

# COMPUTER INFORMATION SYSTEMS

## COMPUTER SUPPORT SPECIALIST

### TECHNICAL

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The Bismarck State College Computer Support Specialist program provides two years of highly technical computer education, leading to an Associate in Applied Science degree. Students will prepare to work in various business and institutional settings. Their experiences at BSC will provide extensive training in computer operating systems, networking environments, and security.

BSC developed this program to fill a growing need in the marketplace. Technology is driving today's businesses, especially health care, financial services, public utilities and sales. These businesses need computer and network specialists to upgrade equipment, maintain data networks, manage servers, and secure company IT resources. In addition to these technical skills, employers are seeking computer personnel who can communicate well with people, since these computer specialists work with end-users to solve problems and provide assistance.

Employment opportunities are expected to grow, as research shows computer-oriented careers are among the fastest growing in the country. In North Dakota, the computer and network administrator occupation is expected to increase significantly in upcoming years, making it one of the fastest-growing occupations in the state.

**Career possibilities:** Computer support specialist, computer technician, computer operator, help desk support, computer systems analyst, data communications analyst, systems administrator, security administrator, network administrator, network systems analyst, information systems manager

Most Computer Support Specialist courses are offered on campus one semester and online the next semester. Required classes are listed below with the highly recommended class order. General education courses are incorporated into the following four semesters.

### ASSOCIATE IN APPLIED SCIENCE DEGREE

#### SEMESTER I

#### CREDITS

College Composition I (ENGL 110) .....	3
Microsoft Windows Operating System Client (CIS 212) .....	3
Linux Fundamentals (CIS 107) .....	3
Networking Fundamentals (CIS 265) .....	4
Electronic Publishing (CIS 230) .....	3
Total credits .....	16

#### SEMESTER II

#### CREDITS

Beginning Visual Basic (CSCI 122) .....	3
Implementing a Microsoft Windows Network Infrastructure (CIS 216).....	3
Linux System Administration (CIS 223) .....	3
Routing Protocols and Concepts (CIS 266) .....	4
Microcomputer Hardware (CIS 219).....	3
Total credits .....	16

#### SEMESTER III

#### CREDITS

Arts & Humanities/Social & Behavioral Science Elective .....	3
Implementing a Microsoft Windows Active Directory Infrastructure (CIS 214).....	3
Linux Network and Security Administration (CIS 226) .....	3
LAN Switching and Wireless (CIS 267) .....	4
Database Design and SQL (CIS 204) .....	3
Elementary Statistics (MATH 210) .....	3
Total credits .....	19

#### SEMESTER IV

#### CREDITS

Fundamentals of Public Speaking (COMM 110) .....	3
Implementing Microsoft Windows Server Applications (CIS 213) .....	3
Implementing a Microsoft Windows Server Environment (CIS 215).....	3

Accessing the WAN (CIS 268) .....	4
Computer and Network Security (CIS 255) .....	3
Network Architecture and Design (CIS 269).....	3
Total credits .....	19

## **INFORMATION PROCESSING SPECIALIST**

### **TECHNICAL ONLINE OPTION**

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The two-year program of study in Information Processing Specialist leads to an Associate in Applied Science degree. Students acquire the necessary knowledge and skills needed to meet the ever changing technology of small businesses or corporate offices.

Computer technology has profoundly influenced the kinds of jobs available and the way work is organized and performed. Information Processing Specialist students must possess a variety of communication, business, keyboarding, and technological skills. Students receive concentrated training on various applications of the personal computer including keyboarding, word processing, database, spreadsheets, desktop publishing, electronic presentations, world wide web research, electronic publishing (creation of web pages), and operating systems.

Placement includes working as an information-processing specialist in government agencies, educational institutions, law offices, sales offices, service agencies, insurance companies, or bank and investment firms.

