SCHOOL OF INFORMATION TECHNOLOGY

The Monroe University School of Information Technology prepares students for careers as competent technology professionals by using a challenging curriculum, state-of-the-art technological resources and real-world experience in the classroom. The School offers undergraduate programs in Computer information Systems (CIS) and Computer Networks and Cybersecurity (CNC), graduate programs in Computer Science (CS) and Data Science (DS), and an advanced certificate in Data Science.

Programs

- Computer Information Systems, AS (https://catalog.monroeu.edu/catalog/schools-academic-programs/information-technology/computer-information-systems-as/)
- Computer Information Systems, BS (https://catalog.monroeu.edu/catalog/schools-academic-programs/information-technology/computer-information-systems-bs/)
- Computer Networks and Cybersecurity, BS (https://catalog.monroeu.edu/catalog/schools-academic-programs/information-technology/computer-networks-cybersecurity-bs/)
- Computer Science, MS (https://catalog.monroeu.edu/catalog/schools-academic-programs/information-technology/computer-science-ms/)
- Data Science, Advanced Certificate (https://catalog.monroeu.edu/catalog/schools-academic-programs/information-technology/data-science-advanced-certificate/)
- Data Science, MS (https://catalog.monroeu.edu/catalog/schools-academic-programs/information-technology/data-science-ms/)

Course Offerings

Undergraduate

IT – Information Technology

IT-100 - Introduction to Information Technology (3 cr)
This course is intended for students interested in pursuing a career in the field of Information Technology. Topics include an overview of the fundamentals of information technology, specializations and career paths, current and emerging technologies, business applications, communications and decision-making, and the impact of these systems on business, government, and society. This course also emphasizes the development of both writing and speaking skills. MS Windows and other popular software packages for word processing, spreadsheet development, presentations, and Internet concepts are also introduced.

IT-127 - Computer Hardware and Software (3 cr)
This course is intended for students interested in pursuing a career in the field of Information Technology. This course teaches students to become proficient in the inner workings of a microcomputer. It is a hands-on class that covers the replacement of all parts inside the PC. Students also learn about electricity, formatting hard drives, device drivers, as well as how software works with hardware. Topics include the fundamental concepts of operating systems, installation, configuration and upgrading of operating systems, diagnosing and troubleshooting operating systems, basic concepts of networking and Internet connectivity troubleshooting. Current and emerging operating system technologies will be identified and contrasted. This course will emphasize the development of analytical and problem-solving skills through the application of the concepts that define the course in hands on lab exercises. The class features lectures as well as hands-on exercises that allow students to disassemble and reassemble microcomputers. This course prepares students for the A+ Examination.
Prerequisite: IT-100 or IT-118

IT-130 - Database (3 cr)
Students learn the fundamental concepts of database management systems, relational database model, types of relationships, dependencies, and normalization of database. Students learn Structured Query Language (SQL) to create, maintain, update and query databases, and to enforce constraints. Industry standard Windows-based database management software is used to create databases, forms, queries, and reports. Through hands-on experience, students gain proficiency in the design, creation, and function of tables, data entry forms, and reports.
Prerequisite: IT-100 or IT-118

IT-135 - CCNA I: Introduction to Networks (3 cr)
Introduction to Networking is the recommended training for individuals seeking an understanding and knowledge of networking fundamentals including the Open Systems Interconnect (OSI) seven-layer model concepts; Networking protocols; Networking architecture; terminology and technologies and obtain the skills necessary for the configuration of Cisco routers and switches connected in local-area networks (LANs) and wide-area networks (WANs) typically found at small to medium network sites. It is a part of the recommended training for individuals seeking certifications as a Cisco Certified Network Associate (CCNA).
Prerequisite: IT-100 or IT-118

IT-150 - Web Design Technology (3 cr)
This course introduces the student to Web page design. Careful planning is emphasized as the key to a successful Web site. Hypertext Markup Language (HTML) is introduced and students will create, format, and refine Web pages to include text, images, hyperlink, lists, tables, frames, and forms using an HTML editor. Students are also introduced to Cascading Style Sheets (CSS).
Prerequisite: IT-100 or IT-118

