Computer Science Degree

This program is a comprehensive exposure to programming languages, algorithms and problem solving in preparation for upper division computer science courses. The Computer Science degree includes substantial course work in mathematics as is required by most university computer science programs.

Requirements for Degree 36 Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISP 300</td>
<td>Algorithm Design/Problem Solving</td>
<td>3</td>
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<tr>
<td>CISP 310</td>
<td>Assembly Language Programming for Microcomputers</td>
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</tr>
<tr>
<td>CISP 360</td>
<td>Introduction to Structured Programming</td>
<td>4</td>
</tr>
<tr>
<td>CISP 400</td>
<td>Object Oriented Programming with C++</td>
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<tr>
<td>CISP 430</td>
<td>Data Structures</td>
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<tr>
<td>CISP 440</td>
<td>Discrete Structures for Computer Science</td>
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</tr>
<tr>
<td>CISP 453</td>
<td>Introduction to Systems Programming in UNIX</td>
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<tr>
<td>MATH 400</td>
<td>Calculus I</td>
<td>5</td>
</tr>
<tr>
<td>MATH 401</td>
<td>Calculus II</td>
<td>5</td>
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</tbody>
</table>

Associate Degree Requirements: The Computer Science Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

CIS: Computer Networking Management Degree

The Computer Networking Management degree covers network administration technologies, techniques, and the hardware and software used in today’s business/enterprise networking environment. Major topics covered include installation, configuration, and troubleshooting of network operating systems. The degree stresses the knowledge and skills required for the day-to-day operation, business aspects, security and management of computer networks. This degree has three distinct concentrations with specific courses for each concentration track:

- Microsoft Windows networking concentration, focusing on preparing for the Microsoft Certified Systems Engineer (MCSE) and/or the Microsoft Certified Systems Administrator (MCSA) certification.
- Linux/Unix networking concentration, focusing on preparing for the administration of commercial Linux/Unix servers and network environments.
- Cisco router and network administration concentration, which covers all the objectives of the Cisco Certified Networking Associate (CCNA) certification exam.

Career Opportunities

The Network Management degree is designed for career/technical students who plan to enter the work force as well as to upgrade the skill set of working IT professionals. The degree and its three concentrations are formulated with advice from business and industry representatives and conform to industry standards. Typical jobs a student could expect to fill would be network technical support staff, network administrators, network designers, network systems engineer, network troubleshooters, and information systems security specialists.

Core Requirements for Degree 25-26 Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tr>
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<td>Fundamentals of College Accounting (3)</td>
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<td>or ACCT 301</td>
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<tr>
<td>or BUS 300</td>
<td>Introduction to Business (3)</td>
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<tr>
<td>BUS 310</td>
<td>Business Communications (3)</td>
<td>3</td>
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<tr>
<td>or ENGWR 300</td>
<td>College Composition (3)</td>
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</tr>
<tr>
<td>CISA 305</td>
<td>Beginning Word Processing</td>
<td>2</td>
</tr>
<tr>
<td>CISA 315</td>
<td>Introduction to Electronic Spreadsheets</td>
<td>2</td>
</tr>
<tr>
<td>CISC 320</td>
<td>Operating Systems</td>
<td>1</td>
</tr>
<tr>
<td>CISC 323</td>
<td>Linux Operating System</td>
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</tr>
<tr>
<td>CISC 350</td>
<td>Introduction to Data Communications</td>
<td>1</td>
</tr>
<tr>
<td>CISC 361</td>
<td>Microcomputer Support and Repair</td>
<td>3</td>
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<tr>
<td>CISS 310</td>
<td>Network Security Fundamentals</td>
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<td>and a minimum of 1 unit from the following:</td>
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<tr>
<td>and a minimum of 5 units from the following:</td>
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<tr>
<td>CISA 126</td>
<td>Outlook: Basics (1)</td>
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<tr>
<td>or BUSTEC 126</td>
<td>Outlook: Basics (1)</td>
<td></td>
</tr>
<tr>
<td>and CISA 127</td>
<td>Outlook: Tools (1)</td>
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<tr>
<td>or BUSTEC 127</td>
<td>Outlook: Tools (1)</td>
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<td>CISA 160</td>
<td>Project Management Techniques and Software (3)</td>
<td>3</td>
</tr>
<tr>
<td>CISN 110</td>
<td>Networking Technologies - Preparation for N+ Certification</td>
<td>3 - 4</td>
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<tr>
<td>----------</td>
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<tr>
<td>CISN 111</td>
<td>Intermediate Networking Technologies - Preparation for N+ Certification</td>
<td>2</td>
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<tr>
<td>CISN 119</td>
<td>TCP/IP Protocols</td>
<td>3</td>
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<tr>
<td>CISN 120</td>
<td>Beginning Network Administration with Linux</td>
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<tr>
<td>CISN 121</td>
<td>Network Administration with Linux: LAN Services</td>
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<tr>
<td>CISN 122</td>
<td>Network Administration with Linux: Internet Services</td>
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<tr>
<td>CISP 400</td>
<td>Object Oriented Programming with C++ (4)</td>
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<tr>
<td>CISP 453</td>
<td>Introduction to Systems Programming in UNIX (4)</td>
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</tr>
<tr>
<td>CISS 342</td>
<td>Implementing Linux Operating System Security (3)</td>
<td></td>
</tr>
</tbody>
</table>

**LINUX Concentration 43-44 Units**

- CISN 110 Networking Technologies - Preparation for N+ Certification
- CISN 111 Intermediate Networking Technologies - Preparation for N+ Certification
- CISN 119 TCP/IP Protocols
- CISN 120 Beginning Network Administration with Linux
- CISN 121 Network Administration with Linux: LAN Services
- CISN 122 Network Administration with Linux: Internet Services
- CISP 400 Object Oriented Programming with C++ (4)
- CISP 453 Introduction to Systems Programming in UNIX (4)
- CISS 342 Implementing Linux Operating System Security (3)

**WINDOWS Concentration 44-45 Units**

- CISN 110 Networking Technologies - Preparation for N+ Certification
- CISN 111 Intermediate Networking Technologies - Preparation for N+ Certification
- CISN 300 Network Systems Administration
- CISN 302 Intermediate Network Systems Administration
- CISN 307 Windows Active Directory Services
- CISN 308 Interneetworking with TCP/IP (3)
- CISN 119 TCP/IP Protocols (3)

**Associate Degree Requirements:** The CIS: Computer Networking Management Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

**CIS: Computer Networking Management Certificate**

The CIS: Computer Networking Management certificate provides instruction for entry-level and IT professionals aiming for skill enhancement on the specific knowledge and skills required to master one of three industry standard network technologies:

- Microsoft Windows networking concentration, focusing on preparing for the Microsoft Certified Systems Engineer (MCSE) and/or the Microsoft Certified Systems Administrator (MCSA) certification.
- Linux/Unix networking concentration, focusing on preparing for the administration of commercial Linux/Unix servers and network environments.
- Cisco router and network administration concentration, which covers all the objectives of the Cisco Certified Network Associate (CCNA) certification exam.

**Core Requirements for Certificate 8 Units**

- CISC 323 Linux Operating System
- CISC 350 Introduction to Data Communications
- CISC 361 Microcomputer Support And Repair
- CISC 310 Network Security Fundamentals

**CISCO Concentration 21 Units**

- CISC 324 Intermediate Linux Operating System
- CISN 140 CISCO Networking Academy (CCNA): Data Communication and Networking Fundamentals
- CISN 141 CISCO Networking Academy (CCNA): Networking Theory and Routing Technologies
- CISN 142 CISCO Networking Academy (CCNA): Advanced Routing and Switching
- CISN 143 CISCO Networking Academy (CCNA): Wide Area Network and Project-Based Learning

**LINUX Concentration 23 Units**

- CISC 324 Intermediate Linux Operating System
- CISN 140 CISCO Networking Academy (CCNA): Data Communication and Networking Fundamentals
- CISN 141 CISCO Networking Academy (CCNA): Networking Theory and Routing Technologies
- CISN 142 CISCO Networking Academy (CCNA): Advanced Routing and Switching
- CISN 143 CISCO Networking Academy (CCNA): Wide Area Network and Project-Based Learning

**WINDOWS Concentration 24 Units**

- CISN 140 CISCO Networking Academy (CCNA): Data Communication and Networking Fundamentals
- CISN 141 CISCO Networking Academy (CCNA): Networking Theory and Routing Technologies
- CISN 142 CISCO Networking Academy (CCNA): Advanced Routing and Switching
- CISN 143 CISCO Networking Academy (CCNA): Wide Area Network and Project-Based Learning

**Core Requirements**

- CISC 324 Intermediate Linux Operating System
- CISN 140 CISCO Networking Academy (CCNA): Data Communication and Networking Fundamentals
- CISN 141 CISCO Networking Academy (CCNA): Networking Theory and Routing Technologies
- CISN 142 CISCO Networking Academy (CCNA): Advanced Routing and Switching
- CISN 143 CISCO Networking Academy (CCNA): Wide Area Network and Project-Based Learning
CIS: Computer Programming Degree

The computer programming degree includes general topics in programming as well as focused topics related to one commonly used programming language. General topics include the use of an operating system and systems analysis. Programming language specific topics include syntax, program structuring, language constructs and proper programming methods.

Career Opportunities

Upon completion of the computer programming degree, a student has the minimum qualifications as an entry-level programmer/developer.

