Computer Information Systems (CIS)

Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

CIS 1000  Computer Literacy  1 Credit Hour
English/ESL Placement: Placement into ENG 1055 or higher (or placement into ESL 1011 or higher for students taking the ESL sequence of courses.)

Note: DUE TO FEDERAL REGULATION THIS COURSE IS NOT ELIGIBLE FOR FEDERAL FINANCIAL AID.

Students will be provided an understanding of fundamental computer concepts and personal computer operation. Students will utilize a personal computer to acquire basic skills necessary to power up a computer and access common computer programs. Topics to be covered include elementary word processing, system commands and operation, and general computer concepts. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 3

CIS 1050  Personal Computer Productivity Tools  4 Credit Hours
Equivalent: DPR 1030 | DPR 1010
English/ESL Placement: Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

Students will be introduced to the essentials of personal computer usage. Students will explore and utilize software products such as business graphics, Internet usage, spreadsheets, databases, and word processing. Material in this course will assist students in the use of common desktop productivity tools used by most other disciplines. Refer to the specific section using OCC's online system for the software package being used. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4

CIS 1060  Personal Computer Spreadsheet Concepts  3 Credit Hours
Equivalent: DPR 1060
English/ESL Placement: Placement into ENG 1510 or ESL 2520.

Students will use a personal computer spreadsheet package to solve problems and develop solutions that lend themselves to the spreadsheet environment. Topics covered include spreadsheet menus, macros, charting, importing data files, graphics facilities, data tables and creating web pages. Refer to the specific section using OCC's online system for the software package being used. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 3

CIS 1070  Personal Computer Presentation Concepts  3 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.

Students will utilize a personal computer presentation package to create software-based slide show presentations. Topics covered include planning an effective slide presentation; creating and editing a presentation by adding, deleting and modifying slides and slide content; creating tables and charts; using design templates; adding transition, animation and sound effects; and inserting clip art. Linking and embedding objects from other programs, setting up a self-running presentation and setting up a presentation to run on another computer will also be covered. Refer to the specific section using OCC's online system for the software package being used. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 3

CIS 1080  Personal Computer Database Concepts  3 Credit Hours
Equivalent: DPR 1080
English/ESL Placement: Placement into ENG 1510 or ESL 2520.

Students will use a personal computer database package to implement database solutions in common application areas involving personal computers. Topics covered include relational database concepts, menus, queries, report writing features, screen design, importing and exporting data files, macros and creating hyperlinks and web pages. Refer to the specific section using OCC's online system for the software package being used. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 3

CIS 1090  Web Graphic Concepts  3 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.

This course will introduce students to the fundamental concepts, techniques and tools for understanding, creating and manipulating graphics (image files) suitable for use on web pages. Students will learn to use a graphics editor to create image based web components such as banners, buttons, GIF animation, splash page graphics, montages and will also learn to integrate those components to create an overall interface for a website. Students will learn about file formats, image compression techniques, web page typography, color choices for web pages as well as layout and composition for web-based projects. Students will create a web-based portfolio of all the graphics created during the course of the semester. BILLABLE CONTACT HOURS: 3

CIS 1200  Introduction to Database Systems  4 Credit Hours
Equivalent: DPR 1200
English/ESL Placement: Placement into ENG 1510 or ESL 2520.