IT-160 - Programming Logic (3 cr)
This course teaches students to apply top-down modular programming techniques for the designing and writing of computer solutions to common problems found in mathematics, science, and business. The C++ language is used to test and evaluate these techniques. Some of the concepts covered in the course include interactive programming on the microcomputer, arithmetic operations, logical operations, selection and looping, functions, and arrays.
Prerequisite: IT-100 or IT-118; and MA-115

IT-225 - Unix/Linux (3 cr)
This course is an introduction to the use and management of Unix-based computer systems. Students learn advanced user functions as well as UNIX system administration. Topics include establishing and maintaining security, file system management, shell scripts, control of networks, multi-user environments, and inter-process control.
Prerequisite: IT-100 or IT-118

IT-235 - CCNA II: Switching, Routing & Wireless Essentials (3 cr)
This course describes the architecture, components, and operations of routers and switches in a small-to-medium network. Students learn how to configure a router, switch and a wireless local area networks (WLAN) for basic functionality. By the end of this course, students will be able to configure and troubleshoot routers, switches and wireless resolve common issues with STP, DHCPv4, FHRPs, WLC, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks. This course is a part of the recommended training for individuals seeking certification as a Cisco Certified Network Associate (CCNA).
Prerequisite: IT-135

IT-250 - Advanced Web Design (3 cr)
This course demonstrates how scripting language can be used to convert static HTML pages into dynamic pages. Syntax of a scripting language is introduced and students learn to use an advanced tool to generate more concise and readable code. The topics include Document Object Model (DOM), working with element set, Event model, animations and effects, library functions, latest technology to communicate with the server, creating user interfaces with themes and effects, and working with UI widgets.
Prerequisite: IT-150

IT-260 - Advanced Programming (3 cr)
The purpose of this course is to study the fundamental concepts and techniques necessary to write high-quality programs, including basic and advanced concepts of object-oriented approach, modular design, inheritance, GUI objects, exception handling, files and streams, and class libraries. All of the mentioned concepts and techniques are studied using the C# programming language. C# as a language is elegant and powerful. But to utilize its capabilities fully, the students need to have a good understanding of how it works with the .NET Framework. This course explores several important interactions between C# and the .NET Framework using Microsoft Visual Studio as an Integrated Development Environment (IDE).
Prerequisite: IT-160

IT-275 - Networking in a Windows Environment (3 cr)
This course provides students with an advanced study of Networking as a doorway to Network Administration through the most popular Operating System. Students are provided with the hands-on skills needed to manage a network. This includes configuring, administering, and troubleshooting network resources. The course also provides the knowledge needed to prepare for Networking Certification Exams.
Prerequisite: IT-135

IT-280 - Object Oriented Programming (3 cr)
This course introduces core programming basics-including data types, control structures, algorithm development, and program design with functions-via the Python programming language. The course discusses the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques. Students will problem solve, explore real-world software development challenges, and create practical and contemporary applications using graphical user interfaces, graphics, and network communications.
Prerequisite: IT-160

IT-290 - Internship I (3 cr)
This course provides students with the opportunity to exercise their understanding of the academic field and to apply classroom theory in actual work settings in paid and non-paid supervised positions. This is a requirement and must be completed within the last two semesters of the program. Sophomore Standing.

IT-295 - Systems Analysis & Design (3 cr)
This comprehensive study of the five phases of System Development Life Cycle (SDLC) and the System Analysis Toolkit shows the importance of communications, economic analysis, and project planning skills with current technologies across all phases of the SDLC. Students gain an in-depth understanding of how Information Systems support business requirements in today's intensely competitive environment. Several real world projects are assigned to students on an individual basis and as a member of a systems development team, which allows students to apply their knowledge and skills to act as a System Analyst and develop an information system for problems that arise in typical business organizations.
Prerequisite: IT-130

IT-320 - Operating Systems (3 cr)
A course designed for students with primary knowledge of the working of operating systems. The topics include: various generations of operating systems, process and its transitions, concurrent processes and multiprogramming, deadlock, real storage, virtual and auxiliary storage, processor scheduling and operating system security. The management of the above mentioned resources by operating system are covered in detail. Various popular state-of-the-art operating systems are also discussed.
Prerequisite: IT-127