Core Requirements for Degree

7 Units

- CISC 310 Introduction to Computer Information Science 3
- CISP 453 Introduction to Systems Programming in UNIX 4

or CISA 321 Intermediate Database Management 1

and CISP 350 Database Programming 3

C++ Concentration

22 Units

- Core Requirements 7
- CISP 300 Algorithm Design/Problem Solving 3
- CISP 360 Introduction to Structured Programming 4
- CISP 400 Object Oriented Programming with C++ 4
- CISP 430 Data Structures 4

Cobol Concentration

21 Units

- Core Requirements 7
- CISP 300 Algorithm Design/Problem Solving 3
- CISP 320 COBOL Programming 4
- CISP 321 Advanced COBOL Programming 4
- CISP 457 Computer Systems Analysis and Design 3

Java Concentration

21 Units

- Core Requirements 7
- CISP 300 Algorithm Design/Problem Solving 3
- CISP 360 Introduction to Structured Programming 4
- CISP 401 Object Oriented Programming with Java 4
- CISP 457 Computer Systems Analysis and Design 3

Visual Basic Concentration

21 Units

- Core Requirements 7
- CISP 300 Algorithm Design/Problem Solving 3
- CISP 370 Beginning Visual Basic 4
- CISP 371 Intermediate Visual Basic 4
- CISP 457 Computer Systems Analysis and Design 3

Associate Degree Requirements: The CIS: Computer Programming Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

CIS: Database Management Degree

The CIS: Database Management degree focuses on relational database technology used in the business environment. The emphasis is on selecting the appropriate system platform for database deployment. Course work includes database system design and programming for desktop, enterprise and Internet platforms, structure query language (SQL) programming, introductory principles of modular programming, system design and problem solving, desktop operating systems, electronic spreadsheets and a variety of introductory business courses.

Requirements for Degree

37-38 Units

- ACCT 101 Fundamentals of College Accounting (3) 3 - 4
- or ACCT 301 Financial Accounting (4)
- BUS 110 Business Economics (3) 3
- or ECON 302 Principles of Macroeconomics (3)
- BUS 300 Introduction to Business 3
- BUS 310 Business Communications (3) 3
- or ENGWR 300 College Composition (3)
- CISA 315 Introduction to Electronic Spreadsheets 2
- CISA 320 Introduction to Database Management 1
- CISA 321 Intermediate Database Management 1
- CISC 310 Introduction to Computer Information Science 3
- CISC 320 Operating Systems 1
- CISP 300 Algorithm Design/Problem Solving 3
- CISP 350 Database Programming 3
- CISP 370 Beginning Visual Basic 4
- CISW 300 Web Publishing 3
- CISW 410 Middleware Web Scripting 4

Associate Degree Requirements: The CIS: Database Management Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

CIS: Database Management Certificate

The CIS: Database Management certificate involves the study of relational database technology used in the business environment. The emphasis is on selecting the appropriate system platform for database deployment. Course work includes database system design and programming for desktop, enterprise and Internet platforms, structure query language (SQL) programming, introductory principles of modular programming, system design and problem solving, desktop operating systems, and electronic spreadsheets.

Requirements for Certificate

22 Units

- CISA 315 Introduction to Electronic Spreadsheets 2
- CISA 320 Introduction to Database Management 1
- CISA 321 Intermediate Database Management 1
- CISC 320 Operating Systems 1
- CISP 300 Algorithm Design/Problem Solving 3
- CISP 350 Database Programming 3
- CISP 370 Beginning Visual Basic 4
- CISW 300 Web Publishing 3
- CISW 410 Middleware Web Scripting 4

CIS: Microcomputer Applications Degree

This associate degree program focuses on the use of the microcomputer and current, commonly used software to solve problems in a business environment. Course work includes microcomputer applications in database management, desktop publishing, electronic spreadsheets, presentation graphics, operating systems, word processing, at least one programming language, and a variety of business courses.

Requirements for Degree

36 Units

- BUS 310 Business Communications 3
- CISA 305 Beginning Word Processing 2
- CISA 306 Intermediate Word Processing 2
- CISA 315 Introduction to Electronic Spreadsheets 2
- CISA 316 Intermediate Electronic Spreadsheets 2
- CISA 320 Introduction to Database Management 1
- CISA 321 Intermediate Database Management 1
- CISA 330 Desktop Publishing 2

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CIS: Microcomputer Applications Certificate

This certificate involves the use of the microcomputer and current, commonly used software applications to solve problems in a business environment. Course work includes microcomputer applications in database management, desktop publishing, electronic spreadsheets, presentation graphics, operating systems, and word processing.

Requirements for Certificate 24 Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 310</td>
<td>Business Communications</td>
<td>3</td>
</tr>
<tr>
<td>CISA 305</td>
<td>Beginning Word Processing</td>
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<tr>
<td>CISA 306</td>
<td>Intermediate Word Processing</td>
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</tr>
<tr>
<td>CISA 315</td>
<td>Introduction to Electronic Spreadsheets</td>
<td>2</td>
</tr>
<tr>
<td>CISA 316</td>
<td>Intermediate Electronic Spreadsheets</td>
<td>2</td>
</tr>
<tr>
<td>CISA 320</td>
<td>Introduction to Database Management</td>
<td>1</td>
</tr>
<tr>
<td>CISA 321</td>
<td>Intermediate Database Management</td>
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</tr>
<tr>
<td>CISA 330</td>
<td>Desktop Publishing</td>
<td>2</td>
</tr>
<tr>
<td>CISA 340</td>
<td>Presentation Graphics</td>
<td>2</td>
</tr>
<tr>
<td>CISA 395</td>
<td>Introduction to the Internet</td>
<td>1</td>
</tr>
<tr>
<td>CISA 396</td>
<td>Introduction to Web Page Creation</td>
<td>1</td>
</tr>
<tr>
<td>CISA 310</td>
<td>Introduction to Computer Information Science</td>
<td>3</td>
</tr>
<tr>
<td>CISA 330</td>
<td>Introduction to Data Communications</td>
<td>1</td>
</tr>
</tbody>
</table>

Taken on the Windows operating system.

CIS: PC Support Management Degree

The CIS: PC Support Management degree involves the use of a microcomputer’s hardware, software and networking used in today’s business environment. Course work includes basic computer skills in configuration, use, and troubleshooting major hardware components, different operating systems, and applications in a standalone and network environment. This program covers all the objectives of the Computing Technology Industry Association (CompTIA) A+ certification exam.

Requirements for Degree 30 Units

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
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<tr>
<td>BUS 310</td>
<td>Business Communications</td>
<td>3</td>
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<tr>
<td>CISA 160</td>
<td>Project Management Techniques and Software</td>
<td>3</td>
</tr>
<tr>
<td>CISA 310</td>
<td>Introduction to Computer Information Science</td>
<td>3</td>
</tr>
<tr>
<td>CISA 320</td>
<td>Operating Systems</td>
<td>1</td>
</tr>
<tr>
<td>CISA 350</td>
<td>Introduction to Data Communications</td>
<td>1</td>
</tr>
<tr>
<td>CISA 351</td>
<td>Introduction to Local Area Networks</td>
<td>1</td>
</tr>
<tr>
<td>CISA 361</td>
<td>Microcomputer Support And Repair</td>
<td>3</td>
</tr>
<tr>
<td>CISA 362</td>
<td>Microcomputer and Applications Support</td>
<td>2</td>
</tr>
<tr>
<td>CISA 363</td>
<td>Advanced Microcomputer Support and Repair</td>
<td>2</td>
</tr>
<tr>
<td>CISA 364</td>
<td>Ethical Hacking</td>
<td>2</td>
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</tbody>
</table>

And a minimum of 6 units from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CISA 305</td>
<td>Beginning Word Processing</td>
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</tr>
<tr>
<td>CISA 315</td>
<td>Introduction to Electronic Spreadsheets</td>
<td>2</td>
</tr>
<tr>
<td>CISA 320</td>
<td>Introduction to Database Management</td>
<td>1</td>
</tr>
<tr>
<td>CISA 340</td>
<td>Presentation Graphics</td>
<td>2</td>
</tr>
<tr>
<td>CISA 345</td>
<td>Introduction to Web Page Creation</td>
<td>1</td>
</tr>
<tr>
<td>CISA 395</td>
<td>Introduction to Computer Information Science</td>
<td>3</td>
</tr>
<tr>
<td>CISA 396</td>
<td>Operating Systems</td>
<td>1</td>
</tr>
</tbody>
</table>

Taken on the Windows operating system.

Associate Degree Requirements: The CIS: Microcomputer Applications Associate in Arts (A.A.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

CIS: PC Support Certificate

The CIS: PC Support certificate involves learning the use of a microcomputer’s hardware, software and networking used in today’s business environment. Course work includes basic computer skills in configuration, use, and troubleshooting major hardware components, different operating systems, and applications in a standalone and network environment. This program covers all the objectives of the Computing Technology Industry Associates (CompTIA) A+ certification exam.

Requirements for Certificate 24 Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 310</td>
<td>Business Communications</td>
<td>3</td>
</tr>
<tr>
<td>CISA 310</td>
<td>Introduction to Computer Information Science</td>
<td>3</td>
</tr>
<tr>
<td>CISA 320</td>
<td>Operating Systems</td>
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<tr>
<td>CISA 350</td>
<td>Introduction to Data Communications</td>
<td>1</td>
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<tr>
<td>CISA 351</td>
<td>Introduction to Local Area Networks</td>
<td>1</td>
</tr>
<tr>
<td>CISA 361</td>
<td>Microcomputer Support And Repair</td>
<td>3</td>
</tr>
<tr>
<td>CISA 362</td>
<td>Microcomputer and Applications Support</td>
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</tr>
<tr>
<td>CISA 363</td>
<td>Advanced Microcomputer Support and Repair</td>
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</tr>
<tr>
<td>CISA 364</td>
<td>Ethical Hacking</td>
<td>2</td>
</tr>
</tbody>
</table>

And a minimum of 6 units from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CISA 305</td>
<td>Beginning Word Processing</td>
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<tr>
<td>CISA 315</td>
<td>Introduction to Electronic Spreadsheets</td>
<td>2</td>
</tr>
<tr>
<td>CISA 320</td>
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</tr>
<tr>
<td>CISA 340</td>
<td>Presentation Graphics</td>
<td>2</td>
</tr>
<tr>
<td>CISA 345</td>
<td>Introduction to Web Page Creation</td>
<td>1</td>
</tr>
<tr>
<td>CISA 395</td>
<td>Introduction to Computer Information Science</td>
<td>3</td>
</tr>
<tr>
<td>CISA 396</td>
<td>Operating Systems</td>
<td>1</td>
</tr>
</tbody>
</table>

Taken on the Windows operating system.
Information Systems Security Degree

This program provides the information and skills necessary for network administration professionals to implement security from internal and external threats for an enterprise network. It covers client and server security on different operating systems, disaster recovery planning, and forensics. This program also provides preparation for several computer information security certification exams, including the Computer Technology Industry Association (CompTIA) Security+ exam, Microsoft Certified Systems Engineer (MCSE) exams and several of the Certified Information Systems Security Professional (CISSP) certification exams.