This course will focus on the fundamentals of database systems. Students will study the basics of database vs. file management systems; functions, components, and personnel involved in a database; database, client-server, and transaction processing architectures; and relational data models and operations. Students will also study business requirements analysis, perform data definition, manipulation, and queries using basic SQL, create forms and reports; and analyze macros, procedures and triggers. Concepts of database planning, design, and administration fundamentals, data warehousing, and data mining will be covered. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 1300</td>
<td>Networking Concepts</td>
<td>4</td>
<td>Study network concepts, operations, and security concepts. Students will be exposed to the components of networks and network designs. Communications hardware and the interconnection of servers and clients within LANs and WANs will be presented. Network architectures, standards, protocols, and access methods used within intranets and the Internet will be described. The functions of network operating systems such as Windows Server and Unix/Linux will be explored. Centralized computing, client/server, and peer-to-peer environments, their services and their program-to-program communication protocols will be presented. Data security and system component protection will be studied. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4</td>
</tr>
<tr>
<td>CIS 1305</td>
<td>CCNA Studies I: Introduction to Networks</td>
<td>4</td>
<td>Study network concepts, operations, and security concepts. Students will be exposed to the components of networks and network designs. Communications hardware and the interconnection of servers and clients within LANs and WANs will be presented. Network architectures, standards, protocols, and access methods used within intranets and the Internet will be described. The functions of network operating systems such as Windows Server and Unix/Linux will be explored. Centralized computing, client/server, and peer-to-peer environments, their services and their program-to-program communication protocols will be presented. Data security and system component protection will be studied. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4</td>
</tr>
<tr>
<td>CIS 1310</td>
<td>CCNA Studies II: Switching, Routing, and Wireless Essentials</td>
<td>4</td>
<td>Study network concepts, operations, and security concepts. Students will be exposed to the components of networks and network designs. Communications hardware and the interconnection of servers and clients within LANs and WANs will be presented. Network architectures, standards, protocols, and access methods used within intranets and the Internet will be described. The functions of network operating systems such as Windows Server and Unix/Linux will be explored. Centralized computing, client/server, and peer-to-peer environments, their services and their program-to-program communication protocols will be presented. Data security and system component protection will be studied. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4</td>
</tr>
<tr>
<td>CIS 1320</td>
<td>CCNA Studies III: Enterprise Networking, Security, and Automation</td>
<td>4</td>
<td>Study network concepts, operations, and security concepts. Students will be exposed to the components of networks and network designs. Communications hardware and the interconnection of servers and clients within LANs and WANs will be presented. Network architectures, standards, protocols, and access methods used within intranets and the Internet will be described. The functions of network operating systems such as Windows Server and Unix/Linux will be explored. Centralized computing, client/server, and peer-to-peer environments, their services and their program-to-program communication protocols will be presented. Data security and system component protection will be studied. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4</td>
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<tr>
<td>CIS 1330</td>
<td>CCNA Studies IV: Cybersecurity Operations</td>
<td>4</td>
<td>Study network concepts, operations, and security concepts. Students will be exposed to the components of networks and network designs. Communications hardware and the interconnection of servers and clients within LANs and WANs will be presented. Network architectures, standards, protocols, and access methods used within intranets and the Internet will be described. The functions of network operating systems such as Windows Server and Unix/Linux will be explored. Centralized computing, client/server, and peer-to-peer environments, their services and their program-to-program communication protocols will be presented. Data security and system component protection will be studied. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4</td>
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<tr>
<td>CIS 1400</td>
<td>Web Design I</td>
<td>4</td>
<td>Study network concepts, operations, and security concepts. Students will be exposed to the components of networks and network designs. Communications hardware and the interconnection of servers and clients within LANs and WANs will be presented. Network architectures, standards, protocols, and access methods used within intranets and the Internet will be described. The functions of network operating systems such as Windows Server and Unix/Linux will be explored. Centralized computing, client/server, and peer-to-peer environments, their services and their program-to-program communication protocols will be presented. Data security and system component protection will be studied. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4</td>
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<tr>
<td>CIS 1420</td>
<td>HTML5 Programming</td>
<td>3</td>
<td>Study network concepts, operations, and security concepts. Students will be exposed to the components of networks and network designs. Communications hardware and the interconnection of servers and clients within LANs and WANs will be presented. Network architectures, standards, protocols, and access methods used within intranets and the Internet will be described. The functions of network operating systems such as Windows Server and Unix/Linux will be explored. Centralized computing, client/server, and peer-to-peer environments, their services and their program-to-program communication protocols will be presented. Data security and system component protection will be studied. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4</td>
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<tr>
<td>CIS 1440</td>
<td>JavaScript Programming for Websites</td>
<td>4</td>
<td>Study network concepts, operations, and security concepts. Students will be exposed to the components of networks and network designs. Communications hardware and the interconnection of servers and clients within LANs and WANs will be presented. Network architectures, standards, protocols, and access methods used within intranets and the Internet will be described. The functions of network operating systems such as Windows Server and Unix/Linux will be explored. Centralized computing, client/server, and peer-to-peer environments, their services and their program-to-program communication protocols will be presented. Data security and system component protection will be studied. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4</td>
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</table>
CIS 1500 Introduction to Programming (Java) ..... 4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Students should have elementary Algebra skills and be familiar with both elementary word processing and file management techniques prior to enrolling in this class. Students will be introduced to the fundamental techniques and syntax for understanding, designing, constructing, debugging, and testing object-oriented programs by studying the Java programming language. The structured programming basics of process, selection and iteration will be covered as well as primitive and complex data typing, methods, parameters and input/output. The basics of graphical user interface (GUI) programming such as event handling, windows and widgets will be introduced. Fundamental object-oriented concepts of classes, methods, abstraction, encapsulation and inheritance will also be introduced. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4