#### **ASSOCIATE IN APPLIED SCIENCE DEGREE**

<b>SEMESTER I</b>	<b>CREDITS</b>
* Keyboarding II (BOTE 152) .....	3
Business Math (BOTE 108)	
OR Intermediate Algebra (MATH 102)	
OR College Algebra (MATH 103) .....	3
* Computer Software Applications-Word (CIS 102).....	3
Business English (BOTE 121)	
OR College Composition II (ENGL 120) .....	3
<b>General Education Requirement</b>	
Introduction to Computers (CSCI 101).....	3
Total credits.....	15

<b>SEMESTER II</b>	<b>CREDITS</b>
* Microcomputer Spreadsheets (CIS 105) .....	3
* Presentations (CIS 130) .....	3
Business Communications (BOTE 210).....	3
<b>General Education Requirements</b>	
Business/Math/Science/Technology .....	3
College Composition I (ENGL 110) .....	3
Total credits.....	15

<b>SEMESTER III</b>	<b>CREDITS</b>
Web Foundations (CIS 151) .....	3
Desktop Publishing (CIS 210) .....	3
Student Leadership Practicum (BOTE 116) .....	1
* Electronic Publishing (CIS 230) .....	3
Office Management (BOTE 209) .....	3
<b>General Education Requirement</b>	
Arts & Humanities/Behavioral & Social Science .....	3
Total credits.....	16

<b>SEMESTER IV</b>	<b>CREDITS</b>
* Microcomputer Database (CIS 104) .....	3
XML (CIS 252).....	3
Advanced Software Applications (CIS 202).....	3
Cooperative Education/Internship (CIS 197)	
OR Service Learning (CIS 195).....	1-3
Student Leadership Practicum (PBL) (BOTE 116) .....	1
<b>General Education Requirement</b>	
Intro to Professional Writing (ENGL 125) .....	3
Total credits.....	14-16
* Courses may be challenged	

<b>SUGGESTED ELECTIVES:</b>	<b>CREDITS</b>
Web Design Theory (CIS 154).....	3
Cascading Style Sheets (CIS 152) .....	3
Vector Graphics and Web Animation (CIS 233) .....	3
Site Design (CIS 251) .....	3

## **INFORMATION PROCESSING SPECIALIST CERTIFICATE TECHNICAL ONLINE OPTION**

**CONTACT PERSON: Lynette Borjeson Painter • Armory 109 224-5755 • Lynette.BorjesonPainter@bsc.nodak.edu**

The curriculum is designed for students who want to upgrade their microcomputer application background. Students must complete 30 credits from the courses listed. Completion of the one-year program leads to a Program Certificate in Information Processing Specialist.

### **CERTIFICATE**

<b>SEMESTER I - FALL</b>	<b>CREDITS</b>
Computer Software Applications-Word (CIS 102).....	3
Electronic Publishing (CIS 230) .....	3
Web Foundations (CIS 151).....	3
Microcomputer Spreadsheets (CIS 105).....	3
Desktop Publishing (CIS 210) .....	3

<b>SEMESTER II - SPRING</b>	<b>CREDITS</b>
Microcomputer Database (CIS 104).....	3
Presentations (CIS 130) .....	3
Introduction to Computers (CSCI 101).....	3
Advanced Software Applications (CIS 202).....	3
Cooperative Education/Internship (CIS 197) OR Service Learning (CIS 195).....	1 – 3

Additional classes available with permission of instructor or advisor. Most of the courses may be applied toward an Associate in Applied Science Degree.

## **COMPUTER INFORMATION SYSTEMS (CIS)**

**CIS 102 Computer Software Applications-Word F&S 3 credits**  
Provides hands-on operation of personal computers with the word processing software, Microsoft Word. Students should have keyboarding skills before enrolling in the class. This class prepares students to take the Word section of the Microsoft Certified Application Specialist exam. Students will need access to Word 2007 software for this course. The program is included in the Office 2007 suite. The software is available through the BSC Bookstore at academic pricing. The software is also located on campus in most computer labs. The MCAS exam is required for completion of the course, and lab fees are the student's responsibility. Final grade is not based upon whether student passes or fails MCAS exam.

