

COMPUTER AND INFORMATION SCIENCE (CIS)

CIS 0800

Learning Computer Basics

3 Credit Hours

Prepares students for computer related courses that do not require a prerequisite and develops computer skills for personal or professional growth. Theory and practice are integrated through a combination of instructor-led lessons and mandatory, guided, self-paced practice exercises. Topics include hardware, word processing, math utilized in spreadsheets, presentation software, basic Internet use and e-mail. (3 lecture hours)

CIS 1110

Introduction to Informatics

2 Credit Hours

Prepares students for technological challenges prevalent in professions where human interaction is combined with information science, ethics, privacy, security, information processing, communication software, productivity software, and the transformation of data to information for decision making. (2 lecture hours, 1 lab hour)

Course types: Contemporary Life Skills (A.A., A.S., A.A.S., A.G.S.)

CIS 1120

The Internet

2 Credit Hours

Introduces the fundamental skills and knowledge needed to master and use the Internet. Provides an understanding of the concepts behind the Internet as a tool as well as hands-on activities using the Internet. Intended for a broad audience. (2 lecture hours)

Course types: Contemporary Life Skills (A.A., A.S., A.A.S., A.G.S.)

CIS 1130

Windows Basics

2 Credit Hours

Introduction to the Windows operating system and its Graphical User Interface (GUI). (2 lecture hours)

Prerequisite: Basic computer mouse skills.

Course types: Contemporary Life Skills (A.A., A.S., A.A.S., A.G.S.)

CIS 1140

Cloud Essentials

3 Credit Hours

Introduces a dynamic Web with cloud based applications providing the ability for people to collaborate. Covers legal and ethical concerns regarding responsible use of cloud based technology. Includes cloud computing concepts such as implementation, benefits and risks, and major service providers. Covers areas in preparation for current CompTIA Cloud Exam. (3 lecture hours)

Prerequisite: CIS 1110 or CIS 1120 or CIS 1150 or CIT 1100, with a grade of C or better or equivalent, or consent of instructor.

CIS 1150 (BUS 902)

Understand Computers/Information/Systems

3 Credit Hours

An overview of the computing field and its typical applications. Covers key terminology and components of computer hardware, software and operating systems. Other topics include systems development methods, management information systems, programming languages, communications, networks, application software, the Internet and career opportunities. Microcomputer applications include word processing, spreadsheet, database, and presentation software. (3 lecture hours, 1 lab hour)

Course types: Contemporary Life Skills (A.A., A.S., A.A.S., A.G.S.)

CIS 1160

Windows Command Shell

3 Credit Hours

An introduction to Windows Operating System file configuration, environment management, and task automation. Contains coverage of file system configuration, utilities, and security access. Open source command line and scripting utility software used in industry includes Microsoft PowerShell to effectively prepare students for working in a command driven Windows environment. Prior experience with mouse, keyboard, and general knowledge of Microsoft Windows recommended. (3 lecture hours)

CIS 1170

World of Data Science

1 Credit Hour

Students will develop an understanding of the world of data science by exploring how it applies to multiple disciplines such as business, engineering, technology, health science, medicine, social science, and education. Industry professionals will provide insights and practical applications in a seminar format. (1 lecture hour)

CIS 1180

Data Communication & Networking

3 Credit Hours

The course covers principles of wired and wireless network devices, configuration, and data network systems operation. Current technologies such as mobile, cloud, virtualization, industrial and enterprise networking are also covered in this course. Discuss options of industry certification exam. (3 lecture hours)

Prerequisite: CIS 1150 with a grade of C or better, or equivalent or CIS 1160 with a grade of C or better, or equivalent or consent of instructor.

CIS 1199

Introduction to Game Industry

3 Credit Hours

An introduction to video game industry and development. This course explores the history of games, the game development cycle, game careers, and the social impact of games. (3 lecture hours)

CIS 1200

Game Design

3 Credit Hours

This course introduces pre-production game design techniques. Topics include project scope, game genres, High Concept Documentation, game pitch, game deconstruction, game competitors, peer game design review, storytelling and narrative, character design, world building, game items/objects/equipment/vehicle design, User interface and User Experience (UI/UX), game flow, gameplay cores, game mechanics, game balancing methods, visual style, audio style, accessibility for the handicapped, game prototyping, Quality Assurance (QA), and Game Design Documentation (GDD). (3 lecture hours)

CIS 1201

Advanced Game Design

3 Credit Hours

This course covers advanced pre-production game design techniques. Topics include design principles, game loop and core mechanic flaws, in-game combat, in-game cameras, player/NPC movement, design proposal from Request For Proposal (RFP), pillars of game design, core loops, gameplay mechanics, narrative elements, product production phases, Game Design Documentation (GDD), game pitch, product presentations, and prototyping. (3 lecture hours)

Prerequisite: CIS 1200 with a grade of C or better, or equivalent or consent of instructor.