Requirements for Degree 33 Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 310</td>
<td>Business Communications</td>
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<td>CISC 323</td>
<td>Linux Operating System</td>
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<td>CISC 324</td>
<td>Intermediate Linux Operating System</td>
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<td>CISN 110</td>
<td>Networking Technologies - Preparation for N+ Certification</td>
<td>2</td>
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<tr>
<td>CISN 111</td>
<td>Intermediate Networking Technologies - Preparation for N+ Certification</td>
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<tr>
<td>CISN 300</td>
<td>Network Systems Administration</td>
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<td>CISN 302</td>
<td>Intermediate Network Systems Administration</td>
<td>3</td>
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<tr>
<td>CISN 307</td>
<td>Windows Active Directory Services</td>
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</tr>
<tr>
<td>CISN 310</td>
<td>Network Security Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CISN 325</td>
<td>Network Security and Firewalls</td>
<td>3</td>
</tr>
<tr>
<td>CISN 341</td>
<td>Implementing Windows Operating System Security</td>
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</tr>
<tr>
<td>CISN 342</td>
<td>Implementing Linux Operating System Security</td>
<td>3</td>
</tr>
<tr>
<td>CISN 350</td>
<td>Disaster Recovery</td>
<td>3</td>
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<tr>
<td>CISN 360</td>
<td>Computer Forensics and Investigation</td>
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</tbody>
</table>

Associate Degree Requirements: The Information Systems Security Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Information Systems Security Certificate

This program provides the information and skills necessary for network administrators to implement security to protect against internal and external threats to an enterprise network, and covers client and server security on different operating systems. This program provides preparation for several certification exams, including the Computer Technology Industry Association (CompTIA) Security+ exam, Microsoft Certified Systems Engineer (MCSE) exams and some of the Certified Information Systems Security Professional (CISSP) certification exams.

Requirements for Certificate 23 Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</tr>
<tr>
<td>CISC 324</td>
<td>Intermediate Linux Operating System</td>
<td>1</td>
</tr>
<tr>
<td>CISN 300</td>
<td>Network Systems Administration</td>
<td>3</td>
</tr>
<tr>
<td>CISN 302</td>
<td>Intermediate Network Systems Administration</td>
<td>3</td>
</tr>
<tr>
<td>CISN 307</td>
<td>Windows Active Directory Services</td>
<td>3</td>
</tr>
<tr>
<td>CISN 310</td>
<td>Network Security Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CISN 325</td>
<td>Network Security and Firewalls</td>
<td>3</td>
</tr>
<tr>
<td>CISN 341</td>
<td>Implementing Windows Operating System Security</td>
<td>3</td>
</tr>
<tr>
<td>CISN 342</td>
<td>Implementing Linux Operating System Security</td>
<td>3</td>
</tr>
<tr>
<td>CISN 310</td>
<td>Networking Technologies - Preparation for N+ Certification</td>
<td>2</td>
</tr>
<tr>
<td>CISN 311</td>
<td>Intermediate Networking Technologies - Preparation for N+ Certification</td>
<td>2</td>
</tr>
<tr>
<td>CISN 140</td>
<td>CISCO Networking Academy (CCNA): Data Communication and Networking Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CISN 301</td>
<td>Ethical Hacking</td>
<td>2</td>
</tr>
</tbody>
</table>

And a minimum of 3 units from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISN 10</td>
<td>Networking Technologies - Preparation for N+ Certification</td>
<td>2</td>
</tr>
</tbody>
</table>

CIS: Programming Certificate

This certificate provides up-to-date and general knowledge in the field of computer programming, such as syntax, programming methodologies, and structured programming. It also includes topics relating to the work environment of a programmer. Such topics include operating systems and systems analysis.

Career Opportunities

The programming certificate enables people who are already in information technology and computer fields to develop programs.

Requirements for Certificate 7 Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISC 310</td>
<td>Introduction to Computer Information Science</td>
<td>3</td>
</tr>
<tr>
<td>CISC 320</td>
<td>Operating Systems</td>
<td>1</td>
</tr>
<tr>
<td>CISP 457</td>
<td>Computer Systems Analysis and Design</td>
<td>3</td>
</tr>
</tbody>
</table>

C++ Concentration Requirements 22 Units

Core Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISP 300</td>
<td>Algorithm Design/Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>CISP 360</td>
<td>Introduction to Structured Programming</td>
<td>4</td>
</tr>
<tr>
<td>CISP 400</td>
<td>Object Oriented Programming with C++</td>
<td>4</td>
</tr>
<tr>
<td>CISP 430</td>
<td>Data Structures</td>
<td>4</td>
</tr>
</tbody>
</table>

Java Concentration Requirements 18 Units

Core Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISP 300</td>
<td>Algorithm Design/Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>CISP 360</td>
<td>Introduction to Structured Programming</td>
<td>4</td>
</tr>
<tr>
<td>CISP 401</td>
<td>Object Oriented Programming with Java</td>
<td>4</td>
</tr>
</tbody>
</table>

Visual Basic Concentration Requirements 22 Units

Core Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISP 300</td>
<td>Algorithm Design/Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>CISP 350</td>
<td>Database Programming</td>
<td>3</td>
</tr>
<tr>
<td>CISP 370</td>
<td>Beginning Visual Basic</td>
<td>4</td>
</tr>
<tr>
<td>CISP 371</td>
<td>Intermediate Visual Basic</td>
<td>4</td>
</tr>
</tbody>
</table>

Computer Information Security Essentials Certificate

This program provides the basic information and skills necessary for network administrators to implement security from internal and external threats to a network. It also provides preparation for the Computing Technology Industry Association (CompTIA) Security+ exam.

Requirements for Certificate 12 Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISS 310</td>
<td>Network Security Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CISS 325</td>
<td>Network Security and Firewalls</td>
<td>3</td>
</tr>
<tr>
<td>CISS 341</td>
<td>Implementing Windows Operating System Security</td>
<td>3</td>
</tr>
<tr>
<td>CISS 342</td>
<td>Implementing Linux Operating System Security</td>
<td>3</td>
</tr>
<tr>
<td>CISS 300</td>
<td>Algorithm Design/Problem Solving</td>
<td>2</td>
</tr>
</tbody>
</table>

Network Administration Essentials - Windows Certificate

This program provides the information and skills necessary for network administration professionals to administer a Windows Active Directory domain-based enterprise network. It also provides preparation for several Microsoft Certified Systems Engineer (MCSE) certification exams.
Web Developer Certificate

The web developer certificate offers a program of study for students seeking jobs in the fields of web based programming and web application development. The program provides students with the necessary skills and aptitudes for creating and maintaining interactive, database-driven, web applications.

Requirements for Certificate 12 Units
CISN 300 Network Systems Administration 3
CISN 302 Intermediate Network Systems Administration 3
CISN 307 Windows Active Directory Services 3
CISN 308 Internetworking with TCP/IP 3

Technical Communication Degree

Requirements for Degree 42.5 Units
ART 330 Design: Fundamentals (3) 3
or ARTNM 310 Design: Fundamentals (3)
ART 323 Design: Color Theory 3
ARTNM 305 Graphic Design: Typography 3
CISA 305 Beginning Word Processing 2
CISA 306 Intermediate Word Processing 2
CISC 320 Operating Systems 1
CISW 300 Web Publishing 3
ENGWR 342 Introduction to Technical/Professional Communication 3
ENGWR 344 Technical/Professional Communication: Writing Reports (1.5) 1.5
or ENGWR 348 Technical/Professional Communication: Plain English (1.5)
or ENGWR 350 Technical/Professional Communication: Proposal Writing (1.5)
ENGWR 352 Technical/Professional Communication: Writing Technical Manuals 3

And a minimum of 6 units from the following: 6
ENGOW 450 College Literary Magazine (3)
ENGWR 330 Writing for Publication (3)
ENGWR 331 Writing for Publication (3)
ENGWR 354 Introduction to Careers in Technical Communication (1)
ENGWR 356 Writing Formal Reports (1)
ENGWR 358 Writing Training Materials (1)
JOUR 300 Newswriting and Reporting (3)
JOUR 401 College Newspaper Production (2)
SPEECH 321 Interpersonal Communication (3)
or SPEECH 331 Group Discussion (3)

And a minimum of 12 units from the following: 12
ARTNM 324 Digital Design (3)
ARTNM 328 Digital Photo Imagery - Photoshop Basics (3)
ARTNM 330 Intermediate Digital Photo Imagery (3)
ARTNM 352 Design for Publication (3)
or CISA 330 Desktop Publishing (2)
and CISA 331 Intermediate Desktop Publishing (2)
ARTNM 354 Digital Prepress (3)
ARTNM 402 Intermediate Web Design (3)
ARTNM 404 Interactive Multimedia Basics (3)
CISA 315 Introduction to Electronic Spreadsheets (2)
CISA 340 Presentation Graphics (2)
CISW 310 Advanced Web Publishing (4)

