



B.S. COMPUTER SCIENCE

UNDERGRADUATE GUIDE

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B.S. COMPUTER SCIENCE, GENERAL CONCENTRATION

PROGRAM DESCRIPTION

The Computer Science (CS) major offers instruction and performs research in the essential areas of computer science including software, web and Internet computing, networking, hardware systems, operating systems, compilers, parallel and distributed computing, theory of computing, and computer graphics. This major is designed to prepare students both for graduate study in computer science and for technical careers in software development, computational science, networking, science, and electronic commerce.

PROGRAM GOALS

1. To ensure that students possess the fundamental computer science knowledge and problem-solving skills --- capabilities to carry out the process of task analysis, design, implementation, and evaluation of computer-based solutions to real-world problems.
2. To enhance students' communication and interpersonal skills, professional and ethical values, and learning skills necessary for life-long learning.

PROGRAM LEARNING OUTCOMES

At the completion of this program, students will be able to

1. Demonstrate problem-solving skills applying mathematical foundations, fundamental algorithms and data structures and abilities to translate the algorithmic solutions into programs using procedure-based programming solutions and/or object-oriented programming solutions.
2. Demonstrate an ability to apply design and development principles in the construction of software systems of varying complexity.
3. Demonstrate understanding of the basic computer organization/architecture and demonstrate programming skills on the assembly level.
4. Demonstrate adequate knowledge and understanding of fundamental principles, organization, and protocols of relevant operating systems and networks to solve problems which require the use of synchronization, file operations and web communication.
5. Demonstrate adequate knowledge and understanding of different types of database systems and hands-on abilities in design, operating, and managing small-scale relational and non-relational database systems.
6. Demonstrate knowledge of different types of programming languages and understand the lexical and syntactical analysis stages of compilers.
7. Demonstrate knowledge of fundamental encryption/decryption algorithms, authentication, and access control.
8. Demonstrate the ability to use written, oral, and electronic communication to convey technical information effectively.
9. Demonstrate the ability to work cooperatively and effectively in teams through project-based and experiential learning.
10. Recognize the need for and demonstrate an ability to engage in continuing professional development.

PROPOSED CREDIT REQUIREMENTS

B.S. Computer Science, General Concentration	
General Education Requirements	40
Core Requirements	50
MAT 113 Intermediate Algebra*	3
MAT 115 Precalculus*	4
CIS 120 Web Page Design I	3
CIS 210 Web Page Design II	3
CIS 220 Discrete Mathematical Structures	3
SSC 200 Elementary Statistics	3
Natural Science with Lab*	4
CSC 201 Programming I	3
CSC 202 Programming II	3
CSC 312 Computer Systems & Architecture	3
CSC 315 Computer Organization with Assembly language	3
CSC 330 Data Structure & Algorithm Analysis	3
CSC 340 Networking I	3
CSC 465 Operating Systems	3
CSC 420 Senior Project I	3
CSC 490 Senior Project I	3
Major Requirements	17
MAT 201 Calculus-I	4
CIS 332 Database Management Concepts and Systems	3
CSC 435 Programming Languages and Compilers	3
CSC 445 Software Engineering	3
Natural Science with Lab	4
Electives or Internship Experience	
Total	120

EXPECTED PLAN OF STUDY

Freshman Year

First Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CIS 101 Concepts of the Computer	MAT 112	3	Spring/Fall
ENG 111 College English and Composition		3	
MAT 113 Intermediate Algebra		3	
OAS 100 College Success		1	
or OAS 101 Transfer Student Success			
SSC 115 Introduction to Social Science		3	
Elective		3	
	Total Credit Hours	16	

Second Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 101 Programming I		3	Spring/Fall
MAT 115 Precalculus	MAT 113	4	Spring
ENG 112 College Composition and Argument		3	Spring/Fall
HPE 101 Foundations of Health		3	Spring
Elective		3	
	Total Credit Hours	16	

