COMPUTER STUDIES

Associate Degrees

The College Transfer Office (https://www.dccc.edu/admissions-financial-aid/transfer/transfer-office/) is set up to help Delaware County Community College students transfer to four-year colleges and universities. If you are planning to transfer, you are strongly encouraged to meet with a transfer advisor within your first two semesters (or before you reach 30 transferable college credits from all institutions attended).

Associate in Science (AS) Degrees

Computer Science (CIS) (https://catalog.dccc.edu/academic-programs/programs-study/computer-science-as/)

The Computer Science program is a two-year preparatory curriculum for students who plan to continue their education at a four-year institution and complete their major in the computer science field. This curriculum is fully compliant with Pennsylvania Statewide Program-to-Program Articulation Agreement (TAOC) as promulgated by the Pennsylvania Department of Education. This Agreement assures that the Computer Science student can transfer their full degree into a baccalaureate program at a participating Pennsylvania affiliated institution, transferring with full junior class standing. Students enrolled in this degree are strongly encouraged to choose their transfer school as soon as practical, then consult that institution, their Faculty Advisor and the College's Transfer Office to ensure that their course of study will be consistent with the requirements of their transfer institution.

Associate in Applied Science (AAS) Degrees

Cloud Computing (CSCC) (https://catalog.dccc.edu/academic-programs/programs-study/cloud-computing-aas/)

The Cloud Computing degree will prepare students for employment in Cloud Computing fields such as Cloud Administration, Cloud Development, Security, Architecture, Cloud Data Management, DevOps, and Machine Learning. The material presented in the Cloud Computing degree program will provide students with the knowledge and skills necessary to successfully deploy and manage cloud services and systems including virtualized compute, storage, networking, database, as well as security and governance of these services.

Courses taken in this degree program specifically relate to and will help prepare students for the following industry certification exams; Microsoft Azure Fundamentals, Microsoft Azure Administrator,   Microsoft Azure Architect Technologies, AWS Cloud Practitioner, and AWS Solutions Architect.

The Cloud Computing degree offers general cloud computing training plus the flexibility of tailoring part of the curricula to match one of two professional pathways: Cloud Engineer/Architect and Cloud Software Developer.

Cloud Engineer/Architect:

The cloud architect designs and implements a company's cloud computing strategies. They ensure that everything stays on track, on budget and that the company's transition to cloud operations goes smoothly. Cloud engineers are responsible for the managerial aspects of a company's cloud strategies. Engineers often work alongside architects to ensure a company's cloud strategies are implemented.

Cloud Software Developer: Cloud software engineers work with programmers and related computer scientists to develop software that operates in the cloud. Popular languages for Cloud Development include Python, Java, PHP, and JavaScript as well as knowledge and experience with database technologies.

Information Technology, Computer Programming (DPRP) (https://catalog.dccc.edu/academic-programs/programs-study/information-technology-computer-programming-aas/)

The Computer Programming specialization is intended to prepare students for a career or further study in computer programming. A computer programmer works with a computer analyst and computer engineer to analyze, design, develop, test, implement and maintain computer applications to meet the functional objectives of a business. It is the job of the computer programmer to design and update the software that runs on the computer. A programmer generally works with an analyst to help determine the best way to approach a problem or implement a desired feature for a new version of a software package. A programmer codes the changes and then tests and debugs the software. The Computer Programming specialization emphasizes the more popular computer programming languages used in business today.

The Associate in Applied Sciences in the Information Technology (IT) Career Degrees at Delaware County Community College blends the theoretical with the practical. Students are offered a choice of specializations: Computer Programming, Game Development, Help Desk/Technical Support, Interactive Multimedia, Network Engineering, Mobile Computing and Web Development. Students have the benefit of classroom or online instruction, dedicated laboratory facilities and participation in co-curricular activities. Students in the IT Career Degrees are required to take program courses and related electives in their specialization as well as four IT core courses. In addition, students are required to take general education courses.

Information Technology, Cybersecurity (CYBS) (https://catalog.dccc.edu/academic-programs/programs-study/information-technology-cyber-security-aas/)

The Cyber Security degree program will prepare students for employment as one of the many Cyber, Network, or Computer information security specialists needed in the information technology industry. Students will learn the knowledge and skills necessary to successfully install, manage, and secure current Microsoft and Linux network operating systems. Additionally, students will learn how to evaluate network and data security risks, implement computer and network device security controls, utilize common ethical hacking tools and programs, perform security and data analysis, implement proper risk assessment procedures, and perform penetration testing. Students will also learn how to properly implement and manage a digital forensics audit of computer components, network devices, and data.

Courses taken in this degree program specifically relate to and will help prepare students for the following industry certifications exams; CompTIA A+, CompTIA Network+, CompTIA Security+, CompTIA CySA+, CompTIA Linux+, Microsoft Windows, Microsoft Server, and the Certified Ethical Hacker (CEH).

Information Technology, Game Development (ITGD) (https://catalog.dccc.edu/academic-programs/programs-study/information-technology-game-development-aas/)

The Game Development specialization is intended to prepare students for a career or further study in game development. Courses emphasize the specific skills necessary for the design, development, marketing and testing of computer games. Industry standard programming languages and development tools are utilized in this specialization.

The Associate in Applied Sciences in the Information Technology (IT) Career Degrees at Delaware County Community College blends the theoretical with the practical. Students are offered a choice of specializations: Computer Programming, Game Development, Help Desk/Technical Support, Interactive Multimedia, Network Engineering, Mobile Computing and Web Development. Students have the benefit of classroom or online instruction, dedicated laboratory facilities and participation in co-curricular activities. Students in the IT Career Degrees are required to take program courses and related electives in their specialization as well as four IT core courses. In addition, students are required to take general education courses.

Information Technology, Help Desk/Technical Support (DPM) (https://catalog.dccc.edu/academic-programs/programs-study/information-technology-help-desktechnical-support-aas/)

The Help Desk/Technical Support specialization provides students with the necessary skills for employment at a help desk or as a technical support person in a computer environment. The program reflects the growing emphasis on assessment of skills and skill levels. The learning sequence established by this curriculum is designed to prepare students to qualify to take certification examinations including, Net +, Microsoft Office Specialist (MOS), Service Technician (A+), Microsoft Certified Professional (MCP), Novell Certified Netware Administrator (CNA) and Cisco (CCNA).

The Associate in Applied Sciences in the Information Technology (IT) Career Degrees at Delaware County Community College blends the theoretical with the practical. Students are offered a choice of specializations: Computer Programming, Game Development, Help Desk/Technical Support, Interactive Multimedia, Network Engineering, Mobile Computing and Web Development. Students have the benefit of classroom or online instruction, dedicated laboratory facilities and participation in co-curricular activities. Students in the IT Career Degrees are required to take program courses and related electives in their specialization as well as four IT core courses. In addition, students are required to take the general education courses listed below.

Information Technology, Network Engineering (DPRN) (https://catalog.dccc.edu/academic-programs/programs-study/information-technology-network-engineering-aas/)

The Network Engineering option prepares students for employment as networking specialists in the communications industry. The material presented in the Network Engineering curriculum provides students with the knowledge and skills necessary to successfully complete many of the exams required for Computing Technology Industry Association (CompTIA) and Microsoft (MS) certifications.

The Associate in Applied Sciences in the Information Technology (IT) Career Degrees at Delaware County Community College blends the theoretical with the practical. Students are offered a choice of specializations: Computer Programming, Game Development, Help Desk/Technical Support, Interactive Multimedia, Network Engineering, Mobile Computing and Web Development. Students have the benefit of classroom or online instruction, dedicated laboratory facilities and participation in co-curricular activities. Students in the IT Career Degrees are required to take program courses and related electives in their specialization as well as four IT core courses. In addition, students are required to take the general education courses listed below.

Interactive Computing (IC) (https://catalog.dccc.edu/academic-programs/programs-study/interactive-computing-aas/)

Do the following terms describe you: curious, creative, or problem-solver? Exploring the world of Information Technology (IT) may be right for you! Demand for skilled IT workers is ever-growing and unmatched in other industries.

