

COMPUTER AND INFORMATION TECHNOLOGY

Associate of Applied Science Degree - Computer Technology

- IT Specialist Concentration
- Networking Concentration
- Programming Concentration

Associate of Applied Science Degree - Cybersecurity

Certificate of Completion - Computer Technology

Certificate of Completion - Cybersecurity

Certificate of Completion - Networking

Certificate of Completion - System Administration

Important information about the educational debt, earnings, and completion rates of students who attend this program can be found on the following <https://dacc.nmsu.edu/gainfulemployment/>.

Computer and information technology (CIT) is the discipline of using integrated computer-based systems to solve real world problems. Students will utilize technologies in the disciplines of programming, networking, server administration, information security, database design and development, systems analysis and designing, and web development. Students will work with applications and systems used by leading technology companies such as Amazon, Apple, Google, Microsoft and Samsung. Graduates will be prepared to do the following:

- Investigate and critically analyze real-world problems and concerns;
- Deploy cyber defense measures to protect data and infrastructure;
- Support multiple operating systems, network topologies, and data systems; and
- Accurately convey technical information, both verbally and in written format.

DACC's Computer and Information Technology Department instructs students using state-of-the-art equipment and real-world, career-based case studies. Additionally, the department participates in numerous academic alliances and partnerships, including the Cisco Networking Academy, the CompTIA Academy Partner Program, Microsoft's Imagine, and the VMware IT Academy. Students in DACC's Computer and Information Technology program have access to free software and are eligible to receive significant discounts when taking industry certification exams.

Students have the opportunity to obtain industry certifications in the following fields of study:

- Cisco Certified Network Associate
- Computer Essentials
- Computer Programming
- Information Technology Fundamentals
- Linux Operating Systems
- Microsoft Operating Systems
- Network Administration

- Network Security
- Server Administration

Graduates of the Computer and Information Technology Department are the problem-solvers that employers quickly hire and promote as they upgrade existing systems and deploy new technologies. For more information, see the department webpage at <http://dacc.nmsu.edu/cit>

Computer Technology - Associate of Applied Science (<http://catalogs.nmsu.edu/dona-ana/academic-career-programs/computer-information-technology/computer-information-technology-associate-applied-science>)

Computer and Information Technology - Certificate of Completion (<http://catalogs.nmsu.edu/dona-ana/academic-career-programs/computer-information-technology/computer-information-technology-certificate-completion>)

Cybersecurity - Associate of Applied Science (<http://catalogs.nmsu.edu/dona-ana/academic-career-programs/computer-information-technology/cybersecurity-associate-of-applied-science>)

Cisco Networking - Certificate of Completion (<http://catalogs.nmsu.edu/dona-ana/academic-career-programs/computer-information-technology/cisco-networking-certificate>)

Cybersecurity - Certificate of Completion (<http://catalogs.nmsu.edu/dona-ana/academic-career-programs/computer-information-technology/cybersecurity-certificate>)

System Administration - Certificate of Completion (<http://catalogs.nmsu.edu/dona-ana/academic-career-programs/computer-information-technology/system-administration-certificate>)

BCIS 110. Introduction to Computerized Information Systems 3 Credits

Computerized information systems, their economic, and social implications. Introduction to microcomputer hardware, personal productivity software, and communications.

C S 110. Computer Literacy 3 Credits

This course provides a broad introduction to computing, including computer and information technology concepts; economic and social implications of technology; database management, spreadsheet, word processing, and presentation applications.

C S 111. Computer Science Principles 4 Credits (3+2P)

This course provides a broad and exciting introduction to the field of computer science and the impact that computation has today on every aspect of life. It focuses on exploring computing as a creative activity and investigates the key foundations of computing: abstraction, data, algorithms, and programming. It looks into how connectivity and the Internet have revolutionized computing and demonstrates the global impact that computing has achieved, and it reveals how a new student in computer science might become part of the computing future.

Prerequisite(s): MATH 120 or higher.