IT-330 - Database Management Systems (3 cr)
This course introduces the fundamental concepts of database management systems, with emphasis on the relational model, which is an increasingly important and widespread area in the computer field. Demonstrations and hands-on practice using ORACLE: SQL and PL/SQL reinforce the fundamental concepts.
Prerequisite: IT-130

IT-335 - CCNA III: Enterprise Network, Security and Automation (3 cr)
This course provides an understanding of Switching fundamentals, including a basic understanding of Cisco switches and an intermediate understanding of routers, terminology, and technologies. Students obtain the skills necessary for the configuration of Cisco switches and routers connected in local-area networks (LANs) and wide- area networks (WANs) typically found at small to medium network sites. It is part of the recommended training for those seeking certification as a Cisco Certified Network Associate (CCNA).
Prerequisite: IT-235

IT-360 - Java (3 cr)
An introduction to World Wide Web-focused application programming, using the Java language is presented. Students familiar with the format and syntax of C and/or C++ will develop both Java applets designed to be transported over the Internet and executed with Web browsers as well as stand-alone Java applications. Topics will begin with basic input/output operations, the primary control structures and logical/math operations and proceed to the creation and use of methods, classes, arrays, and abstract data types (ADTs) utilizing accepted practices and techniques of contemporary object-oriented programming.
Prerequisite: IT-260 or IT-280

IT-361 - Programming With Mobile Applications (3 cr)
This course introduces students to the various platforms in use on small and mobile devices. Platforms include Apple iPhone, Google Android OS, and Microsoft Windows Mobile. Students learn about the mobile application development cycle and learn to use different tools to create applications for each platform using specialized development environments. Students also develop web applications for mobile browsers and explore cross- platform development.
Prerequisite: IT-260 or IT-280

IT-362 - Mobile Application Development (3 cr)
This course provides the students with the foundation necessary to build mobile applications for various platforms such as Google Android OS, Apple IOS and Windows Mobile 7. Students learn to work in integrated development environments with cross-platform programming languages. This course also introduces key programming concepts, including variables, decision making, looping, lists, arrays and tables and teaches to incorporate audio, pictures, and animations to create state- of-the-art mobile applications for various platforms.

IT-368 - Web Scripting and Development (3 cr)
This course is intended for those who want to create interactive Web pages that provide customized data in response to visitor requests or collect data from site visitors. No prior experience with databases is required, but students must be familiar with general programming concepts, UNIX or Windows operating systems, and have a basic understanding of how to use the Internet. The course emphasizes the necessity of planning for multiple scenarios, encouraging the student to thoroughly prepare for the various options that Web page visitors might require in using a site.
Prerequisite: IT-250

IT-373 - Network Security (3 cr)
In this hands-on course, students gain the knowledge and skills necessary to assess and implement a total enterprise operating system security. Students learn to control the privacy, integrity and authenticity of data and resources from the file system to the network infrastructure. This course provides a firm background in the fundamentals of network security and prepares students for taking the CompTIA Security+ Exam Code SYO-601.
Prerequisite: IT-135

IT-376 - Wireless Technology (3 cr)
This is a comprehensive course that provides broad knowledge of Mobile Systems and Wireless products. This course is intended for students who want to learn how to evaluate, plan, design and implement a wireless network system. Cisco, Bluetooth, and WAP technologies, protocols, and applications are covered in depth. Radio frequencies, bandwidth requirements, security challenges, the IEEE 802.11 standard, Service Set Identifiers (SSID) and Media Access Control (MAC) Wired Equivalent Protocol (WEP) are also discussed.
Prerequisite: IT-235 or IT-275

IT-387 - Ethical Hacking (3 cr)
This course is an introduction to offensive security topic with emphasis on ethical hacking. This class immerses students into an interactive environment to learn the tools and techniques to scan, test, hack, and secure their own systems. Students are exposed to current techniques used by attackers and learn defensive strategies using both Windows and Linux Systems. The learning environment gives students knowledge and practical experience with the current essential security systems. Students are taught how perimeter defenses work, how intruders escalate privileges and the steps to secure a system. Students also learn about Intrusion Detection, Policy Creation, Social Engineering, DDoS Attacks, Buffer Overflows, and Virus Creation. Junior Standing.
Prerequisite: IT-373