The Interactive Computing Associate of Applied Science degree program is a flexible degree that gives students the freedom to tailor individual curricula to match their professional and personal goals. The program combines theory, media production, programming, web, and interactive design to prepare students for careers in digital media design and development. Foundations of digital technology, as well as the core concepts of current technological innovations, is explored. Students engage in hands-on, project-based instruction that enables them to create multimedia projects and productions, think innovatively and creatively, and explore emerging and immersive technologies. Students also produce a digital portfolio or participate in an internship to prepare for an IT career.

The Interactive Computing program has three pathways: front-end developer, back-end developer, and immersive media or game developer. Electives within the program are selected based on the pathway.

FRONT-END DEVELOPER

A front-end developer is one who builds user interfaces for websites and applications using HTML, CSS, and JavaScript as well as an array of other front-end applications/tools such as browser development tools, image editors, and wireframe tools. Current job titles include UI/UX Developer, Junior Developer, Motion Graphics Designer, Web Content Editor, Interaction Designer, Web Developer, and Junior Angular.JS Developer.

BACK-END DEVELOPER

A back-end developer is one who enables the front-end experience. This type of developer builds and maintains the technology that makes the front end possible. Knowledge of how servers, applications, and databases communicate with one another as well as server-side languages like PHP and Python and tools like MySQL and Oracle is required. Current job titles include Web Developer, Backend Architect, Full-stack Developer, and Full Stack Java Developer.

IMMERSIVE MEDIA or GAME DEVELOPER

An immersive media or game developer designs and develops virtual reality, augmented reality, mixed reality, real-time 3D, simulations, games, and immersive experiences and video content. Developers have demonstrated experience in platforms and pipelines used in the design,

development, and distribution of games and immersive experiences including Unity, HTML, Adobe Creative Suite, C#, and Python. Current job titles include Immersive Media Developer, VR Developer, Game Designer, Game Programmer, Game Artist, Game Animator, Animator, and Game Tester.

Certificates

Certificates are short-term educational programs focused on specific work force skills and/or preparation for continued academic study. Delaware County Community College offers a Certificate of Competency (https://catalog.dccc.edu/academic-information/degree-certificate-requirements/#CertComp) and a Certificate of Proficiency (https://catalog.dccc.edu/academic-information/degree-certificate-requirements/#CertProf).

Cloud Computing (CCCP) (https://catalog.dccc.edu/academic-programs/programs-study/cloud-computing-certificate-proficiency/)

The Cloud Computing certificate program will prepare students for employment in Cloud Computing fields such as Cloud Administration, Cloud Development, Security, Architecture, Data, DevOps, and Machine Learning. The material presented in the Cloud Computing certificate program will provide students with the knowledge and skills necessary to successfully deploy and manage cloud services and systems including virtualized computing, storage, networking, database, and security and governance of these services.

Courses taken in this certificate program specifically relate to and will help prepare students for the following industry certification exams: AZ-900 Microsoft Azure Fundamentals, AZ-104 Microsoft Azure Administrator, and AWS Certified Cloud Practitioner.

The Cloud Computing certificate offers general cloud computing training plus the flexibility of tailoring part of the curricula to match one of two professional pathways: Cloud Engineer/Architect and Cloud Software Developer.

Cloud Engineer/Architect:

The cloud architect designs and implements a company's cloud computing strategies. They ensure that everything stays on track, on budget and that the company's transition to cloud operations goes smoothly. Cloud engineers are responsible for the managerial aspects of a company's cloud strategies. Engineers often work alongside architects to ensure a company's cloud strategies are implemented.

Cloud Software Developer: Cloud software engineers work with programmers and related computer scientists to develop software that operates in the cloud. Popular languages for Cloud Development include Python, Java, PHP, and JavaScript, as well as knowledge and experience with database technologies.

Cyber Security (CSC) (https://catalog.dccc.edu/academic-programs/programs-study/cyber-security-certificate-competency/)

The Cyber Security Certificate Degree Program prepares students to identify security threats to networked computers, devices, and their data. Students will learn how to examine network intrusions in order to implement proper defense techniques. Ethical hacking techniques and programs will be used by students to help them identify potential weaknesses in network, network devices, and data. Students completing this certificate program will be qualified for employment in positions related to networking and cyber security specialists. This program also helps prepare students for the following Information Technology certification exams; CompTIA A+, CompTIA Network+, CompTIA Security +, and the EC-Council Certified Ethical Hacker (CEH).

Students can transfer in correlating college credits for any of the program courses in this certificate degree program. Additionally, students can also gain college credits for any correlating industry certifications listed above that they currently hold, but in either case students must complete at least half of the credits in the program in order to complete and obtain this certificate.

Information Technology, Web Programming (CSWP) (https://catalog.dccc.edu/academic-programs/programs-study/information-technology-web-programming-certificate-competency/)

The Web Programming Certificate is intended to prepare students to be an entry-level web developer or for further study in computer programming or web development. A junior-level web developer works within a team to create the vision for a client's website often utilizing design skills, HTML, CSS and jQuery. It is the job of the junior-level programmer to develop, troubleshoot and debug software programs. The Web Programming certificate emphasizes the more popular object-oriented programming languages as well as web development tools and techniques used in business today.

Interactive Multimedia (IMMC) (https://catalog.dccc.edu/academic-programs/programs-study/interactive-multimedia-certificate/)

The Interactive Multimedia Certificate prepares students for the design and development of multimedia programs and websites that combine a variety of audiovisual elements including text, graphics, audio, animation and video.

Network Engineering (NETC) (https://catalog.dccc.edu/academic-programs/programs-study/network-engineering-certificate-competency/)

This certificate option will provide students with a knowledge base and skill set teaching students the various types of computers and networking devices, network connectivity and communications, current industry standard client and server operating systems and networking security concepts. The program is designed to prepare students for entry-level employment as Networking Support Technicians. Students will learn the components that make up a computing system and network, along with learning how to utilize industry standard applications, operating systems, troubleshooting utilities and security related hardware and software. The program will provide students with necessary skills to use and troubleshoot common applications and their problems, install and configure current industry standard operating systems, connect computers together through LAN and WAN technologies and devices and provide an understanding of how to apply and implement secure network administration procedures and policies.

Web Development (WEB) (https://catalog.dccc.edu/academic-programs/programs-study/web-development-certificate-competency/)

This certificate option provides students with a multi-disciplinary approach to the design, networking and programming areas of web development. Designed to prepare students for entry-level employment as: Web Site Designer, Web Developer, Web Programmer. Students learn

to integrate client-side and server-side technologies to build and manage real-world web-based applications. The program provides students with necessary skills for creating and managing web sites using current industry standards. The design and development of responsive web applications is also covered. Students also gain a foundation in current networking technologies and supporting Linux/UNIX systems.