CIS 1205

Office Ste SOFTWARE and Integration

3 Credit Hours

Introduction to the integrative aspects of business suite software. Concepts related to the creation and editing of word processing, spreadsheet, database, and presentation files. Includes the principles of document integration as it relates to Microsoft Office suite applications as a decision-making tool with realistic business scenarios. This course prepares students for MOS Certification. (3 lecture hours)

Prerequisite: CIS 1110 with a grade of C or better, or equivalent or CIS 1130 with a grade of C or better, or equivalent or CIS 1150 with a grade of C or better, or equivalent or consent of instructor.

CIS 1211

2D Game Development

3 Credit Hours

Computer game development including player controls, sound, music and animation. Two-dimensional games will be created using game editors and development tools. Recommended courses: CIS 1200 and CIS 1400. (3 lecture hours)

CIS 1212

Game Asset Creation Ad File Optimization

3 Credit Hours

This course covers the most up-to-date methods in developing functional audio and visual assets for games, as well as file optimization, file conversion and asset porting techniques. Topics in game asset creation and file optimization include, functional 2D/3D asset creation, shaders, rigging, audio, file types, file conversions, file optimization, and file porting to game engines. (3 lecture hours)

CIS 1221

Data Analysis with Spreadsheets

3 Credit Hours

Introduction to spreadsheets. Organizing and analyzing numerical data for business decision making in statistical and financial analyses. This course includes spreadsheet preparation, design, creation, data calculation, manipulation, database, and visualization. (3 lecture hours)

CIS 1222

Business Intelligence Analysis and Visualization

3 Credit Hours

This course covers advanced spreadsheet features and analytical concepts for Business Intelligence (BI) applications. Students will learn customization, automation features, advanced data analysis, and BI tools. (3 lecture hours)

CIS 1230

Database Application

3 Credit Hours

Relational database management course including database design, database creation, database maintenance, form creation, report creation, query creation, and macro creation. Provides instruction in application development and programming using a representative database management package. (3 lecture hours)

CIS 1240

Presentation Graphics - Windows Based

2 Credit Hours

Introduction to the design and use of presentation graphics for microcomputers in a Windows-based environment. Includes basics of visual design, numeric charts, text charts, diagrams, organization charts, screenshow presentations and other advanced topics. (2 lecture hours)

Prerequisite: CIS 1110 or CIS 1130 or CIS 1150 or consent of instructor.

CIS 1250

Intro to Project Management Software

2 Credit Hours

Introduction to project management software to effectively control project development. Topics covered include application of software in planning, timelines, communication, resources, and costs. (2 lecture hours)

Prerequisite: CIS 1150 or consent of instructor.

CIS 1270

IT Proposals and Presentations

2 Credit Hours

Introduces tools and techniques used to develop and present effective proposals for IT projects. Audience identification, stakeholder classification and decision making criteria will be covered.

Recommended: CIS 1150 with a grade of C or better, or equivalent. (2 lecture hours)

CIS 1300

Web Design Software

3 Credit Hours

Creation of Web sites using Web design software such as DreamWeaver or FrontPage. Topics include Web site design, styles, graphics, tables, frames, forms, and layers. (3 lecture hours)

Prerequisite: CIS 1120 and CIS 1130 or CIS 1150 or consent of instructor.

CIS 1310

HTML and CSS

3 Credit Hours

Creation of effective web pages using Hyper Text Markup Language (HTML) and Cascading Style Sheets (CSS). Includes web page and web site design concepts and preparation of graphics for the web. Primary focus on implementation of web design. Completion of CIS 1110 and CIS 1150 is recommended. (3 lecture hours)

CIS 1400***Programming Logic and Technique***

4 Credit Hours

An introduction to computer-based problem-solving techniques. Includes software design tools such as structure charts, Input Processing Output (IPO) charts, flowcharts, pseudocode, Unified Modeling Language (UML) diagrams, and Graphical User Interface (GUI) wireframe prototypes. Concepts such as documentation, structured design, modularity, Object Oriented Program (OOP) design, and event driven programming are covered. Programming of algorithms are implemented using a high level language that emphasize structured and object oriented design techniques. (4 lecture hours)

Prerequisite: MATH 0482 with a grade of C or better, or equivalent or MATH 1115 with a grade of C or better, or equivalent or a qualifying score on the mathematics placement test or consent of instructor.

Course types: Contemporary Life Skills (A.A., A.S., A.A.S., A.G.S.)

CIS 1410***Introduction to Human Computer Interaction***

3 Credit Hours

Introduction to basic concepts in theory and practice of (HCI) Human Computer Interaction, a discipline concerned with design, implementation, and evaluation of interactive computing systems for human use. Emphasis is on the structure of communication between consumers and computers, capabilities of people to use computers, and concerns that arise in the process of designing and building interfaces between humans and computers. Particular focus is placed on practical design and usability between people and computing systems. (3 lecture hours)

Prerequisite: CIS 1400 or equivalent.

CIS 1450***Intro to Linux/Unix Operating Systems***

3 Credit Hours

Introduction to Linux/Unix, a multi-user, multi-processing, interactive, real time operating system. Emphasis on building a foundation to understand and effectively use the filesystem, utilities, and processes in a command line shell environment. Practical demonstration of operating system concepts in the Linux operating system. (3 lecture hours)

Prerequisite: CIS 1150 or CIS 1160 or CIT 1122 or equivalent or consent of instructor.

