumer. You will also learn about development methodologies, evaluation techniques, task analysis, and prototyping. Activities include observation and analysis of various types of interfaces, plus the use of professional tools to create a new interface design.

Quarter Credit Hours: 6 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT302M1: HCI Theories and Principles

Examine human-computer interaction theories and principles. Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT302M2: HCI Principles and the Discovery Process

Evaluate human-computer interaction principles and the discovery process.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT302M3: Text and Typography in Design

Relate the value of screen components, color theories, and typography in human-computer interaction.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT302M4: Auditory Components

Assess auditory components, accessibility, and redundancy concepts for human-computer interaction.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

## IT302M5: Haptics

Assess the future of haptics in interface design.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT302M6: Interface Design

Design a user interface with appropriate professional tools. Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT303: Cloud Architecture Concepts and Design

This course is designed to provide you with the foundational knowledge within the Cloud Concepts Architecture & Design domain to help you prepare for the Certified Cloud Security Certification (CCSP) exam. Core concepts covered include architectural concepts and design requirements. Follow-on courses address additional CCSP exam domains. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified. Quarter Credit Hours: 6 | Prerequisite: IT222 and IT227

#### IT303M1: Cloud Architecture Technologies

Describe cloud architecture technologies to include virtualization. Quarter Credit Hours: 1 | Prerequisite: IT222 and IT227

## IT303M2: Implementing Virtual Machines and Applications

Implement virtual machines and applications within organizations. Quarter Credit Hours: 1 | Prerequisite: IT222 and IT227

## IT303M3: Cloud Computing Security Concepts

Analyze cloud computing security concepts. Quarter Credit Hours: 1 | Prerequisite: IT222 and IT227

#### IT303M4: Cloud-Based Solutions

Analyze several types of cloud-based solutions. Quarter Credit Hours: 1 | Prerequisite: IT222 and IT227

#### IT303M5: Cloud Security Design Principles

Evaluate design principles of secure cloud computing. Quarter Credit Hours: 1 | Prerequisite: IT222 and IT227

#### IT303M6: Addressing Cloud-Based Security Threats

Evaluate security solutions and strategies for cloud-based security threats.

Quarter Credit Hours: 1 | Prerequisite: IT222 and IT227

#### IT304: Application Development and Scripting in the Cloud

You will compare the cloud offerings of the top cloud platforms. You will also learn about programming in cloud environments using prevalent scripting languages. You will employ the software development life cycle when creating applications for the cloud.

Quarter Credit Hours: 6 | Prerequisite: IT234 and one of the following: IT213, IN250, IN251, IN252, or IN253; IT303 recommended



## IT304M1: Cloud Architecture for Software Development

Investigate cloud architecture for software development. Quarter Credit Hours: 1 | Prerequisite: IT234 and one of the following: IT213, IN250, IN251, IN252, or IN253; IT303 recommended

#### IT304M2: Scripting Languages Concepts

Investigate scripting languages.

Quarter Credit Hours: 1 | Prerequisite: IT234 and one of the following: IT213, IN250, IN251, IN252, or IN253; IT303 recommended

#### IT304M3: Implementing Scripting Languages in the Cloud

Explain how to use scripting languages for cloud solutions. Quarter Credit Hours: 1 | Prerequisite: IT234 and one of the following: IT213, IN250, IN251, IN252, or IN253; IT303 recommended

## IT304M4: Programming Practices

Apply programming practices using scripting languages. Quarter Credit Hours: 1 | Prerequisite: IT234 and one of the following: IT213, IN250, IN251, IN252, or IN253; IT303 recommended

## IT304M5: Comparing Scripting Languages

Synthesize information when comparing popular scripting languages. Quarter Credit Hours: 1 | Prerequisite: IT234 and one of the following: IT213, IN250, IN251, IN252, or IN253; IT303 recommended

## IT304M6: Cloud-Based Software Development

Recommend a software development life cycle for cloud-based software development.

Quarter Credit Hours: 1 | Prerequisite: IT234 and one of the following: IT213, IN250, IN251, IN252, or IN253; IT303 recommended

## IT306: Cloud Services Management

The Cloud is the way of the future. As with anything new, there is a learning curve. In this course you will explore standards, frameworks, laws, and regulations around cloud services. You will explore Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software

as a Service (SaaS), Disaster Recovery as a Service (DRaaS), and Identity as a Service (IDaaS). You will learn about tradeoffs, security models, and shared responsibility, as well as processes and procedures for protecting the company while migrating to the next best thing. Quarter Credit Hours: 6 | Prerequisite: IT303

## IT306M1: Regulating the Cloud Environment

Explore specific laws, regulations, and standards that apply to cloudbased environments.

Quarter Credit Hours: 1 | Prerequisite: IT303

## IT306M2: Governance Considerations for Cloud Migration

Explain governance considerations to ensure successful on-premise to cloud migration.