Courses

View full A-Z Course List

CS - Computer Studies

CS 100 Introduction to Information Technology
(formerly DPR 100) This course is designed to provide an introduction to Information Technology (IT) concepts and applications, and the impact of IT on individuals, organizations, and society. Core content includes computer hardware and software, digital communications, the Internet, databases, networking, programming, computer security, ethics in IT, and current and emerging digital technologies.
Upon successful completion of this course, students should be able to:
Identify the types of computers and describe their purposes.
Describe how the components of a computer system function.
Use system software and utility programs for maintenance, security, and organization purposes.
Use word processing software to create, edit, format and save various documents.
Use spreadsheet, software to construct formulas, use functions, chart and analyze data; and to create, edit, format, and a save spreadsheet.
Use database software to create a query, form, and report.
Use presentation software to create, edit, format and save a presentation.
Describe the importance of computer programming.
Describe the benefits of networks and computer security implications.
Describe the legal, ethical, and privacy issues concerning IT.
Use the internet for research, evaluate, and use information.
Use digital technologies to communicate and work collaboratively.
Research and evaluate career opportunities that utilize IT skills.
Develop an e-Portfolio comprised of academic artifacts.
College Academic Learning Goal Designation: Information Technology (TC)
3 Credits   3 Weekly Lecture Hours

CS 101 Introduction to Computer Science
(formerly DPR 101/DPR 108) An engaging and approachable course that explores many of the foundational concepts of computer science and programming. Develop problem-solving, logic and critical reasoning skills as you learn basic programming structures and concepts common to all programming languages. Covers the fundamentals computer science as well as planning, coding and debugging computer programs. Learn about using computers to process information, find patterns and test hypotheses about digitally processed information to gain insight and knowledge. This is an introductory level course and previous programming experience is not necessary.
Upon successful completion of this course, students should be able to:
Identify and select appropriate programming tools for application development.
Design and implement algorithms in a programming language that involve the use of iteration and boolean logic.
Develop programs that use variables, constants and arrays.
Create programs that can perform basic arithmetic operations.
Construct modular programs using functions.
Use appropriate tools and strategies for debugging and avoiding errors.
Summarize the professional, cultural, legal and ethical issues related to computer science.
Identify career paths available in computer science and determine professional education and training standards.
Apply the process of software development including design, implementation, documentation and testing.
Learn about using computers to process information, find patterns and test hypotheses about digitally processed information to gain insight and knowledge.
Explain how binary sequences are used to represent digital data.
College Academic Learning Goal Designation: Critical Reasoning (CR), Information Technology (TC)
3 Credits   3 Weekly Lecture Hours

CS 102 Introduction to Python
Students learn the fundamentals of designing, developing, and testing computer programs using the Python programming language. Problem-solving, logic and critical reasoning skills are emphasized as you learn to create programs with Python. Covers the fundamentals of computer science as well as planning, coding and debugging computer programs. This is an introductory level course and previous programming experience is not necessary. NOTE: Computer Science and IT majors may substitute this course for DPR 101 - Introduction to Computer Science.
Upon successful completion of this course, students should be able to:
Define basic computing and programming terms.
Navigate through the Python development environment.
Explain and use data, operations, functions and data types in a Python program.
Apply the correct control and iterative structures to a Python program.
Use mathematical equations in the creation of a Python program.
Design, write, test and debug a Python program to implement a working solution to a given problem specification.
Use Python documentation or a knowledge base to resolve technical issues.
Appropriately implement the major steps in the analysis, design and development of a Python computer program.
Explain how binary sequences are used to represent digital data.
Explore career opportunities in computer-science, personal computing and business applications programming.
College Academic Learning Goal Designation: Critical Reasoning (CR), Information Technology (TC)
3 Credits   3 Weekly Lecture Hours

CS 104 Introduction to Java Programming
(formerly DPR 104) This course teaches the fundamentals of analyzing problems and designing, developing and testing computer programs to solve them utilizing Java in an Integrated Development Environment (IDE). The course introduces the fundamental concepts and techniques for programming including simple data structures, algorithms, variables, control structures (decision and looping), text files, method writing, and arrays as well as simple shapes and Graphical user Interface (GUI) basics.
Upon successful completion of this course, students should be able to:
Define basic computing and programming terms.
Navigate a Java IDE to write and debug Java programs.
Identify and use the basic concepts and principles of structured programming.
Explain and use data, operations, functions, and data types.
Apply the correct control and iterative structures to a program.
Implement simple GUIs and write programs that display simple shapes.
Use mathematical equations in the creation of a computer program.
Design, write, test and debug a Java program to implement a working solution to a given problem specification.
Use documentation or a knowledge base to resolve technical issues.
Implement the major steps in the analysis, design and development of a computer program.
Explore career opportunities in computer science, personal computing and business applications programming.
3 Credits   3 Weekly Lecture Hours

CS 105 Management Information Systems
(formerly DPR 105) This introductory course in managing information systems defines business processes, integrates these processes with computer technology, explains the flow of information in a business, and examines the use of information in business management. Business topics are integrated with information systems concepts. The course is designed for students using computer technology in a business environment. This course provides a real world process-oriented component to business education. Selected exercises using MS Office, MIS software, and business simulation games on the Internet are used in this course.
Upon successful completion of this course, students should be able to:
Explain what a business information system is and identify key components.
Outline the phases and steps in the information system development process.
Define business and computer technology terminology.
Give examples of how business information systems can break time, geographic, cost, and structural barriers in business.
Identify how business information systems are affecting the structure and activities of organizations.
Diagram typical flows of information in business operations.
Examine specific ethical principles of conduct and apply an ethical analysis to a difficult business information systems situation.
Identify business software tools that complete word processing, prepare spreadsheets, perform research, design databases, and prepare presentations.
Demonstrate a fundamental knowledge of how business processes and computer technology improve effectiveness of organizational goals.
Explain how information systems can improve management decision-making effectiveness.
3 Credits   3 Weekly Lecture Hours

CS 106 Art and Animation
(Formerly CS 121) This course introduces students to digital art and animation using Adobe Animate and Blender. Students will learn the fundamentals of creating animations, including character design, storyboarding, and motion graphics. The course will cover both software programs' essential techniques, tools, and features to produce high-quality animation projects. Additionally, course content covers the knowledge and skills needed to prepare students for the Adobe Certified Profession in Multiplatform Animation Using Adobe Animate exam.
Upon successful completion of this course, students should be able to:
Apply the principles of animation to create animations.
Create vector graphics and bitmap images in Adobe Animate for use in animation projects.
Design and develop characters using Adobe Animate and Blender.
Develop storyboards and animatics to guide animation projects.
Use the Adobe Animate timeline and motion editor to create animations.
Utilize keyframe animation in Adobe Animate and Blender.
Export animation projects for different platforms and file formats.
Create motion graphics and interactive animations using Adobe Animate.
Apply the foundational principles of 3D modeling, rigging, and animation using Blender.
Apply industry-standard workflows and techniques for creating high-quality animations.
Utilize effective communication techniques for sharing design plans with colleagues and clients.
3 Credits   3 Weekly Lecture Hours

CS 107 Helpdesk Concepts
(formerly DPR 107) This course provides students with a practical introduction to Help Desk concepts. Topics covered include the different types of help desks and how they are measured by organizations; the roles and skills required to function in a Help Desk environment; and the processes and technologies commonly employed to ensure the Help Desk is operating efficiently and effectively.
Upon successful completion of this course, students should be able to:
Discuss the components of a successful Help Desk.
Discuss the emerging support center concepts.
Distinguish between the different types of Help Desks, such as centralized, decentralized, internal, external.
Use required business and technical skills.
Discuss job responsibilities of Help Desk personnel.
Discuss Help Desk processes and procedures.
Apply the technological aspects of the Help Desk.
Apply the informational aspects of the Help Desk.
3 Credits   3 Weekly Lecture Hours

CS 110 Introduction to C++

(formerly DPR 110) The purpose of the course is to teach students the fundamentals of analyzing problems and designing, developing and testing computer programs to solve them, utilizing C++ in an Integrated Development Environment (IDE). The course introduces the basic concepts of programming C++ programming language syntax, and progresses through the techniques of using logical structures such as decision making and loops, using data structures such as arrays, and using functions for logical code organization and re-use.

Upon successful completion of this course, students should be able to:
Define basic computing and programming terms.
Navigate through the C++ editor, compiler, and runtime environment.
Explain and use data, operations, functions and data types.
Apply the correct control and iterative structures to a program.
Use mathematical equations in the creation of a computer program.
Design, write, test and debug a program to implement a working solution to a given problem specification.
Use documentation or a knowledge base to resolve technical issues.
Implement the major steps in the analysis, design, and development of a computer program.
Explore career opportunities in computer science, personal computing, and business applications programming.
College Academic Learning Goal Designation: Information Technology (TC)
3 Credits   3 Weekly Lecture Hours

CS 111 Computer Applications

(formerly DPR 111) This is a comprehensive hands-on personal computer applications course specifically designed for students to develop an intermediate knowledge of word processing software, spreadsheet software, database software and presentation software. Additional topics include an overview of the components of a microcomputer system; hardware and software; storage devices and media; interpretation of error messages, file management, files storage, and Internet research.

