

COMPUTER STUDIES AND INFORMATION PROCESSING

In response to the impact of computer technology on communications and industry, CCRI offers various degree and certificate programs through the Computer Studies and Information Processing Department.

Associate in Science (A.S.) Degree Programs

Computer Programming prepares students to enter a modern programming environment. This degree program stresses problem definition and solution design using different programming languages in the development of applications.

Computer and Information Processing Concentrations prepares students for careers in Computer Support Specialist, General Information Processing, Networking Technology, and Web Technologies.

Cybersecurity is one of the fastest-growing, high-demand fields of information technology and the workplace in general. This degree program offers students the opportunity to acquire the skills needed to compete for these jobs and to prepare for a career in cybersecurity. The program will also provide a strong foundation for students intending to pursue a bachelor's degree in the field as well as an opportunity for industry professionals to update their skills to meet the demands of their employers.

Certificate Programs

Computer Programming, General Information Processing, Computer Support Specialist, Network Support Specialist, Data Analytics, Networking, Web Technologies, Office Automation, Networking Technician, and Advanced Networking Technician. Certificate programs emphasize technical coursework only and do not require students to take electives that are required in the associate degree program.

Programs

Associate Degrees

- Computer Studies and Information Processing, Computer Programming - Associate in Science (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-computer-programming-as/>)
- Computer Studies and Information Processing, Computer Support Specialist - Associate in Science (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-computer-support-specialist-as/>)
- Computer Studies and Information Processing, General Information Processing - Associate in Science (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-general-as/>)
- Computer Studies and Information Processing, Networking Technology - Associate in Science (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-networking-as/>)
- Computer Studies and Information Processing, Web Technologies - Associate in Science (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-web-technologies-as/>)

- Cybersecurity - Associate in Science (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/cybersecurity-as/>)

Certificates

- Computer Studies and Information Processing, Advanced Networking Technician - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-advanced-networking-technician-certificate/>)
- Computer Studies and Information Processing, Computer Programming - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-computer-programming-certificate/>)
- Computer Studies and Information Processing, Computer Support Technician - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-support-technician-certificate/>)
- Computer Studies and Information Processing, Data Analytics - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/data-analytics-certificate/>)
- Computer Studies and Information Processing, General Information Processing - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-general-information-processing-certificate/>)
- Computer Studies and Information Processing, Network Support Technician - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/network-support-technician-certificate/>)
- Computer Studies and Information Processing, Networking - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/computer-studies-information-processing-networking-certificate/>)
- Computer Studies and Information Processing, Networking Technician - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/networking-technician-certificate/>)
- Computer Studies and Information Processing, Software Development - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/software-development-certificate/>)
- Computer Studies and Information Processing, Web Technologies - Certificate (<https://catalog.ccri.edu/programs-study/computer-studies-information-processing/web-technologies-certificate/>)

Courses

CMP Networking Virtual Tech (CNVT)

CNVT 1000 - Computer Repair A+ Hardware (3 Credits)

This course covers the installation, configuration and troubleshooting of hardware components. The material is presented to prepare the student for the A+ Core Hardware examination.

Lecture: 2 hours, Lab: 2 hours

**CNVT 1010 - Computer Repair A+ Software
(3 Credits)**

This course covers installation, configuration and troubleshooting of software/operating system components. The material is presented to prepare the student for the A+ OS Technologies examination.
Lecture: 2 hours, Lab: 2 hours

**CNVT 1200 - Introduction to Wireless
(3 Credits)**

This course introduces wireless networking over a range of applications, from cell phones to wireless local area networks (WLAN), to broadband wide area network links and satellite. Topics covered include an overview of wireless communication technology, protocol layers, local area network (LAN) hardware, IP addressing, 802.11 standards, MAC (Media Access Control) standards, WLAN components, basic security, basic RF theory, antennas and troubleshooting. The student will have hands-on experience with various LAN and WLAN networking components, applications, tools and projects.
Lecture: 2 hours, Lab: 2 hours