CIS 1512 Principles of Software Engineering ..... 3 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
This course is focused on formal methods and approaches used in the design, development, testing and maintenance of computer software. Each stage of the software development life cycle (SDLC) will be studied in detail. Topics such as low-level design, high-level design, modeling with UML (Unified Modeling Language), iterative development models, rapid application development (RAD), formal testing methods, incremental deployment, formal metrics, as well as appropriate use of associated tools will be covered with practical applications. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 3

CIS 1550 Introduction to Secure Programming ..... 3 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
This course presents cybersecurity content related to analyzing software risks, understanding likely points of application attack, and making preliminary decisions about how software applications mitigate attack. The student will learn how to identify systemic threats in any deployment environment, understand the vulnerabilities of common software applications, and how to construct software that are responsive to identified vulnerabilities. BILLABLE CONTACT HOURS: 3

CIS 1600 Fundamentals of Cybersecurity ..... 4 Credit Hours
Equivalent: CIS 2839 | CIS 2839
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course is designed for aspiring security professionals, system or network administrators, or other information technology professionals who want to learn about computer security. Students will be well prepared for the Security+ Exam after taking this class. This course focuses on general security concepts, communication security, infrastructure security, basics of cryptography, and operational organizational security. Students will be required to complete computer-based assignments inside and outside of class. Students should have a basic understanding of computer networking prior to enrolling in this class. BILLABLE CONTACT HOURS: 4

CIS 1610 Data Security .............................................. 4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1600
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course is focused on the structure of data and database systems, their vulnerabilities to cyber attacks, and the proper techniques required to protect these systems from damage. Material covered will include: analysis of database-related malware; data system architecture; database system installation and configuration; data access controls and authentication; data security tools and devices; and security testing and auditing. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 1620 Introduction to Cryptography ............. 4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1600
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course is focused on basic techniques of encryption and decryption and their application to computer security. Topics covered will include: basic number theory and finite field arithmetic used in cryptography; symmetric ciphers; asymmetric ciphers; block and stream ciphers; implementation of popular encryption algorithms (e.g., AES); hash algorithms; digital signatures; and key management and distribution. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 1630 Security Policy, Legal, Ethics and Compliance ......................................................... 3 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1600
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course provides a comprehensive introduction to the identification, selection, assessment, and continuous monitoring of management controls that provide a cyber security governance structure throughout an organization and its supply chain. The course will emphasize security policies and frameworks, their organizational implications, to the psychology, ethics, and legal considerations of their implementation. BILLABLE CONTACT HOURS: 3

CIS 1720 Multimedia Data Management ............ 4 Credit Hours
Equivalent: CIS 1001
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
This course will give students a broad foundation in issues surrounding multimedia, including the role of and design of multimedia systems which incorporate digital audio, graphics and video, underlying concepts and representations of sound, pictures and video, data compression, transmission and storage, integration of media, multimedia authoring, and delivery of multimedia. Course will also include industry overview, societal issues, cultural implications, visual literacy and career opportunity. The students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4
CIS 1721  Web Design II  3 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1400 or consent of instructor.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course will provide students with intermediate to advanced skills in web publishing focusing on abilities to design web pages with variations in web browsers in mind. Students will continue to work with a web design editing tool and create pages that include forms, validation, and cascading style sheet based design layout. Students will create a website that is ADA (American Disabilities Act) compliant. Students should be familiar with elementary word processing and MS Windows file management techniques prior to enrolling in this class. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 3