Upon successful completion of this course, students should be able to:
Differentiate between hardware and software.
Identify various storage devices and media.
Manage files and folders.
Navigate to information stored on the computer.
Perform tasks using features common to integrated software programs.
Demonstrate computer skills using application software on a personal computer.
Use word processing software to create, edit, and format documents.
Apply intermediate word processing skills to solve application-type problems using word processing software.
Design, create, modify, and format worksheets and workbooks using spreadsheet software.
Design databases and create, edit, and modify database objects.
Design, create, enhance, organize, and view presentations using presentation software.
Use the Internet to navigate the Web using URL and Hyperlinks, to create and delete bookmarks, to compose, view, send, receive, and print e-mail messages.
3 Credits   3 Weekly Lecture Hours

CS 113 Database Management Systems

(formerly DPR 113) This course provides students with an introduction to database concepts, data models, and Database Management System (DBMS) software applications. Students examine, design, create and query relational and non-relational database systems. Hands-on activities involve one or more of the database systems currently used in the industry.

Upon successful completion of this course, students should be able to:
Discuss the conceptual and physical aspects of relational database architecture.
Apply the standards for relational database design and apply them to the database design of a specified application.
Design, develop and manipulate a relational database.
Demonstrate mastery of writing and executing SQL statements.
Discuss the advantages and use-cases for using NoSQL databases over traditional relational DBMS.
Identify the types of NoSQL databases (document, key-value, wide-column, graph).
Demonstrate schema definition and querying using one or more NoSQL database systems.
3 Credits   3 Weekly Lecture Hours

CS 115 Microsoft Excel

(formerly DPR 115) This hands-on course provides a comprehensive presentation of Microsoft Excel. The more advance features of Microsoft Excel are stressed.

Upon successful completion of this course, students should be able to:
Develop Excel worksheets that include formulas and functions.
Use Excel to develop professional-looking worksheets.
Develop charts and graphs.
Use Excel to manage financial data.
Use Excel to create static and dynamic Web pages.
Use Excel to work with multiple worksheets and workbooks.
Use Excel for data manipulation with database functions, lookup function, and templates.
Enhance Excel worksheets with Visual Basic and Macros for applications.
Use Excel worksheet for "What-If-Analysis".
Import data into Excel worksheets from other Microsoft applications.
3 Credits   3 Weekly Lecture Hours

CS 116 Introduction to Online Research Strategies

(formerly DPR 116) This course is designed to teach students effective research skills using the internet. Students will learn effective research strategies for retrieving, evaluating and using information from internet web sites, internet-based subscription databases, and various Web 2.0 applications. The development of critical thinking skills for college level research assignments and lifelong learning will be stressed. Ethical and legal aspects regarding the use of information will be discussed.

Upon successful completion of this course, students should be able to:
Distinguish free internet sites from fee-based internet subscription services.
Use advanced features of internet search engines and fee-based internet subscription services.
Evaluate web sites for reliability and relevancy.
Choose the most effective resource and format for the specific information needed.
Understand the legal and ethical issues regarding plagiarism and copyright.
Compose a works cited list using MLA or APA format.
Navigate services available through homepages of a public library and an academic library.
3 Credits   3 Weekly Lecture Hours

CS 117 Fundamentals of Game Design Theory and Practice
(formerly DPR 117) This course introduces students to the theory and practical aspects of the computer game development process. Students brainstorm a game idea, establish focus, determine the storytelling mode, and document the design.
Upon successful completion of this course, students should be able to:
Demonstrate an understanding of the vocabulary of game design theory and practice.
Identify the techniques of top game designers.
Analyze and identify the elements that make successful games.
Apply the computer game development process to create a design document.
3 Credits   3 Weekly Lecture Hours

CS 118 Game Creation Development
(formerly DPR 118) This course focuses on designing, developing and testing computer games using game creation development tools. Students use an icon-based system of events and actions to program computer games. Principles of successful game design and techniques of top game designers are also explored.
Upon successful completion of this course, students should be able to:
List requirements for a game development studio.
Describe the basic elements of an image and how to manipulate it.
Identify and describe game genres.
Identify the elements of good game design.
Utilize the computer game development process to create games using a game engine and design tool.
Demonstrate the ability to use game creation development tools to develop games for inclusion in a portfolio.
3 Credits   3 Weekly Lecture Hours

CS 119 Introduction to Computer Game Programming
(formerly DPR 119) This course introduces students to the concepts of programming using an object-orient programming language and game development tools. Students will create 2D and 3D games using game development tools as well as program a full-featured role-playing game (RPG) using an object-oriented programming language.
Upon successful completion of this course, students should be able to:
Describe the elements of game programming.
Create a 2D game using game development tools.
Create a 3D game using game development tools.
Use the basic programming constructs of an object-oriented programming language.
Create animations for a game.
Add sounds to a game.
Create a game using a HTML5 game-based creation engine.
Create an RPG using an object-oriented programming language
3 Credits   3 Weekly Lecture Hours

CS 121 Game Art and Animation
(formerly DPR 121) The focus of this course is to create 2D artwork, arrange U-V's, generate textures, and create a 3D model. Students create 3D models and animations using industry standard computer graphics software.
Upon successful completion of this course, students should be able to:
Identify the requirements of 2D artwork.
Demonstrate the ability to design and develop 2D artwork.
Identify the requirements of a 3D model.
Use a 3D modeling software product to create models and animations.
3 Credits   3 Weekly Lecture Hours

CS 127 Introduction to PC Support
(formerly DPR 227) This is the first part of the hands-on hardware preparation for students whose goal is to develop an understanding of operating systems to maintain and manage a personal computer. The course prepares students to understand the terminology and technically support ports, motherboards, microprocessors, memory, interrupt requests, basic power needs, chips, cables, troubleshooting and Internet resource discovery both to find information and help in troubleshooting devices.
Upon successful completion of this course, students should be able to:
Identify the components of a typical microcomputer system.
Demonstrate a knowledge of components such as ports, motherboards, microprocessors, memory, interrupt requests, basic power needs, chips, and cables.
Troubleshoot the above devices using various techniques including Internet resources.
Discuss error messages and their meanings.
Install and support operating systems.
Analyze conflicts and problems in both the hardware and software environment.
3 Credits   3 Weekly Lecture Hours

CS 128 PC Repair and Maintenance
(formerly DPR 228) This course is a continuation of the hands-on course for students whose goal is to work with personal computer operating systems. The course prepares students to technically support personal computer repair and maintenance.
Upon successful completion of this course, students should be able to:
Apply knowledge of SCSI, IDE, and similar hard drive configurations.
Utilize knowledge of partitioning, formatting, fragmentation and defragmentation, disk caching, and troubleshooting of hard drives.
Apply knowledge of FDISK, SCANDISK, CHKDSK and other similar disk drive utilities.
Construct configuration files for optimal computer performance.
Utilize CD-ROM drives, video cards, sound cards as well as audio CD use.
Apply knowledge of Caching, Serial and Parallel devices, Mice, and keyboards.
Apply knowledge of monitors, screen savers, video adapters, and video memory.
Troubleshoot FireWire, serial and parallel ports and various bus configurations.
Utilize knowledge of printers including types and troubleshooting techniques.

Apply knowledge of various configurations and troubleshooting methods including DOS, Windows 3 1/95/98/NT/2000.
Use various boot processes and methods as well as optimization techniques.