**CNVT 1810 - Networking Technology
(3 Credits)**

This course provides students with a thorough understanding of how basic networking components work in a practical hands-on environment utilizing state-of-the-art telecommunications equipment.
Lecture: 2 hours, Lab: 2 hours

**CNVT 1820 - Intermediate Networking
(3 Credits)**

This course focuses on networking terminology and protocols, networking standards, LAN, WAN, OSI modules, Ethernet, token ring, FDDI, TCP/IP addressing protocol, dynamic routing and the network administrator's role and function.
Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): CNVT 1810 (may be taken concurrently) or CSCO 1850

**CNVT 1830 - LAN Design and Management
(3 Credits)**

This course focuses on advanced networking concepts that enable students to design and implement local area networks and virtual local area networks.
Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): CNVT 1820 (may be taken concurrently)

**CNVT 1840 - WAN Design and Management
(3 Credits)**

This course focuses on advanced networking concepts that enable students to design and implement wide area networks.
Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): CNVT 1830 (may be taken concurrently)

**CNVT 2010 - Cisco CCNP Route
(5 Credits)**

Cisco ROUTE covers specialized routing concepts including advanced IP addressing techniques, CIDR, NAT, DHCP, IP helper addresses, dynamic routing, static routing, default routing, single area OSPF, multi-area OSPF, point-to-multipoint OSPF, multi-area OSPF, EIGRP route summarization, route redistribution, route filters, route maps, policy routing, BGP, IPv6 and network security.
Lecture: 3 hours, Lab: 5 hours

**CNVT 2030 - Cisco CCNP Switch
(5 Credits)**

Cisco SWITCH concentrates on advanced concepts of multi-layer switching in a network environment. Topics include switching technologies, LAN Media, Gigabit Ethernet, switch configuration, VLANs, VLAN Trunking Protocol (VTP), Spanning Tree Protocol, multi-layer switching, redundant routing protocols, multicasting, and restricting network access.
Lecture: 3 hours, Lab: 5 hours

**CNVT 2060 - CCNP TSHOOT: Cisco IP Network
(5 Credits)**

This course concentrates on advanced concepts of internetwork troubleshooting. Topics include network maintenance and methodologies, troubleshooting processes, troubleshooting tools, maintaining switched and routed solutions, addressing services, performance issues, and network security implementations.
Lecture: 3 hours, Lab: 5 hours

Prerequisite(s): (CNVT 2010 and CNVT 2030)

**CNVT 2100 - Basic Voice Over Internet Protocol (VoIP)
(3 Credits)**

This course concentrates on the transmission of voice over the Internet using Internet Protocol (VoIP). Focus is on the transmission of voice over high speed network connections and quality of service issues and solutions associated with this transmission. VoIP technology, signaling standards, network configuration and queuing are addressed.
Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): CNVT 1830 (may be taken concurrently)

**CNVT 2200 - Network Security Hardware
(4 Credits)**

This course concentrates on network security procedures and practices as they apply to routed networks. Security threats and their management; intrusion detection; securing networks through hardware devices; Authentication, Authorization and Accounting (AAA); firewall technologies; cryptographic systems and virtual private networks (VPNs) are included.
Lecture: 3 hours, Lab: 3 hours

Prerequisite(s): CNVT 1820

**CNVT 2300 - Desktop Technician-Consumer
(3 Credits)**

In this course, students learn how to install and support users running the Microsoft Windows operating system. Topics include installing operating systems and service packs, managing access to files and folders, configuring hardware devices and drivers, setting up network protocols, configuring security options and troubleshooting associated problems. (Fall Only)

Lecture: 2 hours, Lab: 2 hours

**CNVT 2310 - Desktop Technician-Business
(3 Credits)**

In this course, students learn how to install and support desktop applications running under the Microsoft Windows operating system. Applications include the complete Office Suite, Outlook and Internet Explorer. Students learn how to set up standard and custom configurations for these applications. They also learn how to manage security issues and respond to breaches. Troubleshooting problems associated with these applications, including connectivity issues, also are explored. (Spring Only)

Lecture: 2 hours, Lab: 2 hours

Computer Science (COMP)**COMP 1170 - Computer Application Systems
(3 Credits)**

This course covers processes followed in designing computer systems, characteristics of key business computer applications and inter-relationships between computer applications. Exercises and case problems are used to provide a thorough understanding of flowcharting techniques and application development.