CIS 1722  Web Animation  3 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
This course will provide introductory level knowledge of effectively working with vector based design applications aimed at the creation of animation, games, and interactive components for use on the internet. Students will focus on the creation of basic animation and navigation components for use on web sites as well as for projects aimed at offline use. Students taking this course should have basic Windows background and general knowledge of internet technologies. BILLABLE CONTACT HOURS: 3

CIS 1801  Special Topics I: Network Remediation  3 Credit Hours
English/ESL Placement: Placement into ENG 1510.
Prerequisite: The prerequisite for a special topics section will depend on the content of that section. Refer to the specific section using OCC's online system for a description of the current course and its associated prerequisites.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
Network Remediation. BILLABLE CONTACT HOURS: 3

CIS 1802  Special Topics I: Introduction to Cybersecurity and Risk Management  3 Credit Hours
English/ESL Placement: Placement into ENG 1510.
Prerequisite: The prerequisite for a special topics section will depend on the content of that section. Refer to the specific section using OCC's online system for a description of the current course and its associated prerequisites.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
Introduction to Cybersecurity and Risk Management. BILLABLE CONTACT HOURS: 3

CIS 1803  Special Topics I  1-4 Credit Hours
English/ESL Placement: Placement into ENG 1510.
Prerequisite: The prerequisite for a special topics section will depend on the content of that section. Refer to the specific section using OCC's online system for a description of the current course and its associated prerequisites.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
Students will be introduced to a particular contemporary topic or issue in information science that is relevant in today's environment. Refer to the specific section using OCC's online system for current topics. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 1 - 4

CIS 1804  Special Topics I: Macro Media Director  4 Credit Hours
English/ESL Placement: Placement into ENG 1510.
Prerequisite: The prerequisite for a special topics section will depend on the content of that section. Refer to the specific section using OCC's online system for a description of the current course and its associated prerequisites.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
Macro Media Director. BILLABLE CONTACT HOURS: 4

CIS 2111  Systems Analysis and Design (UML)  4 Credit Hours Equivalent: CIS 2030 | DPR 2030
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1400 or consent of instructor.
This course will provide introductory level knowledge of effectively working with vector based design applications aimed at the creation of animation, games, and interactive components for use on the internet. Students will focus on the creation of basic animation and navigation components for use on web sites as well as for projects aimed at offline use. Students taking this course should have basic Windows background and general knowledge of internet technologies. BILLABLE CONTACT HOURS: 3

CIS 2115  Business Analysis and Processes  4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1050 CIS 1060 CIS 1200 and CIS 2111.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course will provide introductory level knowledge of effectively working with vector based design applications aimed at the creation of animation, games, and interactive components for use on the internet. Students will focus on the creation of basic animation and navigation components for use on web sites as well as for projects aimed at offline use. Students taking this course should have basic Windows background and general knowledge of internet technologies. BILLABLE CONTACT HOURS: 3