Discuss compression, encryption, and dial-up networking techniques as well as network security topics.
3 Credits   3 Weekly Lecture Hours

CS 130 Introduction to Unity 3D
This course introduces students to the world's most popular game engine, Unity 3D. Students will learn how to create interactive content for gaming, simulations and visualization.
Upon successful completion of this course, students should be able to:
Demonstrate proficiency using the basics of the software.
Import, create and manage 2D, 3D and audio assets.
Apply materials and textures.
Animate objects and parameters.
Create interactive user interfaces and navigation.
Design, develop and export content for testing, debugging and presentation.
Research and explore careers and education in interactive design and development.
3 Credits   3 Weekly Lecture Hours

CS 131 Virtual Asset Production
This course introduces students to the fundamentals of creating 2D and 3D assets for use in real-time, virtual environments and games using industry-standard software and hardware.
Upon successful completion of this course, students should be able to:
Identify the requirements of 2D asset development.
Design and develop 2D assets.
Identify the requirements of 3D asset development.
Create and animate 3D assets.
Import and manage assets in Unity 3D game engine.
Apply the production pipeline to deploy assets for previsualization and presentation.
3 Credits   3 Weekly Lecture Hours

CS 132 C# Programing for Interactivity
This course introduces students to the concepts of programming using the C# programming language. Students will learn how to write C# code for interactivity using Microsoft Visual Studio and Unity 3D.
Upon successful completion of this course, students should be able to:
Write clean and reusable C# code for scripting interactivity.
Identify similarities and differences between relating coding languages.
Create interactive HUD (Heads-Up Displays).
Create interactive 3D experiences.
Design, develop, and deploy content on XR devices for testing, debugging, and presentation.
3 Credits   3 Weekly Lecture Hours

CS 133 Augmented, Mixed and Virtual Reality: XR Fundamentals
This course introduces students to augmented, mixed and virtual reality technologies. Using the Unity 3D game engine, students will learn how to create interactive and immersive experiences using industry-standard XR hardware.
Upon successful completion of this course, students should be able to:
Understand the production pipeline for successful XR output and delivery.
Create AR experiences for mobile devices.
Create MR experiences.
Create VR experiences.
Determine the appropriate hardware, software, and network environment that support XR design and development.
Research and explore innovative, emerging media technologies, skills, and careers as it pertains to the field of interactive computing.
Understand how to deploy XR content for testing, debugging, and distribution.
3 Credits   3 Weekly Lecture Hours

CS 141 UNIX Operating Systems
(formerly DPR 141) This hands-on course aims to familiarize students with the UNIX operating system. The course covers the installation, use, management and customization of UNIX in a PC environment. Topics in the course include notable and commonly used UNIX commands; the UNIX shell as both user interface and programming environment; the UNIX file system; the UNIX networking subsystem; and bandwidth management under UNIX.
Upon successful completion of this course, students should be able to:
Discuss the features and benefits of the UNIX operating system.
Log onto and out of a UNIX system.
Discuss the UNIX file naming convention.
Construct both simple and enhanced UNIX command lines.
Describe and distinguish between the concepts of kernel, shell and file system.
Discuss the file hierarchical structure.
Employ both user- and administrator-oriented UNIX commands in an effective manner.
Identify the most significant characteristics of the UNIX networking subsystem and UNIX bandwidth management.
Recognize and describe widely-used UNIX applications such as Apache.
3 Credits   3 Weekly Lecture Hours

CS 142 Introduction to Cloud Computing Concepts and Administration using Microsoft Azure
This course will introduce the fundamentals and purposes of cloud computing. Students will learn the administration and maintenance of online resources and services via the Microsoft Azure cloud platform including virtual machines, application services, storage, networking, and databases. The content of this course is explicitly aligned with learning objectives for the Azure Fundamentals and Azure Administrator certification exams.
Upon successful completion of this course, students should be able to:
Describe the benefits, types, and categories of Azure cloud services.
Describe the core Azure cloud resources, services and architectural components.
Describe core cloud solutions and management tools in Azure.
Describe and implement identity, governance, privacy, and compliance features on Azure.
Describe cost management and service level agreements, and perform cost management activities.
Describe, implement and manage storage services.
Deploy and manage compute resources and application services.
Deploy, manage, load-balance, and integrate virtual networking.
Implement reliability and business continuity processes through monitoring and backups.
3 Credits   3 Weekly Lecture Hours

CS 143 Introduction to Cloud Computing Concepts and Administration using Amazon Web Services
This course will introduce the fundamentals and purposes of cloud computing using the Amazon Web Services (AWS) cloud platform. Students will use live AWS Console and Command Line interfaces and automation tools to provision, administer, architect, and manage online resources and services via Amazon Web Services, including virtual machines, application services, storage, networking, and databases. The content of this course is explicitly aligned with the learning objectives of the AWS Certified Cloud Practitioner and the AWS Certified Solutions Architect exams, which students are highly encouraged to complete to enhance employability. Information will be provided to students regarding certification exam registration.
Upon successful completion of this course, students should be able to:
Define AWS Cloud advantages, design principles and economics.
Identify AWS Cloud security and compliance concepts, capabilities and models.
Define key cloud service technologies, geographical infrastructure, deployment methods, and support resources.
Compare and contrast billing and pricing models for various account structures and resources.
Implement and manage logging monitoring and remediation.
Implement and manage data protection, security and compliance policies.
Implement cost and performance optimization.
Implement networking features and connectivity.
Deploy, configure and provision cloud resources through administrative and automated toolsets.
3 Credits   3 Weekly Lecture Hours

CS 190 Computer Programming Internship (1 credit)
(formerly DPR 190) College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 60 hour internship will earn 1 college credit for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.
Upon successful completion of this course, students should be able to:
Explain three program-related concepts that have been applied during the work experience.
Describe the ways that technology is utilized in the work experience.
Analyze the culture of the host organization.
Analyze an operational process within the work experience.
Demonstrate how assigned tasks depend on successful communication.
Describe how time and activity are managed to meet work-imposed deadlines.
Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.
Demonstrate specifically how job-related competence has improved.
Formulate a self-assessment for career growth and personal satisfaction.
Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).
Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes.
1 Credit

CS 194 Computer Programming Internship (2 credit)
(formerly DPR 194) College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 120 hour internship will earn 2 college credit for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.
Upon successful completion of this course, students should be able to:
Explain three program-related concepts that have been applied during the work experience.
Describe the ways that technology is utilized in the work experience.
Analyze the culture of the host organization.
Analyze an operational process within the work experience.
Demonstrate how assigned tasks depend on successful communication.
Describe how time and activity are managed to meet work-imposed deadlines.
Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.
Demonstrate specifically how job-related competence has improved.
Formulate a self-assessment for career growth and personal satisfaction.
Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).
Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes.
2 Credits

CS 199 Computer Programming Internship (3 credit)
(formerly DPR 199) College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 180 hour internship will earn 3 college credits for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.
Upon successful completion of this course, students should be able to:
Explain three program-related concepts that have been applied during the work experience.
Describe the ways that technology is utilized in the work experience.
Analyze the culture of the host organization.
Analyze an operational process within the work experience.
Demonstrate how assigned tasks depend on successful communication.
Describe how time and activity are managed to meet work-imposed deadlines.
Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.
Demonstrate specifically how job-related competence has improved.
Formulate a self-assessment for career growth and personal satisfaction.
Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).
Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes.
3 Credits   3 Weekly Lecture Hours

CS 200 UX Design
User experience (UX) design is a discipline concerned with all the elements that together make up the user interface, including layout, visual design, text, brand, sound and interaction. (Source: User Experience Professionals Association). This course introduces multi-device design strategies for navigation, screen layout, and interactive content. Learn how to apply interaction design principles to your apps and web sites to create experiences that are engaging, accessible and usable. Follow a user-centered design process for analyzing, planning, and designing user experiences. Map user needs to your proposed UX design solution with scenarios, storyboards and prototypes. Gain insight on how to incorporate accessibility into your design process to increase accessibility to all people, including those with disabilities.
Upon successful completion of this course, students should be able to:
Identify and apply an interactive design process model.
Design applications employing user-centered design techniques.
Analyze techniques for assuring compliance with accessibility guidelines.
Use rapid-prototyping tools to develop user interfaces that utilize interface design standards.
Apply visual principles such as layout, color, iconography, imagery and typography to maximize the UX experience.
Identify career paths, academic programs and training opportunities in the field of User Experience Design.
3 Credits   3 Weekly Lecture Hours