Sophomore Year

First Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 202 Programming II	CSC 101	3	Spring/Fall
CIS 120 Web Page Design I		3	Spring/Fall
ETH 215 Cross-Cultural Ethics of Responsibility		3	
or other Religion elective.			
CIS 220 Discrete Mathematical Structures	MAT 115	3	Spring
COM 210 Public Speaking		3	
	Total Credit Hours	15	

Second Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CIS 210 Web Page Design II	CIS 120	3	Spring/Fall
CSC 245 Networking I		3	
ENG 213 Composition and Literature		3	
HUM 201 Introduction to African-American Humanities		3	
or other Humanities/Fine Arts Elective			
MAT 201 Calculus-I	MAT 115	4	
	Total Credit Hours	16	

Junior Year

First Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CIS 332 Database Management Concepts and Systems	CSC 202	3	Fall
CSC 312 Computer Systems & Architecture	CSC 202	3	Fall
CSC 330 Data Structure & Algorithm Analysis	CSC 202	3	Fall
HIS 115 Intro to World Civilization		3	
or other History or Civics Elective			
Elective		3	
	Total Credit Hours	15	

Second Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 315 Computer Organization with Assembly language	CSC 312	3	Spring
CSC 465 Operating Systems	CSC 202	3	Spring
Natural Science and Lab		4	Spring
Elective		3	
Elective		3	
	Total Credit Hours	16	

Senior Year

First Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 435 Programming Languages and Compilers	CSC 202 & CSC 330	3	Fall
CSC 420 Senior Project I	CSC 202	3	Fall
Natural Science and Lab		4	Fall
SSC 200 Elementary Statistics	MAT 112	3	
Elective		3	
	Total Credit Hours	16	

Second Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 445 Software Engineering	CSC 330	3	Spring
CSC 490 Senior Project II	CSC 420	3	Spring
Elective		3	
Elective		3	
	Total Credit Hours	12	

Total		120	
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B.S COMPUTER SCIENCE, CYBER OPERATIONS CONCENTRATION

PROGRAM DESCRIPTION

The Cyber Operations (CO) concentration provides students with a foundation in programming, data structures, networks, security policy and risk, virtualization, malware analysis, and ethical hacking. The Cyber Operations degree merges technical skills with non-technical skills through required and elective courses to provide students with a balanced skillset in areas such as cyber policy, law, and ethics. Upon completion, students will have the opportunity to engage in red-team or blue-team security teams in various government and non-government agencies in support of national security or other such related industries.

PROGRAM GOALS

The goals of the Cyber Operations program are:

1. To ensure students possess the fundamental cyber-related skills, such as, data processing, law and ethics, malware analysis, and ethical hacking, to be thought provokers and leaders in the Cyber Operations field.
2. To give students a holistic education of technical and non-technical skills, such as verbal and written communication, critical thinking, and learning, in preparation for meaningful and positive global contributions.

PROGRAM LEARNING OUTCOMES

Upon completion of the Cyber Operations program, students should be able to:

1. Demonstrate problem-solving skills applying mathematical foundations, fundamental algorithms and data structures and abilities to translate the algorithmic solutions into programs using procedure-based programming solutions and/or object-oriented programming solutions.
2. Demonstrate an ability to apply design and development principles in the construction of software systems of varying complexity.
3. Demonstrate understanding of the basic computer organization/architecture and demonstrate programming skills on the assembly level.
4. Demonstrate adequate knowledge and understanding of fundamental principles, organization, and protocols of modern operating systems and networks to engage in cyber operations related activities.
5. Demonstrate knowledge of fundamental encryption/decryption algorithms, authentication, and access control.
6. Demonstrate understanding of fundamental cyber operations principles, such as data and network communication, operating systems, reverse engineering, and ethical hacking.
7. Demonstrate the hands-on ability to perform a vulnerability assessment on various computing environments, including but not limited to, embedded operating systems, wireless and mobile networks, and enterprise-level.
8. Demonstrate the hands-on ability to analyze and reverse engineer unknown binaries for malware detection using industry standard tools.
9. Demonstrate the ability to use written, oral, and electronic communication to convey technical information effectively.
10. Demonstrate the ability to work cooperatively and effectively in teams through project-based and experiential learning.
11. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
12. Recognize the need for and demonstrate an ability to engage in continuing professional development.