CIS 1800  Business Analysis and Processes  4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1400 or consent of instructor.
This course will provide introductory level knowledge of effectively working with vector based design applications aimed at the creation of animation, games, and interactive components for use on the internet. Students will focus on the creation of basic animation and navigation components for use on web sites as well as for projects aimed at offline use. Students taking this course should have basic Windows background and general knowledge of internet technologies. BILLABLE CONTACT HOURS: 3
CIS 2120  Problem Solving and Information Technology       4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1050 and CIS 1060.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course demonstrates how information technology impacts organizations, with an emphasis on using information technology to solve problems and introduces the need for business processes and IT alignment. Topics include main concepts of information technology at a general level, on-line collaboration tools, application software, and information literacy as applied to searching and using the Internet. In addition, students will use application software at an intermediate level and apply it to problem solving scenarios. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2131  Python Programming                        4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
The course will introduce the fundamental techniques and syntax for understanding, designing, constructing, debugging, and testing object-oriented programs using the Python programming language. The structured programming basics of process, selection and iteration will be covered as well as primitive and complex data typing, methods, parameters and input/output. Fundamental object-oriented concepts of classes, methods, abstraction, encapsulation and inheritance will also be introduced. Students will be required to complete computer-based assignments inside/outside of class. Students should have elementary algebra skills and be familiar with both elementary word processing and file management techniques prior to enrolling in this class. BILLABLE CONTACT HOURS: 4

CIS 2141  R Programming for Data Science          4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: MAT 1150 or placement into a higher level math course.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course will teach students how to program in R for effective data analysis; how to install and configure software necessary for a statistical programming environment and describe generic programming language concepts as they are implemented in a high-level statistical language. The course covers practical issues in statistical computing which includes programming in R, reading data into R, accessing R packages, writing R functions, and debugging R code. Students will learn data structuring, transforming, visualizing, and modeling through hands on exercises. Students should be familiar with both elementary word processing and file management techniques prior to enrolling in this class. BILLABLE CONTACT HOURS: 4

CIS 2151  Object-Oriented Programming (Java)       4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1500
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
Students will be exposed to more complicated programming problems and will study the techniques and structures used to solve these problems with the Java language. Topics will include exception handling, file input and output, composition, inheritance, polymorphism, abstract classes and interfaces. Advanced Graphic User Interface (GUI) design and implementation techniques will be covered. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4

CIS 2212  Project Management                        4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Students should be familiar with the basics of both word processing and Windows file management techniques before enrolling in this course.
This course focuses on management strategies and analysis of business information systems projects. Project management issues and techniques specific to projects will be emphasized. Emphasis is on creating plans and implementing projects that are within budget, on time, and deliver useful results. Technology and project management standards, design tools (e.g., UML), product evaluation criteria, infrastructure integration, and communication of technical implementation details will be covered in group discussion and project work. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2232  Fundamentals of System Support          4 Credit Hours
Equivalent: DPR 2050
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Students will be introduced to the basic software and hardware concepts and facilities needed for simple support tasks. Topics covered include system boot sequences, disk partitioning, disk fragmentation, system configuration files, types of memory and memory management, basic OS commands and batch file construction. Emphasis is given to the Windows OS relationships and facilities. Hardware factors related to system and software evaluation, selection, purchase and installation are presented. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4

CIS 2241  Discrete Structures                      4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: MAT 1150 or placement into a higher level math course.
CIS 1500 or CIS 2131 or CIS 2151 or CIS 2252 or CIS 2656 or CIS 2757
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course provides an introduction to discrete structures, covering topics such as mathematical logic, set theory, trees, matrices, and graphs, as they apply to computer science, data science, and software engineering. Programming applications of matrices as used in computer science will be covered. BILLABLE CONTACT HOURS: 4
CIS 2252  Object-Oriented Programming (C++) ..........4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Students should have a basic understanding of general programming
concepts and techniques prior to enrolling in this class. Students will be
instructed in the syntax and semantics of the ANSI C++ language. Topics
covered include control structures, arrays, pointers, strings, dynamic
memory management, class definition and object-based development, file
I/O, overloading, exception handling, and template libraries. Students will
be required to complete computer-based assignments inside/outside of
class. BILLABLE CONTACT HOURS: 4

CIS 2313  E-Business and E-Commerce ...............4 Credit Hours
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Students should have a basic knowledge of Internet technologies before
enrolling in this course. Introduction is provided to a broad range of
theories, practices, standards, and procedures related to the strategic
implementation of e-commerce systems aimed at supporting one or more
organizational business initiatives. A series of topics will be presented and
cases analyzed that teach the student material ranging from: e-commerce
business models, e-commerce technologies, supporting standards, to
ecommerce analysis and design methodologies. The students will be
required to complete computer-based assignments inside/outside of class.
BILLABLE CONTACT HOURS: 4

