### CAREER AND PROGRAM DESCRIPTION

Computer Information Systems are the lifeblood of the 21st century. The mainstream languages, tools, technologies and techniques used in training will allow students to pursue careers in either the computer networking or information software fields. On the networking side, computer configuration, network installation, network systems administration, security, forensics and wireless networking are some career choices. On the software side, student career choices include all phases of application development, database programming, software quality assurance, and project management on both desktop and World Wide Web platforms.

Computer Information Systems AAS Degree: This degree prepares students for computer information systems related careers. Students will take classes in the CIS Department that include software analysis, design, programming (in two or more languages), database modeling, Windows or Unix operating systems, data communications and an extensive selection of electives. Emphasis is on developing enduring skills and knowledge, rather than on training students to use specific tools and applications that may be "fashionable," but that haven't established a foothold in industry.

Computer Information Systems: Network Administration AAS Degree: This degree prepares students for computer networking related careers. Students will take classes in the CIS Department including data communications, Windows and Linux network administration, network security and an extensive selection of electives. Students earning this degree will be well on their way to several network administration certifications from Microsoft and Comp TIA.

Computer Information Systems One-Year Certificate: This certificate provides students with a foundation in computer information systems concepts. Students seeking this certificate often have various primary roles in their organizations and are taking on additional responsibilities involving information systems.

### DEGREES AND CERTIFICATES OFFERED

#### ASSOCIATE OF APPLIED SCIENCE DEGREE

<table>
<thead>
<tr>
<th>Computer Information Systems</th>
<th>Computer Information Systems: Network Administration Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONE-YEAR CERTIFICATE</td>
<td></td>
</tr>
<tr>
<td>LESS THAN ONE-YEAR CERTIFICATE</td>
<td></td>
</tr>
</tbody>
</table>

#### Academic Prerequisites

- The Less Than One-Year Certificates are limited entry certificates.

### Academic Requirements

- **Computer Information Systems AAS:** Students must satisfactorily complete all courses with a CIS and CS prefix in the degree with a grade of "C" or "P" or better.
- **Computer Information Systems: Network Administration AAS Degree:** Students must satisfactorily complete all courses with a CIS and CS prefix in the degree with a grade of "C" or "P" or better.
- **Computer Information Systems One-Year Certificate:** All required courses in this program apply toward the credits needed to obtain an AAS degree in Computer Information Systems or CIS Network Administration. Students must satisfactorily complete all courses with a CIS and CS prefix with a grade of "C" or "P" or better.
- **The Less Than One-Year Certificates:** These certificates begin at an advanced level and are designed for individuals already working in, or have worked in, an information technology position. Students must satisfactorily complete all courses with a CIS and CS prefix with a grade of "C" or "P" or better.
- **Students must contact a CIS advisor for correct placement in any of these certificate programs.**

### Non-Academic Prerequisites

- None

### Non-Academic Requirements

- None

### ASSOCIATE OF APPLIED SCIENCE DEGREE

- Minimum 94 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of sixteen credits of General Education. Some courses specified within the program may be used as General Education. In addition to required courses in the program of study, students must satisfy MTH 58/65 competency. Students should consult with program advisors for course planning.

### COMPUTER INFORMATION SYSTEMS AAS DEGREE

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 120</td>
<td>Computer Concepts I</td>
<td>4</td>
</tr>
<tr>
<td>CIS 121</td>
<td>Computer Concepts II</td>
<td>4</td>
</tr>
<tr>
<td>CIS 122</td>
<td>Introduction to Programming Logic</td>
<td>4</td>
</tr>
<tr>
<td>CIS 140M</td>
<td>Operating Systems I: Microsoft</td>
<td>4</td>
</tr>
<tr>
<td>or CS 140U</td>
<td>Introduction to UNIX</td>
<td></td>
</tr>
<tr>
<td>CIS 179</td>
<td>Data Communication Concepts I</td>
<td>4</td>
</tr>
<tr>
<td>CIS 234A</td>
<td>Real-World Programming</td>
<td>4</td>
</tr>
<tr>
<td>or CIS 280D</td>
<td>Cooperative Education: Application Development</td>
<td></td>
</tr>
<tr>
<td>CIS 244</td>
<td>Systems Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CIS 275</td>
<td>Data Modeling and SQL Introduction</td>
<td>4</td>
</tr>
<tr>
<td>WR 121</td>
<td>English Composition</td>
<td>4</td>
</tr>
<tr>
<td>WR 122</td>
<td>English Composition</td>
<td>4</td>
</tr>
<tr>
<td>or WR 227</td>
<td>Technical and Professional Writing 1</td>
<td></td>
</tr>
</tbody>
</table>
COMPUTER INFORMATION SYSTEMS

CIS Program Electives  32
CIS Programming Electives  8
CIS Program Business Electives  6
Remaining General Education  8

Total Credits  94

* Could be used as General Education

1 CIS Program Electives - 32 credits total from Introductory Electives or Advanced Electives. A minimum of 16 credits from Advanced Electives.
2 For the Computer Information Systems AAS Degree, eight credits of programming electives must be a two-term sequence from the Programming Elective List.