Quarter Credit Hours: 1 | Prerequisite: IT303

## IT306M3: Cloud Architecture for Systems

Analyze cloud architecture as it relates to systems for the cloud. Quarter Credit Hours: 1 | Prerequisite: IT303

#### IT306M4: Service-Level Agreements

Analyze service-level agreements for cloud providers. Quarter Credit Hours: 1 | Prerequisite: IT303

#### IT306M5: Functionality and Security Requirements for Cloud Environments

Synthesize functionality and security requirements for cloud environments that balance performance and security needs. Quarter Credit Hours: 1 | Prerequisite: IT303

## IT306M6: Designing Cloud Services

Recommend effective approaches for planning, designing, and implementing a successful cloud service for various business scenarios. Quarter Credit Hours: 1 | Prerequisite: IT303

## IT316: Computer Forensics

This course explores the pervasive nature of illegal and unauthorized activity occurring in cyberspace: computer crime. You will learn about the many types of computer crime and the structured procedures deployed in its investigation. This will include a systematic investigative approach of both corporate and criminal-related offenses. You will learn data-retrieval principles including onsite data collection, laboratory data retrieval, and live network data retrieval. You will learn how current computer forensics tools are used for data acquisitions to data analysis. This course will also discuss how computer crimes present unique vulnerabilities to computer systems due to the global nature of the Internet. Quarter Credit Hours: 6 | Prerequisite: None

## IT316M1: Computers and Criminal Behavior

Examine the relationship of computers and criminal behavior. Quarter Credit Hours: 1 | Prerequisite: None

## IT316M2: Computer Forensics as a Profession

Describe the field of computer forensics and investigations as a profession.

Quarter Credit Hours: 1 | Prerequisite: None

## IT316M3: Computer Forensics Processes

Analyze the processes involved in computer forensics. Quarter Credit Hours: 1 | Prerequisite: None

## IT316M4: Data Acquisition Methods

Examine various data acquisition methods. Quarter Credit Hours: 1 | Prerequisite: None

## IT316M5: Computer Forensics Tools

Compare current computer forensic tools. Quarter Credit Hours: 1 | Prerequisite: None

#### IT316M6: Data Analysis and Validation Techniques

Recommend techniques of data analysis and validation for high-tech investigations.

Quarter Credit Hours: 1 | Prerequisite: None

## IT331: Technology Infrastructure

This course explores the concepts and purpose of information technology infrastructure. Emphasis is placed on expanding your knowledge of computer networks and data transmissions and applying those concepts to an organization's technology requirements. Additionally, the course will provide a foundational overview for Information Technology Infrastructure Library (ITIL). Quarter Credit Hours: 6 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT331M1: Networking Skills for Project Success

Describe how networking skills can improve project success. Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT331M2: Key Infrastructure Components

Analyze the functions of key components in information technology Infrastructure.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only



## IT331M3: IT Infrastructure Planning

Plan an effective IT infrastructure based on the needs of an organization. Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT331M4: Wide Area Network Technologies

Evaluate Wide Area Network (WAN) technologies.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT331M5: Global Interconnectedness in Technology Infrastructure

Practice global interconnectedness as it applies to your field of study. Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

## IT331M6: Network Security Design

Formulate a network security design.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

## IT332: Principles of Information Systems Architecture

This course introduces you to the background of information systems architecture. You will learn a holistic approach to both hardware and software architecture design from a broad systems perspective. Both a business and technical focus will be covered with concrete examples of current technologies and related managerial issues. Quarter Credit Hours: 6 | Prerequisite: None

## IT332M1: Binary Language

Analyze the language of computers. Quarter Credit Hours: 1 | Prerequisite: None

#### IT332M2: The Computer as a System

Analyze the computer as a system. Quarter Credit Hours: 1 | Prerequisite: None

## IT332M3: System Architecture Components

Evaluate CPU, RAM, input, output, and peripheral devices as components used in system architecture. Quarter Credit Hours: 1 | Prerequisite: None

#### IT332M4: Data Communication and Networking

Assess data communication and networking options for a computer system.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT332M5: Data Storage and Protection

Recommend data storage and data protection technology for a computer system.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT332M6: Computer Operating Systems

Differentiate between various computer operating systems. Quarter Credit Hours: 1 | Prerequisite: None

## IT333: Emerging Technologies and the Future

This course identifies specific technologies and highlights the dramatic and rapid changes happening in information and knowledge processing and distribution. The course introduces each technology and its basic functionality. You should expect to leave this course with a greater ability to assess and appreciate the impact that these changes will have. You will analyze technologies that affect the future of computing and society. Additionally, you will undertake an introductory investigation into the basic functionality of each. A listing will include, but may not be limited to, the following main areas, each of which breaks down with substantial further classification and detail: advances in cloud computing models, including fog and edge computing; Internet of Things (IOT); machine learning; artificial intelligence (AI); advances in computer architectures, including specialized Systems on Chip (SOCs); graphics processors and neural networks; data science; advanced generations of wireless cellular; blockchain technologies; automation and robotics. You will evaluate and analyze the impacts that these emerging technologies will have in relation to areas, such as world and local economies, privacy and security, work and employment, education and learning, business and entrepreneurship, war and the military, climate and health, government and politics, and the future of society.