IT-390 - Internship Seminar I (3 cr)
This elective course provides students with the opportunity to exercise their understanding of the academic field and to apply classroom theory in actual work settings in paid and non-paid supervised positions.
Designation: Field Experience

IT-391 - Internship Seminar II (3 cr)
This elective course provides students with the opportunity to exercise their understanding of the academic field and to apply classroom theory in actual work settings in paid and non-paid supervised positions. Junior Standing.
Prerequisite: IT-390

IT-395 - Corporate Internship in Information Technology (6 cr)
This course provides students with the opportunity to apply skills learned in the classroom within their discipline to a corporate experience. Students prepare for their professional career, gaining practical experience while being immersed in a corporate setting. Students are required to complete 320 hours at the corporate internship setting.

IT-396 - Management Information Systems (3 cr)
This course provides an understanding of MIS research and teaching, as well as practical experience designing and building real world systems. The fundamentals and importance of Information Systems in today's business environment are covered. The topics include computer and information systems (IS), software types, DBMS, telecommunications, systems analysis and design, software tools and engineering, design support systems, international information systems ethical and social issues. A case study on each topic is reviewed.
Prerequisite: IT-295

IT-425 - Virtual Desktop Infrastructure (3 cr)
This course is intended for students interested in pursuing a career in the field of Information Technology. Students learn to build virtual networks, implement high-availability clusters, enhance performance and security, and manage the virtual data center. Students build virtual desktop infrastructures using industry standard software tools. They also examine public and private cloud computing environments. Career specializations, career paths and business opportunities will be discussed upon successful completion of this course, student will have the requisite knowledge and skills required to take the VM Certification Exams.
Prerequisite: IT-373

IT-435 - Database Administration (3 cr)
This course introduces the students to administration of industry-standard database software and the role of a Database Administrator (DBA). Students are exposed to major topics such as installation and configuration of database software and its components; server and database maintenance; optimization and troubleshooting; backup and restore strategies; import and export of data; database security; managing users and roles, and their permissions; and implementation of high availability with mirroring. Students will attain DBA skills and will be in a better position to help solve complex business problems in their chosen careers.
Prerequisite: IT-330

IT-440 - Cloud Foundations (3 cr)
This course provides a comprehensive study of Cloud concepts and capabilities across the various Cloud service models including Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Identity as a Service (IDaaS). The course also covers data storage, collaboration, virtualization, security and disaster recovery aspects in the cloud. Students will also learn to design and code scalable applications using Cloud-based software applications on top of Cloud platforms such as Google, Amazon, Microsoft, SalesForce, etc.
Prerequisite: IT-235

IT-445 - CCNA Cyber Ops (3 cr)
Uncovering cybercrime, cyber espionage and other threats to the integrity of networks is an exciting new area that spans all industries. Learn the skills to qualify for exciting and growing opportunities in security operation centers as an analyst or incident responder. The course focuses on how to monitor, detect and respond to cybersecurity threats. Plus, covers cryptography, host-based security analysis, security monitoring, computer forensics, attack methods and incident reporting and handling. As they learn, students will prepare themselves for the exam to become Cisco Certified CyberOps Associate (Exam 200-201).
Prerequisite: IT-335

IT-450 - Data Science: Concepts and Programming (3 cr)
Data Science is the study that focuses on the creation of knowledge from data. This course will introduce the students to the fundamental tools of Data Science using a popular programming language. Students will learn about powerful ways to store, analyze, and manipulate data. Students will work on projects that explore the advanced data analysis techniques which will allow to understand how to import data, explore it, analyze it, learn from it, visualize it, and generate outcomes reports. The course covers variety of new Data Science techniques including Machine Learning, Natural Language Processing, Data Visualization, and Web Scraping. A general-purpose programming language like Python will be utilized.
Prerequisite: IT-280