COMPUTER INFORMATION SYSTEMS PROGRAM ELECTIVES

Introductory Courses
CAS 206  Principles of HTML and CSS  4
CAS 215  Intermediate CSS and Preprocessors  4
CIS 125D  Database Application Development I  4
CIS 133J  Java Programming I  4
CIS 133N  Introduction to Programming Using C#.NET  4
CIS 133W  JavaScript for Web Developers  4
CIS 135M  Mobile Application Programming for Android  4
CIS 140M  Operating Systems I: Microsoft  4
CIS 145  Microcomputer Hardware and Troubleshooting  4
CIS 178  Applied Internet Concepts  4
CIS 179  Data Communication Concepts I  4
CIS 188  Introduction to Wireless Networking  4
CIS 189  Wireless Security  4
CIS 195P  PHP Web Development I  4
CIS 133U  C Programming  4
CIS 135T  XML and HL7  4
CIS 235W  CIS 287I
CIS 140U  Introduction to UNIX  4
CIS 160  Exploring Computer Science  4
CIS 161  Computer Science I  4
EET 178  Computing Environments for Technicians  5

Advanced Courses
CIS 225  End User Support  4
CIS 233J  Java Programming II  4
CIS 233N  Intermediate C#.NET Programming  4
CIS 233W  JavaScript for Web Developers II  4
CIS 234A  Real-World Programming  4
CIS 240L  Linux Installation and Configuration  4
CIS 240M  Managing a Windows Server Environment  4
CIS 243  E-sentials of E-Commerce Information Systems  4
CIS 244  Systems Analysis  4
CIS 245  Project Management - Information Systems  4
CIS 275  Data Modeling and SQL Introduction  4
CIS 276  Advanced SQL  4
CIS 277D  Database Security  4
CIS 277O  Advanced Database Concepts in Oracle  4
CIS 277T  Web Business Intelligence Application Development  4

CIS 278  Data Communication Concepts II  4
CIS 279L  Linux Network Administration  4
CIS 280D  Cooperative Education: Application Development  4
CIS 284  Network Security  4
CIS 284C  Cybersecurity Concepts  4
CIS 286  Computer Forensics  4
CIS 287M  Microsoft Server Security  4
CIS 288M  Microsoft Network Administration  4
CIS 289M  Microsoft Active Directory Administration  4
CIS 295P  PHP Web Development II  4
CS 162*  Computer Science II  4
CS 201  Computer Systems  4
CS 260  Data Structures  4
CS 261  Programming Systems  4

* Could be used as General Education
1 A maximum of four CIS 280D credits can be applied toward the CIS degree. Additional credits, up to a maximum of eight, may be applied toward the degree, but must be approved by a CIS Department chair.

COMPUTER INFORMATION SYSTEMS PROGRAMMING ELECTIVES

CS 161  Computer Science I  8
& CS 162  and Computer Science II  8
CS 133J  Java Programming I  8
& CS 233J  and Java Programming II  8
CS 133N  Introduction to Programming Using C#.NET  8
& CS 233N  and Intermediate C#.NET Programming  8
CS 133W  JavaScript for Web Developers  8
& CS 233W  and JavaScript for Web Developers II

COMPUTER INFORMATION SYSTEMS PROGRAM BUSINESS ELECTIVES

BA 206  Management Fundamentals  3
BA 211  Principles of Accounting I  3
BA 212  Principles of Accounting II  3
BA 213  Managerial Accounting  4
BA 223  Principles of Marketing  4
BA 226  Business Law I  4
EC 201*  Principles of Economics: Microeconomics  4
EC 202*  Principles of Economics: Macroeconomics  4

* Could be used as General Education

NETWORK ADMINISTRATION AAS DEGREE

Minimum 94 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of sixteen credits of General Education. Some courses specified within the program may be used as General Education. In addition to required courses in the program of study, students must satisfy MTH 58/65 competency. Students should consult with program advisors for course planning.