**CIS 104 Microcomputer Database F&S 3 credits**  
This is an introduction to the planning, design and programming of database systems using software designed for database management, Microsoft Access. Students should have keyboarding skills before enrolling in this class. This class prepares students the Access section of the Microsoft Certified Application Specialist exam. Students will need access to Access 2007 software for this course. The program is included in the Office 2007 suite. The software is available through the BSC Bookstore at academic pricing. The software is also located on campus in most computer labs. The MCAS exam is required for completion of the course, and lab fees are the student's responsibility. Final grade is not based upon whether student passes or fails MCAS exam.

**CIS 105 Microcomputer Spreadsheets F&S 3 credits**  
Provides hands-on operation of personal computers using Microsoft Excel. Students should have keyboarding skills before enrolling in class. This class prepares students to take the Excel section of the Microsoft Certified Application Specialist exam. Students will need access to Excel 2007 software for this course. The program is included in the Office 2007 suite. The software is available through the BSC Bookstore at academic pricing. The software is also located on campus in most computer labs. The MCAS exam is required for completion of the course, and lab fees are the student's responsibility. Final grade is not based upon whether student passes or fails MCAS exam

**CIS 107 Linux Fundamentals F&S 3 credits**  
This course introduces students to the Linux operating system. It will provide practical skills in using Linux commands and utilities, including editors and file system management. This course prepares students for numerous industry-standard Linux certifications.