IT-455 - Security Strategies in Windows Platforms and Applications (3 cr)
This course focuses on new risks, threats, and vulnerabilities associated with the Microsoft Windows operating system, placing a particular emphasis on Windows and Windows Server. The Course highlights how to use tools and techniques to decrease risks arising from vulnerabilities in Microsoft Windows operating systems and applications. It further ensures that students are educated on the latest Windows security strategies and techniques. The cybersecurity Cloud Labs provide fully immersive mock IT infrastructures with live virtual machines and real software, where students will learn and practice the foundational information security skills they will need to excel in their future careers. These hands-on virtual labs reproduce the complex challenges of the real world, without putting an institution's assets at risk. In essence, the Cloud Labs are essential tools for mastering key course concepts through hands-on training.
Prerequisite: IT-275

IT-477 - Network and Computer Forensics (3 cr)
This course is designed to provide students with an understanding of the overall investigative process of computer forensics as well as the tools and techniques used. Students are introduced to the steps necessary to detect intruders, discover damage, and identify the offending intruder. The documentation of an incident response plan will also be taught. This course provides students with the information and skills necessary to take the International Association of Computer Investigative Specialists (ACIS) certification exam.
Prerequisite: IT-373

IT-494 - IT Project Management (3 cr)
In this course, the relationship between information technology and the fundamental processes driving the business enterprise are evaluated. The course aims to reorient students from a "business as usual" approach to information systems toward an integrated, cross-functional reassessment of the critical processes of the firm. The role of information technology as both an objective of and a participant in effective change is emphasized in relation to crucial organizational, managerial, and cultural factors. Students work as members of project teams to analyze case studies of actual reengineering efforts and to participate in original prototype exercises.
Prerequisite: IT-396

IT-495 - Senior Seminar (3 cr)
Under the guidance of a faculty advisor, students in their final semester are required to utilize their full scope of training and academic abilities in the design and development of an individualized computer-based management information system intended for business use. The project entails system conceptualization, detailed documentation, design, writing and testing of student written software, hardware specifications, user training manuals and other support and background materials. Students also are required to "sell" the project results at a formal presentation to fellow seminar members and faculty Projects and teams are critiqued on the basis of content, approach, and degree of professionalism.
Prerequisite: IT-494

Graduate

CS - Computer and Data Science (Graduate)
CS-ELE - Computer Science Elective (3 cr)
Computer Science elective courses
Corequisite: Please Choose a Computer Science Elective

CS-610 - Computer Architecture (3 cr)

This course teaches students the fundamentals of computer architecture. The course covers the basic organizations of computer systems including number systems, computer logic, ARM architecture, RISC, bus designs, multimedia, performance, processor control, memory hierarchy, secondary storage, I/O, parallel processing, and multithreading. It also addresses a wide range of micro- architecture issues geared toward to improving processor performance.

CS-615 - Operating System Design (3 cr)

This course is an introduction to operating system (OS) and its functions regardless of the hardware that houses it. It is intended for students with a basic background in computing systems. The course presents the basic concepts of operating systems, and covers specific issues of storage, memory management, processor scheduling, process management, concurrent processes, device management, and networking functions of OS. Current operating systems such as Unix/Linux, Windows, and/or Android are explored through case studies.

CS-617 - Statistical Computing (3 cr)

A widely used programming language among statisticians and data miners for developing statistical software and data analysis will be introduced. The language will be utilized as a tool for statistical computing, genetics, graphics and data mining. The purpose of this course is to set a foundation for full exploitation and creative use of the statistical language for computing and graphics. In this course the students will learn how to use a language for statistical programming, computation, graphics, and modeling, write functions and statistical models for effective data analysis and apply it in their own research. The course covers theoretical concepts of descriptive statistics as well as practical topics in statistical computing which includes programming, reading data into a program, accessing packages, data exploration, graphics, organizing and commenting code. Topics in statistical data analysis and optimization using working examples are also included. An open source programming language and software environment for statistical computing and graphics like R will be used.

CS-620 - Software System Design (3 cr)

This course is a comprehensive, accessible, and concise introduction to core topics and methodologies of software development. The essential topics emphasized by IEEE Computer society-sponsored Software Engineering Body of Knowledge (SWEBOK) are included. Students are given an overview of programming concepts, system analysis and design, principles of software engineering, development and support processes, testing methodologies, and product management.