Network Administration Degree Courses
CIS 120*  Computer Concepts I  4
CIS 121*  Computer Concepts II  4
CIS 122*  Introduction to Programming Logic  4
CIS 140M  Operating Systems I: Microsoft  4
CIS 145  Microcomputer Hardware and Troubleshooting  4
### COMPUTER INFORMATION SYSTEMS NETWORK ADMINISTRATION DEGREE ELECTIVES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 188</td>
<td>Introduction to Wireless Networking</td>
<td>4</td>
</tr>
<tr>
<td>CIS 189</td>
<td>Wireless Security</td>
<td>4</td>
</tr>
<tr>
<td>CIS 225</td>
<td>End User Support</td>
<td>4</td>
</tr>
<tr>
<td>CIS 240L</td>
<td>Linux Installation and Configuration</td>
<td>4</td>
</tr>
<tr>
<td>CIS 240M</td>
<td>Managing a Windows Server Environment</td>
<td>4</td>
</tr>
<tr>
<td>CIS 245</td>
<td>Project Management - Information Systems</td>
<td>4</td>
</tr>
<tr>
<td>CIS 275</td>
<td>Data Modeling and SQL Introduction</td>
<td>4</td>
</tr>
<tr>
<td>CIS 278</td>
<td>Data Communication Concepts II</td>
<td>4</td>
</tr>
<tr>
<td>CIS 279L</td>
<td>Linux Network Administration</td>
<td>4</td>
</tr>
<tr>
<td>CIS 280D</td>
<td>Cooperative Education: Application Development</td>
<td>1-4</td>
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<tr>
<td>CIS 284</td>
<td>Network Security</td>
<td>4</td>
</tr>
<tr>
<td>CIS 284C</td>
<td>Cybersecurity Concepts</td>
<td>4</td>
</tr>
<tr>
<td>CIS 286</td>
<td>Computer Forensics</td>
<td>4</td>
</tr>
<tr>
<td>CIS 287I</td>
<td>Computer Concepts</td>
<td>4</td>
</tr>
<tr>
<td>CIS 287M</td>
<td>Microsoft Server Security</td>
<td>4</td>
</tr>
<tr>
<td>CIS 288M</td>
<td>Microsoft Network Administration</td>
<td>4</td>
</tr>
<tr>
<td>CIS 289M</td>
<td>Microsoft Active Directory Administration</td>
<td>4</td>
</tr>
</tbody>
</table>

### COMPUTER INFORMATION SYSTEMS PROGRAM BUSINESS ELECTIVES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 206</td>
<td>Management Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>BA 211</td>
<td>Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>BA 212</td>
<td>Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>BA 213</td>
<td>Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BA 223</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>BA 226</td>
<td>Business Law I</td>
<td>3</td>
</tr>
<tr>
<td>EC 201</td>
<td>Principles of Economics: Microeconomics</td>
<td>4</td>
</tr>
<tr>
<td>EC 202</td>
<td>Principles of Economics: Macroeconomics</td>
<td>4</td>
</tr>
</tbody>
</table>

* Could be used as General Education

### COMPUTER INFORMATION SYSTEMS PROGRAMMING ELECTIVES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 161</td>
<td>Computer Science I</td>
<td>8</td>
</tr>
<tr>
<td>&amp; CS 162</td>
<td>Computer Science II</td>
<td>8</td>
</tr>
<tr>
<td>CIS 133I</td>
<td>Java Programming I</td>
<td>8</td>
</tr>
<tr>
<td>&amp; CIS 233J</td>
<td>Java Programming II</td>
<td>8</td>
</tr>
<tr>
<td>CIS 133N</td>
<td>Introduction to Programming Using C#.NET</td>
<td>8</td>
</tr>
<tr>
<td>&amp; CIS 233N</td>
<td>Intermediate C#.NET Programming</td>
<td>8</td>
</tr>
<tr>
<td>CIS 133W</td>
<td>JavaScript for Web Developers</td>
<td>8</td>
</tr>
<tr>
<td>&amp; CIS 233W</td>
<td>JavaScript for Web Developers</td>
<td>8</td>
</tr>
</tbody>
</table>

### ONE-YEAR CERTIFICATE

Minimum 47 credits. Students must meet all certificate requirements.