<b>CIS 130</b>	<b>Presentations</b>	<b>Spring</b>	<b>3 credits</b>
<p>This class provides hands-on production of researching, creating and delivering electronic business presentation projects using Microsoft PowerPoint. Students should have keyboarding skills before enrolling in this class. This class prepares students to take the PowerPoint section of the Microsoft Certified Application Specialist exam. Students will need access to PowerPoint 2007 software for this course. The program is included in the Office 2007 suite. The software is available through the BSC Bookstore at academic pricing. The software is also located on campus in most computer labs. The MCAS exam is required for completion of the course, and lab fees are the student's responsibility. Final grade is not based upon whether student passes or fails MCAS exam.</p>			
<b>CIS 151</b>	<b>Web Foundations</b>	<b>Fall</b>	<b>3 credits</b>
<p>Students will learn how to create and manage their own Web pages using Hypertext Markup Language (HTML), Extensible HTML (XHTML), and CSS. Students will learn to write code manually, as well as use graphical user interface (GUI) authoring tools. Students will further learn the importance of marketing and implementing fundamental design concepts along with validating their HTML or XHTML code. Other concepts covered include the tasks involved in various Information Technology (IT) job roles, Internet connection methods, Internet protocols, the Domain Name System (DNS), URLs, customization of Web browsers, plug-ins, e-mail, search engines, security and project management. Course prepares students to write the Internet Business and Site Development Foundations sections of the CIW Foundations exam, the first level exam needed for the Master CIW Designer certification. These two CIW exam sections are required and students will be assessed an exam fee. Final grade is not based on whether student passes or fails certifications.</p>			
<b>CIS 152</b>	<b>Cascading Style Sheets</b>	<b>Spring</b>	<b>3 credits</b>
<p>Students will learn how to format Web pages using Cascading Style Sheets (CSS). Concepts covered are the anatomy of a CSS rule, inline, embedded and external style use, contextual selectors, classes, ids, pseudo-classes, font and text properties, style inheritance, the box model, and basic and advanced page layout. Prerequisite: CIS 151 or CIS 230 or instructor's consent.</p>			
<b>CIS 154</b>	<b>Web Design Theory</b>	<b>Fall</b>	<b>3 credits</b>
<p>This course will introduce students to the complete planning and design phases of good web design. Topics include planning phases, color choices, interactivity, branding, cultural concerns, navigation, accessibility and planned maintenance for proper web design.</p>			
<b>CIS 202</b>	<b>Advanced Software Applications</b>	<b>Spring</b>	<b>3 credits</b>
<p>Provides hands-on experience with the powerful integration capabilities of the Microsoft Office suite. Students enrolled in this course must have access to Microsoft Office 2007, specifically Word, Excel, Access, and PowerPoint for the duration of the entire course. Required software MAY NOT BE included with the textbook; required software may be a separate purchase. Required software is available in selected BSC computer labs for student use. Prerequisite/Co-requisite: CIS 102, CIS 104, CIS 105 and CIS 130.</p>			
<b>CIS 204</b>	<b>Database Design and Structured Query Language (SQL)</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>This course provides students with a foundation in database theory and provides the technical skills required to write basic SQL queries.</p>			
<b>CIS 206</b>	<b>Database Implementation and Administration</b>	<b>BD</b>	<b>3 credits</b>
<p>This course provides students with the knowledge and skills required to install, configure, administer, and troubleshoot client-server database management systems.</p>			
<b>CIS 208</b>	<b>Database Programming</b>	<b>BD</b>	<b>3 credits</b>
<p>This course provides students with the technical skills required to program a database solution, using stored procedures, SQL, and proper database design principles. Prerequisite: CIS 204.</p>			
<b>CIS 209</b>	<b>Data Warehousing</b>	<b>BD</b>	<b>3 credits</b>
<p>This course provides students with the technical skills required to plan, implement, and maintain a data warehouse. Prerequisite: CIS 208.</p>			
<b>CIS 210</b>	<b>Desktop Publishing Spring</b>		<b>3 credits</b>
<p>A layout and design course using Adobe Creative Suite software to produce a variety of desktop publishing application projects. Students should have keyboarding and word processing skills before enrolling in this class. Students enrolled in this course must have access to the required software listed in the syllabus for the duration of the course. Required software MAY NOT BE included with the textbook; required software may be a separate purchase. Required software is available in selected BSC computer labs for student use.</p>			
<b>CIS 211</b>	<b>Database Programming Project</b>	<b>BD</b>	<b>3 credits</b>
<p>This course requires students to produce a comprehensive database programming project. Design issues, implementation, and database troubleshooting will be discussed. Prerequisite: CIS 208.</p>			
<b>CIS 212</b>	<b>Microsoft Windows Operating System Client</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>The course helps learners to gain the knowledge and skills to install, configure, customize, optimize, and troubleshoot the Microsoft Windows operating system in a stand-alone and network environment. Windows Vista is the current focus of the class. This course leads to the Microsoft Certified Technology Specialist (MCTS) and Microsoft Certified IT Professional (MCITP) certifications.</p>			
<b>CIS 213</b>	<b>Implementing Microsoft Windows Server Applications</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>This course introduces the learner to the Microsoft Windows Server and the application server technologies it supports. Windows Server 2008 is the current focus of the class. This course leads to the Microsoft Certified Technology Specialist (MCTS) and Microsoft Certified IT Professional (MCITP) certifications.</p>			
<b>CIS 214</b>	<b>Implementing Microsoft Windows Active Directory Infrastructure</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>This course provides students with the knowledge and skills necessary to install, configure, and administer Microsoft Windows Active Directory services. The course also focuses on implementing Group Policy and performing the Group Policy-related tasks that are required to centrally manage users and computers. Windows Server 2008 is the current focus of the class. This course leads to the Microsoft Certified Technology Specialist (MCTS) and Microsoft Certified IT Professional (MCITP) certifications. Prerequisite: CIS 216.</p>			