C S 117. Introduction to Computer Animation**3 Credits**

Introductory course for learning to program with computer animation as well as learning basic concepts in computer science. Students create interactive animation projects such as computer games and learn to use software packages for creating animations in small virtual worlds using 3D models. Recommended for students considering a minor/major in computer science or simply interested in beginning computer animation or programming.

C S 150. C Programming**3 Credits (2+2P)**

Programming in the C language. May be repeated up to 3 credits.

Prerequisite(s): MATH 120 or higher.

C S 151. C++ Programming**3 Credits (2+2P)**

Introduction to object-oriented programming in the C++ language. May be repeated up to 3 credits.

Prerequisite(s): MATH 120 or higher.

C S 152. Java Programming**3 Credits (2+2P)**

Programming in the Java language. May be repeated up to 3 credits.

Prerequisite(s): MATH 120 or higher.

C S 153. Python Programming I**3 Credits**

This course is an introduction to programming in the Python language, covering fundamental scripts, data types and variables, functions, and simple object creation and usage. The focus will be on preparing students to use Python in their own areas. No prior programming experience is required.

Prerequisite(s): MATH 120 or higher.

C S 154. Python Programming II**3 Credits**

This course covers advanced Python programming, including classes, objects, and inheritance, embedded programming in domain applications, database interaction, and advanced data and text processing. The focus will be on preparing students to use Python in their own areas.

Prerequisite(s): C S 153 or C S 453.

C S 155. Internet Programming I**3 Credits**

This course is an introduction to programming for the Web in PHP and Javascript, covering fundamental web scripting ideas, CSS, data types and variables, functions, simple object creation and usage. Javascript usage will focus on dynamic page content. No prior programming experience is required, though a basic understanding of HTML will be assumed.

Prerequisite(s): MATH 120 and a basic understanding of HTML.

C S 156. Internet Programming II**3 Credits**

This course covers advanced web scripting, including Javascript with AJAX, PHP integration with databases, object oriented features of PHP and Javascript, advanced CSS usage, and using web application frameworks.

Prerequisite(s): C S 155 or C S 455.

C S 157. Topics in Software Programming and Applications**3 Credits (2+2P)**

Current topics in computer programming and software applications.

Topic announced in the Schedule of Classes. May be repeated if subtitle is different.

C S 158. R Programming I**3 Credits**

This course is an introduction to data processing in the R language, covering fundamental script configuration, data types and data collections, R control structures, and basic creation of graphs and data visualizations. This course will not focus on the statistical capabilities of R, though some basic statistical computations will be used.

Prerequisite(s): MATH 121G.

C S 159. R Programming II**3 Credits**

This course covers advanced R programming, including advanced data collection processing, advanced data visualizations, object oriented features of R, and file processing. It is recommended that students have one statistics course before taking this course.

Prerequisite(s): C S 158 or C S 458.

C S 171G. Introduction to Computer Science**4 Credits (3+2P)**

Computers are now used widely in all area of modern life. This course provides understanding of the theoretical and practical foundations for how computers work, and provides practical application and programming experience in using computers to solve problems efficiently and effectively. The course covers broad aspects of the hardware, software, and mathematical basis of computers. Weekly labs stress using computers to investigate and report on data-intensive scientific problems. Practical experience in major software applications includes an introduction to programming, word processing, spreadsheets, databases, presentations, and Internet applications.

Prerequisite(s): MATH 210G or MATH 120 or higher.

C S 172. Computer Science I**4 Credits (3+2P)**

Computational problem solving; problem analysis; implementation of algorithms using Java. Object-oriented concepts, arrays, searching, sorting, and recursion. May be repeated up to 4 credits. Crosslisted with: C S 460.

Prerequisite(s): MATH 121G or higher; C S 111 or successful placement.

C S 209. Special Topics.**1-3 Credits**

May be repeated for a maximum of 12 credits.

C S 271. Object Oriented Programming**4 Credits (3+2P)**

Introduction to problem analysis and problem solving in the object-oriented paradigm. Practical introduction to implementing solutions in the C++ language. Pointers and dynamic memory allocation. Hands-on experience with useful development tools. May be repeated up to 4 credits.