CIS 1510***Graphical User Interface Programming***

4 Credit Hours

Introduction to event-driven programming in the Windows environment and design techniques used to create the Windows Graphical User Interface (GUI). Includes program design, program syntax and control structures, forms and controls. (4 lecture hours)

Prerequisite: CIS 1130 and CIS 1400 or consent of instructor.

CIS 1600***Fundamental Principles Operating Systems***

3 Credit Hours

Fundamental principles of operating systems, process execution, scheduling, memory management, concurrent processes, distributed processing, deadlock, security, and related topics. Also examines current microcomputer, mid-range computer, and mainframe operating systems. The following courses are strongly recommended: CIS 1130 and CIS 1160. (3 lecture hours)

CIS 1610***Windows Client OS***

3 Credit Hours

Introduces theoretical and practical concepts of local area network on the Microsoft Windows desktop Operating System (OS). Includes installing and configuring the client OS, administering users, managing devices, organizing file system, establishing security, and installation and configuration of networking components. Covers network and performance monitoring tools provided by the OS and the establishment of baselines to troubleshoot problems. This course may be taken four times for credit as new versions are released. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1180 with a grade of C or better, or equivalent or consent of instructor.

CIS 1620***Windows Server OS***

3 Credit Hours

Introduces administration of the Windows server Operating System (OS). Includes installing and configuring server operating system, planning security, installing applications, backing up file system, using utilities, managing users, setting network printers, and troubleshooting. Also includes Terminal Services (TS) administration and Network Monitor installation and configuration as well as system recovery functions. This course may be taken four times for credit as new versions are released. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1610 with a grade of C or better, or equivalent or consent of instructor.

CIS 1630***Windows Server Active Directory (AD)***

3 Credit Hours

Advanced administrative course for Windows server, Active Directory Services (ADS) on the Windows network operating system. Includes network administration tasks and tools, management of user and group accounts, organization of shared folders, management of ADS, policy, security, and installation and management of Trees and Forests. This course may be taken four times for credit as new versions are released. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1620 with a grade of C or better, or equivalent or consent of instructor.

CIS 1640***Cybernetic Safety and Security***

3 Credit Hours

An overview of aspects of cybernetic safety and security including business, policy and procedures, communications security, network security, security management, legal issues, political issues, conduct computer security audits, and technical issues. Discussion of new risks, threats, and vulnerabilities associated with the transformation to a digital world. Utilize industry leading procedures for protecting, preventing, and tracking cyber-attacks. Discuss options of industry certification exam. (3 lecture hours)

CIS 1655***AI Technical Essentials***

3 Credit Hours

This course surveys Artificial Intelligence (AI) techniques, theories, and applications. It explores machine learning, Computer Vision (CV), Natural Language Processing (NLP), and AI applications. Exposes students to AI project cycles and decision making. Students will be introduced to various social issues and concerns surrounding AI such as ethics and bias, and demonstrate AI in action with a mini project. (3 lecture hours)

CIS 1660***Managing Microsoft Windows Server Network***

3 Credit Hours

Administration course for managing a Microsoft Windows Server network. Includes configuration, administration, and troubleshooting elements ranging from user accounts to server security. Covers how to create and manage network resources such as file, print and web resources as well as Active Directory (AD) objects. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1620 or equivalent or consent of instructor.

CIS 1670***Planning a Microsoft Win Server Network***

3 Credit Hours

Administration course for planning a Microsoft Windows Server network. Includes overview of network services. Plan for a network infrastructure, network data flow, configuration of routing and switching, Dynamic Host Configuration Protocol (DHCP), and Domain Name Services (DNS). Covers security, network access, server availability, certificates, and problem recovery. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1620 or equivalent or consent of instructor.

CIS 1820***Selected Topics***

1-3 Credit Hours

Introductory exploration and analysis of selected topics with a specific theme indicated by course title listed in college class schedule. This course may be taken four times for credit as long as a different topic is selected each time. Prerequisites will vary depending upon the course contents. Skills attained in prerequisites are necessary for successful completion of the course. (3 lecture hours)

CIS 1840***Independent Study***

1-4 Credit Hours

Exploration and analysis of topics within the discipline to meet individual student-defined course description, goals, objectives, topical outline and methods of evaluation in coordination with and approved by the instructor. This course may be taken four times for credit as long as different topics are selected. (1 to 4 lecture hours)

Prerequisite: Consent of instructor is required.

CIS 2211***2D Game Scripting***

3 Credit Hours

Introduction to 2D game development using a scripting language. Topics include sprite control, keyboard, mouse, controller, game play, and control of non-playable characters. (3 lecture hours)

Prerequisite: CIS 1211 with a grade of C or better, or equivalent or consent of instructor.