<b>CIS 215</b>	<b>Implementing Microsoft Windows Server Environment</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>This course introduces the learner to Microsoft Windows Server and the networking technologies it supports. The learner will become familiar with networking and operating system concepts and the common tasks required to administer and support the Microsoft Windows operating system in a network environment. Windows Server 2008 is the current focus of the class. This course leads to the Microsoft Certified Technology Specialist (MCTS) and Microsoft Certified IT Professional (MCITP) certifications. Prerequisite: CIS 216 and CIS 214.</p>			
<b>CIS 216</b>	<b>Implementing a Microsoft Windows Network Infrastructure</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>This course is for professionals who will be responsible for configuring, managing, and troubleshooting a network infrastructure that uses the Microsoft Windows Server products. These tasks include implementing routing; implementing, managing, and maintaining Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS), and Windows Internet Name Service (WINS); and implementing a network access infrastructure by configuring the connections for remote access clients. Windows Server 2008 is the current focus of the class. This course leads to the Microsoft Certified Technology Specialist (MCTS) and Microsoft Certified IT Professional (MCITP) certifications.</p>			
<b>CIS 219</b>	<b>Microcomputer Hardware</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>Students learn the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. The students, through hands-on activities and labs, learn to assemble and configure a computer, install operating systems and software, and troubleshoot hardware and software problems. In addition, this course helps students prepare for the CompTIA A+ certification.</p>			
<b>CIS 221</b>	<b>Networking Essentials</b>	<b>Fall</b>	<b>3 credits</b>
<p>This course introduces students to the concepts and terminology of data communications, local area and wide area networks, communications hardware, standards, media, signaling concepts, data communication, error prevention, detection and correction. Course prepares students to write the Network Technology Foundations section of the CIW Foundations exam, the first level exam needed for the Master CIW Designer certification. This CIW exam section is required and students will be assessed an exam fee. Final grade is not based on whether student passes or fails certification.</p>			
<b>CIS 223</b>	<b>Linux System Administration</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>This course covers command line and graphical administration of Linux computer systems. Topics covered include installation, user management, process management, software management, network configuration, and other system configuration tasks. This course prepares students for numerous industry-standard Linux certifications. Prerequisite: CIS 107 or instructor approval.</p>			
<b>CIS 226</b>	<b>Linux Network and Security Administration</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>This course covers common Linux networking services, installation, and configuration. Students will learn to configure and administer a Linux system to support common network services and discuss methods to alleviate security problems on a Linux system. Students will learn to configure and administer Linux systems with security in mind. This course prepares students for numerous industry-standard Linux certifications. Prerequisite: CIS 223.</p>			
<b>CIS 230</b>	<b>Electronic Publishing</b>	<b>Fall</b>	<b>3 credits</b>
<p>Students will use Adobe Dreamweaver, Flash and Fireworks in this course. Dreamweaver concepts include working with text, images, graphics, links, tables, and publication of Web sites. Flash concepts include creating objects, working with symbols and interactivity and creating animations and special effects. Fireworks concepts include working with objects and importing, selecting and modifying graphics. Students enrolled in this course must have access to the required software listed in the syllabus for the duration of the course. Required software MAY NOT BE included with the textbook; required software may be a separate purchase. Required software is available in selected BSC computer labs for student use.</p>			
<b>CIS 231</b>	<b>Search Engine Optimization (SEO)</b>	<b>Fall</b>	<b>3 credits</b>
<p>Students will learn the basic principles of optimizing Web sites for improved performance in search engine results, ultimately enhancing the marketability of their Web site products and/or services. Students will further develop a basic understanding of the history of search engines, differences in search engine and directory results, and applied practices in structuring HTML and page content to increase the Web site's visibility to the consumer. Prerequisite: CIS 151 or CIS 230, and ENGL 110 or instructor's consent.</p>			
<b>CIS 233</b>	<b>Vector Graphics and Web Animation</b>	<b>Spring</b>	<b>3 credits</b>
<p>Students will learn how to create Web sites using Adobe Flash. Concepts covered include animation, tweening, layers, guides, masks, symbols, publishing movies, and ActionScript. Students enrolled in this course must have access to the required software listed in the syllabus for the duration of the course. Required software MAY NOT BE included with the textbook; required software may be a separate purchase. Required software is available in selected BSC computer labs for student use.</p>			
<b>CIS 235</b>	<b>CIW Database Design Methodology</b>	<b>Fall</b>	<b>3 credits</b>
<p>CIW Database Design Methodology teaches students how to plan and design relational databases. Students will learn about the theory behind relational databases, relational database nomenclature, and relational algebra. This course includes sections on Structured Query Language (SQL) and optimizing databases through normalization. Students will apply their knowledge with hands-on labs designed to teach the intricacies of database design methodology. Course prepares students to write the CIW Database Specialist Exam. This CIW exam is required and students will be assessed an exam fee. Final grade is not based on whether student passes or fails certification.</p>			
<b>CIS 250</b>	<b>Advanced Web Design</b>	<b>Fall</b>	<b>3 credits</b>
<p>Students will learn how to add JavaScript to their Web pages. Concepts covered include variables, expressions, functions, methods, objects, events, control structures, windows, forms, frames and cookies. Course prepares students to write the CIW JavaScript Fundamentals Exam. This CIW exam is required and students will be assessed an exam fee. Final grade is not based on whether student passes or fails certification. Prerequisite: CIS 151 and CSCI 122 or instructor's consent.</p>			