Prerequisite(s): At least a C- in C S 172 or E E 112.

C S 272. Introduction to Data Structures**4 Credits (3+2P)**

Design, implementation, use of fundamental abstract data types and their algorithms: lists, stacks, queues, deques, trees; imperative and declarative programming. Internal sorting; time and space efficiency of algorithms.

Prerequisite(s): At least a C- in C S 172, or placement.

C S 273. Machine Programming and Organization**4 Credits (3+2P)**

Computer structure, instruction execution, addressing techniques; programming in machine and assembly languages. May be repeated up to 4 credits.

Prerequisite(s): At least a C- in C S 172 or E E 112.

C S 278. Discrete Mathematics for Computer Science**4 Credits (3+2P)**

Discrete mathematics required for Computer Science, including the basics of logic, number theory, methods of proof, sequences, mathematical induction, set theory, counting, and functions. Crosslisted with: MATH 278.

Prerequisite(s): At least C- in C S 172.

CSEC 275. Introductory to Cryptography**3 Credits**

Introduction to the foundation of cryptography, principles behind cryptographic design, and cryptographic applications. Topics include encryption techniques, common cryptographic protocols and security functions. Restricted to Community Colleges campuses only.

Prerequisite(s): MATH 120.

CSEC 280. Introduction to Cyber Defense**3 Credits**

Introduction to computer network attacks and countermeasures used to reduce threat exposure to individuals and organizations. This course will examine common types of cyber threats and current industry standard techniques to defend against common cyber-attacks.

Prerequisite(s)/Corequisite(s): OECS 269. Restricted to Community Colleges campuses only.

CSEC 285. Introduction to Managing Information Security**3 Credits**

Managerial aspects of information security and assurance including access control models, information security governance, accountability metrics, legal responsibilities, and information security program assessment.

Prerequisite(s)/Corequisite(s): A ST 251G or STAT 251G. Restricted to Community Colleges campuses only.

CTEC 105. Introduction to Information Technology**3 Credits**

Examination of information systems and their impact on commerce, education, and personal activities. Utilization of productivity tools for communication, data analysis, information management, and decision-making. Restricted to Community Colleges campuses only.

CTEC 110. Software Applications for Technicians**1-3 Credits (1-3)**

Introduction to software applications for communication, information management, and data analysis. Students will utilize presentation, word processing, spreadsheet, database, and utility software to simulate real-world activities experienced by help desk technicians. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 115. TOPICS IN IT**1-3 Credits (1-3)**

Topics to be announced in the Schedule of Classes. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 120. IT Infrastructure Support I**1-3 Credits (1-3)**

Introduction to most common types of PC configurations, installations, and failures. This course will explore troubleshooting skills for maintaining and repairing common hardware and software related problems. May be repeated up to 3 credits. Restricted to Community Colleges campuses only.

CTEC 122. IT Infrastructure Support II**1-3 Credits (1-3)**

Continuation of CTEC 120. May be repeated up to 3 credits. Restricted to Community Colleges campuses only.

Prerequisite(s): CTEC 120 or OECS 185.

CTEC 127. Introduction to Internet of Things**1-3 Credits (1-3)**

Exploration of the importance of IoT in society, components of typical IoT devices and future trends. IoT design considerations, constraints, interfacing and key components of networking will also be covered. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 130. Linux Workstation**1-3 Credits (1-3)**

Installation, configuration, and maintenance of the Linux operating system. Covers file organization, user management, and system security. Addresses general procedures for working with and modifying the operating system. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 135. Windows Workstation**1-3 Credits (1-3)**

Installation, configuration, and maintenance of the Windows operating system. Covers file organization, user management, and system security. Addresses general procedures for working with and modifying the operating system. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 140. Introduction to Database Design**1-3 Credits (1-3)**

Introduction to basic relational database concepts including terminology, tables, queries, forms, and reports. The course teaches data modeling concepts, building Entity Relationship Diagrams (ERDs), mapping ERDs, and use of data management system applications. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 145. Introduction to Database Management**1-3 Credits (1-3)**

Use of SQL to analyze complex business scenarios as well as to design and create, and manage databases. Course includes exposure to Application Express (APEX) to provide practical, hands-on activities. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

Prerequisite(s): CTEC 140 or OECS 220.