Associate Degree Requirements: The Technical Communications Associate in Arts (A.A.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Technical Communication Certificate

Requirements for Certificate 20.5-21.5 Units
ARTNM 324 Design for Publication (3) 3-4
or CISA 330 Desktop Publishing (2)
and CISA 331 Intermediate Desktop Publishing (2)
CISA 305 Beginning Word Processing 2
CISA 306 Intermediate Word Processing 2
ENGWR 342 Introduction to Technical/Professional Communication 3
ENGWR 344 Technical/Professional Communication: Writing Reports (1.5) 1.5
or ENGWR 348 Technical/Professional Communication: Plain English (1.5)
or ENGWR 350 Technical/Professional Communication: Proposal Writing (1.5)
ENGWR 352 Technical/Professional Communication: Writing Technical Manuals 3
And a minimum of 6 units from the following: 6

- **ARTNM 324** Digital Design (3)
- **ARTNM 328** Digital Photo Imagery - PhotoShop Basics (3)
- **ARTNM 330** Intermediate Digital Photo Imagery (3)
- **ARTNM 402** Intermediate Web Design (3)
- **ARTNM 404** Interactive Multimedia Basics (3)
- **CISA 340** Presentation Graphics (2)
- **CISW 300** Web Publishing (3)
- **CISW 310** Advanced Web Publishing (4)

**CISA 126** Outlook: Basics 1 Unit
Same As: BUSTEC 126
Advisory: BUSTEC 300
Hours: 18 hours LEC
This course introduces desktop communication management for users of Microsoft Outlook. Topics include e-mail, creating and managing contacts in the address book, and accessing files and folders. The skills and topics needed to pass the International Computer Driver's License (ICDL) Module 7: Information and Communication communications portion of the ICDL exam are covered. Additionally, CISA 126/BUSTEC 126 and CISA 127/BUSTEC 127 taken together are considered sufficient preparation to pass the Microsoft Office Specialist certification objectives for the Microsoft Outlook application. This course is not open to students who have taken BUSTEC 126.

**CISA 127** Outlook: Tools 1 Unit
Same As: BUSTEC 127
Advisory: BUSTEC 300
Hours: 18 hours LEC
This Outlook course presents the communication tools beyond basic email. Topics include calendar and scheduling, tasks and notes, shared folders, and customizing Outlook. In addition, the course covers the integration of Outlook with other applications within the Microsoft Office suite. CISA 126/BUSTEC 126 and CISA 127/BUSTEC 127 taken together are considered sufficient preparation to pass the Microsoft Office Specialist certification objectives for the Microsoft Outlook application. This course is not open to students who have taken BUSTEC 127.

**CISA 141** Capturing and Publishing Digital Media 2 Units
Hours: 27 hours LEC, 27 hours LAB
This course is an overview of multimedia publishing software and peripherals used to produce digital media. Topics include the function and features of technology devices such as video camcorders, digital cameras, digital music devices, graphic pads and pens, DVD/CD burners, USB drives, and photo/CD/DVD printers. Multimedia publishing software and devices are examined and discussed for advantages and disadvantages. File and equipment management techniques are presented.

**CISA 160** Project Management Techniques and Software 3 Units
Same As: MGMT 142
Advisory: ENGRD 116; or ESLR 320 and ESLW 320; CISW 300
Hours: 54 hours LEC
This is an introductory course covering the responsibilities of a project manager. It includes the knowledge needed to manage a project, control costs and schedule resources. It will also introduce the use of project management software to track project resources, tasks and milestones. Not open to students who have taken MGMT 142.

**CISA 171** Introduction to Adobe Acrobat 1 Unit
Hours: 9 hours LEC, 27 hours LAB
This course introduces Adobe Acrobat tools for creating, editing, reading, and printing Portable Document Format (PDF) documents. Topics include software navigation, converting other file types to PDF, and customizing output quality. Additional topics include modifying PDF files, placing documents on-line, adding digital signatures and security, creating presentations, manipulating graphics, and managing eBooks.

**CISA 294** Topics in Computer Information Science - Applications .5 Units
Prerequisite: To be determined with each topic.
Hours: 9-72 hours LEC, 0-54 hours LAB
This is an individualized course developed in cooperation with industry and/or government to meet specialized training needs. The course may be taken twice for credit.

**CISA 305** Beginning Word Processing 2 Units
Advisory: CISW 300
General Education: AA/AS Area II(b)
Course Transferable to CSU
Hours: 27 hours LEC, 27 hours LAB
This is an introductory course in word processing. The course introduces word processing operations such as creating, editing, file management techniques, and printing text. Emphasis is on formatting and document production techniques to produce professional business documents used in today's workplace. The course culminates with the study of intermediate level features such as merge, sort, graphics, macros, style, and templates. This course may be taken four times on a different software package or version.

**CISA 306** Intermediate Word Processing 2 Units
Prerequisite: CISA 305 with grade of “C” or better.
Course Transferable to CSU
Hours: 27 hours LEC, 27 hours LAB
This course is a continuation of word processing with emphasis on applications for business documents and reports. In addition, this course includes desktop publishing techniques using word processing software, newsletter production, macro editing, complex document styles and commands, importing, linking and merging data from other applications into a word processing document. This course may be taken four times on a different software packaging or version.

**CISA 308** Exploring Word Processing and Presentation Software 1 Unit
Course Transferable to CSU
Hours: 18 hours LEC
The course introduces word processing and presentation software. The basic features and skills of creating, editing and formatting documents, inserting tables and graphics and enhancing word documents are covered. PowerPoint presentations are included.

**CISA 315** Introduction to Electronic Spreadsheets 2 Units
Advisory: CISW 100 and the ability to touch type.
General Education: AA/AS Area II(b)
Course Transferable to CSU
Hours: 27 hours LEC, 27 hours LAB
This course introduces the use of electronic spreadsheet programs. The course includes designing spreadsheets, developing formulas for automatic calculations, developing “what if” models, and producing printed reports. In addition, the course will introduce 3-D cell referencing, accessing real-time spreadsheet data from the Internet, and data filtering techniques. The course may be taken four times for credit on a different software package or version.
CISA 316 Intermediate Electronic Spreadsheets  2 Units
Prerequisite: CISA 315 with a grade of “C” or better.
Course Transferable to CSU
Hours: 27 hours LEC; 27 hours LAB
This course is a continuation of electronic worksheets with emphasis on workbook design and integration, template design, use of complex formulas, and built-in financial and logical functions. The course also includes look-up tables, the use of worksheet analysis tools, macros, and data integration. The course may be taken four times for credit on a different software package or version.

CISA 318 Exploring Spreadsheet Software  1 Unit
Course Transferable to CSU
Hours: 18 hours LEC
The course introduces widely used spreadsheet software. The basic features and skills of editing and formatting a spreadsheet, using basic formulas and functions, inserting and formatting charts and graphics in a spreadsheet workbook and analyzing and presenting that workbooks are covered.

CISA 320 Introduction to Database Management  1 Unit
Advisory: BUSTEC 300 and CISC 300
General Education: AA/AS Area II(b)
Course Transferable to CSU
Hours: 18 hours LEC; 18 hours LAB
This course introduces the student, through hands-on operation, to the use of database management programs on the microcomputer. It includes designing a database; assessing, searching, and updating files, and designing and producing printed reports. This course may be taken four times for credit on a different software package or version.

CISA 321 Intermediate Database Management  1 Unit
Prerequisite: CISA 320 with grade of “C” or better.
Course Transferable to CSU
Hours: 18 hours LEC; 18 hours LAB
This course continues the study of microcomputer database with emphasis on database design, reporting, application building, and utilization of files created using other software. This course may be taken four times on a different software package or version.

CISA 322 Advanced Database Management  1 Unit
Prerequisite: CISA 321 with a grade of “C” or better in the corresponding software application CISA 322 package.
Course Transferable to CSU
Hours: 18 hours LEC; 18 hours LAB
This course continues the study of microcomputer database with emphasis on database design, reporting, application building, and utilization of files created using other software. The course may be taken four times on a different software package or version.

CISA 330 Desktop Publishing  2 Units
Advisory: CISC 300, CISA 300 and ability to touch type.
Course Transferable to CSU
Hours: 27 hours LEC; 27 hours LAB
The course is designed to present an overview of desktop publishing and a major desktop publishing program. Material presented will include page layout skills needed to produce newsletters, brochures, flyers, reports, and directories on the computer. File and equipment management techniques will be presented. This course may be taken four times on a different software package or version.

CISA 331 Intermediate Desktop Publishing  2 Units
Prerequisite: CISA 330 with a grade of “C” or better.
Course Transferable to CSU
Hours: 27 hours LEC; 27 hours LAB
This course is designed to present an overview of advanced desktop publishing (DTP) skills. Advanced techniques in page layout and design, select and use software programs which interface with DTP, use advanced typographic features, create and integrate image/graphic designs, handle files and directories, and analyze DTP needs and equipment integration will be presented. This course may be taken four times on a different software package or version.

CISA 340 Presentation Graphics  2 Units
Advisory: CISC 300.
Course Transferable to CSU
Hours: 27 hours LEC; 27 hours LAB
This course presents an in-depth look at using presentation software in business environments. Topics include elements of good presentation design, slide show techniques, integrating and linking of various software applications and media, animation effects, and the production of presentations using a variety of hardware. This course may be taken four times on a different software package or version.