#### Computer Information Systems Certificate Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 120</td>
<td>Computer Concepts I</td>
<td>4</td>
</tr>
<tr>
<td>CIS 121</td>
<td>Computer Concepts II</td>
<td>4</td>
</tr>
<tr>
<td>CIS 122</td>
<td>Introduction to Programming Logic</td>
<td>4</td>
</tr>
<tr>
<td>CIS 140M</td>
<td>Operating Systems I: Microsoft</td>
<td>4</td>
</tr>
<tr>
<td>or CS 140U</td>
<td>Introduction to UNIX</td>
<td>4</td>
</tr>
<tr>
<td>WR 121</td>
<td>English Composition</td>
<td>4</td>
</tr>
<tr>
<td>WR 122</td>
<td>English Composition</td>
<td>4</td>
</tr>
<tr>
<td>CIS Program Electives (see list below)</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>CIS Program Business Electives (see list below)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Related Instruction Human Relations Elective (see list below)</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

#### Total Credits

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
</tr>
</tbody>
</table>

§ Course contains Related Instruction and cannot be substituted with another course; Related Instruction details can be viewed here.

### COMPUTER INFORMATION SYSTEMS PROGRAM ELECTIVES

#### Introductory Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 206</td>
<td>Principles of HTML and CSS</td>
<td>4</td>
</tr>
<tr>
<td>CAS 215</td>
<td>Intermediate CSS and Preprocessors</td>
<td>4</td>
</tr>
<tr>
<td>CIS 125D</td>
<td>Database Application Development I</td>
<td>4</td>
</tr>
<tr>
<td>CIS 133J</td>
<td>Java Programming I</td>
<td>4</td>
</tr>
<tr>
<td>CIS 133N</td>
<td>Introduction to Programming Using C#.NET</td>
<td>4</td>
</tr>
<tr>
<td>CIS 133W</td>
<td>JavaScript for Web Developers</td>
<td>4</td>
</tr>
<tr>
<td>CIS 135M</td>
<td>Mobile Application Programming for Android</td>
<td>4</td>
</tr>
<tr>
<td>CIS 140M</td>
<td>Operating Systems I: Microsoft</td>
<td>4</td>
</tr>
<tr>
<td>CIS 145</td>
<td>Microcomputer Hardware and Troubleshooting</td>
<td>4</td>
</tr>
</tbody>
</table>
COMPUTER INFORMATION SYSTEMS

CIS 178  Applied Internet Concepts  4
CIS 179  Data Communication Concepts I  4
CIS 188  Introduction to Wireless Networking  4
CIS 189  Wireless Security  4
CIS 195P  PHP Web Development I  4
CS 133U  C Programming  4
CIS 135T  XML and HL7  4
CIS 235W  4
CIS 287I  Introduction to UNIX  4
CS 140U  Exploring Computer Science  4
CS 160  Computer Science I  4
EET 178  Computing Environments for Technicians  4

Advanced Courses
CIS 225  End User Support  4
CIS 233J  Java Programming II  4
CIS 233N  Intermediate C#.NET Programming  4
CIS 233W  JavaScript for Web Developers II  4
CIS 234A  Real-World Programming  4
CIS 240L  Linux Installation and Configuration  4
CIS 240M  Managing a Windows Server Environment  4
CIS 243  Essentials of E-Commerce Information Systems  4
CIS 244  Systems Analysis  4
CIS 245  Project Management - Information Systems  4
CIS 275  Data Modeling and SQL Introduction  4
CIS 276  Advanced SQL  4
CIS 277D  Database Security  4
CIS 277O  Advanced Database Concepts in Oracle  4
CIS 277T  Web Business Intelligence Application Development  4
CIS 278  Data Communication Concepts II  4
CIS 279L  Linux Network Administration  4
CIS 280D  Cooperative Education: Application Development  4
CIS 284  Network Security  4
CIS 284C  Cybersecurity Concepts  4
CIS 286  Computer Forensics  4
CIS 287M  Microsoft Server Security  4
CIS 288M  Microsoft Network Administration  4
CIS 289M  Microsoft Active Directory Administration  4
CIS 295P  PHP Web Development II  4
CS 162  Computer Science II  4
CS 201  Computer Systems  4
CS 260  Data Structures  4
CS 261  Programming Systems  4

* Could be used as General Education
1 A maximum of four CIS 280D credits can be applied toward the CIS degree. Additional credits, up to a maximum of eight, may be applied toward the degree, but must be approved by a CIS Department chair.