CTEC 150. Mobile Application Programming**1-3 Credits (1-3)**

Introduction to elements of mobile application coding including concepts, design strategies, and tools needed to create, test, and deploy applications for mobile devices. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 152. JAVA Programming**1-3 Credits (1-3)**

Introduction to concepts of programming in the Java language. Topics include data types, control structures, functions, arrays, files, and the mechanics of running, testing, and debugging code. This is a hands-on course that does not require students to have prior programming experience. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 154. C++ Programming**1-3 Credits (1-3)**

Introduction to concepts of programming in the C++ language. Topics include data types, control structures, functions, arrays, files, and the mechanics of running, testing, and debugging code. This is a hands-on course that does not require students to have prior programming experience. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 156. Python Programming**1-3 Credits (1-3)**

Introduction to concepts of programming in the Python language. Topics include data types, control structures, functions, arrays, files, and the mechanics of running, testing, and debugging code. This is a hands-on course that does not require students to have prior programming experience. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 158. Visual Basic Programming**1-3 Credits (1-3)**

Introduction to concepts of programming in the Visual Basic language. Topics include data types, control structures, functions, arrays, files, and the mechanics of running, testing, and debugging code. This is a hands-on course that does not require students to have prior programming experience. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 180. Introduction to Networking**3-4 Credits (3-4)**

Introduction to networking principles including the practical and conceptual skills for understanding basic networking, planning and designing networks, implementing IP addressing schemes, examining the OSI and TCP/IP layers, and performing basic configurations for routers and switches. Aligns to the first course of the Cisco Networking Academy CCNA curriculum. May be repeated up to 8 credits. Restricted to Community Colleges campuses only.

CTEC 185. Introduction to Routing and Switching**3-4 Credits (3-4)**

Examination of the architecture, components, and operations of routers and switches in a small network. Student will learn how to configure, verify, and troubleshoot: routers and switches, static routing, default routing, VLANs, and ACLs. Aligns to the second course of the Cisco Networking Academy CCNA curriculum. May be repeated up to 8 credits.

Prerequisite(s)/Corequisite(s): CTEC 180 or OECS 261. Restricted to Community Colleges campuses only.

CTEC 220. Internship**1-3 Credits (1-3)**

Work experience, directly related to a student's field of study, that provides an opportunity to explore career options while experiencing hands-on application, knowledge, and theory learned in the classroom. May be repeated up to 6 credits. Consent of Instructor required. S/U Grading (S/U, Audit). Restricted to Community Colleges campuses only.

CTEC 230. Introduction to Linux Server Administration**1-3 Credits (1-3)**

This course addresses the implementation and support needs of IT professionals that are planning to deploy and support Linux Server(s). It provides in-depth, hands-on training for IT professionals responsible for the planning, implementation, management, and support of Linux Server operating system(s). May be repeated up to 6 credits.

Prerequisite(s)/Corequisite(s): CTEC 130 or OECS 204. Restricted to Community Colleges campuses only.

CTEC 235. Introduction to Windows Server Administration**1-3 Credits (1-3)**

This course addresses the implementation and support needs of IT professionals that are planning to deploy and support Window Server(s). It provides in-depth, hands-on training for IT professionals responsible for the planning, implementation, management, and support of Windows Server operating system(s). May be repeated up to 6 credits.

Prerequisite(s)/Corequisite(s): CTEC 135 or OECS 237. Restricted to Community Colleges campuses only.