CISA 405 Scripting for Applications  3 Units
Course Transferable to CSU
Hours: 36 hours LEC; 54 hours LAB
This course is an introduction to the application scripting via object oriented programming concepts. Topics covered include the OS environment; office suites; scripting languages; user interface; creating application macros and scripts; using application objects; properties and methods; customizing applications; linking application data; buttons; boxes; graphics; data handling; error handling; control; and form handling. This course may be taken four times with a different scripting language.

CISC 100 Computer Fundamentals with Hands-on Lab  2 Units
Hours: 27 hours LEC; 27 hours LAB
This introductory course provides general non-technical knowledge combined with a hands-on lab on how computers work including basic computer terminology and concepts. The focus is slower paced instruction with extensive hands-on reinforcement of instructional concepts. Course topics include an introduction to the operating system software and application software focusing on word processing, spreadsheets, the Internet and email.

CISC 294 Topics in Computer Information Science  1 Unit
Prerequisite: To be determined with each topic.
Hours: 9-72 hours LEC; 0-54 hours LAB
This is an individualized course developed in cooperation with industry and/or government to meet specialized training needs. The course may be taken twice for credit.

CISC 300 Computer Familiarization  1 Unit
Advisory: ENGRD 116 or ESLR 320, and the ability to touch type.
General Education: AA/AS Area II(b); AA/AS Area III(b)
Course Transferable to CSU
Hours: 18 hours LEC
This course provides a general non-technical introduction to how computers work in addition to basic computer terminology and concepts. The focus is hands-on instruction using an operating system, word processing, spreadsheet, and Internet software. The course may be taken twice for credit on different hardware platforms.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISC 305</td>
<td>Introduction to the Internet</td>
<td>1 Unit</td>
</tr>
<tr>
<td></td>
<td>Advisory: CISC 300.</td>
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<tr>
<td></td>
<td>Course Transferable to CSU</td>
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<tr>
<td></td>
<td>Hours: 18 hours LEC; 18 hours LAB</td>
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<td></td>
<td>This course is an introduction to how the Internet works, how to connect, and how to use the basic services. Topics will include E-mail, the World Wide Web, newsgroups, mailing lists, Telnet, and FTP.</td>
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</tr>
<tr>
<td>CISC 306</td>
<td>Introduction to Web Page Creation</td>
<td>1 Unit</td>
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<td></td>
<td>Advisory: CISC 305.</td>
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<td></td>
<td>Course Transferable to CSU</td>
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<tr>
<td></td>
<td>Hours: 18 hours LEC; 18 hours LAB</td>
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<td></td>
<td>This course covers the production of web pages, including design, layout, construction, and presentation. A web authoring tool is used to format a web page and Extensible Hypertext Markup Language (XHTML) is introduced. This course may be taken four times for credit on a different software package or version.</td>
<td></td>
</tr>
<tr>
<td>CISC 308</td>
<td>Exploring Computer Environments and the Internet</td>
<td>1 Unit</td>
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<td></td>
<td>Course Transferable to CSU</td>
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<td></td>
<td>Hours: 18 hours LEC</td>
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<td></td>
<td>The course introduces the fundamentals of microcomputer hardware, software and computer networking, focusing on operating systems. The fundamentals of the Internet and Internet tools are introduced.</td>
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<tr>
<td>CISC 309</td>
<td>Applied Applications Lab</td>
<td>.5 Unit</td>
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<td></td>
<td>Corequisite: CISC 300, CISA 305, CISA 306, CISA 315, CISA 316, or CISA 320.</td>
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<tr>
<td></td>
<td>Advisory: ENGRD 116 or ESLR 320 and ability to keyboard 20 WAM.</td>
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<tr>
<td></td>
<td>Course Transferable to CSU</td>
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<tr>
<td></td>
<td>Hours: 27 hours LAB</td>
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<tr>
<td></td>
<td>This course complements CISC 300, CISA 305, CISA 306, CISA 315, CISA 316, and CISA 320 by providing supplemental lab instruction. The material reinforces the concepts and techniques presented in these courses. This course may be taken four times. Credit/no credit only.</td>
<td></td>
</tr>
<tr>
<td>CISC 310</td>
<td>Introduction to Computer Information Science</td>
<td>3 Units</td>
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<tr>
<td></td>
<td>Course Transferable to UC/CSU</td>
<td></td>
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<tr>
<td></td>
<td>Hours: 54 hours LEC</td>
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<tr>
<td></td>
<td>This course is a survey of the computer field covering the function and purpose of computer hardware and software, computer programming concepts, productivity software, employment opportunities, and the social impact of the computer.</td>
<td></td>
</tr>
<tr>
<td>CISC 320</td>
<td>Operating Systems</td>
<td>1 Unit</td>
</tr>
<tr>
<td></td>
<td>Advisory: CISC 300 and ability to touch type.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Course Transferable to CSU</td>
<td></td>
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<tr>
<td></td>
<td>Hours: 18 hours LEC; 18 hours LAB</td>
<td></td>
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<tr>
<td></td>
<td>This course introduces operating systems for the PC. Topics include file systems, operating system services, program management, file and directory organization, and hard drive maintenance. It also includes information on protecting your PC from viruses, Trojans, worms, adware, spyware, and other malicious network exploits. Additional topics are DOS commands and batch files. The course may be taken four times on a different Windows operating system version.</td>
<td></td>
</tr>
<tr>
<td>CISC 323</td>
<td>Linux Operating System</td>
<td>1 Unit</td>
</tr>
<tr>
<td></td>
<td>Advisory: CISC 300 and ability to touch type.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Course Transferable to CSU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours: 18 hours LEC; 18 hours LAB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This course introduces the Linux operating system for microcomputers. Concepts include kernels, file structures, daemons, shells, GUIs, procedures for installing software, creation of user accounts, shell commands, scripts, and file security.</td>
<td></td>
</tr>
<tr>
<td>CISC 324</td>
<td>Intermediate Linux Operating System</td>
<td>1 Unit</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: CISC 323 with a grade of &quot;C&quot; or better.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Course Transferable to CSU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours: 18 hours LEC; 18 hours LAB</td>
<td></td>
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<tr>
<td></td>
<td>This course is a continuation of CISC 323. It covers advanced shell scripting. C Shell, K Shell, BASH and other varieties will be compared. It also includes decision-making logic, looping, nesting, and other scripting tools will be used.</td>
<td></td>
</tr>
<tr>
<td>CISC 325</td>
<td>Introduction to Data Communications</td>
<td>1 Unit</td>
</tr>
<tr>
<td></td>
<td>Advisory: CISC 300 and ability to touch type.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Course Transferable to CSU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours: 18 hours LEC</td>
<td></td>
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<tr>
<td></td>
<td>This course introduces business data communication concepts, systems, technology, protocols, theory, and basic terminology. Specific topics include analog and digital data encoding and transmission, media, interfaces, packet, circuit and broadcast networks, and data multiplexing.</td>
<td></td>
</tr>
<tr>
<td>CISC 351</td>
<td>Introduction to Local Area Networks</td>
<td>1 Unit</td>
</tr>
<tr>
<td></td>
<td>Advisory: CISC 320 and 350.</td>
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<tr>
<td></td>
<td>Course Transferable to CSU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours: 36 hours LEC; 54 hours LAB</td>
<td></td>
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<tr>
<td></td>
<td>This course introduces local area networks (LAN) and provides hands-on training in LAN applications and network administration. Topics include planning, installing, and maintaining a LAN, responsibilities of the system administrator, and basic network security principles. The course may be taken for credit four times on a different Windows operating system.</td>
<td></td>
</tr>
<tr>
<td>CISC 361</td>
<td>Microcomputer Support And Repair</td>
<td>3 Units</td>
</tr>
<tr>
<td></td>
<td>Advisory: CISC 310, 320, and 350.</td>
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<td></td>
<td>Course Transferable to CSU</td>
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<td></td>
<td>Hours: 36 hours LEC; 54 hours LAB</td>
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<td>This course covers hardware repair for stand-alone personal computers. It includes training to troubleshoot hardware to a field replaceable component. Desktop operating systems installation and simple networking are also covered. The course provides a firm grounding in the supporting software that runs the hardware and in distinguishing hardware from software problems. This course provides a foundation for the Computing Technology Industry Association (CompTIA) A+ certification.</td>
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<tr>
<td>CISC 362</td>
<td>Microcomputer and Applications Support</td>
<td>2 Units</td>
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<td></td>
<td>Prerequisite: CISA 305, 315, and 320 with grades of &quot;C&quot; or better.</td>
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<td></td>
<td>Corequisite: CISC 361.</td>
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<td>Course Transferable to CSU</td>
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<td></td>
<td>Hours: 18 hours LEC; 54 hours LAB</td>
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<td>The course is an in-depth investigation of the technical skills, business skills, soft skills, and self-management skills technicians need to provide effective customer service and support in an information technology (IT) environment. Customer service and problem solving skills needed for success in a small or large business environment are introduced. Work experience serving as a student intern in computer support is required through an internship in one of the American River College (ARC) computer classrooms/labs.</td>
<td></td>
</tr>
</tbody>
</table>
CISC 363 Advanced Microcomputer Support and Repair 2 Units
Prerequisite: CISC 361 with a grade of "C" or better.
Course Transferable to CSU
Hours: 27 hours LEC; 27 hours LAB
This course provides a foundation in personal computer (PC) support. Hands-on skills include advanced component installation and configuration, troubleshooting component hardware, and configuring and troubleshooting major operating systems and networking hardware. This course is a preparation for the Computing Technology Industry Association (CompTIA) A+ Certification exam.

CISC 498 Work Experience in Computer Information Science 1-4 Units
Corequisite: Must be enrolled in a minimum of 7 units including work experience.
Course Transferable to CSU
Hours: 18 hours LEC; 75-300 hours LAB
This course is supervised work experience in Computer Information Science for the purpose of increasing the understanding of the nature and scope of the operation of business, government or service agencies. This course requires that students be employed in a paid or volunteer work experience environment. May be taken twice for a maximum of 8 units.