COMPUTER INFORMATION SYSTEMS PROGRAM BUSINESS ELECTIVES
BA 206  Management Fundamentals  3
BA 211  Principles of Accounting I  3
BA 212  Principles of Accounting II  3
BA 213  Managerial Accounting  4

BA 223  Principles of Marketing  4
BA 226  Business Law I  4
EC 201  Principles of Economics: Microeconomics  4
EC 202  Principles of Economics: Macroeconomics  4

COMPUTER INFORMATION SYSTEMS RELATED INSTRUCTION HUMAN RELATIONS ELECTIVES
CG 191  Exploring Identity and Diversity for College Success  4
PSY 101  Psychology and Human Relations  4
PSY 201A  Introduction to Psychology - Part 1  4
PSY 202A  Introduction to Psychology - Part 2  4
PSY 214  Introduction to Personality  4
PSY 215  Human Development  4
PSY 216  Social Psychology  4
PSY 222  Family & Intimate Relationships  4
PSY 231  Human Sexuality  4
PSY 232  Human Sexuality  4
PSY 236  Psychology of Adult Development and Aging  4
PSY 239  Introduction to Abnormal Psychology  4
PSY 240  Personal Awareness and Growth  4
SOC 204  Sociology in Everyday Life  4
SOC 205  Social Change in Societies  4
SOC 206  Social Problems  4
SOC 213  Diversity in the United States  4
SOC 218  Sociology of Gender  4
SOC 232  Death and Dying: Culture and Issues  4
WS 101  Women's Studies  4

C# APPLICATION PROGRAMMING LESS THAN ONE-YEAR CERTIFICATE
Minimum 16 credits. Students must meet all certificate requirements.
CIS 122  Introduction to Programming Logic  4
CIS 133N  Introduction to Programming Using C#.NET  4
CIS 233N  Intermediate C#.NET Programming  4
CIS 234A  Real-World Programming  4
Total Credits 16

CYBERSECURITY FUNDAMENTALS LESS THAN ONE-YEAR CERTIFICATE
Minimum 28 credits. Students must meet all certificate requirements.

Cybersecurity Fundamentals Certificate Courses
CIS 120  Computer Concepts I  4
CIS 122  Introduction to Programming Logic  4
CIS 140M  Operating Systems I: Microsoft  4
CS 140U  Introduction to UNIX  4
CIS 179  Data Communication Concepts I  4
CIS 189  Wireless Security  4
CIS 284C  Cybersecurity Concepts  4
or CIS 284  Network Security  4
Total Credits 28

DATABASE DESIGN AND SQL LESS THAN ONE-YEAR CERTIFICATE
Minimum 12 credits. Students must meet all certificate requirements.
Database Design and SQL Certificate Courses
- CIS 125D Database Application Development I 4
- CIS 275 Data Modeling and SQL Introduction 4
- CIS 276 Advanced SQL 4
Total Credits 12

JAVA APPLICATION PROGRAMMING LESS THAN ONE-YEAR CERTIFICATE
Minimum 16 credits. Students must meet all certificate requirements.

Java Application Programming Certificate Courses
- CIS 122 Introduction to Programming Logic 4
  or CIS 135M Mobile Application Programming for Android
- CIS 133J Java Programming I 4
- CIS 233J Java Programming II 4
- CIS 234A Real-World Programming 4
Total Credits 16

NETWORK ADMINISTRATION: LINUX SERVER LESS THAN ONE-YEAR CERTIFICATE
Minimum 16 credits. Students must meet all certificate requirements.

Linux Server Certificate Courses
- CIS 179 Data Communication Concepts I 4
- CIS 240L Linux Installation and Configuration 4
- CIS 279L Linux Network Administration 4
- CIS 140U Introduction to UNIX 4
Total Credits 16

NETWORK ADMINISTRATION: MICROSOFT SERVER ADMINISTRATION LESS THAN ONE-YEAR CERTIFICATE
Minimum 24 credits. Students must meet all certificate requirements.

Microsoft Server Certificate Courses
- CIS 140M Operating Systems I: Microsoft 4
- CIS 179 Data Communication Concepts I 4
- CIS 240M Managing a Windows Server Environment 4
- CIS 287M Microsoft Server Security 4
- CIS 288M Microsoft Network Administration 4
- CIS 289M Microsoft Active Directory Administration 4
Total Credits 24

WEB APPLICATION DEVELOPMENT LESS THAN ONE-YEAR CERTIFICATE
Minimum 12 credits. Students must meet all certificate requirements.

Web Application Development Certificate Courses
- CIS 133W JavaScript for Web Developers 4
- CIS 135M Mobile Application Programming for Android 4
- CIS 195P PHP Web Development I 4
Total Credits 12

CIS 120. Computer Concepts I. 4 Credits.
Introduces computing fundamentals from older, mature technologies through recent and emerging technologies. Utilizes key applications, such as word processing, spread sheet, database, and presentation software, to solve realistic problems. Explores the benefits and risks of the online environment. Recommended: basic computer skills equivalent to CAS 133 or BA 131. Prerequisites: (WR 115 and RD 115) or IRW 115 and MTH 20 or equivalent placement. Audit available. This course fulfills the following GE requirements: Science, Math, Computer Science/AS, Science, Math, Computer Science/AAS, Science, Math, Computer Science/AGS.