CIS 2333  Web System Administration .............. 4 Credit Hours
English/ESL Placement: Placement into ENG 1510.
Prerequisite: CIS 1300
Note: Prerequisites for courses in this department are not automatically
waived for College Guest students and students with a bachelor's degree
or higher from a U.S. institution.
This course focuses on the operation and administration of Web
application servers such as Apache HTTP, IIS, Tomcat and WebSphere.
Students will study the basic structure and function of Web servers as well
as the common tasks and services performed by administrators. Topics
include Web protocols and related networking; Web server installation
and configuration; integration with other essential services such as
e-mail, database management, file transfer, domain name services, and
authentication; security; monitoring and performance; and virtualization.
Students will be required to complete computer-based assignments inside
and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2353  Data Structures ............................... 4 Credit Hours
Equivalent: DPR 2810
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1500 or CIS 2131 or CIS 2252 or CIS 2757
Note: Prerequisites for courses in this department are not automatically
waived for College Guest students and students with a bachelor's degree
or higher from a U.S. institution.
Students will investigate the programming techniques and theories
involved in implementing linked lists, queues, stacks and tree structures.
Recursion, searching techniques and sorting algorithms will also be
considered. Students will be required to complete computer-based
assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2434  Introduction to Linux and Unix Administration ......3 Credit
Hours
Equivalent: CIS 2332
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Students should be familiar with elementary word processing and basic
computer concepts prior to enrolling in this course. This hands-on
class covers the concepts related to Linux/Unix installation and system
administration. Students will install and administer a Linux/Unix operating
system using a virtual machine software product. It is intended for students
who plan to take one or more certification tests as part of their professional
preparation. Students will be required to complete computer-based
assignments inside/outside of class. BILLABLE CONTACT HOURS: 3

CIS 2454  Web System Development (PHP, Java) ..........4 Credit Hours
Equivalent: CIS 1930
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1500 or CIS 2151
Note: Prerequisites for courses in this department are not automatically
waived for College Guest students and students with a bachelor's degree
or higher from a U.S. institution.
This course focuses on design and implementation techniques for Web-
based application software. Server-side software design and development
techniques associated with Web Developer job skills will be emphasized.
Topics to be covered include: Web application architecture; design
patterns and application frameworks; PHP language basics; Java
technologies for server-side Web development; database access;
Extensible Markup Language (XML) and Asynchronous JavaScript and
XML (AJAX)-based request processing; and Web application security.
Students will be required to complete computer-based assignments inside
and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2515  Database Design and Management with Oracle
SQL .......................................................... 4 Credit Hours
Equivalent: DPR 2830
English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1200 or consent of instructor.
Note: Prerequisites for courses in this department are not automatically
waived for College Guest students and students with a bachelor's degree
or higher from a U.S. institution.
This course will focus on design and management of database
environments using Oracle SQL and associated Oracle technologies.
Topics include enterprise information resource planning and object-
oriented and entity-relationship data modeling methodologies,
normalization and the relational model, logical and physical database
design, and implementation, population and processing of a relational
database for data access, report generation, database definition, data
manipulation, and access control. Oracle-specific materials used in this
course are designed to prepare students for an Oracle Database SQL
exam which is the first exam required to become an Oracle Certified
Associate or Oracle Certified Professional. Students will be required
to complete computer-based assignments inside and outside of class.
BILLABLE CONTACT HOURS: 4
CIS 2535  Microsoft Windows Server Administration  ...  3 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.