Quarter Credit Hours: 3 | Prerequisite: None

#### IT350: Output Advanced Database Concepts

This course incorporates advanced concepts of the database language Transact-SQL (T-SQL) for creating efficient database implementations. You will use the T-SQL programming language and connect to an MS SQL Server database for displaying organized information to users. You will explore the various fundamental features of the T-SQL language such as DataTypes, Sets, and Builtin functions. You will explore the programmability of SQL by creating stored procedures; learn how to format a result set by sorting, filtering, and grouping; apply advanced SQL query techniques such as subqueries and common table expressions; use Report Builder to generate analytical reports from your data; and examine the use of non-SQL relational databases. Quarter Credit Hours: 6 | Prerequisite: IT234

#### IT350M1: SQL Programming Concepts

Apply fundamental SQL programming concepts. Quarter Credit Hours: 1 | Prerequisite: IT234

## IT350M2: Designing Stored Procedures

Design simple stored procedures to meet business needs. Quarter Credit Hours: 1 | Prerequisite: IT234

#### IT350M3: Creating Aggregated Business Report Datasets

Create aggregated business report datasets to format output and filter data.

Quarter Credit Hours: 1 | Prerequisite: IT234

#### IT350M4: Common Security Expressions Explore techniques to ensure the database is secure. Quarter Credit Hours: 1 | Prerequisite: IT234

#### IT350M5: Using Report Builder

Use a report builder to display and analyze information generated in an MS SQL server database. Quarter Credit Hours: 1 | Prerequisite: IT234

## IT350M6: Nonrelational Database Alternatives Explore nonrelational database alternatives.

Quarter Credit Hours: 1 | Prerequisite: IT234



## IT374: O Linux Security

This course introduces Linux security and hardening to ensure your network remains secure. Additionally, the course will explore Kali Linux as a penetration testing and security auditing platform with advanced tools to identify, detect, and exploit any vulnerabilities uncovered in the target network environment. You will explore how to secure your environment and how hackers will look to exploit those secure configurations. You will develop a strong understanding of secure administration, as well as practical penetration testing skills by demonstrating hacker tools and techniques that reflect real-world attack scenarios from a business perspective in today's digital age.

Quarter Credit Hours: 6 | Prerequisite: IT275

## IT374M1: Linux Installation and Configuration

Configure a Linux installation and user accounts. Quarter Credit Hours: 1 | Prerequisite: IT275

#### IT374M2: Information Gathering Process

Illustrate the information gathering process. Quarter Credit Hours: 1 | Prerequisite: IT275

#### IT374M3: Securing the Server

Illustrate securing the Linux server and access control. Quarter Credit Hours: 1 | Prerequisite: IT275

## IT374M4: Encryption and Hardening Process

Analyze encryption and secure shell (SSH) hardening. Quarter Credit Hours: 1 | Prerequisite: IT275

## IT374M5: Scanning and Intrusion Detection

Analyze scanning, auditing, and intrusion detection in Linux environments.

Quarter Credit Hours: 1 | Prerequisite: IT275

#### IT374M6: Security Countermeasures

Analyze security tips and wireless exploitation in Linux. Quarter Credit Hours: 1 | Prerequisite: IT275

#### IT375: Windows Enterprise Administration

This advanced course in Microsoft Windows enterprise administration prepares you to install, configure, and manage key network services and Active Directory. You will perform administrative tasks such as network service installation and configuration; Active Directory installation; Group Policy design and configuration; and network and Active Directory security configuration. You will learn the theory behind Active Directory design and operation; and complete hands-on labs and projects that develop the skills needed for real-world settings. Quarter Credit Hours: 6 | Prerequisite: IT278

#### IT375M1: Windows Server Installation

Install a current version of the Windows operating system into a virtual machine or hardware chassis.

Quarter Credit Hours: 1 | Prerequisite: IT278

## IT375M2: Windows Server Advanced Configuration

Configure a current version of the Windows operating system including administration tools.

Quarter Credit Hours: 1 | Prerequisite: IT278

## IT375M3: Windows Server Active Directory Configuration

Configure Active Directory and policy functions in a new domain on a current version of the Windows operating system. Quarter Credit Hours: 1 | Prerequisite: IT278

## IT375M4: Network Services and Components

Configure network services and components. Quarter Credit Hours: 1 | Prerequisite: IT278

#### IT375M5: Network Policy

Implement network policy and monitoring to specific situations. Quarter Credit Hours: 1 | Prerequisite: IT278

#### IT375M6: Security Functions

Apply security functions in a current version of the Windows operating system.

Quarter Credit Hours: 1 | Prerequisite: IT278

#### IT390: Intrusion Detection and Incident Response

This course provides an introduction to intrusion detection systems available to protect networks from cybercriminals. You will explore various security concepts and the basics of security attacks. You will install and configure various intrusion detection system tools. Topics include principles and classifications of intrusion detection systems, incident response process, and response types. Additionally, the course presents insight into intrusion detection and forensics and incident response strategies required to protect critical assets. Quarter Credit Hours: 6 | Prerequisite: IT286

#### IT390M1: Principles and Concepts

Discuss intrusion detection and incident response principles and concepts.

Quarter Credit Hours: 1 | Prerequisite: IT286

## IT390M2: Comparing Intrusion Detection Systems

Compare intrusion detection systems. Quarter Credit Hours: 1 | Prerequisite: IT286

#### IT390M3: Responding to Threats

Analyze the security threat spectrum. Quarter Credit Hours: 1 | Prerequisite: IT286

#### IT390M4: Installing and Examining Intrusion Detection Systems

Demonstrate the ability to install and examine intrusion detection system tools.