CIS 2212***3D Game Development***

4 Credit Hours

Course covers three-dimensional. (3D) game development. Students will use 3D game engines and development tools to create fully playable games from design documentation through published executable. Topics to include but not limited to level design documentation, player parameters, perspective views, controls, level creation, terrain, materials, lighting, collision, level streaming, event driven logic, gameplay objectives, artificial intelligence, equipment logic, pickup logic, and graphical user interface. Recommended: CIS 1211 with a grade of C or better or equivalent and CIS 1212 with a grade of C or better or equivalent. (4 lecture hours)

CIS 2214***Augmented Reality and Virtual Reality Development***

4 Credit Hours

This course introduces students to the design and development of augmented reality (AR) and virtual reality (VR) software applications. Students will learn about how AR and VR hardware functions, and will utilize industry standard software tools to build software for lab and consumer use. (2 lecture hours, 4 lab hours)

Prerequisite: CIS 1400 with a grade of C or better, or equivalent.

Recommended: CIS 2212 and CIS 1410, both with a grade of C or better, or equivalent.

CIS 2220***Game Programming Using C++***

3 Credit Hours

Game programming using C++ libraries to create Windows-based games and simulators. Topics include player controls, sound, music, and animation. (3 lecture hours)

Prerequisite: CIS 2542 with a grade of C or better, or equivalent or consent of instructor.

CIS 2230***Simulation and Serious Game Design***

3 Credit Hours

Introduction to simulation and serious game design which may include military, academic, medical, and training applications. (3 lecture hours)

Prerequisite: CIS 1201 with a grade of C or better, or equivalent or consent of instructor.

CIS 2250***Multiplatform Game Programming***

3 Credit Hours

Game programming for multiplatform development. Topics include player controls, sound, music, and animation. (3 lecture hours)

Prerequisite: CIS 2541 or CIS 2561 or equivalent.

CIS 2252***Advanced Multiplatform Game Programming***

3 Credit Hours

Advanced programming for multiplatforms such as consoles, phones, tablets, and/or hand-held devices. (3 lecture hours)

Prerequisite: CIS 2250 or equivalent.

CIS 2290***Game Development Capstone Project***

4 Credit Hours

This course provides students with a real-life experience where students will design and develop marketable games from conceptual design through marketable build using industry methodologies and development process that may include agile development process and Scrum methodologies. Topics in Pre-Production, Production, and Post-Production phases will be covered. (4 lecture hours)

Prerequisite: CIS 1211 with a grade of C or better, or equivalent and CIS 2212 with a grade of C or better.

CIS 2320**JavaScript Programming**

4 Credit Hours

This course covers the fundamentals of European Computer Manufacturers Association ECMAScript (ESX) which JavaScript is based on. Also covers data types from primitives to objects, as well as operators and expressions. Includes values, types, operators, program structures, control flow, functions, event handling, windows, form validation, animation, cookies, debugging and Regular Expressions (RegEx). (4 lecture hours)

Prerequisite: CIS 1310 and CIS 1400, or equivalents, or consent of instructor.

CIS 2321**Advanced JavaScript Programming**

4 Credit Hours

Covers exploration of advanced objects, arrays, de-structuring, Spread and Rest. Includes generators, exception handling, storage (Local, Cookies, Session and offline). Topics also include Asynchronous JavaScript and XML (Ajax), Promises (fetch), XMLHttpRequest, Proxies, JavaScript Object Notation (JSON), Sets and Maps. (4 lecture hours)

Prerequisite: CIS 2320 with a grade of C or better, or equivalent.

CIS 2330**Introduction to XML**

3 Credit Hours

An exploration of extensible Markup Language (XML) Web technology, highlighting the power of XML to structure data without regard to how the data will be presented. (3 lecture hours)

Prerequisite: CIS 1310 or consent of instructor.

CIS 2331**Advanced XML**

3 Credit Hours

Advanced study of eXtensible Markup Language (XML) Web technology. Covers latest XML technologies relating to XML document validation, query and processing. Also includes formal XML data models, XQuery, XSLT, and Document Object Model (DOM). (3 lecture hours)

Prerequisite: CIS 2330 with a grade of C or better, or equivalent or consent of instructor.

CIS 2332**Game Animation**

3 Credit Hours

Course covers animating for gameplay and in-game cutscenes. Students will design storyboards and translate them into complete animations to be used in gameplay and in-game cutscenes. Topics to include but not limited to storyboarding, rigging, particle effects, audio cues, animation states, in-game camera movements/effects, post process effects, lighting, and in-game cutscene creation. Credit cannot be earned for both CIS 2332 and MPTV 2332. (1 lecture hour, 4 lab hours)

Prerequisite: MPTV 2331 with a grade of C or better or equivalent, or CIS 1212 with a grade of C or better or equivalent, or consent of instructor.

CIS 2335**AJAX**

4 Credit Hours

Advanced study in AJAX (Asynchronous JavaScript and XML) web development. Emphasis is on understanding and implementing basic AJAX techniques to develop highly responsive web pages. Students will examine the use of essential client-side libraries to implement AJAX applications that enhance the user experience and support effective application architecture. (4 lecture hours)

Prerequisite: CIS 2320 with a grade of C or better, or equivalent and CIS 2330 with a grade of C or better, or equivalent or consent of instructor.