CISN 110 Networking Technologies - Preparation for N+ Certification 2 Units
Corequisite: CISC 350.
Advisory: CISC 361.
Hours: 27 hours LEC; 27 hours LAB
This course is an introductory, hands-on course in networking software and hardware. Topics covered include modems, communication protocols, local and wide area networks, intra and inter networks, network architectures, topologies, and the Open Systems Interconnect (OSI) model. CISN 110 and CISN 111 are preparation for industry N+ certification test.

CISN 111 Intermediate Networking Technologies - Preparation for N+ Certification 2 Units
Prerequisite: CISN 110 with a grade of "C" or better.
Advisory: CISC 361.
Hours: 27 hours LEC; 27 hours LAB
This course is an intermediate, hands-on course in networking software and hardware. Topics covered will include network operating systems setup, analyzing network performance, diagnosing, repairing of network problems, and network security techniques. CISN 110 and CISN 111 are preparation for industry N+ certification test.

CISN 119 TCP/IP Protocols 3 Units
Advisory: CISC 350.
Hours: 54 hours LEC
This course covers the TCP/IP protocol suite for the Internet. Information to support and manage TCP/IP is provided.

CISN 120 Beginning Network Administration with Linux 3 Units
Prerequisite: CISC 323 with a grade of "C" or better.
Advisory: CISC 324.
Hours: 45 hours LEC; 27 hours LAB
This course covers the basics of installation and administration of the Linux Network Operating System. Topics include installation of the Linux server, connecting to a network, utilizing network utilities, administering and maintaining network printing, protecting network data, and installing network applications. This course also covers planning, accessing, and managing file systems, planning and implementing login and file system security, administering and maintaining user accounts, upgrading the kernel, and backing up servers.

CISN 121 Network Administration with Linux: LAN Services 2 Units
Prerequisite: CISN 120 with a grade of "C" or better.
Advisory: CISN 119.
Hours: 27 hours LEC; 27 hours LAB
This course covers Linux network administration of local area network (LAN) services. Topics focus on server and LAN services including the network file system (NFS), share resources between Linux and Microsoft Windows using Server Message Block (Samba), network information service (NIS), virtual network computing (VNC), remote network access, the secure shell (SSH) vs. telnet, X-windows as a network service, and dynamic host configuration protocol (DHCP). The course also covers the command scheduler (cron), monitoring and logging system activities and system events (syslog), as well as installing and configuring MySQL Structured Query Language (SQL) database management service.

CISN 122 Network Administration with Linux: Internet Services 2 Units
Prerequisite: CISN 120 with a grade of "C" or better.
Advisory: CISN 119.
Hours: 27 hours LEC; 27 hours LAB
This course covers Linux network administration of Internet services. Topics focus on server and TCP/IP services including the Internet services daemon (XINETD), file transfer protocol (FTP), email, domain name service (DNS), firewall, secure shell, and proxy services. Installing and configuring the Apache Web Server and Webmin (the Linux web based administration tool) are introduced.

CISN 140 Cisco Networking Academy (CCNA)®: Data Communication and Networking Fundamentals 3 Units
Advisory: CISC 310, OR CISC 300 and 320.
Hours: 54 hours LEC; 18 hours LAB
This course introduces data communication and networking fundamentals. It surveys data communication hardware and software components and basic networking concepts. Topics include data communication, the OSI Model, IP addressing, routing concepts, LAN media, and network management and analyses. This is the first course in preparation for Cisco CCNA certification examination. ARC is a certified Cisco Networking Academy and all courses are taught by Cisco Certified Academy Instructors (CCAI).

CISN 141 Cisco Networking Academy (CCNA)®: Networking Theory and Routing Technologies 3 Units
Prerequisite: CISN 140 with a grade of "C" or better.
Hours: 54 hours LEC; 18 hours LAB
This course provides an introduction to networking theory and routing technologies, including OSI Model, beginning router configurations, routed and routing protocols. This is the second course in preparation for Cisco CCNA certification examination. ARC is a certified Cisco Networking Academy and all courses are taught by Cisco Certified Academy Instructors (CCAI).
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
<th>Prerequisite</th>
<th>Exams</th>
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<tbody>
<tr>
<td>CISN 142</td>
<td>CISCO Networking Academy (CCNA®): Advanced Routing and Switching</td>
<td>3 Units</td>
<td>Prerequisite: CISN 141 with a grade of &quot;C&quot; or better. Hours: 54 hours LEC, 18 hours LAB</td>
<td>This course provides advanced routing and switching technologies. Topics include advanced router configurations, network management, advanced network design, LAN switching, and VLANs. This is the third course in preparation for Cisco CCNA certification examination. ARC is a certified Cisco Networking Academy and all courses are taught by Cisco Certified Academy Instructors (CCAI).</td>
</tr>
<tr>
<td>CISN 143</td>
<td>CISCO Networking Academy (CCNA®): Wide-Area Network and Project-Based Learning</td>
<td>3 Units</td>
<td>Prerequisite: CISN 142 with a grade of &quot;C&quot; or better. Hours: 54 hours LEC, 18 hours LAB</td>
<td>This course provides the skills to design and configure advanced wide area network (WAN) projects using Cisco IOS command set. This is the fourth course in preparation for Cisco CCNA certification examination. ARC is a certified Cisco Networking Academy and all courses are taught by Cisco Certified Academy Instructors (CCAI).</td>
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<tr>
<td>CISN 190</td>
<td>Client Operating Systems</td>
<td>2 Units</td>
<td>Prerequisite: CISN 102. Hours: 27 hours LEC, 27 hours LAB</td>
<td>This course covers the planning, installation, configuration and administration of Client Operating Systems. Client Operating Systems are an essential component for both the client/server and peer-to-peer network models. Topics covered include planning the Client Operating System implementation; installation and configuration; managing user resources; connectivity of clients in heterogeneous networking environments; monitoring and optimization of the network; and common troubleshooting techniques.</td>
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<tr>
<td>CISN 200</td>
<td>Designing Windows 2000 Network Security</td>
<td>3 Units</td>
<td>Prerequisite: CISN 102 with a grade of &quot;C&quot; or better. Advisory: CISN 105 and 108. Hours: 45 hours LEC, 27 hours LAB</td>
<td>This course is an introduction to designing and implementation of network strategy in an enterprise network environment. Topics include user authentication, encryption, internal and external risks, Trojans, worms, and viruses. Types of hardware and software attacks on networks, use and configuration of firewalls, file system security, logging, and auditing will be examined. It also covers security consideration for Windows 2000 servers, administrative tools, security tools, security between LAN's and WAN's, and security policy management.</td>
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<tr>
<td>CISN 300</td>
<td>Network Systems Administration</td>
<td>3 Units</td>
<td>Advisory: CISC 320, 350, and 351. Course Transferable to CSU Hours: 45 hours LEC, 27 hours LAB</td>
<td>This course covers the administration of a server in a client/server network. Topics include designing a basic network, installing and configuring a network operating system, and managing network security with user and group accounts. Additional topics are creating network shares, setting up and managing network printers, backing up servers, monitoring and setting access permissions on network resources, and establishing policies and procedures for network operations. This course may be taken four times on a different Windows version.</td>
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<tr>
<td>CISN 302</td>
<td>Intermediate Network Systems Administration</td>
<td>3 Units</td>
<td>Prerequisite: CISN 300 with a grade of &quot;C&quot; or better. Course Transferable to CSU Hours: 45 hours LEC, 27 hours LAB</td>
<td>This course covers advanced system administration in a client/server network. Topics include configuring the server environment, implementing system policies, implementing and managing fault-tolerant disk volumes, and managing applications. Additional topics covered are managing connectivity for different network and client operating systems, as well as managing and implementing remote servers. This course covers material required for one of the Microsoft MCSE Networking certification examinations. This course may be taken four times on a different Windows software version.</td>
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<tr>
<td>CISN 307</td>
<td>Windows Active Directory Services</td>
<td>3 Units</td>
<td>Prerequisite: CISN 302 with a grade of &quot;C&quot; or better. Course Transferable to CSU Hours: 45 hours LEC, 27 hours LAB</td>
<td>This course covers installing, configuring, and administering Microsoft Windows Active Directory services. It also focuses on implementing Group Policy and understanding the Group Policy tasks required to manage users and computers. Group Policies are used to configure and manage the user desktop environment, configure and manage software, and implement and manage security settings. Installation and configuration of Domain Naming System (DNS) and Windows Internet Naming System (WINS) is covered, as well as publishing, replication, and the backup of the directory services database. This course may be taken up to four times on different Windows operating system versions.</td>
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<tr>
<td>CISN 308</td>
<td>Internetworking with TCP/IP</td>
<td>3 Units</td>
<td>Prerequisite: CISN 302 with a grade of &quot;C&quot; or better. Course Transferable to CSU Hours: 45 hours LEC, 27 hours LAB</td>
<td>This course covers installing, configuring, managing, and supporting a network infrastructure using the Microsoft Windows Server products. It focuses on TCP/IP and related services, including Dynamic Host Configuration Protocol (DHCP), Domain Naming System (DNS), Windows Internet Naming Service (WINS), Internet Information Server (IIS), Public Key Infrastructure (PKI) and certificate service, Internet protocol security (IPSec), Network Address Translation (NAT), and remote access. It also covers configuring Windows as a network router, Virtual Private Network (VPN) connectivity and managing a Windows deployment using Remote Installation Services (RIS). This course may be taken four times on different Windows operating system versions.</td>
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<tr>
<td>CISN 314</td>
<td>Fiber Optic Networking</td>
<td>3 Units</td>
<td>Advisory: CISC 350. Course Transferable to CSU Hours: 54 hours LEC</td>
<td>This course introduces basic fiber optic technologies including splices, connectors, optical sources, detectors, optical amplifiers, splitters and modulators. Optical switching technology and fiber based standards and protocols are covered along with services such as voice, data and video. Industry procedures and practices are examined.</td>
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<tr>
<td>CISN 374</td>
<td>Messaging Server Administration</td>
<td>3 Units</td>
<td>Prerequisite: CISN 302 with a grade of &quot;C&quot; or better. Course Transferable to CSU Hours: 45 hours LEC, 27 hours LAB</td>
<td>This course covers the installation and administration of messaging servers. Topics include the installation, configuration, management and tuning of mail and messaging services on both servers and clients; mail access protocols; security issues; backup and restore of the messaging database; and Internet connectivity. This course may be taken four times for credit on different software versions.</td>
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CISP 317  Computer Organization and Assembly Language Programming 4 Units
Prerequisite: CISP 300 with a grade of "C" or better.
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course is an introduction to the internal organization of a computer. Topics include learning to program in assembly language, implementing high level logic such as loops and subroutines, and performing low level hardware access.