Quarter Credit Hours: 1 | Prerequisite: IT286

#### **IT390M5: Security Analytics**

Interpret various security analytic measures. Quarter Credit Hours: 1 | Prerequisite: IT286

## IT390M6: Incident Response Strategies

Differentiate incident response strategies. Quarter Credit Hours: 1 | Prerequisite: IT286

#### IT391: Advanced Software Development Including Web and Mobility

This course focuses on advanced design and programming concepts and techniques offering you a choice of implementation and demonstrating how advanced concepts apply across a variety of languages. You will develop advanced software, web, and mobile applications, while applying concepts related to data structures, algorithms, web services, graphics, mobile, and multimedia. You also learn how to create interactive applications across a variety of platforms (traditional applications, websites, and mobile applications).

Quarter Credit Hours: 6 | Prerequisite: IT232, IT234, and IT302

## IT391M1: Programming Data Structures

Apply the common linear structures of lists, stacks, and queues. Quarter Credit Hours: 1 | Prerequisite: IT232, IT234, and IT302

#### IT391M2: Recursion, Sorting, and Searching

Develop procedures to solve data structures and algorithm problems. Quarter Credit Hours: 1 | Prerequisite: IT232, IT234, and IT302

#### **IT391M3: User Interface Development and Data Validation** Analyze best practices for interactive user interface design.

Quarter Credit Hours: 1 | Prerequisite: IT232, IT234, and IT302

## IT391M4: Multitier Architecture and XML

Analyze the client/server relationship. Quarter Credit Hours: 1 | Prerequisite: IT232, IT234, and IT302

IT391M5: Web Services Development Evaluate web services. Quarter Credit Hours: 1 | Prerequisite: IT232, IT234, and IT302

**IT391M6: Mobility Development and Cross-Compiling** Design interactive web or mobile applications. Quarter Credit Hours: 1 | Prerequisite: IT232, IT234, and IT302

## IT395: () Certified Ethical Hacking II

This course continues concepts introduced in IT262 covering the tools and procedures needed to perform ethical hacking. More advanced penetration testing procedures are covered as well as how to incorporate the knowledge learned into a cohesive set of procedures to help organizations find potential vulnerabilities. This course is designed, among other things, to provide you with the foundational knowledge necessary to continue the pursuit of the EC-Council Certified Ethical Hacker certification. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified. Quarter Credit Hours: 6 | Prerequisite: IT262

## IT395M1: Social Engineering and Physical Security Attacks

Conduct social engineering and physical security attacks. Quarter Credit Hours: 1 | Prerequisite: IT262

## IT395M2: Trojans, Malware, and Cryptology Attacks

Illustrate Trojans, malware, and cryptology attacks. Quarter Credit Hours: 1 | Prerequisite: IT262

**IT395M3: Web Server and Web Application Attacks** Devise web server and web application attacks. Quarter Credit Hours: 1 | Prerequisite: IT262

## IT395M4: Wireless Network Attacks

Prepare wireless network attacks. Quarter Credit Hours: 1 | Prerequisite: IT262

## IT395M5: Cyberthreat Mitigation Procedures

Formulate organizational cyberthreat mitigation procedures. Quarter Credit Hours: 1 | Prerequisite: IT262

## IT395M6: Ethical Hacking Plans

Develop an ethical hacking plan to test an organization's cybersecurity posture.

Quarter Credit Hours: 1 | Prerequisite: IT262

## IT400: Ethics in Cybersecurity

New innovations within information technology continue to evolve around the world, creating ethical challenges and concerns for information technology professionals. This course will examine ethical and legal concerns with the use of information technology. Ethical issues will be examined as they relate to common information systems. Additional topics including privacy, regulations, as well as societal and cultural influences on decision making will be examined. Quarter Credit Hours: 6 | Prerequisite: None

## IT400M1: Ethical Issues in Information Technology

Explore the relevance of ethical issues that involve the use of information technology.

Quarter Credit Hours: 1 | Prerequisite: None

## IT400M2: Ethical and Legal Topics in Information Technology

Evaluate a broad array of topics including privacy, free speech, information security, and law.

Quarter Credit Hours: 1 | Prerequisite: None

**IT400M3: Critical Thinking Methods Related to Cybersecurity Ethics** Develop critical thinking methods addressing cybersecurity ethics. Quarter Credit Hours: 1 | Prerequisite: None

## IT400M4: Privacy and Confidentiality in Information Technology

Explain ethical concerns relating to privacy and confidentiality involving information technology.

Quarter Credit Hours: 1 | Prerequisite: None

# IT400M5: Ethical Issues Related to the Use of Information Technology

Examine relevant ethical issues that proliferate the use of information technology.