Students should be familiar with the basics of both word processing and Microsoft Windows file management techniques and basic hardware, software, and network operating system, architecture, and protocol concepts needed for simple support tasks prior to enrolling in this course. Concepts of electronic business communications and local area networks will be covered. The Microsoft Windows Server operating system will be used and studied in this course. Installation of network operating system, setup of users and groups, files and folder trustee rights, and console management will be covered. Students will be required to complete computer-based assignments inside/outside of class. This course covers material in and prepares students for the first part of Microsoft's MCSA and MCSE certification tracks. BILLABLE CONTACT HOURS: 3

CIS 2541  Introduction to Machine Learning  ...  4 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 2131, MAT 1580
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course provides an introduction to fundamental machine learning topics in the context of data science. Students will learn fundamental examples and applications of machine learning, and types of machine learning systems, including supervised, unsupervised, semi-supervised, and reinforcement. Discussion of major challenges and solutions will be covered as well. BILLABLE CONTACT HOURS: 4

CIS 2616  Database Application Design and Development with Oracle PL/SQL  ...  4 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1200 or consent of instructor.
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course will focus on design and development of database applications using Oracle PL/SQL, Oracle development tools, and use of Oracle XML data types for implementation of PL/SQL programs, procedures, functions, packages, and triggers. Oracle-specific materials used in this course are designed to prepare students for the Oracle Program with PL/SQL exam which is the second exam required to become an Oracle Certified Associate or Oracle Certified Professional. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2636  Network Administration  ...  4 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1300
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course is designed for Information Technology professionals who want to learn advanced topics in network administration. Areas covered include topics like routing protocols, congestion control algorithms, Quality of Service. The student will also be exposed to network security, trouble shooting networks, remote access technologies like VPN and some router switch configuration. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4

CIS 2637  Big Data and NoSQL Systems  ...  3 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1200
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course is focused on the architecture, design, implementation and support of Big Data systems and non-traditional information retrieval techniques (i.e. techniques that do not use structured query languages). Topics covered include: characteristics and analysis of big data; big data life cycle; big data platforms and highly distributed file systems; big data processing and storage technologies; and NoSQL. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 3

CIS 2656  Visual Basic.NET Programming  ...  4 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.

This course focuses on software design and development techniques with the Visual Basic .NET programming language. Topics to be covered will include: Overview of the Microsoft .NET architecture; user interface forms and controls; variables, arrays, procedures, and control structures; object-oriented programming techniques; exception handling; data access with ADO.NET; and simple integration with Web technologies. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2737  Database Administration  ...  4 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.
Prerequisite: CIS 1200
Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

The purpose of the Database Administration course is to train students on typical activities performed by a database administrator (DBA) and on issues important to efficient performance of a database. The course will involve significant hands-on and lab work using the Oracle and/or MySQL server DBMS. Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4

CIS 2757  C# Programming  ...  4 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.

Students should have a basic understanding of general programming concepts and techniques prior to enrolling in this class. This course focuses on the design and implementation of software using the C# programming language. Students will learn how to develop programs that utilize classes and objects, arrays, graphical user interfaces, event-driven programming and exception handling. Visual Studio .NET will be used as the primary integrated development environment. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4
CIS 2818 Mobile Application Development (Android) 4 Credit Hours
**English/ESL Placement:** Placement into ENG 1510 or ESL 2520.
**Prerequisite:** CIS 1500 or consent of instructor.
**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course focuses on the design and implementation of wireless handheld application software on the Android platform for business and personal use. Students will use the Android Studio integrated development environment (IDE) to develop and test application software. Development techniques will focus on operational aspects of mobile devices that distinguish them from PCs and general computing platforms. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2819 Mobile Application Development (iOS) 4 Credit Hours
**English/ESL Placement:** Placement into ENG 1510 or ESL 2520.
In this course, students will learn how to write computer software using the SWIFT programming language that runs on Apple iOS-based mobile devices. Topics covered will include: the iOS platform execution environment; basic SWIFT language features such as data types, conditional statements, iteration, data collections, classes, functions, and error handling; user interface design and event-based processing; persistent data management; and integration with local and remote services. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2838 System Security 4 Credit Hours
**English/ESL Placement:** Placement into ENG 1510 or ESL 2520.
**Prerequisite:** CIS 1600
**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course is designed for aspiring security professionals, system or network administrators, or other information technology professionals who want to learn about computer security. Being a part of two courses, this part focuses on the security engineer who needs to worry about the attacks used by hackers and the defenses against them. The course makes an effort to understand defenses against Reconnaissance, Scanning, Gaining Access, Maintaining access and covering tracks. Last but not the least, the course covers computer ethics. The Students will be required to complete computer-based assignments inside/outside of class. BILLABLE CONTACT HOURS: 4