CISP 319  Advanced Assembly Programming 4 Units
Prerequisite: CISP 317 with a grade of "C" or better.
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course is an extension of the language and techniques studied in CISP 317. Topics include stacks, call frames, arrays and structures in assembly language. Hardware related topics such as interrupts, preemption and multitasking are also introduced.

CISP 320  COBOL Programming 4 Units
Prerequisite: CISP 300, 340, 365, or 370 with a grade of "C" or better
Advisory: CISP 317
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course covers advanced COBOL concepts and programming techniques. The topics include sequential file processing, data editing, indexed sequential file processing, disk sorts, job control language, debugging techniques, table searching, segmentation, and subroutines. Emphasis is on structured design and structured programming utilizing top-down and modular techniques.

CISP 321  Advanced COBOL Programming 4 Units
Prerequisite: CISP 320 with a grade of "C" or better.
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course covers advanced COBOL concepts and programming techniques. The topics include sequential file processing, data editing, indexed sequential file processing, disk sorts, job control language, debugging techniques, table searching, segmentation, and subroutines. Emphasis is on structured design and structured programming utilizing top-down and modular techniques.

CISP 340  FORTRAN Programming 3 Units
Advisory: CISC 310, CISP 300, and MATH 120
Course Transferable to UC/CSU
Hours: 36 hours LEC; 54 hours LAB
This course is an introduction to the computer solution of problems by programming in FORTRAN. The emphasis is on learning the language and structured programming techniques. Emphasis is placed on solving problems in engineering and the physical sciences. Appropriate for all majors in engineering, science, and mathematics.

CISP 350  Database Programming 3 Units
Advisory: CIS 320, CISA 321, CISC 310, and CISP 300
Course Transferable to UC/CSU
Hours: 36 hours LEC; 54 hours LAB
This is an introductory course to programming in database. The topics include analysis and design, modular programming, screen displays and menus, and multiple databases.
CISP 360  Introduction to Structured Programming  4 Units
Prerequisite: CISP 300, 320, 340, or 370 with a grade of “C” or better
General Education: AA/AS Area II(b)
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course is an introduction to structured programming and objects. Topics include program design, documentation, testing, and debugging, as well as data representation, data types, variables, constants, and operators. It also includes control structures, interactive and file input/output, standard libraries, arrays, pointers, methods (functions), classes and objects.

CISP 370  Beginning Visual Basic  4 Units
Advisory: CISC 310 and CISP 300.
Course Transferable to CU
Hours: 54 hours LEC; 54 hours LAB
This is an introductory programming course employing the language of Visual BASIC. Concepts and problems relate to a graphic user interface operating system (such as Windows) and object oriented programming. Terms, rules, and program components used in desktop customization will be explored. Applications include control menu boxes, menu bars, and scroll bar development. This course may be taken four times on a different software version. (CAN CSCI 6)

CISP 371  Intermediate Visual Basic  4 Units
Prerequisite: CISP 370 with a grade of “C” or better.
Course Transferable to CU
Hours: 54 hours LEC; 54 hours LAB
This is the second course in Visual Basic programming. The course examines data and its relationship to the functions that operate on data. Topics include forms, components, properties, classes, objects, static and dynamic relationships, databases, data sets, queries, hierarchies, inheritance, coding, dialog boxes, associations, testing, and debugging. This course may be taken four times with a different version of Visual Basic.

CISP 372  Beginning Visual Basic for Applications Programming  1 Unit
Course Transferable to CU
Hours: 15 hours LEC; 9 hours LAB
This course introduces Visual Basic for Applications (VBA) programming for the purposes of application automation and customization. It includes basic programming concepts such as variables, control structures and subroutines. The use of elementary user interface controls are also included in this course.

CISP 400  Object Oriented Programming with C++  4 Units
Prerequisite: CISP 360 with a grade of “C” or better
Advisory: CISC 323
General Education: AA/AS Area II(b)
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course is an introduction to the C++ programming language and object-oriented programming in the Linux/UNIX environment. Topics include program analysis and design, encapsulation, overloading, classes, inheritance, virtual functions, polymorphism, templates, exception handling, and the standard template library. In addition, basic Linux/UNIX commands and make files are covered.

CISP 401  Object Oriented Programming with Java  4 Units
Prerequisite: CISP 360 with a grade of “C” or better.
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course is an introduction to object oriented programming using the Java programming language. Topics include: objects, inheritance, polymorphism, interfaces, abstract classes, inner classes, error handling, graphical user interfaces, applets, threads, files, databases, and packages.

CISP 430  Data Structures  4 Units
Prerequisite: CISP 360 with a grade of “C” or better.
Advisory: CISP 400.
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course applies object oriented techniques for systematic problem analysis and the managing of program complexity using abstraction. Specifications, design, coding, testing, and documentation of large multi-file programs are covered. It uses advanced language features such as classes, strings, non-text files, pointers, and recursion. Abstract data types such as stacks, queues, lists, binary trees, heaps/priority queues, hash tables, and graphs are examined. Various sorting and searching algorithms are presented and analyzed using Big-O notation. (CAN CSCI 24)

CISP 440  Discrete Structures for Computer Science  3 Units
Prerequisite: MATH 370 with a grade of “C” or better
Corequisite: CISP 430
General Education: AA/AS Area II(b); CSU Area B4
Course Transferable to UC/CSU
Hours: 54 hours LEC
This course is an introduction to the essential discrete structures used in Computer Science, with emphasis on their applications. Topics covered include elementary formal logic and set theory, elementary combinatorics, recursive programming and algorithm analysis, finite state machines and formal languages, digital logic and switching, combinatorial circuits, and computer arithmetic.

CISP 453  Introduction to Systems Programming in UNIX  4 Units
Prerequisite: CISP 310, 360, and 430 with grades of “C” or better.
Advisory: CISC 323.
Course Transferable to UC/CSU
Hours: 54 hours LEC; 54 hours LAB
This course covers the features of the C language commonly used in systems programming, and the application of those features to systems programming in a Linux/UNIX environment. Topics include C preprocessor macros, input/output, bit-manipulation facilities; timesharing system concepts; shell script programming; make files and source code control; basic system calls including fork and exec; pointers and dynamic memory allocation; libraries; and relocation and linking concepts including assembler handling of symbol tables.

CISP 457  Computer Systems Analysis and Design  3 Units
Prerequisite: CISP 300 or 370 with a grade of “C” or better.
Advisory: CISA 305 and 340.
Course Transferable to CSU
Hours: 54 hours LEC
This course covers the methods used to analyze, design, and implement a computer system that meets client business needs. The methodology emphasizes the skills needed by a system analyst throughout the steps of a system development life cycle. These steps include system feasibility, analysis, design, implementation, documentation, and evaluation.
CIS - Security

**CIS 300 Introduction to Information Systems Security**  
1 Unit  
Course Transferable to CSU  
Hours: 18 hours LEC; 18 hours LAB  
This course provides an introduction to network-based and Internet-based security applications and standards. Topics include encryption, security protocols, network security applications, digital signatures, protecting computers and the network from viruses, Trojans, spyware, unsolicited E-mail and public and private key exchange.

**CIS 301 Ethical Hacking**  
2 Units  
Advisory: CISS 320, 323, 350 or 351.  
Course Transferable to CSU  
Hours: 27 hours LEC; 27 hours LAB  
This course introduces basic security concepts, principles and “best practices” and explores ways in which security for a stand-alone PC and a network-connected PC can be compromised. It provides ways in which the security of a PC can be checked and evaluated. Principles of ethical hacking are discussed. Internal and external security threats are discussed, including viruses, worms, trojans, scripts and other malicious e-mail content. Network vulnerabilities, common exploits and basic countermeasures are discussed.

**CIS 310 Network Security Fundamentals**  
3 Units  
Advisory: CISN 119, 140, and 302.  
Course Transferable to CSU  
Hours: 45 hours LEC; 27 hours LAB  
This course provides the information and skills required to analyze security risks from potential network intrusions to organizations’ network information systems. Topics cover the required content of the Computing Technology Industry Association (CompTIA) Security+ certification exam.

**CIS 325 Network Security and Firewalls**  
3 Units  
Prerequisite: CIS 310 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 45 hours LEC; 27 hours LAB  
This course focuses on network and Internet security and deployment of industry standard countermeasures, including configuring Virtual Private Network (VPN) connections. Topics include the evaluation, implementation, and management of secure remote-access technologies. Also covered is the configuration of network firewalls such as Microsoft ISA Server, and allowing access to key services while maintaining security. This course provides preparation for the Check Point Security’s “Check Point Certified Security Administrator” (CCSA) certification exam. This course is not open to students who have completed CISS 320 and CISS 330.