Lecture: 3 hours

**COMP 1200 - Database Design & Management
(3 Credits)**

This course provides a foundation in database theory. Students learn database design principles utilizing ERD and Normalization techniques. Database implementation and management utilizing SQL basics and transactions are also discussed.

Lecture: 3 hours, Lab: 1 hour

**COMP 1210 - Database Implementation and Administration
(3 Credits)**

This course focuses on the significant aspects of implementing, utilizing and maintaining a database using a relational DBMS. Students learn the basics of database implementation including installing and configuring a DBMS, creating and populating database tables, managing database tables using constraints and indexes, and extracting data using SQL.

Lecture: 2 hours, Lab: 2 hours

**COMP 1230 - Systems Analysis and Design
(4 Credits)**

This course serves as a capstone course and offers an introduction to concepts, methodology and techniques used in business-systems analysis and the design of computerized business systems. A project-team approach is used to solve a case study.

Lecture: 3 hours, Lab: 2 hours

**COMP 2430 - Operating Systems
(4 Credits)**

This course covers the structure and components of operating systems. Topics include controlling system resources, interface concepts, multiprogramming, networks and command language techniques of current operating systems. Laboratory assignments provide application of these principles.

Lecture: 3 hours, Lab: 2 hours

**COMP 2500 - Cybersecurity Practicum/Capstone Course
(3 Credits)**

The Cybersecurity Practicum/Capstone course provides "hands on" experience to promote development of important skills. Weekly meetings with the course instructor will review key program topics. To complete the course, the student is required to spend an average of 10 hours per week of field work under the guidance of industry professionals in order to apply the accumulation of program knowledge in a real world setting. The student will be required to produce a report relating to the work experience and how it is connected to the content of this program. This class also has an on-campus meeting requirement which will be used to develop a portfolio identifying the experiences the student has been exposed to in the field. Students will keep a working journal during the semester to help assess the progress of their experience.

Lecture: 1 hour, Other: 9 hours

Prerequisite(s): CNVT 1830 and COMI 2037

Computer Studies & Information Processing (COMI)**COMI 1000 - Computer Basics
(1 Credit)**

This course is designed for students with no familiarity with computers. It covers topics such as working with Windows and the Windows desktop, file handling, email and the Internet (browsing and searching).

Lab: 4 hours

**COMI 1100 - Introduction to Computers
(3 Credits)**

This computer literacy course provides a comprehensive introduction to the principles of computers and information processing. Students are introduced to the operation and terminology of computer systems as well as certain selected application software packages such as word processing, spreadsheets and presentation software. Note: Lecture and lab hours vary by instructor but total four hours per week.

Lecture: 3 hours, Lab: 1 hour

**COMI 1150 - Programming Concepts
(3 Credits)**

This course introduces important concepts and skills necessary for computer programming. Emphasis is on structured programming techniques and top-down design.
Lecture: 3 hours, Lab: 1 hour

**COMI 1215 - Programming in C++
(3 Credits)**

This is a comprehensive course in programming in C++. Topics include types, operators, expressions, control flow, functions, arrays, pointers, and file handling.
Lecture: 3 hours, Lab: 1 hour

Course completes the following requirements:
Computer Programming Rqmt

**COMI 1225 - Programming in C#
(3 Credits)**

This course covers the fundamentals of software development using Microsoft's Visual Studio C# object-orientated programming language. Data Structures, Methods, Classes, Decision Making, Iteration and Arrays are covered.
Lecture: 2 hours, Lab: 2 hours

