INFORMATION SYSTEMS AND TECHNOLOGY (IN/IT)

IN150: Foundations for Success in Information Technology (IT) Careers
In this course, you will develop foundational skills for professional success in information technology (IT) careers. You will explore career resources and opportunities within IT and related fields and practice using various software applications and IT tools. You will apply professional writing and presentation skills and demonstrate awareness of social responsibility and ethical decision-making in a global context. You will identify a potential career path and determine skill sets to develop.
Quarter Credit Hours: 5 | Prerequisite: None

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: Routing 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, open-source 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 Google 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

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 develop a complete, modest-scope 2D or 3D video game of your own design using the Unity game engine and C#. Building on prior game design experience, the course emphasizes scalable game project architecture, data-driven gameplay systems, and professional production workflows from prototype through final build. You will implement gameplay features, enemy behavior, user interface systems, and saved game states while extending your project incrementally each week. The course also introduces the responsible use of AI-assisted programming tools as part of a modern game development workflow.
Quarter Credit Hours: 5 | Prerequisite: IN240

IN241M1: Game Programming Planning and Documentation
Organize scripts, scenes, assets, and workflows to support a scalable and maintainable video game project.
Quarter Credit Hours: 1 | Prerequisite: IN240

IN241M2: Audio, Visual, and Art
Collaborate with AI-assisted programming tools to correctly and ethically augment video game development.
Quarter Credit Hours: 1 | Prerequisite: IN240

IN241M3: Programming Events
Implement user interface systems that respond to game state and guide and inform video game players.
Quarter Credit Hours: 1 | Prerequisite: IN240

IN241M4: Gameplay Programming and Optimizations
Implement core gameplay systems (movement, collision, physics) using event-driven C# coding to create interactive game experiences.
Quarter Credit Hours: 1 | Prerequisite: IN240

IN241M5: Game Deployment and Support
Develop a complete, modest-scope video game using an industry-standard game engine.
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

IN245: Introduction to Artificial Intelligence and Its Impact
This course offers a broad, accessible exploration of Artificial Intelligence, demystifying its core concepts and examining its pervasive influence on our world. You will trace the historical development of AI, delve into its major subfields like machine learning and natural language processing, and analyze its diverse applications across industries. A significant focus will be placed on the ethical dilemmas and societal transformations brought about by AI, encouraging you to critically evaluate its opportunities and challenges for the future. No prior technical background is required.
Quarter Credit Hours: 5 | Prerequisite: None

IN246: The Human Side of Artificial Intelligence: Understanding Interaction and Design
This course explores the critical intersection of artificial intelligence and human experience. You will investigate how humans interact with AI systems, focusing on the psychological, social, and design principles that underpin effective and ethical AI interactions. Topics will include user interface design for AI, building trust and transparency in AI systems, the role of natural language in human-AI communication, and the broader impact of AI on social dynamics. You will learn to critically analyze and design AI interactions with a human-centered approach.
Quarter Credit Hours: 5 | Prerequisite: None

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, IN253, or IT213

IN254M1: Software Process Models With Python
Explore various software process models.
Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

IN254M5: Object-Oriented Programming Concepts with Python
Examine object-oriented programming concepts.
Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, IN253, or IT213

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, IN253, or IT213

IN255M1: Software Process Models With C#
Explore various software process models.
Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

IN255M5: Object-Oriented Programming Concepts With C#
Examine object-oriented programming concepts.
Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, IN253, or IT213

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, IN253, or IT213

IN256M1: Software Process Models With Java
Explore advanced array concepts.
Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

IN256M5: Object-Oriented Programming Concepts With Java
Examine object-oriented programming concepts.
Quarter Credit Hours: 1 | Prerequisite: One of the following: IN250, IN251, IN252, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

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, IN253, or IT213

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

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

IN305: Artificial Intelligence, Society, and the Future of Work
This course examines the profound societal and economic transformations driven by the advancement of Artificial Intelligence. You will critically analyze the impact of AI on the labor market, exploring potential job displacement and the creation of new opportunities. The course will also delve into issues of inequality, governance, creativity, and the philosophical questions raised by increasingly intelligent machines. You will develop a nuanced understanding of the complex interplay between AI and the fabric of human society, fostering informed perspectives on the future.
Quarter Credit Hours: 5 | Prerequisite: None

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)

IN315: Computer Architecture
This course is designed to provide you with a deep understanding of the fundamental concepts and principles underlying the structure of modern computer systems. Topics include understanding the operation of transistors and logic gates to instruction sets and memory hierarchies. Additionally, the course examines compiler optimizations, memory management techniques, and instruction set design principles by understanding the use of assembler and machine language, and the related binary and hexadecimal math concepts.
Quarter Credit Hours: 6 | Prerequisite: IT310

IN317: Compilers
In this course, you can expect to gain a thorough understanding of the theory and practice of compiler construction. You must have a solid background in programming languages and algorithms before taking it. The course will provide a strong foundation in compiler construction, preparing you for careers in software development, compiler construction, or related fields.
Quarter Credit Hours: 6 | Prerequisite: IN315