CIS 2340**Common Gateway Interface (CGI)/Perl**

4 Credit Hours

Introduction of CGI/Perl, a portable cross-platform, object-based scripting language using the Unix/Linux platform to write Perl scripts and use modules from the Perl module library. Includes simple data types, standard and file input/output, flow control, lists and arrays, regular expressions, subroutines and functions, objects and modules, Perl Database Interface (DBI), process management, security, and introduction to the Common Gateway Interface (CGI) and client-server applications. (4 lecture hours)

Prerequisite: CIS 1450 and any CIS 2000-level programming language or consent of instructor.

CIS 2350**Introduction to ASP.NET**

4 Credit Hours

Introduction to web server programming. Includes server programming models, processing forms, creating dynamic web applications, working within the server application environment, debugging web applications, integrating with the file system and other components, interacting with data sources and other web services, using server programming tools, and developing web server applications. (4 lecture hours)

Prerequisite: CIS 1310 and CIS 1400 or consent of instructor.

CIS 2360**Intro to PHP Programming Language**

4 Credit Hours

Introduces students to the PHP scripting language. Covers history of PHP and compares PHP with dynamic content alternatives such as Perl and CGI. Covers creation of basic PHP scripts, self referring forms, HTTP headers, passing of PHP variables via the URL, debugging, PHP functions, PH flow control and configuration. (4 lecture hours)

Prerequisite: CIS 1400 with a grade of C or better, or equivalent or consent of instructor.

CIS 2420**Microprocessor Assembly Language**

4 Credit Hours

Introduction to the Assembly language of the Intel microprocessor-based microcomputer. Includes the architecture of the microprocessor, the instruction set, memory organization, data representation, and data manipulation. Recommended: Any computer programming experience. (4 lecture hours)

CIS 2440***Shell Programming for Unix/Linux***

3 Credit Hours

Introduction to shell programming. Covers a variety of popular shells used in both UNIX and LINUX operating systems. Includes file security and permissions, filename substitution, shell standard input and output, redirection, file input and output, regular expressions, utilities such as grep, awk, sed and the login environment. Emphasis on shell programming, user defined and shell variables, flow control structures, shell functions, shell built-in commands, and the writing and executing of shell scripts. (3 lecture hours)

Prerequisite: CIS 1450 and any CIS 2000 level-programming language course.

CIS 2455***LINUX System Administration***

3 Credit Hours

Contemporary Linux operating system administration and maintenance course. Emphasizes Linux system installation, management, user account control, file system and services, storage management, system performance, and security. Covers concepts of current Linux industry certification exams. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1450 or equivalent or CIT 1450 or equivalent, or consent of instructor.

CIS 2470***Web Connected Devices***

3 Credit Hours

Introduction to Web of Things (WoT) architecture for communication with devices on the Internet. Topics include Internet of Things (IoT) technology, common IoT applications, and strategies for uniform access to web connected devices. Construction of simple web interfaces practiced with a single-board computer connected to sensors on a network. Basic remote sensor data presentation using Representational State Transfer (REST) architecture and JavaScript Object Notation (JSON) protocols. (3 lecture hours, 1 lab hour)

Prerequisite: CIS 1450 and CIS 2320, both with a grade of C or better or equivalent, or consent of instructor.

CIS 2471***Building Internet of Things (IoT) Devices***

3 Credit Hours

Creation of connected devices on Internet using single-board computers with attached sensors. Topics include Internet of Things (IoT) architecture, single-board computers, sensors, software configuration, and remote device access. Students will design, implement, and test a web connected sensor device on a single-board computer applying IoT principles and using web programming languages. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1180 or CIT 1116 with a grade of C or better or equivalent; and CIS 2470 and CIS 2531, both with a grade of C or better or equivalent; or consent of instructor.

CIS 2485***C++ for Science and Engineering***

3 Credit Hours

Development and application of the C++ language. Emphasis on object-oriented design, programming and documentation of scientific applications. Includes statistical analysis, curve fitting, optimization and engineering, and scientific modeling applications. Topics include language format and syntax, functions, data-storage classes, arrays, structures, introduction to user-defined classes, inheritance and polymorphism. (3 lecture hours)

Prerequisite: MATH 2231 or college equivalent.

CIS 2510***Adv Graphical User Interface Programming***

4 Credit Hours

Advanced topics in event driven programming in the Windows environment. (4 lecture hours)

Prerequisite: CIS 1510 or consent of instructor.

CIS 2531***Introduction to Python Programming***

4 Credit Hours

Introduces the object-oriented programming language of Python. Course focuses on features of Python and develops skills for creating object oriented applications. (4 lecture hours)

Prerequisite: CIS 1400 with grade of C or better, or equivalent, or consent of instructor.

CIS 2532***Advanced Python Programming***

4 Credit Hours

This covers advanced Python Programming Language features with an emphasis on the implementation of data structures and exploration of the large standard libraries. This course also covers practical data science, web app development, and optimization. (4 lecture hours)

Prerequisite: CIS 2531 with grade of C or better, or equivalent, or consent of instructor.