Course completes the following requirements:
Computer Programming Rqmt

**COMI 1240 - Object-Oriented Programming
(3 Credits)**

This course introduces students to the fundamentals of designing and coding object-oriented programs. Basic topics such as objects, classes and class inheritance are discussed. Students write programs using one of the object-oriented languages.
Lecture: 3 hours, Lab: 1 hour

Prerequisite(s): COMI 1150 or COMI 1215 or COMI 1225 or COMI 1510 or COMI 2040

Course completes the following requirements:
Computer Programming Rqmt

**COMI 1260 - Introduction to SQL
(3 Credits)**

This course offers a foundation in the fundamentals of SQL. Particular attention is devoted to the use of ANSI-Standard SQL to construct and manipulate database objects. Students create database tables work with Functions and Operators, and generate SQL scripts to extract and manipulate data from the database.
Lecture: 3 hours, Lab: 1 hour

Course completes the following requirements:
Computer Programming Rqmt

**COMI 1300 - Introduction to Data Analytics
(3 Credits)**

This course provides an introduction to the concepts and procedures in Data Analytics. The course introduces students to the underlying skills required in the collection, manipulation, and analysis of data needed to begin the process of reporting and creating visualizations used in Data Analytics. An overview of data collection, cleansing, and manipulation of data for analysis and reporting are introduced and reviewed. Emphasis is placed on the tools used for statistical analysis and visualization such as: Excel, SQL (Structured Query Language), and Tableau.
Lecture: 2 hours, Lab: 2 hours

Course completes the following requirements:
Computer Programming Rqmt

**COMI 1350 - Data Analytics: Tools & Visualization
(3 Credits)**

This course provides students with the fundamental skills required to effectively manipulate and visualize data. The course covers the topics of statistical reasoning, hypothesis testing, regression analysis, and visualization methods used in Data Analytics. Emphasis is placed on utilizing a statistical programming language.
Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): COMI 1150 and COMI 1300

Course completes the following requirements:
Computer Programming Rqmt

**COMI 1410 - Personal Computer Software
(3 Credits)**

This course introduces operational procedures for several standard data management software packages that utilize computer systems. Students construct and manipulate data files to produce clear, concise reports.
Lecture: 2 hours, Lab: 2 hours

**COMI 1415 - Personal Computer Operating System
(1 Credit)**

This module familiarizes students with operating system commands for the personal computer. Students are exposed to statements to enhance their computer operation abilities.
Lecture: 2 hours, Lab: 2 hours

**COMI 1420 - Introduction to Spreadsheets
(1 Credit)**

The purpose of this module is to introduce the operational procedures for a spreadsheet software package. Students construct and manipulate data files to produce clear and concise reports.
Lecture: 2 hours, Lab: 2 hours

**COMI 1422 - Intermediate Spreadsheets
(1 Credit)**

This module presents topics and functions, advanced database techniques and additional add-in topics. It focuses on conceptual features beyond the scope of beginning spreadsheet uses. Topics include utilizing additional spreadsheet features and macro planning and development.

Lecture: 2 hours, Lab: 2 hours

**COMI 1425 - Advanced Spreadsheets
(1 Credit)**

This module covers advanced topics using integrated spreadsheet software including macros, application design and menu building.

Lecture: 2 hours, Lab: 2 hours

**COMI 1430 - Introduction to Database Software
(1 Credit)**

This module introduces students to different methods of organizing and accessing computer files. Fundamentals of database design and management are covered.

Lecture: 2 hours, Lab: 2 hours

**COMI 1432 - Intermediate Database Software
(1 Credit)**

This module focuses on the creation and manipulation of data files to produce meaningful output using database software. Emphasis is on the presentation of queries, forms and reports.