CS 202   Intermediate Python
This course teaches students the fundamentals of Object Oriented Programming (OOP) by designing, coding and testing simple applications using Python. The course is designed for students who have an understanding of programming design and logic but who need to understand object-oriented programming methods and techniques. NOTE: Prerequisite requires a grade of 'C' or higher.
Upon successful completion of this course, students should be able to:
Use a Python IDE.
Use Python classes.
Create and use functions in a Python program.
Create and initialize classes.
Explain and use inheritance.
Use function overloading in a Python object-oriented program.
Use Object –Oriented programming techniques.
3 Credits   3 Weekly Lecture Hours

CS 204   Intermediate Java Programming
(formerly DPR 204) This course teaches students how to create single-user applications using the Java programming language. Students learn the fundamentals of object-oriented programming (OOP) by designing, coding and testing simple applications. The course is designed for students who have an understanding of programming methods and techniques using the Java programming language. It incorporates the design, coding and use of programmer developed classes and objects. Simple container classes are used to build collections of newly defined objects.
Upon successful completion of this course, students should be able to:
Define object-oriented programming terms.
Explain the fundamentals of object-oriented structures and principle of programming.
Design, implement and document Java classes to be used in a computer program.
Demonstrate use of Java class libraries.
Demonstrate use of methods and method overloading.
Explain inheritance and polymorphism and use them for derived classes.
Explain and use derived and abstract classes.
Demonstrate use of objected-oriented programming techniques to solve problems.
Build and use container classes such as vector and list.
Apply analytical skills to produce sample test cases, pseudocode or an incremental coding plan for a given problem specification.
Write, test and debug a Java program to implement a working solution to a given problem specification.
3 Credits   3 Weekly Lecture Hours

CS 210   Object Oriented C++
(formerly DPR 210) This course teaches students how to create single-user applications using the C++ programming language. Students learn the fundamentals of object-oriented programming (OOP) by designing, coding, and testing simple applications. The course is designed for students who have an understanding of programming using the C++ language. The student must be able to design and code functions and use logic structures to accomplish specific tasks. Using the aforementioned functions and structures, the student is guided to employ object-oriented programming methods and techniques in the development of a modern OOP application. This course does NOT cover graphical designs or graphic user interfaces (GUI)
Upon successful completion of this course, students should be able to:
Define object-oriented programming terms.
Explain the fundamentals of object-oriented structures and principles of programming.
Use a C++ compiler and Integrated Development Environment (IDE) to create, document and debug multi-file projects.
Design, code and implement C++ classes.
Design and use class methods.
Instantiate and use class objects.
Explain inheritance and polymorphism and use them for derived classes.
Generate and handle exception objects to support error processing.
Build and use function and class templates to provide generic processes for OOP applications.
Declare and use pointer variables to generate dynamic data structures.
Design, write, test and debug C++ program to implement a working solution to a given problem specification.
3 Credits   3 Weekly Lecture Hours

CS 212   Data Structures and Algorithms
(formerly DPR 212) This course focuses on problem analysis, algorithm design and refinement, and computer programming. Complex data structures such as stacks, heaps, and trees as well as sorting and searching techniques are examined. Software engineering methods and structured style as well as object-oriented programming are emphasized.
Upon successful completion of this course, students should be able to:
Develop programs using good programming style and object-oriented programming techniques to implement algorithms and data structures.
Use simple and advanced data types including linked lists, stacks, queues, trees, heaps and sets.
Analyze the efficiency of various algorithms for looping, recursion, sorting, and searching.
Use abstract data types, containers and class templates, encapsulation, inheritance, and polymorphism.
Evaluate simple systems concepts such as input/output buffers, parameter passing mechanisms, and memory management.
Use documentation or a knowledge base to resolve technical issues.
Apply the software development process to design, write, test, and debug computer programs using an object-oriented language.
4 Credits   3 Weekly Lecture Hours
**   2 Weekly Lab Hours**

CS 214 jQuery/JavaScript
(formerly DPR 214) jQuery is a fast, small, and feature-rich JavaScript library. In this course students learn to use jQuery, JavaScript and Ajax to include dynamic content and create feature-rich web sites. Also covers jQuery Mobile to build cross-platform mobile web pages. NOTE: Pre-reqs with grade of 'C' or better.
Upon successful completion of this course, students should be able to:
Develop dynamic Web 2 applications with jQuery, HTML, CSS and Ajax.
Enhance HTML forms using jQuery validation and call web services.
Build cross-platform, cross-device mobile pages using jQuery Mobile.
Animate web pages using jQuery effects.
Convert serialized server data to HTML using JSON.
Design sophisticated user interfaces with jQuery UI.
Use objects, methods, and properties to manage and manipulate the elements of a web page using the Document Object Model.
3 Credits   3 Weekly Lecture Hours

CS 222 Visual Basic Programming
(formerly DPR 222) This course familiarizes students with ways to create single-use applications using Microsoft's Visual Basic (VB.NET) programming language. Students learn the fundamentals of Object Oriented Programming (OOPS) by designing, coding and testing simple Windows-based applications. The course is designed for students with an understanding of programming design and logic but who need to understand event-driven programming methods and techniques.
Upon successful completion of this course, students should be able to:
Describe the differences between event-driven programs and procedure-driven programs.
Define objects, properties, methods, and events.
Create applications that correctly declare and use variables, accept user input, use subs and functions, and use code loops and control structures.
Locate and correct coding problems using de-bugging tools.
4 Credits   3 Weekly Lecture Hours
    2 Weekly Lab Hours

CS 240 Responsive Web Design
(formerly DPR 241, CS 241) Students learn to use the responsive design web development approach and follow a mobile-first strategy. Design and create responsive user interfaces and navigation systems using current HTML, CSS, and JavaScript standards. Also, learn how to publish, promote, and optimize websites for search engine optimization. Additional topics include meeting accessibility standards and using command-line interfaces. NOTE: IMM 120 "C" or better and (CS 101 or CS 102 or DPR 101, "C" or better)
Upon successful completion of this course, students should be able to:
Create mobile-friendly websites and navigation systems.
Explain the principles of responsive design.
Describe and implement mobile-first strategies.
Optimize a website for search engine optimization (SEO).
Use a CSS framework to create responsive webpages.
Use a command-line interface to navigate and manage files and folders.
Apply the W3C Web Accessibility Initiative guidelines to meet Section 508 of the Rehabilitation Act.
3 Credits   3 Weekly Lecture Hours

CS 242 Azure Cloud Architect Technologies
Microsoft Azure Architect Technologies course prepares students for a career as a certified Azure Cloud Architect. Students will deepen knowledge of managing Azure resources, and integrating virtual services using Azure Portal and Command Line Interface to solve business solutions. This course is explicitly aligned with the Azure Solutions Architect certification exam.
Upon successful completion of this course, students should be able to:
Implement, manage, and monitor cloud resources and infrastructure.
Implement storage accounts.
Configure and deploy virtual machines for Windows and Linux.
Automate deployment and configuration of resources.
Configure and deploy virtual networks.
Implement Azure Active Directory and hybrid identities.
Manage workloads and network security for applications.
Implement and manage Azure governance solutions.
Implement solutions for applications.
Implement and manage data platforms.
3 Credits   3 Weekly Lecture Hours