CIS 121. Computer Concepts II. 4 Credits.
Covers the logic of programming and how to break problems down into algorithmic solutions. Includes problem solving, basic logic constructs, organizing and debugging programs, modular programming, and secure coding. Emphasizes development of secure, well-designed software projects. Recommended: CIS 120 or CIS 121 or CAS 133 or BA 131. Prerequisites: (WR 115 and RD 115) or IRW 115 and MTH 60 or equivalent placement. Audit available. This course fulfills the following GE requirements: Science, Math, Computer Science/AS, Science, Math, Computer Science/AAS, Science, Math, Computer Science/AGS.

CIS 125D. Database Application Development I. 4 Credits.
Introduces database management issues, database design, creating and maintaining databases, forms, queries and reports. Design, create and maintain a database system. Recommended: CIS 121 or instructor permission. Audit available.

CIS 133J. Java Programming I. 4 Credits.
Covers design, implementation and testing of software using Java. Introduces how to write Java programs that solve practical, real world, business-oriented problems using object-oriented design techniques. Prerequisite: CIS 122. Audit available.

CIS 133N. Introduction to Programming Using C#.NET. 4 Credits.
Introduces design, implementation and testing of software using C#.NET. Includes how to write C#.NET programs that solve practical, real world business-oriented problems using object-oriented design techniques. Prerequisite: CIS 122 or instructor permission. Audit available.

CIS 133W. JavaScript for Web Developers. 4 Credits.
Covers fundamental programming concepts to build practical, real-world web applications using JavaScript. Covers building websites that handle user events to manipulate page content on-the-fly, allowing a range of dynamic features to be implemented. Includes an introduction to JavaScript. Prerequisites: (CIS 122 or CAS 213) or instructor permission. Audit available.

CIS 135M. Mobile Application Programming for Android. 4 Credits.
Covers introductory mobile application development for the Android Operating System using XML and Java. Introduces developing simple applications that could run on Android phones and tablets. Covers Android application development phases, terminologies, application design, and coding. Recommended: prior completion of or concurrent enrollment in CIS 133J. Prerequisite: CIS 122. Audit available.

CIS 135T. XML and HL7. 4 Credits.
Introduces XML and HL7. Covers design and creation of basic XML documents, namespaces, validation of an XML document using DTDs (Document Type Definitions) and schemas, importing and including XML schema domain information, XML schema intrinsic and user-defined data types, and combining XML with XHTML and Cascading Style Sheets. Discusses the advantages and disadvantages of XML design formats of Flat Catalog, Russian Doll and Venetian Blind. Introduces HL7. Recommended: CIS 122 or instructor permission. Audit available.

CIS 140M. Operating Systems I: Microsoft. 4 Credits.
Introduces Microsoft operating systems administration including installation, configuration, and management. Covers command line interface and GUI tools to organize, manage and maintain the file system. Introduces users, groups, printing, profiles, policies and the registry. Prerequisite: CIS 120 or instructor permission. Audit available.
CIS 145. Microcomputer Hardware and Troubleshooting. 4 Credits. Students will learn to identify, remove, and install standard components of a PC style microcomputer, including motherboards, CPUs, RAM, hard drives, removable media drives and power supplies. Additional topics include BIOS, CMOS, the boot process, video displays, printers, and home networking. Audit available.

CIS 178. Applied Internet Concepts. 4 Credits. Introduces the Internet from a user’s perspective, with emphasis on productive, professional access. Topics include how to connect to the Internet, how to communicate with others, how to find and share information productively, as well as educational, business and social issues related to the Internet. Recommended: CIS 120 or instructor permission. Audit available.

CIS 179. Data Communication Concepts I. 4 Credits. Introduces data communication technology and its practical application. Explores a variety of current and emerging wireless Local, Metropolitan, and Wide Area Networking technologies. Topics may include: WiFi (802.11a/b/g/n), Bluetooth, WiMAX (802.16), 3G/4G, and others. Includes hands-on design of wireless networks and the configuration of wireless Access Points. Prerequisite: CIS 179, or instructor permission. Audit available.

CIS 189. Wireless Security. 4 Credits. Introduces wireless security intrusion, policies, tools, and solutions. Prerequisite: CIS 179 or instructor permission. Recommended: CIS 188. Audit available.