CIS 2541 (CS 911)***C++ Language Programming***

4 Credit Hours

Introduces C++ Language Programming, an object-oriented programming language. Includes C++ data types, operators, expressions, control structures, functions, arrays, pointers, strings, Abstract Data Types (ADTs), classes, inheritance, polymorphism, virtual functions and file input/output. Emphasis on building the foundation to understand the capabilities of the C++ programming language and the skills to develop practical procedural and object-oriented applications. (4 lecture hours)

Prerequisite: CIS 1400 or consent of instructor.

CIS 2542 (CS 912)***Adv C++ With Data Structure Application***

4 Credit Hours

Covers advanced C++ Programming Language features with data structure applications. Includes object-oriented applications using classes, inheritance, encapsulation, polymorphism and other advanced C++ language features. Emphasis on the use of vectors, pointers, dynamic memory, lists, iterators, stacks, queues, linked lists, binary trees, associative containers, hashing, sequential file access, direct file access, recursive algorithms, sorting and searching techniques. (4 lecture hours)

Prerequisite: CIS 2541 or consent of instructor.

CIS 2551***Introduction to MS Visual C++ .NET Prog***

4 Credit Hours

Introduction to Visual C++ Graphical User Interface (GUI) programming, the Microsoft .NET Visual Studio, .NET Framework Library, and the Common Language Runtime (CLR). Includes Visual C++ Managed Extensions, control structures, methods, arrays, classes, Active Server Pages (ASP) .NET Web Services, database access, GUI windows forms, windows control, event handling/delegates, files and streams, multithreading, namespaces and assemblies. Emphasis is on building the foundation necessary to thoroughly understand the capabilities of .NET and object-oriented, event-driven client/server GUI software development. (4 lecture hours)

Prerequisite: CIS 2542.

CIS 2552***Object-Oriented Program Development With***

4 Credit Hours

Introduction to application development using Visual C++ .NET. Includes client/server model, the common object model, Active Template Library (ATL) components, Active Template Library servers, Active Data Object (ADO) and Object Data Base Connectivity (ODBC) technologies, Internet programming, Visual Basic integration, C# integration, managed and unmanaged C++, and Extensible Markup Language (XML) services. The Unified Modeling Language (UML) is introduced as a design tool. (4 lecture hours)

Prerequisite: CIS 2551 or consent of instructor.

CIS 2561***Introduction to C# .NET***

4 Credit Hours

Introduction to C# .NET (pronounced C-sharp dot NET), an object-oriented, Graphical User Interface .NET programming language. Designed to introduce the .NET platform, the .NET Framework Library, C# control structures, methods, arrays, object-oriented programming, graphical user interface, strings, regular expressions, graphics, files, streams and data base access. Emphasis is on building the foundation necessary to understand the capabilities of the C# programming language and the skills to develop Internet and World-Wide-Web based client/server applications. (4 lecture hours)

Prerequisite: CIS 1510 or CIS 2541 or consent of instructor.

CIS 2562***Advanced C# Programming***

4 Credit Hours

Covers advanced C# programming language features with data structure applications. Includes object oriented applications using classes, inheritance, encapsulation, polymorphism, and other advanced features. Emphasis on the use of Windows Communication Foundation (WCF) Web Services, rich Internet applications, multimedia, data structures, generics, collections, and ASP.NET. (4 lecture hours)

Prerequisite: CIS 2561 with a grade of C or better, or equivalent or consent of instructor.

CIS 2571***Introduction to Java***

4 Credit Hours

Introduction to object-based problem solving in the Java language. Includes encapsulation, class design, objects, polymorphism, and Graphical User Interface (GUI) components. (4 lecture hours)

Prerequisite: CIS 1400 with a grade of C or better, or equivalent or consent of instructor.

CIS 2572***Collections in Java***

4 Credit Hours

Development of applications using the Java language. Emphasis on applications involving exception handling, images, animation, files, streams, recursion, generics, collections, containers, menus, toolbars, borders, layout managers, graph applications and data structures. (4 lecture hours)

Prerequisite: CIS 2571 with a grade of D or better, or equivalent or consent of instructor.

CIS 2573***Advanced Java Technologies***

4 Credit Hours

Development of applications using advanced Java technologies, including observers, multi-document interfaces, model-view-controllers, multi-threading, networking, Remote Method Invocation (RMI), Java Beans, Java database connectivity, servlets, and Java Server Pages (JSP). (4 lecture hours)

Prerequisite: CIS 2572 with a grade of D or better, or equivalent or consent of instructor.

CIS 2590***Swift Programming Language***

4 Credit Hours

An introduction to programming in the Swift language. Topics include variables, constants, strings, operators, collections, memory management, protocols, and protocol extensions. (4 lecture hours)

Prerequisite: CIS 1400 with a grade of C or better or equivalent or consent of instructor.