CS-625 - Object Oriented Software (3 cr)

This course is a conceptual and practical study of object-oriented programming. Students learn how to use data structures known as "objects" to implement object-oriented problem solving. Topics covered include functions, multi-dimension arrays, lists, classes, objects, methods, inheritance, polymorphism, exception handling, recursion, multithreading, and graphics. Object-oriented languages like C#, Java, or Python are used.

CS-628 - Data Science (3 cr)

Data Science is the study that focuses at the creation of knowledge from data. This course will introduce the students to the fundamental tools of Data Science using a popular programming language. Students will learn about powerful ways to store, analyze, and manipulate data. Corporations worldwide are using programming tools to gather insights from their data and gain a competitive advantage. Throughout the course the students will work on projects that explore the advanced data analysis techniques which will allow to understand how to import data, explore it, analyze it, learn from it, visualize it, and generate outcomes reports. The course covers variety of new Data Science techniques including Machine Learning, Natural Language Processing, Data Visualization, and Web Scraping. A general-purpose programming language that is appropriate for Data Science will be utilized.

CS-630 - Database Systems (3 cr)

This course introduces the fundamental concepts of database management systems, with emphasis on relational model. Students are exposed to database design topics such as data models, ER modeling, normalization of database tables, SDLC, performance and query optimization, distributed systems, web technology and database connectivity, and data warehousing. Students learn how to create and maintain databases as well as perform queries using Structured Query Language (SQL). Advanced SQL topics such as joins, subqueries, set operators, and procedural SQL are also covered. Students use Oracle or a similar database package to complete several hands-on database projects.

CS-632 - Data Structures and Algorithms in Public Health (3 cr)

This course is designed to provide a comprehensive understanding of data structures and algorithms, with a strong emphasis on their practical applications in the field of Public Health. Students will explore how data structures and algorithms can be harnessed to address complex challenges encountered in Public Health practice. Through a combination of theoretical knowledge and hands-on Python programming, participants will learn how to effectively manage and analyze Public Health data, make data-driven decisions and develop solutions that contribute to improved Public Health outcomes. This course will equip students with the essential skills needed to leverage data structures, algorithms, and Python for meaningful impact in Public Health practice.
Prerequisite: PH-660 PH-705;

CS-633 - Data Mining (3 cr)

This course presents a conceptual and practical study of the basic concepts in data mining. Students learn the fundamental principles of data querying, data analysis, inferential statistics, and classification and then implement solutions to extract meaningful insights from the data. Building upon previous course requirements in coding, programmatic solutions are developed using an enterprise DBMS and a popular language environment.
Prerequisite: CS-630

CS-635 - Mobile Computing (3 cr)
This course introduces students to mobile computing, device security, and mobile application development. The overall goal of this course is to provide an in depth understanding of the fundamental problems in the area of mobile computing and study the existing and proposed solutions for these problems from both research and development perspective. Mobile computing is discussed from three standpoints: mobile technology, application development, and user interaction. The course will first overview various mobile computing applications, technologies and wireless communication. Next, students learn about common paradigms in mobile computing such as low power computing, computing in an environment with limited resources, fault tolerance, security measures in mobile devices and persistence. Students are introduced to and use the cross-platform mobile development environment to reinforce concepts covered in lectures. User interface and user experience are discussed and application development guidelines from various platforms are analyzed. Lastly, the course will look at some current research in mobile computing.
Prerequisite: CS-625 and CS-630

CS-637 - Designing E-Commerce Site (3 cr)
The phenomenal growth in the last few years of the Internet and its related technologies has created new ways of communicating and trading. The most obvious effects of this growth is the great impact of e-commerce on business transactions in today's marketplace. This course presents concepts and skills for the strategic use of e-commerce and related information system technologies needed to plan, design, analyze develop and evaluate an e-commerce website. Through this project oriented course, students learn essentials of e-commerce Web site development including design techniques, shopping carts, payment options, security, ethical and legal issues. Students design and create a fully functioning e-commerce site and online shops for small business clients. In class projects guide the students step by step through the design and business decisions that are critical to success.
Prerequisite: CS-625 and CS-630

CS-640 - Computer Networks (3 cr)
This course explores the fields of computer networks and data communications in detail. Students become familiar with network topologies and standards necessary to support computer network systems and their applications. Emphasis is to achieve a balance between the technical aspects of data communications and everyday practical aspects. Topics include networking protocols, Ethernet standards, OSI model, transmitting media, interfaces, various Network Operating Systems case studies, Internet protocols, network management, and network security.