CIS 2845 Computer Forensics 4 Credit Hours
**English/ESL Placement:** Placement into ENG 1510 or ESL 2520.
**Prerequisite:** CIS 1600
**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
With ever growing reliance on computers for every day life projects, and increased focus on security and breach of security and privacy, there is a need for a course which can help security professionals and law enforcement agencies learn ways to investigate security breaches. This course is designed to introduce a variety of operating systems investigation techniques, incident response tactics, and legal issues. The course helps learn forensic techniques and tools for both Windows and Linux investigations. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2858 Web System Integration and Service Development 4 Credit Hours
**English/ESL Placement:** Placement into ENG 1510 or ESL 2520.
**Prerequisite:** CIS 1500 or CIS 2151 or CIS 2454
**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.
This course focuses on design and implementation strategies for integration of distributed client-server software and development of Web application services. Topics to be covered will include: Web middleware-related technologies such as the Java Enterprise Edition platform (Java EE), multi-tier application frameworks; Extensible Markup Language (XML) processing; Simple Object Access Protocol (SOAP); Representational State Transfer (RESTful) Web services; Web Services Description Language (WSDL); and Cloud Computing services. Students will use a popular IDE tool to create and integrate Web application components. Completion of computer-based assignments inside and outside of class will be required. BILLABLE CONTACT HOURS: 4

CIS 2859 Foundations of Game Software Development 4 Credit Hours
**English/ESL Placement:** Placement into ENG 1510 or ESL 2520.
**Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.**
This course is focused on the essential principles of designing game software. The philosophy of video games as a form of entertainment as well as important design concepts that feature player-centric approaches will be explored. Other topics to be covered include: the genres of games; design components and processes; game analysis frameworks; storytelling; creative and expressive play; character development; storytelling and narrative; game play mechanics; defining appropriate physical models and game worlds; and level design. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4

CIS 2862 Game Design 3 Credit Hours
**English/ESL Placement:** Placement into ENG 1510 or ESL 2520.
This course is focused on the essential principles of designing game software. The philosophy of video games as a form of entertainment as well as important design concepts that feature player-centric approaches will be explored. Other topics to be covered include: the genres of games; design components and processes; game analysis frameworks; storytelling; creative and expressive play; character development; storytelling and narrative; game play mechanics; defining appropriate physical models and game worlds; and level design. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 4
CIS 2980  Computer Service Technologies & Techniques A
+ ................................................................. 4 Credit Hours

Equivalent: ECT 2150

English/ESL Placement: Placement into ENG 1510 or ESL 2520.

Prerequisite: CIS 2232 or consent of instructor.

Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course provides the necessary preparation to take the industry standard Core Hardware Certification exams. Topics studies include, but are not limited to: core hardware requirements, installation, configuration and upgrading, diagnosing and troubleshooting, preventive maintenance, motherboard/processors/memory, basic networking and security. Students will be required to complete computer-based assignments outside of class.

Note: certification exams are administered and charged separately by an outside agency. BILLABLE CONTACT HOURS: 4

CIS 2991  Special Project in Software Engineering ..... 3 Credit Hours

English/ESL Placement: Placement into ENG 1510 or ESL 2520.

Prerequisite: Successful completion of all required core courses in the CIS.SWE.CT CIS Software Engineering Certificate program: CIS 1200 CIS 1500 CIS 1512 and CIS 2353. Complete a minimum of 6 credits in one focus area of the CIS.SWE.CT CIS Software Engineering Certificate program.

Note: Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course is focused on development of material for a personal 'software' portfolio that may be used to support employment opportunity applications. Common tools and techniques used in work environments as well as typical workplace processes will be explored with the purpose of preparing students for employment as software developers. Students will be required to complete computer-based assignments inside and outside of class. BILLABLE CONTACT HOURS: 3