CONSIDERATION FOR STUDENTS INTERESTED IN THE MAJOR

Students who are considering the Cyber Operations program should have a strong interest in computers and information technology as it applies to security of data, devices, and networks. Students' performance in foundational mathematics, sciences, programming, and cyber operations courses will be strong indicators of success in the Cyber Operations program. Students in the program will gain technical skills involving computers and networks, while also gaining non-technical skills in policy, law, and ethics. No prior programming or technical experience is required to be successful in this program.

PROGRAM CREDIT REQUIREMENTS

B.S. Computer Science, Cyber Operations Concentration	
General Education Requirements	40
Core Requirements	50
MAT 113 Intermediate Algebra*	3
MAT 115 Precalculus*	4
CIS 120 Web Page Design I	3
CIS 210 Web Page Design II	3
CIS 220 Discrete Mathematical Structures	3
SSC 200 Elementary Statistics	3
Natural Science with Lab*	4
CSC 101 Programming I	3
CSC 202 Programming II	3
CSC 245 Networking I	3
CSC 312 Computer Systems & Architecture	3
CSC 315 Computer Organization with Assembly language	3
CSC 330 Data Structure & Algorithm Analysis	3
CSC 420 Senior Project I	3
CSC 465 Operating Systems	3
CSC 490 Senior Project I	3
Major Requirements	36
CSC 105 Introduction to Cyber Operations	3
CSC 115 Computer Hardware, Virtualization, & Data Communication	3
CSC 210 Information Security Ethics, Policy, & Risk	3
CSC 305 Networking II	3

CSC 350 Defensive Security	3
CSC 355 Software Security	3
CSC 405 Malware Analysis I	3
CSC 410 Ethical Hacking I	3
CSC 415 Cellular & Mobile Communications	3
CSC 455 Malware Analysis II	3
CSC 460 Ethical Hacking II	3
CSC 485 Applied Cyber Operations in Enterprise Environments	3
Electives or Internship Experience	
Additional 3 credits since Natural Science satisfies a Gen Ed Requirements	
Total	120

EXPECTED PLAN OF STUDY

Freshman Year

First Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CIS 101 Concepts of the Computer		3	Spring/Fall
ENG 111 College English and Composition		3	
MAT 113 Intermediate Algebra	Counts toward Electives	3	
OAS 100 College Success		1	
or OAS 101 Transfer Student Success			
SSC 115 Introduction to Social Science		3	
HPE 101 Foundations of Health		3	
	Total Credit Hours	16	

Second Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 101 Programming I	MAT 112	3	Spring/Fall
CSC 105 Introduction to Cyber Operations		3	Spring/Fall
CSC 115 Computer Hardware, Virtualization, & Data Communications		3	Spring
MAT 115 Precalculus	MAT 113	4	
ENG 112 College Composition and Argument		3	
	Total Credit Hours	16	

Sophomore Year

First Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 202 Programming II	CSC 101	3	Spring/Fall
CIS 120 Web Page Design I		3	Fall
ETH 215 Cross-Cultural Ethics of Responsibility		3	
or other Religion elective.			
CIS 220 Discrete Mathematical Structures	MAT 115	3	Spring
COM 210 Public Speaking		3	
	Total Credit Hours	15	

Second Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CIS 210 Web Page Design II	CIS 120	3	Spring/Fall
CSC 245 Networking I		3	Spring
CSC 210 Information Security Ethics, Policy, & Risk		3	Spring
ENG 213 Composition and Literature		3	
HUM 201 Introduction to African-American Humanities			
or other Humanities/Fine Arts Elective		3	
	Total Credit Hours	15	