CS-642 - Data Visualization in Public Health (3 cr)
This course focuses on the principles and practical applications of data visualization in the field of Public Health. Students will learn how to effectively communicate complex health information to diverse audiences through visual representations. The course covers various data visualization techniques, tools, and programming languages used in Public Health research and practice. Through hands-on exercises and projects, students will develop the skills necessary to create visually compelling and informative data visualizations using real-world Public Health datasets.
Prerequisite: CS-632

CS-645 - Computer Security & Privacy (3 cr)
This course expands students' knowledge of computer network and business security. Emphasis is on hands-on projects to guide students through several key security activities. Students will also apply the concepts to case projects. The course topics include the ten domains of CISSP (Certified Information Systems Security Professional) Security: access control; telecommunications and network security; information security governance and risk management; software development security; cryptography; security architecture and design; security operations; business continuity and disaster recovery and planning; legal regulations, investigations, and compliance; and physical environment security.
Prerequisite: CS-640

CS-650 - Artificial Intelligence (3 cr)
This course surveys of the field of Artificial Intelligence. The focus is on theory of AI, problems in the field of AI, and techniques and algorithms for solving those problems. Various computer languages of AI from LISP to Python are discussed. Students are exposed to many applications of AI in game programming, intelligent agents, neural networks, pattern recognition, data mining, and more. Students are not expected to have any prior knowledge of AI, but they are expected to have good programming skills and basic understanding of theoretical techniques for analyzing computer algorithms.
Prerequisite: CS-625 or CS-628

CS-655 - Machine Learning (3 cr)
This course provides a broad introduction to machine learning and statistical pattern recognition based on fundamental knowledge of computer science principles and skills, probability and statistics theory. The course will discuss recent applications of machine learning including: supervised and unsupervised learning, robotic control, data mining, autonomous navigation, bioinformatics, speech recognition, and text and web data processing. Machine learning uses statistics, optimization, and computer science to create automated systems that can sift through large volumes of data at high speed to make predictions or decisions without human intervention. Machine learning as a field is now incredibly pervasive, with applications spanning from business intelligence to homeland security, from analyzing biochemical interactions to structural monitoring of aging bridges, and from emissions to astrophysics, etc. This class will familiarize students with a broad cross-section of models and algorithms for machine learning, and prepare students for research or industry application of machine learning techniques.
Prerequisite: CS-628

CS-660 - Managing Projects, Resources and Risks (3 cr)
This course helps students develop the knowledge and skills necessary to successfully addressthe complex and unique issues in an Information Technology project environment. The emphasis is on learning how to accomplish project objectives on time and within budget. The course focuses on the nine knowledge areas specified by the Project Management Institute (PMI). Team-based and discovery-based methodology is stressed. An industry recognized software is used in conjunction with this course, and students participate in group projectsto investigate the scopes, deadlines, and constraints of actual industry problems.
Prerequisite: CS-620

CS-665 - Analytic Techniques (3 cr)
This course covers an integrated system of software applications that enables the user to perform: data entry, management, mining reports, statistical analysis, forecasting, decision support, operations research and project management, applications development, data warehousing (extract, transform, load), platform independent and remote computing. In addition, the utilized system integrates with many business solutions that enable large scale software solutions for areas such as financial management, business intelligence, and customer relationship management. In this course the students will learn how to use programs to access, explore, prepare, and analyze data. The course explores how to use the software tool for data science, machine learning, and artificial intelligence as main applications. The students will study theoretical concepts as well as hands on applications for various topics that includes: Base Programming, Data Visualization, Enterprise Management Integration, Scalability & Performance, Statistics, and Operations Research. Students will use an industry-standard software tool such as The SAS System (Statistical Analysis System).