CTEC 240. Fundamentals of Database Management**1-3 Credits (1-3)**

Exploration of database management using SQL and PL/SQL to extend and automate SQL in administering database systems. Students will create and work with projects which challenge them to enhance the SQL of a database solution for a business or organization. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

Prerequisite(s): CTEC 140.

CTEC 245. Fundamentals of Cloud Based Data Systems**1-3 Credits (1-3)**

Introduction to the techniques and tools required to develop database driven web applications. The course teaches students how to design, develop, and deploy efficient and responsive, database-driven web applications using Oracle Application Express. May be repeated up to 6 credits.

Prerequisite(s)/Corequisite(s): CTEC 240. Restricted to Community Colleges campuses only.

CTEC 255. Special Topics**1-3 Credits (1-3)**

Topics to be announced in the Schedule of Classes. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

CTEC 280. Fundamentals of Wide Area Networks**3-4 Credits (3-4)**

Fundamentals of networking architecture, components, and operations including practical and conceptual skills using routers and switches. Student will learn how to configure, verify, and troubleshoot static routing, default routing, VLANs, and ACLs. This course aligns to the third course of the Cisco Networking Academy CCNA curriculum. May be repeated up to 8 credits.

Prerequisite(s)/Corequisite(s): CTEC 185 or OECS 262. Restricted to Community Colleges campuses only.

CTEC 285. Fundamentals of Network Routing Protocols**3-4 Credits (3-4)**

Fundamentals of routing protocols for troubleshooting advanced network operations. Covers common networking issues such as RIP, OSPF, and EIGRP for IPv4 and IPv6 networks. This course aligns to the fourth course of the Cisco Networking Academy CCNA curriculum. May be repeated up to 8 credits.

Prerequisite(s)/Corequisite(s): CTEC 280 or OECS 263. Restricted to Community Colleges campuses only.

CTEC 290. Network Security**3-4 Credits (3-4)**

Fundamentals of design and implementation of network security solutions that will reduce the risk of system vulnerability. Topics include: threats, attacks, vulnerabilities, tools, architecture, design, access management, risk management, and cryptography. May be repeated up to 8 credits.

Prerequisite(s)/Corequisite(s): CTEC 120 and CTEC 180, or consent of instructor. Restricted to Community Colleges campuses only.

CTEC 299. Independent Study**1-4 Credits (1-4)**

Specific subject to be determined based upon student need. May be repeated up to 8 credits. Restricted to Community Colleges campuses only.

OECS 101. Computer Basics**1 Credit**

Hands-on instruction to introduce computer use and commonly used software. Graded S/U.

OECS 105. Introduction to Information Technology**3 Credits**

Examination of information systems and their impact on commerce, education, and personal activities. Utilization of productivity tools for communication, data analysis, information management and decision-making. May be repeated up to 3 credits. Restricted to Community Colleges campuses only.

OECS 110. Introduction to Power Point**1-3 Credits (1-3)**

An introduction to Power Point software to develop business presentations. Includes concepts of basic presentation methods and graphic design principles. Students will create and deliver presentations using text, charts, digitized images, and sound. Restricted to Community Colleges campuses only.

OECS 125. Operating Systems**1-3 Credits**

Installation, configuration and optimization of current operating systems. Restricted to: Community Colleges only.

OECS 128. Operating Systems Linux/Unix**3 Credits**

Installation, configuration, and use of Linux/Unix operating system software and utilities including hardware management, file management, use of command line, and scripting. Restricted to: Community Colleges only.

OECS 140. Introduction to Game Production Industry**1-3 Credits (1-3)**

Students explore the business behind game production, understanding how game companies are organized and funded, positions within the game industry, and what skills game producers need. Restricted to Community Colleges campuses only.

OECS 141. Introduction to Interactive Game Programming**1-3 Credits (1-3)**

This introductory programming class reviews the basics of programming, including the object-oriented approach. Students will de-construct existing games, develop their own code, and gain an appreciation for coding strategies. May be repeated for a maximum of 6 credits. Restricted to Community Colleges campuses only.