Quarter Credit Hours: 1 | Prerequisite: None

## IT400M6: Ethical Behavior and Laws in the Use of Information Technology

Discuss laws and regulations involving ethical behavior of individuals and organizations using information technology. Quarter Credit Hours: 1 | Prerequisite: None

## IT401: Project Management II

This course is the second of two project management courses and explores more advanced topics. You will gain knowledge of the project management skills and processes needed to execute, control, and close a project. Topics include planning project resources, developing the project team, conducting procurements, measuring project performance, controlling work results, and applying professional responsibility. Quarter Credit Hours: 6 | Prerequisite: IT301

## IT402: IT Consulting Skills

This course will introduce you to the theory and practice of IT consulting. You examine the processes and techniques associated with the consulting field. Business aptitude skills will be taught including communication, ethics, presentation, and leadership skills. Additionally, project definition and analysis, project planning, gathering user and project requirements, executing projects, time management, and the history of consulting will be examined. Through case studies, you prepare a project proposal and a persuasive presentation for an organization. Quarter Credit Hours: 6 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT402M1: Consulting and Ethics

Justify ethical decisions with IT consulting. Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT402M2: Time and Resource Management

Generate time management and analysis representations.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT402M3: Interpersonal Skills

Develop skills for negotiation, decision-making, and other people-related processes with IT consulting.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

## IT402M4: Consulting History and Global Views

Appraise historical and international facets of IT consulting. Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only





## IT402M5: The Consulting Project Proposal

Create a project proposal with a unique vision.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

#### IT402M6: Persuasive Presentations

Generate persuasive materials for IT consulting.

Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upperlevel students only

## IT403: Cloud Security

This course is designed to provide you with the foundational knowledge within the cloud data security, cloud platform and infrastructure security, and cloud application security domains to help you prepare for the Certified Cloud Security Certification (CCSP) exam. Core concepts covered include data classification, cloud data security, security in the cloud, and cloud application security. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified.

Quarter Credit Hours: 6 | Prerequisite: IT303

## IT403M1: Cloud Architecture Security

Explore security as it relates to cloud architecture. Quarter Credit Hours: 1 | Prerequisite: IT303

## IT403M2: Cloud Data Security

Explore security as it relates to data in the cloud. Quarter Credit Hours: 1 | Prerequisite: IT303

#### IT403M3: Cloud Application Security

Explain security as it relates to cloud applications. Quarter Credit Hours: 1 | Prerequisite: IT303

#### IT403M4: Cloud Security Vulnerabilities

Explore security vulnerabilities based on cloud deployment model. Quarter Credit Hours: 1 | Prerequisite: IT303

#### IT403M5: Security Factors for Cloud Migrations

Synthesize the security factors to consider during migration of systems, applications, data, and databases to a cloud environment. Quarter Credit Hours: 1 | Prerequisite: IT303

#### IT403M6: Recommended Cloud Solutions and Security

Recommend appropriate cloud solutions and cloud security for various business scenarios.

Quarter Credit Hours: 1 | Prerequisite: IT303

## IT404: Advanced Cloud Security

This course is designed to provide you with the knowledge to build enterprise-scale secure cloud architectures, and to implement and manage enterprise security at cloud scale. The course particularly focuses on the operational aspects of cloud as it pertains to compliance and audit. Advanced Cloud Security also covers the Operations and Legal and Compliance domains to help you prepare for the Certified Cloud Security Certification (CCSP) exam. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified.

Quarter Credit Hours: 6 | Prerequisite: IT403

#### IT404M1: Software Development Testing Techniques

Investigate software development testing techniques. Quarter Credit Hours: 1 | Prerequisite: IT403

#### IT404M2: Security Testing Techniques

Investigate security testing techniques for cloud-based systems. Quarter Credit Hours: 1 | Prerequisite: IT403

## IT404M3: Testing Procedures for Cloud-Based Applications

Explain the differences in testing cloud-based applications as compared to traditional software applications.

Quarter Credit Hours: 1 | Prerequisite: IT403

#### **IT404M4: Security Testing for Cloud Applications** Perform security testing on cloud applications.

Quarter Credit Hours: 1 | Prerequisite: IT403

## IT404M5: Legal and Risk Assessment of the Cloud Infrastructure

Explain the various legal requirements and unique risks associated with the cloud environment.

Quarter Credit Hours: 1 | Prerequisite: IT403

## IT404M6: eDiscovery in the Cloud

Investigate the requirements to build and implement the physical cloud infrastructure.

Quarter Credit Hours: 1 | Prerequisite: IT403

## IT410: Certified Information Systems Security Professional III

This course primarily addresses two domains in the Certified Information Systems Security Professional (CISSP) Common Body of Knowledge (CBK). Domain 6 is about Security Assessment and Testing; Domain 7 is Security Operations. The security assessment and testing domain explores vulnerability assessments and secure software testing strategies. The domain of security operations details how to manage change and respond to incidents. There will also be a discussion of two important topics from Domain 1 Security and Risk Management that were not addressed in CISSP I. These topics are professional ethics and legal and regulatory issues. This course is designed, among other things, to provide you with the foundational knowledge necessary to pursue CISSP certification. While the course may provide you with the knowledge necessary to sit for the examination, the University cannot guarantee your eligibility either to take this exam or become certified. Quarter Credit Hours: 6 | Prerequisite: None

#### IT410M1: Assessment and Test Strategies

Discriminate assessment and test strategies. Quarter Credit Hours: 1 | Prerequisite: None

#### IT410M2: Security Control Testing

Analyze security control testing. Quarter Credit Hours: 1 | Prerequisite: None

#### IT410M3: Security Operations Concepts

Examine foundational security operations concepts. Quarter Credit Hours: 1 | Prerequisite: None

## IT410M4: Incident Prevention and Response Strategies

Determine incident prevention and response strategies. Quarter Credit Hours: 1 | Prerequisite: None

#### IT410M5: Disaster Recovery Planning and Physical Security

Generalize key issues related to disaster recovery planning and physical security.