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 queues.
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 Using Java
This course focuses on advanced design and programming concepts and techniques, and the application of advanced concepts in Java. You will develop advanced software and web 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, such as 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: Development and Cross-Compiling
Design interactive web 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 queues.
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

IN403M5: Deep Learning Application
Develop a deep learning project.
Quarter Credit Hours: 1 | Prerequisite: None

IN403M6: AI System Risks and Controls
Examine risks and controls in deployed AI systems.
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

IT163M2: Relational Databases
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

IT200: Software Engineering
You will experience a comprehensive understanding of the principles, methods, and tools, including hardware, used in software development. Explore the software development lifecycle (SDLC), design patterns, algorithms, data structures, and object-oriented programming, gaining experience through hands-on projects as you build real-world applications.
Quarter Credit Hours: 5 | Prerequisite: IN256

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
In this 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), JavaScript navigation bars, multimedia, website page layouts, search engine optimization, and web security. You will create an individual portfolio to share 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 | Prerequisite: 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. You will leverage generative artificial intelligence (GenAI) applications to aid in relational database design and utilization activities.
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: Web Programming with JavaScript and PHP
In this course, you will learn how to use HTML, JavaScript, and PHP to build an interactive web game. You will start by planning and designing the game interface and creating the necessary objects and graphics. Using JavaScript, you will implement front-end features, while PHP will handle back-end functionalities. You will also explore how JavaScript and PHP can interact to create a seamless, browser-based application. By the end, you will have the skills to develop a complete and dynamic web game.
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: Networking 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

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: IT Integrative Project
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: AASIT students: Last term or permission from the Dean; BSIT students: Completion of 70 quarter credit hours

IT301: Project Management I
This course will introduce you to global project management concepts used by teams across all industries, such as Agile development, project charters, and stakeholder management. You will explore foundational project management principles and performance domains while learning how to plan, manage, and deliver project work effectively. Emphasis will be placed on engaging stakeholders, collaborating with teams, and applying project approaches that reflect real-world, cross-industry practices.
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 industry.
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; upper-level 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; upper-level 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; upper-level 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; upper-level 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; upper-level students only

IT302M5: Haptics
Assess the future of haptics in interface design.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level students only

IT302M6: Interface Design
Design a user interface with appropriate professional tools.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level 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 cloud-based 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

IT310: Data Structures and Algorithms
In this course you will have the opportunity to develop a deep understanding of the fundamental concepts and principles underlying modern algorithms and data structures used in computer science. Topics include organizing and manipulating data effectively by designing solutions that tackle complex problems. You will study containers such as arrays, lists, stacks, queues, trees, and graphs, and then explore techniques such as sorting, searching, graph algorithms, recursion, and other techniques that use those containers.
Quarter Credit Hours: 6 | Prerequisite: IN256 and IT234

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

IT320: Operating Systems
This course helps you develop a deep understanding of the fundamental concepts and principles underlying modern operating systems. You should have a background in computer architecture and programming before taking this course. This course prepares you for careers in software development, systems programming, and related fields.
Quarter Credit Hours: 6 | Prerequisite: IT310

IT321: Artificial Intelligence Fundamentals and Python for Data
This foundational course introduces the core concepts behind artificial intelligence (AI), machine learning, and data science. You will learn the essential Python programming skills necessary for working with data, including data manipulation, basic statistics, and visualization using popular libraries. The course emphasizes practical application through hands-on coding exercises, preparing you to confidently handle data as a prerequisite for more advanced AI topics. By the end, you will have a solid understanding of how data forms the backbone of AI and will possess foundational programming skills.
Quarter Credit Hours: 6 | 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; upper-level 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; upper-level 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; upper-level 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; upper-level students only

IT331M4: Wide Area Network Technologies
Evaluate Wide Area Network (WAN) technologies.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level 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; upper-level students only

IT331M6: Network Security Design
Formulate a network security design.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level 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: Information Systems and Architecture
Explain the fundamental concepts of information systems and architecture principles.
Quarter Credit Hours: 1 | Prerequisite: None

IT332M2: The Computer as a System
Analyze system components, devices, and operating systems.
Quarter Credit Hours: 1 | Prerequisite: None

IT332M3: Information System Technologies
Assess data communication and networking technologies.
Quarter Credit Hours: 1 | Prerequisite: None

IT332M4: Information System Methodologies and Frameworks
Evaluate current systems architecture methodologies and modern frameworks.
Quarter Credit Hours: 1 | Prerequisite: None

IT332M5: Big Data and Analytics
Evaluate big data and analytics in an information system.
Quarter Credit Hours: 1 | Prerequisite: None

IT332M6: Future and Emerging Technologies
Examine future and emerging artificial intelligence-enabled systems in information systems architecture.
Quarter Credit Hours: 1 | Prerequisite: None