CS 243 Amazon AWS Cloud Solutions Architecture
AWS Solutions Architecture will provide students with the tools to design, plan, and implement resilient, high-performing, secure, and cost-optimized architectures using AWS best practices for integrating the more than 70 available AWS cloud services into well-orchestrated solutions. This course is explicitly aligned with the latest AWS Solutions Architect certification exam and is part of the Cloud Computing degree and certificate programs.
Upon successful completion of this course, students should be able to:
Design resilient, fault-tolerant architectures for applications and storage using techniques such as decoupling and multi-tiering.
Design and manage high-performing architecture for compute, storage, networking, and database solutions.
Design decoupling mechanisms using AWS services such as serverless technologies and microservices.
Apply application rules for access to AWS resources at the user, group, role levels using AWS policies and mechanisms for determining the net effect and traceability of resource access.
Design cost-optimized storage, compute, database, and networking architectures.
Design secure applications and architectures with appropriate access controls, traffic controls, network segmentation, and data security.
Implement, configure, manage, and monitor cloud resources and infrastructure.
3 Credits   3 Weekly Lecture Hours

CS 250 Digital Portfolio Development

(formerly DPR 250) The focus of the Digital Portfolio Development course is to design a portfolio that makes evident a student's knowledge and skills of their field of study. The portfolio is a collection of material that can be used as an interactive resume, an archive of work over time or a demonstration of proficiency. The contents of a student's portfolio can include work samples, letters of recommendation, references, transcripts, GPA, accomplishments/awards, competency lists, certifications, curricular standards, instructor assessments/evaluation, reflections, and work experiences/employer evaluations. Thus, a student's portfolio provides the ability to show work on demand and evidence of their preparation for a career or further education in their field of study. The objective of this course is for students to demonstrate the theoretical as well as the technical skills they have acquired throughout their program. Students will assess personal strengths to establish a career goal and decide how to organize their design and production work in a graduation portfolio. NOTE: Prerequisites: Depending on CS specialization, all required program courses.

Upon successful completion of this course, students should be able to:
Identify the need for a digital portfolio.
Identify the target audience of a digital portfolio.
Demonstrate the ability to organize, collect and prepare material for a digital portfolio.
Explain copyright laws as it applies to acquiring and protecting intellectual property.
Demonstrate the ability to design and develop work samples using industry standard tools and/or programming languages.
Demonstrate the use of design and development tools to develop a digital portfolio.

3 Credits   3 Weekly Lecture Hours

IMM - Interactive Multimedia

IMM 110 Multimedia Graphics & Design

This course introduces students to multimedia and the design and development process for creating digital media content. Students gain an in-depth knowledge of digital imaging as well as design principles and communication techniques. Students use Adobe Photoshop, an industry-standard graphics tool, to create and edit professional-looking images for multimedia, web, and mobile projects. Course content covers the knowledge and skills needed to prepare students for the Adobe Certified Professional in Visual Design Using Adobe Photoshop exam.

Upon successful completion of this course, students should be able to:
Utilize effective communication techniques for sharing design plans with colleagues and clients.
Identify legal and ethical considerations for utilizing content in digital design.

Define and utilize key vocabulary related to visual design and digital images.
Recognize basic design principles and best practices in the design industry.
Set and adjust Adobe Photoshop's interface and settings to create an efficient and effective workflow.
Utilize Adobe Photoshop tools such as panels, selection and painting tools, filters, opacity and layer style settings, and blending modes.
Utilize Adobe Photoshop to retouch, create, and publish digital images.

3 Credits   3 Weekly Lecture Hours

IMM 120 Web Page Design and Development

This course introduces students to publishing on the World Wide Web (WWW) using HTML, Cascading Style Sheet (CSS), and Adobe Dreamweaver. Students gain hands-on experience in creating web pages that include text, images, sound, video, animation and basic JavaScript. The history of the Internet and WWW along with accessibility, universal design, responsive design, and careers in web development are also researched and explored.

Upon successful completion of this course, students should be able to:
Describe the history of the Internet and World Wide Web as a communication and marketing tool.
Identify the hardware, software, and networked environment necessary to support the development and maintenance of a website.
Use HTML elements to create web pages that include links, lists, multimedia, forms and tables.
Demonstrate the ability to manipulate images for inclusion in web pages.
Use basic JavaScript to add interactivity to web pages.
Use CSS to format and layout web pages.
Design websites to provide accessibility.
Design websites that apply universal design concepts.
Research and explore careers and education in web development.
Generate design and development documents for a website.
Demonstrate a working knowledge of standard HTML, and CSS to create web pages.
Demonstrate a working knowledge of responsive web design.
Use Adobe Dreamweaver to design and develop web pages.
Upload files to a web server and maintain websites on a web server.

3 Credits   3 Weekly Lecture Hours

IMM 200 UX Design

User experience (UX) design is a discipline concerned with all the elements that together make up the user interface, including layout, visual design, text, brand, sound and interaction. (Source: User Experience Professionals Association). This course introduces multi-device design strategies for navigation, screen layout, and interactive content. Learn how to apply interaction design principles to your apps and web sites to create experiences that are engaging, accessible and usable. Follow a user-centered design process for analyzing, planning, and designing user experiences. Map user needs to your proposed UX design solution with scenarios, storyboards and prototypes. Gain insight on how to incorporate accessibility into your design process to increase accessibility to all people, including those with disabilities.

Upon successful completion of this course, students should be able to:
Identify and apply an interactive design process model.
Design applications employing user-centered design techniques.
Analyze techniques for assuring compliance with accessibility guidelines.
Use rapid-prototyping tools to develop user interfaces that utilize interface design standards.
Apply visual principles such as layout, color, iconography, imagery and typography to maximize the UX experience.
Identify career paths, academic programs and training opportunities in the field of User Experience Design.

3 Credits   3 Weekly Lecture Hours

IMM 201 Audio and Video for Multimedia
This course provides students with the skills needed to create and edit digital audio and video. There is an emphasis on planning, copyright, workflow, digital capture, editing and delivery alternatives. Students learn to utilize audio and software to deliver professional audio and video for use in multimedia and web programs.
Upon successful completion of this course, students should be able to:
Research and evaluate legal issues involving copyright and multimedia production.
Identify equipment specifications for audio and video production.
Demonstrate proficiency in audio and video planning and acquisition.
Demonstrate the use of audio software to record and edit sound/music / voice.
Demonstrate the ability to capture analog and digital video.
Demonstrate the use of video software to record and edit digital video.
Demonstrate proficiency in audio and video output and dissemination.
Demonstrate how audio and video can be integrated with other elements such as texts, graphics, and animation for use in multimedia and web programs.
Create and package a multimedia project that incorporate audio and video.
3 Credits   3 Weekly Lecture Hours

NET - Network Engineering

NET 110 Network Communications
This course prepares students to have an overall view of the way computers communicate and the basics of networking. Key topics include networking standards, the OSI model, network protocols, transmission media, topologies, hardware, software, WANs and remote connectivity, security, managing and upgrading a network, and TCP/IP.
Upon successful completion of this course, students should be able to:
Describe and implement various network services and standards as related to the Open Systems Interconnection (OSI) model.
Demonstrate the ability to properly troubleshoot network connectivity problems.
Establish network security and various management practices.
Describe and install network connectivity devices and transmission media.
Define the topologies and how they work with each other.
Perform basic TCP/IP computations and perform troubleshooting utilizing various TCP/IP command line utilities.
Describe and implement common network protocols.
College Academic Learning Goal Designation: Information Technology (TC)
3 Credits   3 Weekly Lecture Hours

NET 115 Microsoft Windows
This course is designed to introduce students to setup and manage the current field accepted and supported Microsoft Windows client operating system. Students will gain experience in installing, configuring, and troubleshooting this enterprise level workstation operating system along with gaining the knowledge and foundation related to Microsoft's current vendor certification exams for this operating system.
Upon successful completion of this course, students should be able to:
Understand the current Windows operating system features and requirements.
Perform installations and upgrades of current Windows client operating systems.
Configure and manage virtual hard disks.
Configure IP addresses and network settings.
Configure and manage NTFS permissions to shares, folders, and files.
Configure and monitor Windows system performance.
Configure User Account Controls and Local Policies.
Configure Windows Firewall.
Configure Windows backup and recovery options.
Configure Windows mobility and remote access controls.
4 Credits   3 Weekly Lecture Hours
       2 Weekly Lab Hours

NET 116 Microsoft Hybrid Server: Core Infrastructure
This course is designed to teach students how to implement the core components of the current Microsoft Server operating system. Students will learn how to enable Windows Server to integrate with Azure Cloud. Students will gain hands-on experience with configuring Active Directory and objects, group policies, file and storage services, DNS, virtualization and containers, and hybrid network connectivity. This course helps prepare students to sit for the Testout Hybrid Server Pro Core certification exam and the Microsoft AZ-800 certification exam.
Upon successful completion of this course, students should be able to:
Plan and install the most recent Microsoft Windows Server operating system.