Junior Year

First Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 305 Networking II	CSC 245	3	Fall
CSC 312 Computer Systems & Architecture	CSC 202	3	Fall
CSC 330 Data Structure & Algorithm Analysis	CSC 202	3	Fall
HIS 115 Intro to World Civilization		3	
Elective		3	
	Total Credit Hours	15	

Second Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 350 Defensive Security	CSC 305	3	Spring
CSC 355 Software Security	CSC 202	3	Spring
CSC 315 Computer Organization with Assembly language	CSC 312	3	Spring
CSC 465 Operating Systems	CSC 202	3	
Natural Science and Lab		4	
	Total Credit Hours	16	

Senior Year

First Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 405 Malware Analysis I	CSC 305, CSC 315, and CSC 355	3	Fall
CSC 410 Ethical Hacking I	CSC 350	3	Fall
CSC 415 Cellular & Mobile Communications	CSC 245	3	Fall
CSC 420 Senior Project I	CSC 202	3	Fall
SSC 200 Elementary Statistics	MAT 112	3	
	Total Credit Hours	15	

Second Semester

Course	Prerequisites/Notes	Credits	Semester(s) Offered
CSC 455 Malware Analysis II	CSC 405	3	Spring
CSC 460 Ethical Hacking II	CSC 410	3	Spring
CSC 485 Applied Cyber Operations in Enterprise Environments	CSC 115, CSC 210, and CSC 305	3	Spring
Senior Project II	CSC 420	3	Spring
	Total Credit Hours	12	

Total		120	
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COURSE DESCRIPTIONS

CIS 101 - Concepts of the Computer

Prerequisite: none

Description: This course provides the student with the knowledge and skills necessary to understand and use microcomputer systems for professional, home, and small business tasks. Application software packages are used to create various types of documents, and to explore cyberspace.

Textbook: MyLab IT -- Instant Access -- for GO! All in One 4th Ed, Gaskin, Vargas, Geoghan & Graviett,

CIS 120 - Introduction to Web Page Design

Prerequisite: CIS 101 Concepts of the Computer

Description: This course is designed to make students familiar with web page designing techniques using applications such as FrontPage for possible use in e-commerce. Students learn to incorporate basic graphical skills with Web Pages.

Textbook: Minnick's Responsive Web Design with HTML 5 & CSS, 9th Ed., and the MindTap digital learning solution Jessica Minnick Copyright 2021.

CIS 210 - Advanced Web Page Design II

Prerequisite: CIS 120 Introduction to Web Page Design & MAT 112 General Mathematics II

Description: This course expands on using HTML, CSS, and JavaScript concepts in designing web pages. Students use many of the skills developed in CIS 120. The course presents more progressive complex language skills such as JAVA, JavaScript, Python, and PHP. Students are encouraged to use their imagination when developing web pages. Include other secondary materials such as wix.com and Google Blogger as necessary.

Textbook: Minnick's Responsive Web Design with HTML 5 & CSS, 9th edition

CIS 220 - Discrete Mathematical Structures

Prerequisite: MAT 112 General Mathematics II

Description: This course is designed to provide the student with knowledge of mathematical topics related to the computer and information sciences, including various number systems and their relationship, logic, sets and relations, algorithms, graph theory, logic circuits, grammar, Boolean algebra, and automata.

Textbook: Discrete Mathematics: An Open Introduction. Oscar Levin, 3rd Ed

CIS 311 - Visual Programming I

Prerequisite: CSC 101 Programming I

Description: An introduction to Visual BASIC as a computer programming language used in business-oriented applications. Included are analysis of the problem, development of the structure, formulation of the algorithms, design of the programs, coding and debugging the programs, and hands-on running of the programs.

Textbook: Python by Tony Gaddis, 4th Ed.