OECS 145. Mobile Application Development**1-3 Credits (1-3)**

Introduction to elements of mobile application coding including concepts, design strategies, tools needed to create, test and deploy applications for mobile devices. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

OECS 150. Visual Basic Programming**3-4 Credits (3-4)**

Introduction to algorithmic problem-solving concepts, structured programming design-oriented application programming interface development. Solutions to problems are implemented using the Visual Basic programming language in the Windows environment, with connection to Access databases as applicable.

Prerequisite(s)/Corequisite(s): OECS 220. Restricted to Community Colleges campuses only.

OECS 155. Special Topics - Introductory Computer Technology**0.5-4 Credits (.5-4)**

Topics to be announced in the Schedule of Classes. May be repeated up to 8 credits.

OECS 185. PC Maintenance and Repair I**1-3 Credits**

Introduction to most common types of PC configurations, installations, and failures. This course will explore troubleshooting skills for maintaining and repairing common hardware and software related problems. May be repeated up to 3 credits. Restricted to Community Colleges campuses only.

OECS 192. C++ Programming I**3 Credits**

Development of skills in programming using the C++ programming language. Restricted to: Community Colleges only.

OECS 195. Java Programming I**1-3 Credits**

Developing of skills in programming using the Java programming language. Restricted to: Community Colleges only.

OECS 200. Accounting on Microcomputers**3 Credits**

Fundamental accounting principles using popular microcomputer software to include G/L, A/R, A/P, purchase order, billing, inventory, and forecasting modules.

Prerequisite: ACCT 221 or BOT 121.

OECS 203. UNIX Operating System**1-3 Credits**

Introduction to the UNIX operating system using Telnet to access a remote UNIX system. Basic UNIX commands and file system concepts.

Prerequisite: C S 110, BCIS 110 or OECS 105.

OECS 204. Linux Operating System**1-3 Credits**

Install and configure the Linux operating system on X86 systems. Covers issues involved in maintaining operating system, networking, creating and managing users, and installing and updating software. General procedures for working with operating system includes maintaining disk space, preserving system security, and other related topics. May be repeated up to 3 credits. Restricted to Community Colleges campuses only.

OECS 205. Advanced Operating Systems: Administration**3 Credits**

Examines operating systems designed for PC, minicomputers and mainframes. Covers maintaining operating systems, creating and managing users, and installing and updating software. General procedures for working with operating systems will include maintaining disk space, preserving system security, providing mail services, among other topics. May be repeated for a maximum of 6 credits.

Prerequisite: OECS 128.

OECS 207. Windows**0.5-3 Credits**

Covers local installation, configuration of core local services, managing users, and the general local management and maintenance of Windows workstations. May be repeated up to 6 credits.

Prerequisite(s)/Corequisite(s): OECS 185. Prerequisite(s): . Restricted to Community Colleges campuses only.

OECS 208. Internet Applications**1-3 Credits**

Survey of the Internet to include e-mail, file transfer, current search techniques, the World Wide Web and basic Web page development. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

OECS 209. Computer Graphic Arts**1-3 Credits**

Basic graphics composition using computer programs to include editing and manipulating graphic images, clip-art, and printing of pictures. May be repeated for a maximum of 6 credits under different subtitles listed in the Schedule of Classes.

Prerequisite: OECS 105, C S 110, or OECS 101.

OECS 211. Word Processing Applications**1-3 Credits**

Basic word processing to include composing, editing, formatting, and printing of documents. May be repeated under different subtitles listed in the Schedule of Classes for a maximum of 6 credits.

Prerequisites: C S 110, BCIS 110 or OECS 105.

OECS 213. Image Processing**1 Credit**

Introduction to digital imaging acquisition and editing. Use of digital cameras and computer graphic software for business and personal use. Graded S/U.

Prerequisites: C S 110, BCIS 110 or OECS 105.

OECS 214. Creating a Web Page**1 Credit**

Introduction to creating Web pages for business and personal use. Graded S/U.

Prerequisites: C S 110, BCIS 110 or OECS 105.