Quarter Credit Hours: 1 | Prerequisite: None

## **IT410M6: Legal Issues and Professional Ethics in Information Security** Distinguish legal issues and professional ethics in information security. Quarter Credit Hours: 1 | Prerequisite: None



This course is designed so that you will be able to perform the computer forensic role as part of an incident response team. In this course, you will learn about computer forensics and techniques used to perform computer forensics examinations. You will learn how to gather and protect evidence used in prosecuting computer crimes. Topics in this course include acquiring digital evidence, bookmarking data, file signature analysis, hash analysis, and other forensic techniques. Quarter Credit Hours: 6 | Prerequisite: IT286

## IT411M1: Digital Forensic Concepts and Techniques

Examine digital forensic concepts and techniques. Quarter Credit Hours: 1 | Prerequisite: IT286

## IT411M2: Securing Digital Evidence

Plan appropriate methods to secure digital evidence. Quarter Credit Hours: 1 | Prerequisite: IT286

#### IT411M3: Examining Forensic Data

Apply various types of forensic analysis tools for data recovery to forensic scenarios.

Quarter Credit Hours: 1 | Prerequisite: IT286

## IT411M4: Audits and Investigations

Prepare audits and investigations of electronic computing devices. Quarter Credit Hours: 1 | Prerequisite: IT286

## IT411M5: Analyzing System Files and Artifacts

Analyze forensic data from computers to investigate security breaches. Quarter Credit Hours: 1 | Prerequisite: IT286

## IT411M6: Current Practices and Trends

Investigate current practices and trends in digital and network forensics. Quarter Credit Hours: 1 | Prerequisite: IT286

#### IT413: Migrating Data and Applications to the Cloud

You will analyze various scenarios regarding data/database and application migrations to a cloud environment. Lab environments provide hands-on experience related to migration scenarios. Quarter Credit Hours: 6 | Prerequisite: None

**IT413M1: Application and Data Migration in the Cloud** Explore cloud architecture as it relates to application and data migration. Quarter Credit Hours: 1 | Prerequisite: None

## IT413M2: Application and Data Migration Strategies

Explore data and application migration strategies and practices for onpremise systems to the cloud.

Quarter Credit Hours: 1 | Prerequisite: None

## IT413M3: Cloud Migration Concepts

Apply migration strategies for moving data to the cloud. Quarter Credit Hours: 1 | Prerequisite: None

## IT413M4: Migration Procedures

Explain the procedure and processes for migrating data and applications to the cloud.

Quarter Credit Hours: 1 | Prerequisite: None

## IT413M5: Business Requirements for Migrations

Synthesize business requirements as they relate to migrating a system(s) to the cloud.

Quarter Credit Hours: 1 | Prerequisite: None

## IT413M6: Recommended Cloud Migration Strategies

Recommend a migration strategy for a cloud-based system(s). Quarter Credit Hours: 1 | Prerequisite: None

## IT414: Software Development Operations in Cloud Environments

You will examine the software development life cycle (SDLC) and development operations in a cloud. This includes the ability to implement and manage continuous delivery systems and methodologies. Quarter Credit Hours: 6 | Prerequisite: None

#### IT414M1: Cloud Architecture and Software Development

Review cloud architecture as it relates to software development. Quarter Credit Hours: 1 | Prerequisite: None

## IT414M2: Development Operations

Explore development operations for software development. Quarter Credit Hours: 1 | Prerequisite: None

## IT414M3: Continuous Delivery Concepts

Analyze continuous delivery as it relates to software development in the cloud.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT414M4: Managing Software Development in the Cloud

Explain the differences and similarities when managing cloud-based software development products and/or services compared to on-premise software development products and/or services. Quarter Credit Hours: 1 | Prerequisite: None

## IT414M5: Software Development Operations

Synthesize software development operations based on different types of cloud products and/or services.

Quarter Credit Hours: 1 | Prerequisite: None

## IT414M6: Business Practices for Cloud-Based Software Development

Recommend business practices for cloud-based software development operations.

Quarter Credit Hours: 1 | Prerequisite: None

#### IT441: Directed Studies, School of Information Technology

In this course, students in the School of Information Technology will engage in an independent, directed-study project focused on a studentsubmitted topic of inquiry. The student will select a topic of inquiry that is of interest and relevant to his or her professional goals. Quarter Credit Hours: 1 | Prerequisite: CM220; upper-level students only

#### IT442: Directed Studies, School of Information Technology

In this course, students in the School of Information Technology will engage in an independent, directed-study project focused on a studentsubmitted topic of inquiry. The student will select a topic of inquiry that is of interest and relevant to his or her professional goals. Quarter Credit Hours: 2 | Prerequisite: CM220; upper-level students only

## IT443: Directed Studies, School of Information Technology

In this course, students in the School of Information Technology will engage in an independent, directed-study project focused on a studentsubmitted topic of inquiry. The student will select a topic of inquiry that is of interest and relevant to his or her professional goals. Quarter Credit Hours: 3 | Prerequisite: CM220; upper-level students only

## IT444: Directed Studies, School of Information Technology

In this course, students in the School of Information Technology will engage in an independent, directed-study project focused on a studentsubmitted topic of inquiry. The student will select a topic of inquiry that is of interest and relevant to his or her professional goals.