Lecture: 2 hours, Lab: 2 hours

**COMI 1440 - Presentation Software (PowerPoint)
(1 Credit)**

This module focuses on the use of computer software that incorporates presentation as well as analytical graphics. Students create informative report documents and visual presentations using charts, graphs and/or pictures.

Lecture: 2 hours, Lab: 2 hours

**COMI 1450 - WINDOWS Operating System
(3 Credits)**

This course familiarizes students with the Windows operating system. Basic and advanced features of Windows are demonstrated. Students explore topics in system diagnostics and troubleshooting, networking, configuration, customization, and commonly used software tools as well as learning about new developments in Windows.

Lecture: 3 hours, Lab: 1 hour

**COMI 1451 - Introduction to WINDOWS
(1 Credit)**

This module familiarizes students with the graphical-user operating environment. Basic functions of Windows are demonstrated. Students do laboratory assignments to utilize the basic operating functions of Windows such as file handling, fonts, graphics, icons and screen control.

Lecture: 3 hours, Lab: 1 hour

**COMI 1460 - Unix Operating System
(3 Credits)**

This course covers basic command structures and syntax of the UNIX operating system and includes file and directory manipulation and shell scripts. Essential system administration topics and system administration shell scripts also are discussed as well as system startup/shutdown, account management and system backup of the UNIX operating system. This class covers advanced system administration topics including networking, security, printing systems and graphical-user interface of the UNIX operating system.

Lecture: 3 hours, Lab: 1 hour

**COMI 1461 - Introduction to UNIX
(1 Credit)**

This module exposes students to the basic command structures and syntax of the UNIX operating system. Content includes file and directory manipulation as well as use of shell scripts.

Lecture: 3 hours, Lab: 1 hour

**COMI 1470 - Windows Programming Using C++
(3 Credits)**

This course focuses on using C++ to design programs that run under the Windows operating system. It includes an overview of object-oriented concepts, creating Windows applications, capturing the mouse and keyboard, creating menus, dialog boxes and toolbars and single and multiple document interfaces.

Lecture: 3 hours, Lab: 1 hour

Course completes the following requirements:

Computer Programming Rqmt

**COMI 1475 - Introduction to VISIO
(1 Credit)**

This module introduces basic Visio tools. Students create and manipulate drawings and shapes, including flow charts, diagrams and organizational charts.

Lecture: 3 hours, Lab: 1 hour

**COMI 1510 - Java Programming
(3 Credits)**

This course introduces students to topics in programming and software design using the Java programming language. Specific topics reflect current technologies and might include an introduction to object-oriented program design, data analysis, and search and sort algorithms.

Lecture: 3 hours, Lab: 1 hour

Prerequisite(s): COMI 1150 or COMI 1215 or COMI 1225 or COMI 1240 or COMI 2040

Course completes the following requirements:

Computer Programming Rqmt

**COMI 1640 - Introduction to Word Processing
(1 Credit)**

This module introduces introductory word processing features such as creating, printing and editing a document. This course covers formatting documents including text and paragraphs. Students use spelling, grammar and auto-correct features and are introduced to headers, footers and tables in basic word processing documents.

Lecture: 3 hours, Lab: 1 hour

**COMI 1750 - Web Development 1
(3 Credits)**

This course provides an in-depth introduction to Hypertext Markup Language version 5 (HTML 5) and Cascading Style Sheets version 3 (CSS 3) emphasizing conformance to W3C (World Wide Web Consortium) specifications. Students begin by creating simple web pages and progress to include images, hyperlinks, tables, web forms, animations, and transitions. A portfolio website will be created, including examples of attempts at cloning existing websites.

Lecture: 2 hours, Lab: 2 hours

Course completes the following requirements:

Computer Programming Rqmt

**COMI 1751 - Introduction to HTML
(1 Credit)**

This module introduces students to the use of the HTML language and the basic features of HTML scripting.