IT333: Emerging Technologies and the Future
Emerging technologies are transforming industries, reshaping business operations, and driving innovation. This course explores key technological advancements, including artificial intelligence (AI), machine learning, cloud computing, the internet of things (IoT), blockchain, and robotics, and their impact on business strategy and industry transformation. You will examine how these technologies create opportunities, introduce challenges, and influence privacy, security, and ethical decision-making. Through case studies, discussions, and active learning projects, you will develop a practical understanding of how businesses can adapt and thrive in an era of rapid technological change.
Quarter Credit Hours: 3 | Prerequisite: None

IT341: Core Machine Learning Algorithms
Building upon foundational Python and data skills, this course dives into the core algorithms that power modern machine learning. You will explore supervised learning techniques (regression and classification) and unsupervised learning (clustering). Through practical implementation in Python using libraries, you will learn how to train models, evaluate their performance, and understand the trade-offs involved in different algorithms. The focus is on understanding the "how" and "why" behind model selection and tuning.
Quarter Credit Hours: 6 | Prerequisite: IT321

IT350: 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 a Microsoft SQL Server database for displaying organized information to users. You will explore the various fundamental features of the T-SQL language, such as data types, sets, and built-in 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 Microsoft Report Builder to generate analytical reports from your data; and examine the use of non-SQL relational databases. You will also leverage generative artificial intelligence (GenAI) applications to aid in relational database design and utilization activities.
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: 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 introduces the fundamentals of IT consulting and its impact on organizational success. You will explore the value consultants bring to businesses, analyze the client-consultant relationship, identify opportunities and issues, and develop solutions that align with client goals. Project planning, ethical decision-making, and leadership strategies will be examined. Through case studies, you will prepare a project proposal and a persuasive presentation for a client.
Quarter Credit Hours: 6 | Prerequisite: 200-level or above IT course; upper-level students only

IT402M1: Consulting Role and Value
Describe the role of IT consulting and its value to clients.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level students only

IT402M2: Proposal Management
Create a project proposal that addresses client needs.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level students only

IT402M3: Project Analysis
Analyze client capabilities and business opportunities.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level students only

IT402M4: Client and Team Management
Manage client relationships and teams to ensure project success.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level students only

IT402M5: Project Organization
Organize project tasks to meet objectives.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level students only

IT402M6: Findings and Recommendations
Communicate consulting findings and recommendations to the client.
Quarter Credit Hours: 1 | Prerequisite: 200-level or above IT course; upper-level 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

IT411: Digital Forensics
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 on-premise 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

IT421: AI-Powered Cybersecurity: Tools and Techniques
This course covers the basic concepts of artificial intelligence (AI) and machine learning (ML), including their principles, techniques, and tools, with an emphasis on their applications in cybersecurity. The course also highlights the principles and practices of conducting security assessments and evaluations leveraging AI, methodologies for assessing organizations, evaluating vulnerabilities, implementing measures to mitigate identified risks, and applying AI to strengthen defensive cybersecurity measures using AI-driven tools and techniques to defend against AI-specific cyberattacks.
Quarter Credit Hours: 5 | Prerequisite: None

IT440: Neural Networks and Deep Learning Foundations
This course introduces the exciting field of deep learning, starting with the fundamental building blocks of neural networks. You will learn the architecture of artificial neural networks, including concepts like activation functions, forward propagation, and backpropagation. You will design, train, and evaluate various types of neural networks, exploring their application to classification and regression tasks. The course emphasizes practical implementation and understanding the underlying mechanics of deep learning.
Quarter Credit Hours: 6 | Prerequisite: IT341

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 student-submitted 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 student-submitted 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 student-submitted 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 student-submitted 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 student-submitted 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 student-submitted 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

IT451: Specialized Deep Learning and Applied Artificial Intelligence Systems
This advanced course delves into specialized deep learning architectures crucial for handling complex data types and real-world artificial intelligence (AI) applications. You will explore Convolutional Neural Networks (CNNs) for image processing and Recurrent Neural Networks (RNNs) for sequential data like text. The course also covers transfer learning and introduces concepts for deploying AI models into practical systems. By the end, you will be equipped to build and integrate advanced AI solutions for computer vision and natural language processing tasks.
Quarter Credit Hours: 6 | Prerequisite: IT440

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; upper-level students only

IT460M1: Information Systems Concepts
Compare various types of information systems.
Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upper-level 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; upper-level students only

IT460M3: Object Modeling
Create logical models that describe system processes.
Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upper-level 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; upper-level students only

IT460M5: Systems Architecture
Assess system implementation methods.
Quarter Credit Hours: 1 | Prerequisite: 300-level or above IT course; upper-level 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; upper-level 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: Cybersecurity 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 end-user 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 builds on the knowledge and skills developed throughout the Information Technology degree program. In this course, you will apply technical, analytical, and problem-solving competencies to design, develop, and implement a viable, student-created solution that addresses a clearly defined technology or design need within a business or institutional environment. The capstone project is designed to be completed in a collaborative team setting, reflecting real-world professional practice and emphasizing teamwork, communication, and shared responsibility. In extraordinary circumstances, and with instructor approval, the project may be completed individually while still meeting all academic and technical requirements of the course.
Quarter Credit Hours: 6 | Prerequisite: Last term or permission from the Program Chair