CIS 2591***Objective C***

4 Credit Hours

Introduction to Objective-C programming language. Students will use XCode to enter, develop, and debug their programs under Mac OSX for iPhone/iPad application development. (4 lecture hours)

Prerequisite: CIS 1400 with a grade of C or better, or equivalent or consent of instructor.

CIS 2592***iOS Application Development***

4 Credit Hours

An introduction to iOS application development includes the project flow of design through the deployment of iOS mobile applications. Students will learn to design a simple yet marketable iOS mobile application and develop it so that it is ready for deployment to an app store. Current industry-standard iOS environments are used for application design and development. (3 lecture hours, 2 lab hours)

Prerequisite: CIS 2590 with a grade of C or better or equivalent, or consent of instructor required. CIS 1410 recommended.

CIS 2593***Android Application Development***

4 Credit Hours

An introduction to Android application development includes the project flow of design through the deployment of Android mobile applications. Students will learn to design a simple yet marketable Android mobile application and develop it so that it is ready for deployment to an app store. Current industry-standard Android environments are used for application design and development. (3 lecture hours, 2 lab hours)

Prerequisite: CIS 2571 with a grade of C or better or equivalent, or consent of instructor required. CIS 1410 recommended.

CIS 2594***Advanced iOS Application Development***

4 Credit Hours

Advanced topics in iOS application development builds upon mobile applications developed in the iOS Application Development course to include advanced services such as client-server protocols, Fetch API, notifications, database integration, location-based services, 3D graphics, and Augmented Reality (AR). Current industry-standard iOS environments are used for application design and development. (3 lecture hours, 2 lab hours)

Prerequisite: CIS 2592 with a grade of C or better or equivalent, or consent of instructor required.

CIS 2595**Advanced Android Application Development**

4 Credit Hours

Advanced topics in Android application development builds upon mobile applications developed in the Android Application Development course to include advanced services such as client-server protocols, Fetch API, notifications, database integration, location-based services, 3D graphics, and Augmented Reality (AR). Current industry-standard Android environments are used for application design and development. (3 lecture hours, 2 lab hours)

Prerequisite: CIS 2593 with a grade of C or better or equivalent, or consent of instructor required.

CIS 2610**Network Security**

3 Credit Hours

Advanced administration course for Network Security on the Windows network operating system. Includes basics of Firewall, Intrusion Detection (IDS), virus scanning, attack/prevention methodologies, advanced security scenarios, Virtual Private Network (VPN), remote access, wireless security, security policy, and Microsoft security solutions. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1630 with a grade of C or better, or equivalent or consent of instructor.

CIS 2620**Exchange Server**

3 Credit Hours

Advanced administration course of Exchange Server, the mail system on the Windows network operating system. Includes installation and configuration of basic Exchange Server features, various Outlook clients, and advanced Exchange Server features. Create, publish and manage public folders, monitor Exchange Server performance and status, integrate Exchange with Microsoft Mail, setup and configure Exchange/Internet security, and setup and maintain users and distribution lists. This course may be taken four times for credit as new versions are released. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1620 with a grade of C or better, or equivalent or consent of instructor.

CIS 2630**MS SQL Server Administration**

3 Credit Hours

Administration course for Microsoft Standard Query Language (MS SQL) Server, database system on Windows server network operating system. Includes installation and configuration of SQL Server, configuration of SQL Extensible Markup Language (XML) support in Internet Information Server (IIS), enterprise manager, and creating databases. Covers SQL database structure, physical data storage, transaction architecture, query analyzer, import and export data, profiler, bulk copy program, data transformation services, and replication. This course may be taken four times for credit as new versions are released. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1620 with a grade of C or better, or equivalent or consent of instructor.

CIS 2640**Introduction to Machine Learning (ML)**

4 Credit Hours

This course introduce students to a sub-field of Artificial Intelligence (AI), Machine Learning (ML) with analysis of big data. Discusses classic unsupervised, supervised, and reinforcement learning methods used in the field of data classification, clustering, and optimization. This includes k-means, hierarchical clustering, self-organizing maps, linear regression, decision trees, Naïve Bayes, and optimization techniques such as genetic algorithms. It will also cover accessing interesting datasets, ideas on how to collect data from users, and many different ways to analyze and understand the data once found. (3 lecture hours, 2 lab hours)

Prerequisite: MATH 1635, CIS 1655, and CIS 2532 with a grade of a C or better, or equivalent, or consent of instructor.

CIS 2641**Introduction to Natural Language Processing (NLP)**

4 Credit Hours

Natural language processing (NLP) is having a rapidly growing presence in everyday lives. NLP is about how computers work with human language. This course provides students with the most widely used techniques, strategies, and tools for NLP. The primary focus will be on the tools available with Python programming language. Evaluates new digital methodologies in contrast to traditional approaches to structure, historical development and relationships of language analysis. Students acquire knowledge and experience on using Python to conduct textual and linguistic analyses. (3 lecture hours, 2 lab hours)

Prerequisite: MATH 1635, CIS 1655, and CIS 2532 with a grade of a C or better, or equivalent, or consent of instructor.