Lecture: 3 hours, Lab: 1 hour

Course completes the following requirements:

Computer Programming Rqmt

**COMI 1755 - Fundamentals XML eXtensible Markup Language
(3 Credits)**

This course introduces fundamentals of XML languages to define and validate data, use schemas, transformations, linking, VML, SMIL and CSS. XML files are used with different editing software. Assignments are used to demonstrate XML activity at students' websites.

Lecture: 3 hours, Lab: 1 hour

Course completes the following requirements:

Computer Programming Rqmt

**COMI 1770 - Web Development 2
(3 Credits)**

This course provides an in-depth introduction to a variety of technologies used in modern web development. Building on a base of Hypertext Markup Language version 5 (HTML 5) and Cascading Style Sheets version 3 (CSS 3), students will explore JavaScript, JQuery and related technologies for building dynamic web sites. Students will also be introduced to server-side scripting and best practices for web hosting.

Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): COMI 1750

**COMI 1800 - Computer Networking Software Linux
(3 Credits)**

This course presents the administration of a LINUX network. Topics include installing, using, administering and maintaining a LINUX network.

Lecture: 3 hours, Lab: 1 hour

**COMI 1840 - Microsoft Windows Server
(3 Credits)**

This course presents the terminology and operating principles of Microsoft Windows server software. Students learn how to use, install and maintain Microsoft Windows networking software.

Lecture: 3 hours, Lab: 1 hour

**COMI 2010 - Client-Side Scripting Languages
(3 Credits)**

This course will introduce scripting languages and their use in programming for the World Wide Web with a focus on client-side scripting. It will include fundamental programming topics such as memory concepts, control structures and writing functions. It also will include an introduction to both client-side and server-side scripts.

Lecture: 3 hours, Lab: 1 hour

Course completes the following requirements:

Computer Programming Rqmt

**COMI 2015 - Introduction to Microsoft Project
(1 Credit)**

This module introduces students to project management software, an essential tool used by most information technology environments. Upon completion of this course, students are able to create and analyze projects using Microsoft Project Manager.

Lecture: 3 hours, Lab: 1 hour

**COMI 2020 - Network Security Software Fundamentals
(3 Credits)**

This course introduces students to networking security, a critical knowledge point for technology professionals. This course provides students with introductory concepts and technical skills needed to create and maintain a secure network environment.

Lecture: 3 hours, Lab: 1 hour

**COMI 2031 - Computer Support: Concepts
(3 Credits)**

This course introduces students to basic technical concepts, functions and support systems.

Lecture: 2 hours, Lab: 2 hours

**COMI 2033 - Computer Support: Network and Virtual Machine
(3 Credits)**

This course focuses on software support tools and how to determine which tools are best suited for particular environments as well as methods to assess the success and effectiveness of these tools.

Lecture: 2 hours, Lab: 2 hours

**COMI 2035 - Introduction to Computer Forensics
(3 Credits)**

This course starts with the basics of computer technology to build a foundation for understanding where evidence can be found. It introduces students to the technology and procedures of acquiring and analyzing digital evidence taken from computers. This course also exposes students to the software being used in the industry.

Lecture: 2 hours, Lab: 2 hours

**COMI 2036 - Introduction to Computer Ethics
(3 Credits)**

This course explores the ethical impact of computer technology on the world, as well as the rules and regulations that ensure the proper use of technology. Internet crime, privacy protection and first amendment rights that protect our freedoms in cyberspace are closely examined.

Lecture: 2 hours, Lab: 2 hours

**COMI 2037 - Introduction to Cybersecurity
(3 Credits)**

This course introduces students to the opportunity that exists in the cybersecurity field. Topics such as certified ethical hacking, cyber threats and vulnerabilities and cryptography are introduced.

Lecture: 2 hours, Lab: 2 hours

**COMI 2040 - Beginning Game Programming
(3 Credits)**

This course will introduce the student to game development and the beginning principles of game programming.

Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): COMI 1150

Course completes the following requirements:

Computer Programming Rqmt

**COMI 2055 - Introduction to Virtual Computing
(1 Credit)**

This five-week class provides an introduction to computer virtualization concepts which include hands-on activities of installing, configuring and using virtualization products.

Lecture: 2 hours, Lab: 2 hours

**COMI 2225 - Advanced Programming in C#
(3 Credits)**

This course introduces the student to advanced topics in programming and software design using Microsoft's C# programming language. Topics covered include classes, abstract classes, inheritance, ADO.Net data driven applications using a database, ASP.Net for Web applications, collections and file streams.

Lecture: 3 hours, Lab: 1 hour

Prerequisite(s): COMI 1225 or COMI 1215 or COMI 1510

Course completes the following requirements:

Computer Programming Rqmt

**COMI 2510 - Advanced Java Programming
(3 Credits)**

This course introduces students to advanced topics in programming and software design such as graphical modeling techniques and algorithms and analysis as well as current techniques in interface design and user interaction. Specific topics reflect current technologies and might include inheritance and polymorphism in object-oriented design and graphical user interfaces and the event loop.

Lecture: 3 hours, Lab: 1 hour

Prerequisite(s): COMI 1510

Course completes the following requirements:

Computer Programming Rqmt

**COMI 2520 - Data Structures and Algorithms
(3 Credits)**

This course introduces the student to data structures, algorithm design, and space and time complexity analysis. Topics include common data structures such as linked lists, stacks, queues, binary trees, searching and sorting algorithms, maps, and hash tables, and techniques of run-time complexity analysis such as a Big O notation.

Lecture: 3 hours, Lab: 1 hour

Prerequisite(s): COMI 2510

Course completes the following requirements:

Computer Programming Rqmt

**COMI 2530 - Introduction to Software Engineering
(3 Credits)**

This course introduces students to important concepts in software engineering. Students will learn how to take a project through all stages of the Software Development Life Cycle, including requirements analysis and implementation. Topics may include Unified Modeling Language (UML), Design Patterns, Version Control Systems, Agile, Validation/Correctness, and developing an understanding of current best practices in software engineering.

Lecture: 3 hours, Lab: 2 hours

Prerequisite(s): COMI 2510 (may be taken concurrently)

Course completes the following requirements:

Computer Programming Rqmt

COMI 2900 - Data Analytics Internship

(3 Credits)

The opportunity to implement the skills and knowledge learned in the classroom through “hands on” experience in a business setting is a critical aspect of gaining a thorough understand of how Data Analytics is utilized. To complete the course, the student is required to spend an average of 10 hours per week of field work under the guidance of industry professionals. This work experience will constitute the practicum and capstone for the program. The student will be required to produce a portfolio relating to the work experience and how it is connected to the content of this program. Students will keep a working journal during the semester to help assess the progress of their experience.

Lecture: 2 hours, Other: 9 hours

Prerequisite(s): COMI 1350 (may be taken concurrently)

Cybersecurity (CYBR)

CYBR 1100 - Defending External Threats Using the Cyber Range

(3 Credits)

This course focuses on techniques, considered preventative in nature, which are used to manage and protect networking devices from external attacks. This course utilizes hands-on virtual labs which allow students to examine sophisticated devices such as ASA firewalls and to explore how these devices may be used to control access to resources. We will also explore methods to test, audit, and analyze the outcomes of a cyber-attack.

Lecture: 3 hours, Lab: 1 hour

Prerequisite(s): COMI 2037 and CNVT 1830

CYBR 1200 - Defending Internal Threats using the Cyber Range

(3 Credits)

This course focuses on techniques, considered preventative in nature, which are used to manage and protect networking devices from internal attacks. This course utilizes hands-on virtual labs which allow students to examine sophisticated devices such as ASA firewalls and to explore how these devices may be used to control access to resources. We will also explore methods to test, audit, and analyze the outcomes of a cyber-attack.

Lecture: 3 hours, Lab: 1 hour

Prerequisite(s): CNVT 1830 and COMI 2037