Quarter Credit Hours: 4 | Prerequisite: CM220; upper-level students only





## IT445: Directed Studies, School of Information Technology

In this course, students in the School of Information Technology will engage in an independent, directed-study project focused on a studentsubmitted topic of inquiry. The student will select a topic of inquiry that is of interest and relevant to his or her professional goals.

Quarter Credit Hours: 5 | Prerequisite: CM220; upper-level students only

## IT446: Directed Studies, School of Information Technology

In this course, students in the School of Information Technology will engage in an independent, directed-study project focused on a studentsubmitted topic of inquiry. The student will select a topic of inquiry that is of interest and relevant to his or her professional goals.

Quarter Credit Hours: 6 | Prerequisite: CM220; upper-level students only

#### IT460: Systems Analysis and Design

This course provides an overview of the system development life cycle (SDLC), including the modification and design process. You will learn to choose a system development methodology and evaluate the impact on the organization's strategic plan. It emphasizes the factors for effective communication with users and team members and all those associated with development and maintenance of the system.

Quarter Credit Hours: 6 | Prerequisite: 300-level or above IT course; upperlevel students only

#### IT460M1: Information Systems Concepts

Compare various types of information systems.

Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upperlevel students only

#### IT460M2: Developing Logical Systems Models

Analyze user needs to develop a requirements document including a feasibility study.

Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upperlevel students only

#### IT460M3: Object Modeling

Create logical models that describe system processes.

Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upperlevel students only

#### IT460M4: Development Strategies

Develop information systems by converting design specifications into data structures.

Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upperlevel students only

## IT460M5: Systems Architecture

Assess system implementation methods.

Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upperlevel students only

## IT460M6: Systems Performance Evaluation

Evaluate system performance to support data-driven decision making and continuous process improvement.

Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upperlevel students only

## IT469: Bachelor's-Level Cloud Computing and Solutions Internship

This course is taken at the conclusion of the cloud computing and solutions degree program and incorporates practical job experience with the skills and knowledge gained from prior coursework. You will work with instructors and other students on real-world projects that may include, but are not limited to the creation of cloud solutions, developing secure cloud information systems, evaluating trends associated with cloud computing, and recognizing ethical considerations in the IT field. This course will enable you and your team members to practice your problem-solving talents. Along with timelines and project plans, your team will consider other business constraints. As is a requirement for most information technology projects, each cloud computing project may include evaluation mechanisms, hands-on demonstrations, examples for stakeholders, and a final rollup of future project improvements. Internships must be preapproved by the Dean before the start of the term. Students who fail this course on the first attempt may not reenroll in this course without the Dean's approval.

Quarter Credit Hours: 6 | Prerequisite: Last term or permission from the Dean

#### IT473: Bachelor's Capstone in Cloud Computing and Solutions

The Bachelor's Capstone in Cloud Computing and Solutions builds on the concepts of all information technology and cloud computing courses you have taken as a part of your degree plan. The capstone project integrates problem-solving techniques and the development and implementation of viable, student-developed solutions to meet an identified technology or design need in a business or institutional environment. You will demonstrate mastery of cloud computing and solutions by completing a course-long project.

Quarter Credit Hours: 6 | Prerequisite: Last term or permission from the Program Chair

#### IT479: Bachelor's-Level Cybersecurity Internship

This course is taken at the conclusion of the cybersecurity degree and incorporates practical job experience with the skills and knowledge gained from prior coursework. You will work with instructors and other students on real-world projects that may include security system design, forensic analysis, or recommendations for an organization's security infrastructure. This course will enable you and your team members to practice your problem-solving talents. Along with timelines and project plans, your team will consider other business constraints. As is a requirement for most information technology projects, each security project may include evaluation mechanisms, hands-on demonstrations, examples for stakeholders, and a final roll-up of future project improvements. Internships must be preapproved by the Dean prior to the start of the term. Students who fail this course on the first attempt may not reenroll in this course without the Dean's approval. Quarter Credit Hours: 6 | Prerequisite: Last term or permission from the Dean

#### IT481: Advanced Software Development

This course addresses advanced software design and development concepts, offering you a choice of implementations demonstrating how the concepts apply across a variety of languages. You will apply analysis and benchmarking, database creation and usage, data in motion and data at rest security, threading, reentrancy, and advanced testing concepts. You will also learn how to package software for distribution. Quarter Credit Hours: 6 | Prerequisite: IT350 and IT391

IT481M1: Distributed and Collaborative Development Concepts

Describe distributed and collaborative development concepts. Quarter Credit Hours: 1 | Prerequisite: IT350 and IT391

## IT481M2: Database Schema Implementation

Implement a database schema with security and optimization. Quarter Credit Hours: 1 | Prerequisite: IT350 and IT391

IT481M3: System Testing and Quality Assurance Plan system testing and quality assurance activities. Quarter Credit Hours: 1 | Prerequisite: IT350 and IT391

## IT481M4: Algorithms for Analysis and Optimization

Implement algorithms that allow analysis and optimization. Quarter Credit Hours: 1 | Prerequisite: IT350 and IT391