OECS 215. Spreadsheet Applications**1-3 Credits**

Use of spreadsheets to include graphics and business applications. May be repeated for a maximum of 6 credits.

Prerequisites: C S 110, BCIS 110 or OECS 105.

OECS 216. Programming for the Web**3 Credits**

Designing web-based applications using appropriate programming language(s) such as, but not limited to HTML, PHP, MySQL, SQL, Java, Perl, C or C++. May be repeated up to 6 credits. Restricted to: Community Colleges only.

Prerequisite(s): One semester of any programming course.

OECS 220. Database Application and Design**1-3 Credits**

Creating, sorting, and searching of single and multifile databases to include report generation and programming database commands. May be repeated for a maximum of 6 credits under different subtitles listed in the Schedule of Classes. Restricted to: Community Colleges only.

Prerequisite(s): C S 110 OR BCIS 110 OR E T 120 OR E T 122 OR OECS 105.

OECS 221. Internship I**1-3 Credits**

Work experience that directly relates to a student's major field of study that provides the student an opportunity to explore career paths and apply knowledge and theory learned in the classroom. Internships may be paid or unpaid. Students are supervised/evaluated by both the employer and the instructor. May be repeated up to 3 credits. Consent of Instructor required. Restricted to: OECS majors. S/U Grading (S/U, Audit). Restricted to Community Colleges campuses only.

Prerequisite(s): Consent of instructor.

OECS 222. Internship II**1-3 Credits**

Continuation of OECS 221. Each credit requires specified number of hours of on-the-job work experience. May be repeated up to 3 credits. Consent of Instructor required. Restricted to: OECS majors. S/U Grading (S/U, Audit). Restricted to Community Colleges campuses only.

Prerequisite(s): OECS 221 and consent of instructor.

OECS 227. Computer Applications for Technicians**3 Credits**

Computer applications for service technicians in various disciplines. Hardware and software applications explored. Includes operating systems, high level programming, and networking hardware and software.

OECS 230. Data Communications and Networks I**1-3 Credits**

Definition of data communication; survey of hardware applications and teleprocessor software; examination and design of networks. May be repeated for a maximum of 6 credits.

Prerequisite: OECS 185.

OECS 231. Data Communications and Networks II**1-3 Credits**

Installation and application of popular microcomputer network software. May be repeated for a maximum of 6 credits.

Prerequisite: OECS 230.

OECS 232. Implementing and Supporting Networks I**3 Credits**

Knowledge and skills relating to post-installation and day-to-day administration tasks in a single-domain or multiple-domain network.

Prerequisite: OECS 230 or OECS 261.

OECS 234. Linux Server**3-4 Credits (3-4)**

This course addresses the implementation and support needs of IT professionals that are planning to deploy and support Linux Server(s). It provides in-depth, hands-on training for planning, implementation, management and support of Linux networking services. May be repeated up to 8 credits.

Prerequisite(s)/Corequisite(s): OECS 204. Restricted to: OECS majors. Restricted to Community Colleges campuses only.

OECS 235. Structured Query Language (SQL)**1-3 Credits**

Installation, configuration, administration, and troubleshooting of SQL client/server database management system. May be repeated up to 3 credits.

Prerequisite(s)/Corequisite(s): OECS 220. Restricted to Community Colleges campuses only.

OECS 237. Windows Server**3-4 Credits (3-4)**

This course addresses the implementation and support needs of IT professionals that are planning to deploy and support Microsoft Windows Server Active Directory Domain Services in medium to large businesses. It provides in-depth, hands-on training for Information Technology (IT) professionals responsible for the planning, implementation, management, and support of Windows Active Directory services. May be repeated up to 4 credits.

Prerequisite(s)/Corequisite(s): OECS 207. Restricted to Community Colleges campuses only.

OECS 245. Game Programming I**3 Credits**

Development of programming skills for games and animation using current programming languages and tools. May be repeated for a maximum of 6 credits.

Prerequisite: consent of instructor.