CIS 2650**MS SharePoint Portal**

3 Credit Hours

Administrative course for a local intranet system based on Microsoft SharePoint Portal. This course covers tasks in planning, installing, configuring, and maintaining an intranet site. This course may be taken four times for credit as new versions are released. (2 lecture hours, 2 lab hours)

Prerequisite: CIS 1620 with a grade of C or better, or equivalent or consent of instructor.

CIS 2710**Database Management**

4 Credit Hours

Surveys micro, mini and mainframe database (DB) systems including physical and logical structures, data languages, and database design and administration. Includes client/server, Internet DB environments, data warehousing, Object-Oriented data modeling, On-line Analytic Processing (OLAP) and DB development. DB commercially available database systems are discussed and hands-on experience is given using a specific database system. (4 lecture hours)

Prerequisite: Any college-level programming class or consent of instructor.

CIS 2720**Structured Query Language (SQL) I**

3 Credit Hours

Introduction to Structured Query Language (SQL) programming. Includes concepts of relational databases and SQL programming commands. Uses SQL statements to create and maintain database objects. One or more DataBase Management Systems (DBMS) are used. No prior SQL programming knowledge is required. (3 lecture hours)

Prerequisite: CIS 1230 and CIS 2710 or equivalent, or consent of instructor.

CIS 2725***Enterprise SQL Application***

3 Credit Hours

Application of Structured Query Language (SQL) command statements on a vendor-specific Enterprise Database Management System (DBMS). Creation, maintenance and deployment of a database in an enterprise network environment. Covers writing stored procedures, triggers, Windows applications, Web applications. Essential Administrative information for developers is also introduced. (3 lecture hours)

Prerequisite: CIS 2720 or equivalent, or consent of instructor.

CIS 2730***Enterprise Database Development***

3 Credit Hours

Apply Structured Query Language (SQL) command statements on a vendor-specific Enterprise Database Management System (DBMS). Creation, maintenance and deployment of a database in an enterprise network environment. Essential administrative information for developers is also introduced. (3 lecture hours)

Prerequisite: CIS 2720 or equivalent, or consent of instructor.

CIS 2735***Data Analytics and Visualization***

4 Credit Hours

Focus of this course is to correctly use existing software products and gain an overview of current analytics tools in Business Intelligence (BI). Through hands-on assignments and projects, this course teaches students to build insightful and interactive dashboards using a variety of data sources. This hands-on course is designed for database professionals, data analysts, and professionals in business, social, health, and engineering fields. (4 lecture hours)

CIS 2770***Introduction to System Analysis & Design***

3 Credit Hours

Explores the planning, analysis, design, and implementation of computer-based information systems and software applications. Particular focus is placed on planning and workflow using contemporary and traditional system development life cycle (SDLC) phases and contemporary project management methodologies. Topics include soliciting requirements, creating textual and graphical models of functional requirements, design considerations for functional and object-oriented development, project management tools, requirements gathering techniques, process specifications and design, effective input and output design, normalized database design, user interface design, and test plan development. (3 lecture hours)

Prerequisite: ENGLI 1101 or ENGLI 1105 and CIS 1400, or equivalent, or consent of instructor.

CIS 2775***Information Technology Project Management***

3 Credit Hours

Introduces principles of Project Management as defined by the Project Management Institute (PMI). Students gain hands-on experience with information technology project management procedures to increase basic familiarity with state-of-the-art project management processes. (3 lecture hours)

Prerequisite: CIS 1400 with a grade of C or better, or equivalent or consent of instructor.

CIS 2790***Software Development Capstone Project***

4 Credit Hours

Capstone course combines a range of topics integral to specification, design, implementation, and testing of medium-scale software systems. Focus is on demonstrating software development concepts within an agile Software Development Lifecycle (SDLC) framework. Students apply project management tools within small teams to propose software development projects highlighting human computer interaction (HCI), professionalism, teamwork, and ethical responsibilities throughout the SDLC. Each team presents a functioning software prototype that can be incorporated into a student's portfolio. Recommended for students in their final semester of Software Development AAS Degree. (3 lecture hours)

Prerequisite: Consent of instructor.

CIS 2840***Experimental/Pilot Class***

1-6 Credit Hours

Exploration and analysis of topics within the discipline. This course is used to pilot a proposal for a permanent discipline course. This course may be taken four times for credit as long as different topics are selected. (1 to 6 lecture hours)

Prerequisite: At least one course in the CIS discipline.

CIS 2860***Internship (Career & Technical Ed)***

1-4 Credit Hours

Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. (5 to 20 lab hours)

Prerequisite: Consent of instructor and 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the dean from the academic discipline where the student is planning to earn credit.

Course types: Contemporary Life Skills (A.A., A.S., A.A.S., A.G.S.)

CIS 2865***Internship Advanced (Career & Tech Ed)***

1-4 Credit Hours

Continuation of Internship (Career and Technical Education). Course requires participation in Career & Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. (5 to 20 lab hours)

Prerequisite: Consent of instructor and 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the dean from the academic discipline where the student is planning to earn credit.

Course types: Contemporary Life Skills (A.A., A.S., A.A.S., A.G.S.)