## IT481M5: Software Development Best Practices

Integrate the best practices of software development. Quarter Credit Hours: 1 | Prerequisite: IT350 and IT391

## IT481M6: Software Distribution

Prepare software for distribution. Quarter Credit Hours: 1 | Prerequisite: IT350 and IT391

## IT484: Oppersecurity Policies

This course teaches you how to defend organizational resources by implementing and maintaining cybersecurity policies. Cybersecurity policies are used to support defense of data availability, integrity, and confidentiality. By establishing and applying effective security policies, organizations can keep valuable data safe. Topics include applying cybersecurity policies to access controls, cybersecurity operations and administration, risk analysis, incident response, and recovery. This course also teaches you cybersecurity policies for securing publicly available resources and web applications.

Quarter Credit Hours: 6 | Prerequisite: None

## IT484M1: Access Controls and Security Technologies

Evaluate access controls and security technologies supported by cybersecurity policies used to protect network resources and ensure data availability.

Quarter Credit Hours: 1 | Prerequisite: None

## IT484M2: Security Operations and Administration Procedures

Create security operations and administration procedures related to data privacy and cybersecurity policy.

Quarter Credit Hours: 1 | Prerequisite: None

## IT484M3: Risk Management and Compliance

Evaluate risk management and compliance in regard to cybersecurity policy and industry standards.

Quarter Credit Hours: 1 | Prerequisite: None

## IT484M4: Incident Response Planning

Create an incident response plan, integrated with cybersecurity policy, which assists with organizational recovery. Quarter Credit Hours: 1 | Prerequisite: None

## IT484M5: Protecting Private Information

Evaluate cryptology, network, and communications technology used to protect private information from public disclosure and supported by cybersecurity policies.

Quarter Credit Hours: 1 | Prerequisite: None

## IT484M6: Organizational System and Application Security Procedures

Evaluate organizational system and application security procedures related to cybersecurity policies and industry standards. Quarter Credit Hours: 1 | Prerequisite: None

## IT488: Software Product Development Using Agile

This project-based course concludes the multiplatform software development series of courses and allows you to apply your learning to the development of a software product in an agile team software development environment. You will explore the concepts of agile development and then implement those concepts as you work on an agile development team, designing and developing a software product using an agile software development life cycle, from concept to packaged product. Quarter Credit Hours: 6 | Prerequisite: IT350 and one of the following: IN450, IN451, IN452, IN453, or IT481

#### IT488M1: Software Development Using Agile Development Practices Determine agile development practices.

Quarter Credit Hours: 1 | Prerequisite: IT350 and one of the following: IN450, IN451, IN452, IN453, or IT481

# IT488M2: Software Development Using Agile Project Development and Communication

Engage in agile project teamwork and communication. Quarter Credit Hours: 1 | Prerequisite: IT350 and one of the following: IN450, IN451, IN452, IN453, or IT481

## IT488M3: Continuous Integration Environment

Demonstrate software development skills in a continuous integration environment.

Quarter Credit Hours: 1 | Prerequisite: IT350 and one of the following: IN450, IN451, IN452, IN453, or IT481

## IT488M4: Integration and System Testing

Apply integration and system testing skills in an agile environment. Quarter Credit Hours: 1 | Prerequisite: IT350 and one of the following: IN450, IN451, IN452, IN453, or IT481

#### IT488M5: Software Application Creation

Create a software application from a concept to a finished product. Quarter Credit Hours: 1 | Prerequisite: IT350 and one of the following: IN450, IN451, IN452, IN453, or IT481

#### IT488M6: Software Project Release Packaging

Create a distribution package of software product for release to the enduser market.

Quarter Credit Hours: 1 | Prerequisite: IT350 and one of the following: IN450, IN451, IN452, IN453, or IT481

#### IT489: Bachelor's-Level Information Technology Internship

This course gives you practical job experience in the information technology field. The internship provides you with an opportunity to learn about the IT career field through practical, real-world experiences and mentoring from an IT professional. This experience will enrich your technology skills and provide a better understanding of the level of expertise needed to be successful in your career. Internships must be preapproved by the Dean prior to the start of the term. Students who fail this course on the first attempt may not reenroll in this course without the Dean's approval.

Quarter Credit Hours: 6 | Prerequisite: Last term or permission from the Dean





#### IT497: Bachelor's Capstone in Cybersecurity

The Bachelor's Capstone in Cybersecurity is designed to build on the concepts of all information technology and security courses you have taken as a part of your degree plan. The capstone project integrates problem-solving techniques and the development and implementation of viable, student-developed solutions to meet an identified technology or design need in a business or institutional environment. You will be directed to work collaboratively to achieve the learning objectives for this course.

Quarter Credit Hours: 6 | Prerequisite: Last term or permission from the Program Chair

#### IT499: Bachelor's Capstone in Information Technology

The Bachelor's Capstone in Information Technology is designed to build on the concepts of all information technology courses you have taken as a part of your degree plan. The capstone project integrates problemsolving techniques and the development and implementation of viable, student-developed solutions to meet an identified technology or design need in a business or institutional environment.

Quarter Credit Hours: 6 | Prerequisite: Last term or permission from the Program Chair