**CIS 330 Implementing UNIX/Linux Operating System Security**  
3 Units  
Prerequisite: CIS 310 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 45 hours LEC; 27 hours LAB  
This course presents in-depth explanations of the UNIX/Linux operating system security features as well as step-by-step configuration guides for proper operating system configuration. Topics include data and system integrity, authenticity, availability, and privacy of data.

**CIS 340 Disaster Recovery**  
3 Units  
Prerequisite: CIS 310 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 45 hours LEC; 27 hours LAB  
This course provides methods for identifying vulnerabilities and implementing countermeasures to prevent and mitigate failure risks for the business enterprise. Topics include disaster recovery, development of a disaster recovery plan, and development and implementation of disaster recovery policies and procedures.

**CIS 342 Implementing UNIX/Linux Operating System Security**  
3 Units  
Prerequisite: CIS 310 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 45 hours LEC; 27 hours LAB  
This course presents in-depth explanations of the UNIX/Linux operating system security features as well as step-by-step configuration guides for proper operating system configuration. Topics include data and system integrity, authenticity, availability, and privacy of data.

**CIS 350 Disaster Recovery**  
3 Units  
Prerequisite: CIS 310 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 45 hours LEC; 27 hours LAB  
This course provides methods for identifying vulnerabilities and implementing countermeasures to prevent and mitigate failure risks for the business enterprise. Topics include disaster recovery, development of a disaster recovery plan, and development and implementation of disaster recovery policies and procedures.

**CIS 360 Computer Forensics and Investigation**  
3 Units  
Prerequisite: CIS 310 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 45 hours LEC; 27 hours LAB  
This course introduces the methods used to conduct a computer forensics investigation. Topics include an overview of computer forensics as a profession, the computer investigation process, operating system boot processes and disk structures, data acquisition and analysis, technical writing, ethics, and a review of standard computer forensics tools. The course topics map to the objectives of the International Association of Computer Investigative Specialists (IACIS) certification.

CIS - Web

**CISW 300 Web Publishing**  
3 Units  
Advisory: CISC 300 and CISC 305.  
Course Transferable to CSU  
Hours: 36 hours LEC; 54 hours LAB  
This course is an introduction to publishing on the World Wide Web. Topics include creating web pages with the Hyper Text Markup Languages (HTML), organizing a series of pages into a web site, and uploading web pages to a server. The course makes extensive use of the computer tools necessary to insert HTML tags, create images, and view web documents. It also prepares apprentice web designers and publishers to identify the information dissemination needs of a client, design an appropriate web solution, and implement it.

**CISW 307 Introduction to Web Development and Design**  
3 Units  
Same As: ARTNM 401  
Course Transferable to CSU  
Hours: 36 hours LEC; 54 hours LAB  
This course covers the strategies for the development and design of web sites. Using an industry standard web authoring tool, the course integrates both artistic and technical concepts. Topics include assembling, designing and publishing web pages using strategies, principles and processes universally practiced by the professionals in this field. This course, in combination with ARTNM 401, may be taken four times for credit on a different software package or version.
CISW 310  Advanced Web Publishing  4 Units  
Prerequisite: CISW 300.  
Course Transferable to CSU  
Hours: 54 hours LEC; 54 hours LAB  
This course builds upon previous web publishing concepts and study. The primary focus of this course is the systematic development of interactive web sites. Topics include cascading style sheets, dynamics HTML, forms, client-side programming with JavaScript, CGI scripting with Perl, and web-database interactivity.

CISW 350  Imaging for the Web  1 Unit  
Same As: ARTNM 400  
Advisory: CISC 306 or CISW 300  
Course Transferable to CSU  
Hours: 18 hours LEC; 18 hours LAB  
This course takes an in-depth look at designing graphics for the Web. Industry standard graphic software is used to create original graphics as well as to manipulate found imagery. Topics include developing graphic elements for a Web site using a visual theme, creating buttons and intuitive navigational elements, making background textures and images, understanding Web file formats, scanning, presenting to a client, and simple animation. May be taken twice for credit on different platforms or software versions. Not open to students who have completed ARTNM 400.

CISW 355  Web Imaging Projects  2 Units  
Prerequisite: CISW 350 or ARTNM 402 or ARTNM 400 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 27 hours LEC, 27 hours LAB  
This course is a continuation of CISW 350. Projects and simulations developing graphics for the Web are created for the purpose of marketing and advertising on the Web. The steps, procedures, and common problems encountered when producing quality graphics for professional Web sites are discussed and practiced. Real and simulated projects will include the following: compressing and uploading times, cropping and resizing, digital camera imaging, retouching and fixing photographs, photographic special effects and filters, rasterizing text, implementing backgrounds, buttons, themes, image maps, slicing, and simple animations.

CISW 365  Interactive Multimedia Basics  3 Units  
Same As: ARTNM 404  
Advisory: ARTNM 324, ARTNM 402, CISW 300, or CISW 310  
Course Transferable to CSU  
Hours: 36 hours LEC; 54 hours LAB  
This course demonstrates how to create simple vector-based graphics, animation, buttons, movies and raster files in a web environment. Topics include drawing tools, time-line effects, sound and video integration and basic interactivity. CISW 365 and/or ARTNM 404 may be taken a total of 4 times on different platforms or software versions.

CISW 370  Designing Accessible Web Sites  1 Unit  
Prerequisite: CISW 300 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 18 hours LEC  
This course provides an overview of the methods that are used to design web sites for people with disabilities. Current legal requirements for accessible web sites, especially the Americans with Disabilities Act (ADA), are emphasized.

CISW 385  E-Commerce  3 Units  
Prerequisite: CISC 305 or CISW 300 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 54 hours LEC  
This course provides both the beginner and the professional with a working knowledge of e-commerce. It emphasizes the theory and practice of marketing in an electronic environment. The personalization and interactivity of commercial web sites as a tool to build strong customer relationships are stressed.

CISW 400  Client-side Web Scripting  4 Units  
Prerequisite: CISW 300 with a grade of “C” or better.  
Advisory: CISW 310 and CISP 300.  
Course Transferable to CSU  
Hours: 54 hours LEC; 54 hours LAB  
This course emphasizes the creation of dynamic and interactive web sites using a client-side scripting language such as JavaScript. Topics include the Document Object Model of web pages, core features of the client-side scripting language, event handling, control of windows and frames, functions, and form validation. May be taken twice on a different client-side scripting language.

CISW 405  ActionScript for Flash  3 Units  
Prerequisite: CISP 300 or CISW 400.  
Advisory: CISP 300 or CISW 300.  
Course Transferable to CSU  
Hours: 54 hours LAB  
This course introduces Macromedia Flash users to programming with ActionScript to animate, process data, and create dynamic content. It emphasizes the object-oriented capabilities of Macromedia Flash, and instructs how to use ActionScript objects, methods, events, properties, and functions, with an eye toward ActionScript best practices.

CISW 410  Middleware Web Scripting  4 Units  
Prerequisite: CISW 300 with a grade of “C” or better.  
Advisory: CISW 310 and CISP 300.  
Course Transferable to CSU  
Hours: 54 hours LEC; 54 hours LAB  
This course emphasizes the creation of interactive web sites using a middleware scripting environment such as PHP or ASP. Topics include core features of the middleware scripting language, embedding server commands in HTML pages, control structures, functions, arrays, form validations, cookies, environmental variables, email applications, and database-driven web applications. May be taken twice in a different middleware web scripting environment.

CISW 411  Middleware Scripting Database Web Applications  2 Units  
Prerequisite: CISW 410 with a grade of “C” or better.  
Advisory: CISW 310.  
Course Transferable to CSU  
Hours: 27 hours LEC; 27 hours LAB  
This course includes interactive database applications for the Web using a database and middleware scripting language. Topics include organizing data, developing tables for databases, creating middleware scripts that add, delete, sort, edit and merge the data in the database. Maintaining database integrity, and using DHTML to streamline certain client-side functions such as form validation are covered.
**CISW 420  Server-side Web Scripting**  4 Units  
Prerequisite: CISW 300 with a grade of “C” or better.  
Advisory: CISW 310 and CISP 300.  
Course Transferable to CSU  
Hours: 54 hours LEC; 54 hours LAB  
This course emphasizes the creation of interactive web sites using a server-side scripting language such as a Perl or Java. Topics include core features of the server-side web scripting language, control structures, functions, arrays, form validation, regular expressions, cookies, environmental variables, email applications, and database-driven web applications. May be taken twice with a different server-side web scripting language.

**CISW 442  Web Publishing with XML**  3 Units  
Prerequisite: CISW 300 with a grade of “C” or better.  
Course Transferable to CSU  
Hours: 36 hours LEC; 54 hours LAB  
This course describes how to create well-formed and valid Extensible Markup Language (XML) documents, which are later used in conjunction with Extensible Style Sheet Language (XSL) to produce Web pages and other result documents. Topics include formatting XML documents with Cascading Style Sheets (CSS), Document Type Definitions (DTD), XML Namespaces and Schemas, XPath, and Extensible Style Sheet Language Transforms (XSLT).

**CISW 471  Interactive Multimedia Projects**  4 Units  
Same As: ARTNM 410  
Prerequisite: ARTNM 402, ARTNM 404, CISW 300, CISW 310, or CISW 365 with a grade of “C” or better  
Advisory: ARTNM 328, CISW 410, and CISW 420  
Course Transferable to CSU  
Hours: 54 hours LEC; 54 hours LAB  
This course focuses on interactive multimedia project development. Emphasis is placed on the project development cycle including design specification, research, production, modification, and presentation. Projects assigned are multifaceted, approaching the complexity that individuals would be expected to encounter in the interactive multimedia development industry. This course is not open to students who have completed ARTNM 410.