Install and configure the DNS server role.
Install and configure Active Directory.
Manage IP Addressing.
Implement and manage storage and file services.
Implement and manage virtualization and containers.
Plan and implement Group Policies.
4 Credits   4 Weekly Lecture Hours

NET 117 Microsoft Server: Networking
This course is designed for students who plan to support Microsoft Server 2016 and its various domain environment and networking services. Students will learn how to manage and configure DNS and TCP/IP on a Microsoft Server, how to install and configure a DHCP server, how to install and configure the Routing and Remote Access policies and Network Access policies in a Microsoft Server environment, as well as configuring NIC teaming. This course is designed to help students prepare for the current, related, directly maps towards and is a first step in helping students prepare for the Microsoft Server 2016 Networking 70-741 certification exam.
Upon successful completion of this course, students should be able to:
Manage and Configure DNS on a Microsoft Server.
Manage and Configure TCP/IP settings and addresses.
Install and Configure a Microsoft DHCP Server.
Install and Configure Routing and Remote Access on a Microsoft Server.
Implement and Manage Network Access Policies on a Microsoft Server.
Configure NIC Teaming on a Microsoft Server.
4 Credits   4 Weekly Lecture Hours

NET 125 Ethical Hacking
This course is designed to teach students how to identify common cyber and network attacks. Students will utilize current cyber and network administration software utilities in order to perform penetration testing, vulnerability assessments, and analyze network traffic. Students will configure network devices that help to prevent common cyber threats and provide network system and data security. This course is intended to help prepare students for the EC Council's Certified Ethical Hacker Certification exam.
Upon successful completion of this course, students should be able to:
Identify common penetration testing processes and types.
Identify current Social Engineering Techniques and Countermeasures.
Understand and perform vulnerability assessments.
Compare and contrast the various forms of Malware.
Analyze network traffic by utilizing current cyber and network administration tools.
Configure and manage Intrusion Detection systems.
Define and implement Wireless network device security.
Define and implement Cloud Security.
Define and implement Cryptography.
4 Credits   4 Weekly Lecture Hours

NET 142 Cyber and Network Security Concepts
This course gives the student the skills necessary to apply and implement secure network administration procedures and policies. Students will be able to identify common network threats and vulnerabilities, understand networking compliance and operational security, implement application, data and host security, manage access control, and perform stable cryptography implementations. This course is intended to help prepare students for the CompTia Security+ certification exam.
Upon successful completion of this course, students should be able to:
Explain the security function and purpose of network devices and technologies.
Apply and implement secure network administration principles.
Implement and use common protocols and default network ports.
Execute disaster recovery plans and procedures.
Analyze and differentiate among types of malware.
Analyze and differentiate among types of social engineering, wireless, and application attacks.
Analyze and differentiate among types of mitigation and deterrent techniques.
Implement assessment tools and techniques to discover security threats and vulnerabilities.
Explain the fundamental concepts and best practices related to authentication, authorization and access control.
Implement appropriate security controls when performing account management.
Use and apply appropriate cryptographic tools and products.
Implement Private Key Infrastructure, certificate management and associated components.
4 Credits   4 Weekly Lecture Hours

NET 200 Digital Forensics
This course is designed to teach the students the methods of digital computer forensics and investigation. Students will learn how to properly conduct a digital forensics investigation by navigating through each phase of the digital forensics analysis methodology. Computer forensics lab requirements will be introduced along with the practical aspects of identification, seizure, and transportation of gathered evidence. Anti-forensics techniques and how they may negatively affect the forensic investigation process are discussed. The main elements of a digital forensics investigative report are also discussed. Additional topics include acquiring digital evidence, analyzing digital evidence, Windows forensics analysis, web browser and e-mail forensics, and open source intelligence.
Upon successful completion of this course, students should be able to:
Differentiate digital forensics from other cyber security domains.
Research the characteristics and components of a physical forensics lab to determine implementation strategies and necessary costs.
Implement utilities to capture computer memory images.
Identify the nature of Anti-forensics techniques.
Explain the main elements of a final digital forensics investigative report.
3 Credits   3 Weekly Lecture Hours

NET 210 CCNA CISCO Network Support
In this course, students will learn how to select, configure, and troubleshoot Cisco networking devices. The course will also provide the student with fundamental knowledge of computer networking topics including Internetworking essentials, the OSI Model, and various networking protocols including TCP\IP. This course also helps to prepare students for the current CISCO Routing and Switching certification exams.
Upon successful completion of this course, students should be able to:
Explain the OSI Model and the concept of Layered Communications.
Analyze the fundamentals of bridging, switching, and wireless networks.
Analyze the fundamentals of security prevention and detection.
Describe Cisco network basics and the Cisco IOS.
Identify features and characteristics of various WAN protocols.
Apply commonly used Cisco automation tools.
Perform basic configuration tasks of Cisco routers and switches.
6 Credits   6 Weekly Lecture Hours

NET 230 Linux Operating Systems I
This course is designed to provide students the needed information and abilities to understand and support popular Linux operating systems. Major concepts included are Linux operating system installation, user and group management, Linux file systems and file system security, network connectivity, process and task management, and Linux software and package management. Additionally, this course directly relates to, and helps students prepare for, the current CompTIA Linux + certification exam.
Upon successful completion of this course, students should be able to:
Understand components of current Linux operating systems.
Implement a logical, organized, and secure file system.
Implement Linux console commands, services, and processes.
Perform Linux operating system installation.
Configure Linux operating system and software package updates.
4 Credits   4 Weekly Lecture Hours

NET 231 Microsoft Hybrid Server II
This course is designed to teach students how to implement the advanced components of the current Microsoft Server operating system. Students will learn how to further enable Windows Server to integrate with Azure Cloud. Students will gain hands-on experience with installing and configuring advanced Windows Server on-premises and hybrid infrastructures, managing failover clusters, performing server backups and recovery, migrating servers to Azure, and troubleshooting hybrid networking connectivity and virtual machines. This course helps prepare students to sit for the Testout Hybrid Server Pro Advanced certificate exam and the Microsoft AZ-801 certification exam.
Upon successful completion of this course, students should be able to:
Implement secure Windows Server on-premises and hybrid infrastructures.
Implement and manage Windows Server high availability.
Implement disaster recovery.
Migrate servers and workloads.
Monitor and troubleshoot Windows Server environments.
4 Credits   4 Weekly Lecture Hours

NET 236 Cyber Security Defense and Analysis
This course provides students with the advanced knowledge and skills to apply behavioral analytics to networks and devices in order to prevent, detect, and combat cybersecurity threats through continuous security monitoring. Major topics students will learn are threat and vulnerability management, software and systems security, cybersecurity compliance and assessment, cybersecurity operations and monitoring, and incident response. Additionally, this course helps prepare students for the current CompTIA Cybersecurity Analyst (CySA+) certification exam.
Upon successful completion of this course, students should be able to:
Apply proactive threat detection techniques.
Identify network vulnerabilities.
Explain software and hardware assurance best practices.
Apply security concepts in support of organizational risk mitigation.
Analyze and interpret network traffic and data.
Understand advanced electronic messaging concepts.
Understand advanced network security concepts.
Implement network configuration policies, procedures, and controls to improve security.
Apply appropriate incident response procedures.
4 Credits   4 Weekly Lecture Hours