CS-670 - Cloud Computing (3 cr)
This course provides a comprehensive study of Cloud concepts and capabilities across the various Cloud service models including Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Identity as a Service (IDaaS). The course also covers data storage, collaboration, virtualization, security, and disaster recovery aspects in the cloud. Students learn to design and code scalable applications using Cloud-based software applications on top of various Cloud platforms. Students are introduced to different layers of the cloud technologies, as well as practical solutions such as Google, Amazon, Microsoft, and SalesForce.com.
Prerequisite: CS-640

CS-675 - Big Data: Management & Analytics (3 cr)
Organizations today are generating massive amounts of data that are too large and unstructured to fit in relational databases. Organizations and enterprises are turning to massively parallel computing solutions such as Hadoop. The Apache Hadoop platform allows for distributed processing of large data sets across clusters of computers using the map and reduce programming model. Students will gain an in-depth understanding of how MapReduce and Distributed File Systems work. In addition, they will be able to author Hadoop-based MapReduce applications in Java and use Hadoop subprojects Hive and Pig to build powerful data processing applications. Industry systems, such as IBM InfoSphere BigInsights and Spark 2.0 will be studied.
Prerequisite: CS-617 and CS-630

CS-700 - Special Projects in Computer Science I (3 cr)
Students work on a special project in the computer science field, to complete degree requirements. Students are required to find an appropriate adviser to guide and monitor the project. The project must be industry standard, and it adequately demonstrate mastery in the project design, creation, execution, and implementation. An oral presentation of the project in front of a panel of professors is required. Students must register for the special project in two semesters for 3 credits each.

CS-701 - Special Projects in Computer Science II (3 cr)
Students work on a special project in the computer science field, to complete degree requirements. Students are required to find an appropriate adviser to guide and monitor the project. The project must be industry standard, and it adequately demonstrate mastery in the project design, creation, execution, and implementation. An oral presentation of the project in front of a panel of professors is required. Students must register for the special project in two semesters for 3 credits each.

CS-703 - Applied Data Science Project (3 cr)
Students are required to work on a special hands-on project in Data Science field, for which 3 credits can be earned toward the degree requirement. Students will work with a professor assigned as a primary faculty for guidance. The project must be industry standard, and it should adequately demonstrate the student's mastery in the project design, creation, execution and implementation. An oral presentation of the project in front of a panel of professors is required. Student may register for this capstone project in the last semester of their studies with the program director/department dean's permission.

CS-705 - Computer Science Thesis I (3 cr)
Exceptional students may elect to write a master's thesis in computer science, for which 6 credits can be earned toward the degree requirement. Students are required to find an appropriate adviser to guide and monitor the research. The research may or may not be original, but it should adequately demonstrate the student's proficiency in the subject matter. An oral defense of the thesis in front of a panel of professors is required. Students must register for the thesis in two semesters for 3 credits each.

CS-706 - Computer Science Thesis II (3 cr)
Exceptional students may elect to write a master's thesis in computer science, for which 6 credits can be earned toward the degree requirement. Students are required to find an appropriate adviser to guide and monitor the research. The research may or may not be original, but it should adequately demonstrate the student's proficiency in the subject matter. An oral defense of the thesis in front of a panel of professors is required. Students must register for the thesis in two semesters for 3 credits each.
Prerequisite: CS-705
Corequisite: CS-705

CS-707 - Research Topics in Data Science (3 cr)
Data Science is an up-and-coming field that uses databases, scientific methods, processes, programming/algorithms and systems to extract knowledge. It is a concept that unifies statistics, data analysis, machine learning and their related methods in order to understand and analyze data. Students are required to select an advanced research topic in this growing field, for which 3 credits can be earned toward the degree requirement. Students are required to find an appropriate adviser to guide and monitor the research. The research might or might not be original, but it should adequately demonstrate the student's proficiency in the subject matter. An oral defense of the research in front of a panel of professors is required. Student may register for the research class either in second-to-the-last or in the last semester of their studies with the department dean's permission.

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