OECS 246. Game Programming II**3 Credits**

Continuation of OECS 245. May be repeated for a maximum of 6 credits.

Prerequisite: OECS 245.

OECS 250. Systems Analysis and Design I**3 Credits**

Analysis, configuration, design and testing of organizations' work flow as it relates to hardware, software, data, procedures and personnel. Systems Life Cycle approach matching end users' needs to feasible financial, technical and operational solutions. Restricted to Community Colleges campuses only.

Prerequisite(s): OECS 220.

OECS 255. Special Topics**1-4 Credits**

Topics to be announced in the Schedule of Classes.

OECS 260. Hypertext Markup Language (HTML)**1-3 Credits**

Coverage of HTML as used for web-page development for Internet and Intranet. Text manipulation, graphics, hypertext links, lists, and tables. May be repeated for a maximum of 3 credits.

Prerequisite: C S 110, BCIS 110 or OECS 105.

OECS 261. Introduction to Networks**3-4 Credits (3-4)**

Introduction to networking principles including the practical and conceptual skills for understanding basic networking, planning and designing networks, implementing IP addressing schemes, examining the OSI and TCP/IP layers, and performing basic configurations for routers and switches. Aligns to the first course of the Cisco Networking Academy CCNA curriculum. Restricted to Community Colleges campuses only.

OECS 262. Essentials of Routing and Switching**3-4 Credits (3-4)**

Examination of the architecture, components, and operations of routers and switches in a small network. Student will learn how to configure, verify and troubleshoot: routers and switches, static routing, default routing, VLANs, and ACLs. Aligns to the second course of the Cisco Networking Academy CCNA curriculum. May be repeated up to 4 credits.

Prerequisite(s)/Corequisite(s): OECS 261. Restricted to Community Colleges campuses only.

OECS 263. Network Fundamentals**3-4 Credits (3-4)**

Fundamentals of networking architecture, components, and operations including practical and conceptual skills using routers and switches. Student will learn how to configure, verify and troubleshoot static routing, default routing, VLANs, and ACLs. This course aligns to the third course of the Cisco Networking Academy CCNA curriculum. May be repeated up to 4 credits.

Prerequisite(s)/Corequisite(s): OECS 262. Restricted to Community Colleges campuses only.

OECS 264. Network Routing Protocols**3-4 Credits (3-4)**

Fundamentals of routing protocols for troubleshooting advanced network operations. Covers common networking issues such as RIP, OSPF, and EIGRP for IPv4 and IPv6 networks. This course aligns to the fourth course of the Cisco Networking Academy CCNA curriculum. May be repeated up to 4 credits.

Prerequisite(s)/Corequisite(s): OECS 263. Restricted to Community Colleges campuses only.

OECS 269. Network Security**3-4 Credits (3-4)**

Fundamentals of design and implementation of network security solutions that will reduce the risk of system vulnerability. May be repeated up to 8 credits. Restricted to Community Colleges campuses only.

Prerequisite(s): OECS 204 or OECS 207 or OECS 261 or consent of instructor.

OECS 275. PC Maintenance and Repair II**1-3 Credits**

Continuation of OECS 185. May be repeated up to 6 credits. Restricted to Community Colleges campuses only.

Prerequisite(s): OECS 185.

OECS 280. Desktop Publishing I**3 Credits**

Design and production of publication materials to fill the needs of business communities, using a microcomputer. May be repeated for a maximum of 6 credits. Same as BOT 280.

Prerequisites: either BCIS 110, C S 110, OECS 105.

OECS 290. Computer Technology Capstone**1-3 Credits**

Refines skills learned in the OECS program. Culminates in a review and practice of advanced software applications. May be repeated up to 3 credits. Restricted to: OECS & OECT majors. Restricted to Community Colleges campuses only.

Prerequisite(s): (OECS 125, OECS 128, OECS 207, OR OECS 203) AND (OECS 185 OR E T 283).

OECS 299. Independent Study**1-3 Credits**

Specific subjects to be determined based on need. Restricted to: Community Colleges only.

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