<b>CIS 251</b>	<b>Site Design</b>	<b>Spring</b>	<b>3 credits</b>
<p>This course focuses on theory, design and Web construction, along with information architecture concepts, Web project management, scenario development and performance evaluations. Students will further learn how to create and manage Web sites with tools such as MicroSoft Expression Web, Adobe Dreamweaver, Fireworks and Flash, Dynamic HTML, and various multimedia and CSS standards. Students will also implement the latest strategies to develop third-generation Web sites, evaluate design tools, discuss future technology standards, and explore the incompatibility issues surrounding current browsers. This course provides a balance of training in theory, technology, project management, and hands-on development.</p> <p>Course prepares students to write the CIW Site Designer Exam, the second level exam needed for the Master CIW Designer certification. This CIW exam is required and students will be assessed an exam fee. Final grade is not based on whether student passes or fails certification. Prerequisite: CIS 151 and CIS 221, or CIW Foundations certification or instructor's consent.</p>			
<b>CIS 252</b>	<b>XML</b>	<b>Spring</b>	<b>3 credits</b>
<p>This course will introduce students to Extensible Markup Language (XML). Concepts covered include document type definitions (DTDs), schemas, namespaces. Other topics covered include the use of XML in application software, such as Microsoft Office suite. Prerequisite: CIS 151 and CIS 104, or CIS 235 or instructor's consent.</p>			
<b>CIS 253</b>	<b>PHP</b>	<b>Spring</b>	<b>3 credits</b>
<p>Students will learn how to design dynamic, data-driven Web pages using server-side scripting. Prerequisite: CIS 151 and CSCI 160 or instructor's consent.</p>			
<b>CIS 254</b>	<b>CIW E-Commerce Strategies and Practices</b>	<b>Spring</b>	<b>3 credits</b>
<p>During this course, students will be taught the concepts of e-commerce and doing business online, including technical concerns and differences from traditional commerce.</p> <p>Course prepares students to write the CIW E-commerce Strategies and Practices exam, the third and final level exam needed for the Master CIW Designer certification. This CIW exam is required and students will be assessed an exam fee. Final grade is not based on whether student passes or fails certification. Prerequisite: CIS 251 or CIW Site Designer certification or instructor's consent.</p>			
<b>CIS 255</b>	<b>Computer and Network Security</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>This course introduces students to computer and network security topics, including cryptography, authentication, VPNs, and other aspects of enterprise security. Networking and operating system knowledge recommended before taking this course.</p>			
<b>CIS 256</b>	<b>Web Portfolio</b>	<b>Spring</b>	<b>3 credits</b>
<p>This course provides an opportunity for a student to receive unique work experience in Web design and development through creating Web sites for non-profit organizations or businesses.</p>			
<b>CIS 265</b>	<b>Networking Basics</b>	<b>F&amp;S</b>	<b>4 credits</b>
<p>This course focuses on network terminology and protocols, LANs, WANs, the OSI model, cabling, cabling tools, routers, IP addressing, and network standards. This class leads to the Cisco Certified Network Associate (CCNA) certification.</p>			
<b>CIS 266</b>	<b>Routing Protocols and Concepts</b>	<b>F&amp;S</b>	<b>4 credits</b>
<p>This course introduces the architecture, components, and operation of routers, and principles of routing and routing protocols. Students will learn the primary routing protocols RIP, EIGRP, and OSPF. This class leads to the Cisco Certified Network Associate (CCNA) certification. Prerequisite: CIS 265 or instructor approval.</p>			
<b>CIS 267</b>	<b>LAN Switching and Wireless</b>	<b>F&amp;S</b>	<b>4 credits</b>
<p>This course teaches the technologies and protocols needed to design and implement a converged switched network. Students learn about the hierarchical network design model. Students also learn to implement VLANs, VTP, STP, and Inter-VLAN routing. This class leads to the Cisco Certified Network Associate (CCNA) certification. Prerequisite: CIS 265 or instructor approval.</p>			
<b>CIS 268</b>	<b>Accessing the WAN</b>	<b>F&amp;S</b>	<b>4 credits</b>
<p>This course focuses on WAN technologies and services required by converged applications in enterprise networks. Students learn to implement and configure common data link protocols and to apply WAN security concepts, traffic principles, access control, and addressing services. This class leads to the Cisco Certified Network Associate (CCNA) certification. Prerequisite: CIS 266 and CIS 267, or instructor approval.</p>			
<b>CIS 269</b>	<b>Network Architecture and Design</b>	<b>F&amp;S</b>	<b>3 credits</b>
<p>A capstone course for the Computer Support Specialist program, this class teaches network and security design principles as they apply to Information Technology projects. Significant hands-on work with an IT project is required for this class. It is recommended that students take this course during their last semester in the Computer Support Specialist program.</p>			
<b>CIS 270</b>	<b>Building Scalable Internetworks</b>	<b>BD</b>	<b>4 credits</b>
<p>This course teaches the advanced skills required to implement and support enterprise-class IP routing networks. Topics covered include scalable network design, advanced EIGRP, multi-area OSPF, integrated IS-IS, route optimization, BGP, IP multicasting, and IPv6. The first of four courses leading to the Cisco Certified Professional (CCNP) certification. Prerequisite: CIS 266, CCNA certification, or instructor approval.</p>			
<b>CIS 271</b>	<b>Implementing Secure Converged WANs</b>	<b>BD</b>	<b>4 credits</b>
<p>This course teaches the advanced skills required to secure and enhance services in enterprise networks for teleworkers and remote sites. It will focus on securing remote access and VPN client configuration. The second of four courses leading to the Cisco Certified Professional (CCNP) certification. Prerequisite: CIS 268, CCNA certification, or instructor approval.</p>			