CIS 195P. PHP Web Development I. 4 Credits. Introduces the server-side scripting language PHP and its use in the development of websites. Includes web server, PHP, and MySQL database installation. Covers scripting, database manipulation, user authentication, tracking and session management and e-commerce techniques. Prerequisite: CIS 122 or CIS 213. Audit available.

CIS 225. End User Support. 4 Credits. Prepares computer professionals for providing training and support to end users. Includes the roles and responsibilities of the end-user support person; characteristics of the adult learner; and strategies and techniques for developing instruction, teaching technical subject matter, troubleshooting and providing ongoing technical support. Prerequisites: CIS 120 or instructor permission. Audit available.

CIS 233J. Java Programming II. 4 Credits. Covers the use of Java to access databases and files including XML. Includes creating collections and arrays and using inheritance in Java programs. Prerequisites: CIS 133J. Prerequisites/concurrent: CIS 275. Audit available.

CIS 233N. Intermediate C#.NET Programming. 4 Credits. Utilizes C#.NET to access streams and relational databases. Includes how to follow UML diagrams to create objects, arrays and collections that solve advanced, real-world, business-oriented problems. Introduces building an interactive web page using ASP.NET. Includes writing test plans to evaluate software quality. Continues use of object oriented design techniques. Prerequisites: CIS 133N. Prerequisites/concurrent: CIS 275 or instructor permission. Audit available.

CIS 233W. JavaScript for Web Developers II. 4 Credits. Covers advanced programming concepts to build practical, real-world web applications using JavaScript, AJAX, and jQuery. Covers Object-Oriented Design and Programming, User Interface (UI) design and implementation, and communicating with a web server back-end. Covers using these techniques to create dynamic, interactive web applications, as well as the language-specific details needed to implement them in JavaScript. Prerequisites: CIS 133W. Audit available.

CIS 234A. Real-World Programming. 4 Credits. Introduces real-world programming using agile software development methodologies. Includes a comprehensive team project utilizing object-oriented programming languages and relational databases. Prerequisites: (CIS 233J or CIS 233N or CIS 235W or CIS 296P), and CIS 275, or instructor permission. Audit available.

CIS 240L. Linux Installation and Configuration. 4 Credits. Introduces the administration of systems utilizing the Linux operating system. Focuses on knowledge and skills necessary for day-to-day operations on a Linux system using the command line. This is the first course of a two course sequence. Prerequisite: CS 140U or instructor permission. Audit available.

CIS 240M. Managing a Windows Server Environment. 4 Credits. Prepares students for an entry level position administering systems utilizing Microsoft server operating systems. Focuses on the knowledge and skills necessary to install, configure and manage an Active Directory domain consisting of Microsoft Windows servers and workstations. Prerequisites: CIS 140M or instructor permission. Audit available.


CIS 244. Systems Analysis. 4 Credits. Provides overview of the system development life cycle (SDLC) emphasizing analytical techniques to develop the correct definition of business problems and user requirements. Students will prepare a feasibility assessment and develop system requirements for an assigned project. Recommended: One class in a high-level programming language and WR 227. One 200-level business administration course. Additional lab hours may be required. Audit available.

CIS 245. Project Management - Information Systems. 4 Credits. Study practical approaches for managing, planning, organizing and controlling information systems projects using modern management techniques. Complete hands-on projects requiring management of project resources, scope, time-line, cost, scheduling, human and other resources. Use Microsoft Project and other project monitoring tools. This course is one of the Project Management series that includes CAS 220, MGT 279, and BA 255. Project management is a broad term that can include many areas of business. Recommended: CIS 122, MGT 279, and CAS 220. Audit available.

CIS 275. Data Modeling and SQL Introduction. 4 Credits. Introduces the design, uses, and terminology of a database management system. Includes data modeling using Entity Relationship modeling tools, normalization rules, relational database terminology, and program/query development. Prerequisites: CIS 133N or CIS 133J or CIS 133W or CIS 195P or CIS 161 or CIS 125D or instructor permission. Audit available.

CIS 276. Advanced SQL. 4 Credits. Focuses on design, development and implementation of SQL programming for all types of relational database applications including client/server and Internet databases. Covers the writing of complicated interactive and embedded SQL statements and the implications of multi-user database applications. Recommended: two-term programming language sequence. Prerequisites: CIS 275 and (CIS 133B or CIS 133N or CIS 133J or CIS 133W or CIS 195P or CIS 161 or CIS 125D) or instructor permission. Audit available.

CIS 277D. Database Security. 4 Credits. Covers all aspects of securing a database. Uses Oracle database security to explain concepts in a relational database. Topics covered include: the importance of a database policy, identification and authorization methods (including web applications), securing connection pools and proxy accounts, identity management functions to enterprise users, authorizations and auditing, fine-grained access control (including application contexts security, views, row-level security, virtual private database, Oracle label security and database encryption). Recommended: CIS 276. Additional lab hours may be required. Audit available.