**CIS 272 Building Multilayer Switched Networks****BD****4 credits**

This course teaches the advanced skills required for building enterprise-class switched networks with integrated voice and wireless applications. Topics covered include network requirements, defining VLANs, implementing STP, implementing inter-VLAN routing, implementing high availability in a campus environment, wireless LANs, configuring campus switches to support voice, minimizing service loss and data theft in a campus network. The third of four courses leading to the Cisco Certified Professional (CCNP) certification. Prerequisite: CIS 267, CCNA certification, or instructor approval.

**CIS 273 Optimizing Converged Cisco Networks****BD****4 credits**

This course teaches the advanced skills required to optimize QoS in converged networks supporting voice, wireless, and security applications. Topics covered include network architecture, Cisco VoIP, QoS Overview, QoS Details, Auto QoS, and wireless scalability. The fourth of four courses leading to the Cisco Certified Professional (CCNP) certification. Prerequisites: CIS 270, 271, and 272, or instructor approval.

**CIS 294 Independent Study****1-3 credits**

Independent or directed study of topics in computer information systems. Department chairperson approval is required.

**CIS 195-295 Service Learning****1-3 credits**

Service learning may be accomplished by one of three methods: Joining a club that has a public service component, doing volunteer work at a non-profit organization, or taking a course that links public service with its curriculum.

**CIS 197-297 Cooperative Education/Internship****1-3 credits**

Students get on-the-job experience under qualified supervision in computer applications, office technology, and network administration occupations. Work hours are arranged by the employer, adviser, and student. Student progress is checked by oral and written reports from the employer. Student-advisor conferences are held to discuss progress and/ or problems. All co-op/internship experiences are graded on a satisfactory/ unsatisfactory basis. Department chairperson approval is required.

**CIS 299 Special Topics in Computer Information Systems****BD****1-3 credits**

Repeatable up to six semester hours. An examination of special topics in computer information systems.