CIS 277F. Advanced Database Concepts in Oracle. 4 Credits. Covers concepts with Oracle including PL/SQL, programming concepts review. Includes design considerations for PLSQL program units and packages. Advanced interface methods, features for PL/SQL, performance and tuning, and advanced features of Oracle supplied packages also covered. Recommended: CIS 276. Audit available.

CIS 277T. Web Business Intelligence Application Development. 4 Credits. Introduces fundamentals of Oracle Application Express 4.0, Web Application Development and Business Intelligence reporting using the newest ANSI 99 standard's features for SQL and DML. Covers fundamentals of Web Business Intelligence reporting and Web User Interface development. Recommend: CIS 276 or equivalent database experience. Audit available.

CIS 278. Data Communication Concepts II. 4 Credits. Provides in-depth concepts of data communications and networking. Explores network architectures, complex network designs and network hardware configuration. Includes a close look at network/telephony company interfaces. Includes configuring operating Cisco routers and other data communication equipment in order to build functional networks. Prerequisite: CIS 179, or instructor permission. Audit available.
CIS 279L. Linux Network Administration. 4 Credits.
Second of a two-term sequence designed to prepare students for an entry-level position as a system administrator of a network utilizing the Linux network operating system. Covers networking, TCP/IP, DNS, DHCP, NFS and Samba. Prerequisite: CIS 240L or instructor permission. Audit available.

CIS 280D. Cooperative Education: Application Development. 1-4 Credit.
Develop career objectives by linking course work with off-campus learning experiences in computer information systems of the public/private sector organizations. Successful completion of 16 CIS course credit hours in CIS declared major with a letter grade of C or better, and instructor permission.

CIS 284. Network Security. 4 Credits.
Continues exploring the role of network administrator. Focuses on the knowledge and skills necessary to maintain system security and to install, configure and maintain a local area network with common internet applications. Emphasizes the use of Open Source software and CompTIA’s Security+ content. Prerequisite: CIS 240M or CIS 279L or instructor permission. Audit available.

CIS 284C. Cybersecurity Concepts. 4 Credits.
Provides an introduction to cybersecurity. Explores security trends, vulnerabilities, threats to those vulnerabilities, and current techniques and tools used to fortify network defenses. Examines legal issues associated with information security, as well as how those issues are addressed within the context of an organization. Prerequisites: CIS 179 and (CIS 140M or CS 140U) or instructor permission. Audit available.

CIS 286. Computer Forensics. 4 Credits.
Introduces computer security administrators to computer forensics. Includes setup and use of an investigator’s laboratory, computer investigations using digital evidence controls, processing crime and incident scenes, performing data acquisition, computer forensic analysis, e-mail investigations, image file recovery, investigative report writing, and expert witness testimony. Includes maps to the IACIS certification. Prerequisite: CS 140U and either CIS 240L or CIS 240M, or instructor permission. Audit available.

CIS 287M. Microsoft Server Security. 4 Credits.
Prepares IT security professionals working in medium to large computing environments to implement authorization and authentication strategies, use certificates and certificate authorities, use Encrypting File System, create secure baselines, use Software Update Services, enhance data transmission security, wireless network security, perimeter security and secure remote access. Focuses on Windows Server with some client content. Prerequisites: CIS 240M or instructor permission. Audit available.

CIS 288M. Microsoft Network Administration. 4 Credits.
Covers preparation for an entry-level systems administrator position utilizing Microsoft server operating systems. Focuses on the knowledge and skills necessary to design, install, configure, and administer a network infrastructure that uses Microsoft Windows Server products. Prerequisites: CIS 240M or instructor permission. Audit available.

CIS 289M. Microsoft Active Directory Administration. 4 Credits.
Covers preparation for an entry-level systems administrator position utilizing Microsoft server operating systems. Focuses on the knowledge and skills necessary to design, install, configure, and administer an enterprise network using Microsoft Active Directory, including implementing Group Policies to centrally manage users and computers. Prerequisites: CIS 240M or instructor permission. Audit available.

CIS 295P. PHP Web Development II. 4 Credits.
Introduces the advanced capabilities and features of PHP for website development. Includes using the object-oriented features of PHP, developing applications for security and portability, advanced features of databases, and creating efficient applications by implementing business logic within the database itself using stored procedures and triggers. Prerequisite: CIS 195P. Prerequisite/Concurrent: CIS 275. Audit available.