CIS 312 - Visual Programming II

Prerequisite: CIS 311 Visual Programming I

Description: An introduction to Visual BASIC.NET as a computer programming language used in business-oriented applications. Included are analysis of the problem, development of the structure, and formulation of the algorithms, design of the programs, coding and debugging the programs, and hands-on running of the programs.

Textbook: Python by Tony Gaddis, 4th Ed.

CIS 321 - Systems Analysis and Design

Prerequisite: CSC 101 Programming I

Description: This course provides the student with the knowledge and skills necessary to understand and use computer systems for professional, home, and small business tasks. Application software packages will be used to create various types of documents, and to explore cyberspace.

Textbook: Modern System Analysis and Design, Jeffrey Hoffer, Joey George, and Joseph Valacich, Prentice Hall 2009, 6th Ed.

CIS 332 - Database Management Concepts and Systems

Prerequisite: CSC 202 Programming II

Description: A course covering the fundamental topics of database systems architectural principles such as data abstraction, data independence, data definition, and data manipulation language. Data models such as entity-relationship and relational data models; data structures, integrity constraints, and operations for each data model; relational query languages: SQL, algebra, calculus. Theory of database designs in which functional dependencies; normal forms; and dependency preservation are stressed.

Textbook: Friedrichsen, Illustrated Microsoft Office 365 & Access 2016: Comprehensive

CIS 421 - Management Information Systems

Prerequisite: none

Description: This course is an in-depth study of the computer as an organizational information system. It also provides students with an opportunity to gain practical skills in designing, implementing, and maintaining computer-based information systems.

Textbook: MyLab IT -- Instant Access -- for GO! All in One 4th Ed

CSC 101 - Programming I

Prerequisite: MAT112 General Mathematics II

Description: An introduction to the fundamental programming concepts in Java that will provide students a foundation in the fundamental programming concepts in Java that will provide students a foundation in the following fundamental programming constructs: (a) representation of numeric, character and string data, (b) arithmetic expressions, (c) basic statements, (d) logic expressions, (e) conditional and (f) iterative control. Programming laboratory experiences are included in this course.

Textbook: Y. Daniel Liang, Introduction to Java: Programming and Data Structures, 12th Ed, Pearson

CSC 105 Introduction to Cyber Operations

Prerequisite: none

Description: Cyber Operations is a cross-disciplinary field of study. This course provides a broad introduction to cyber operations principles including, but not limited to, data communication, networking, wireless communication, legal and ethical considerations, cyber defense, applied cryptography, and user experience. Special consideration is paid toward legal authorities and procedures when conducting a cyber operation from the military or government perspectives, and how they differ from consumer-level legal considerations.

Textbook: Cisco CyberOps Associate

CSC 115 Computer Hardware, Virtualization, & Data Communication

Prerequisite: none

Description: Virtualization and related technologies have become a necessity for the modern web. This course covers topics, such as: computer hardware, virtualization technologies, computer architecture, and data communication.

Textbook: none

CSC 202 - Programming II

Prerequisite: CSC 101 Programming I

Description: A continuation of CSC 201 which covers the following fundamental programming constructs and data structures in Java: (1) functions/methods and parameter passing, (2) arrays, (3) I/O operations, and (4) basic classes and objects.

Textbook: Y. Daniel Liang, Introduction to Java: Programming and Data Structures, 12th Ed, Pearson

CSC 210 Information Security Ethics, Policy, & Risk

Prerequisite: none

Description: Students will learn the fundamental concepts to manage the protection and security of organizational digital resources. The course will review security programs, security policies and procedures, and review disaster

recovery plans, security awareness training and IT auditing procedures. Moreover, students will identify current regulatory bodies which oversee the security posture of an organization. This is a writing-intensive course which will require students to document the legal and ethical considerations required when assessing risk and developing security policies.

Textbook: none

CSC 245 - Networking I

Prerequisite: none

Description: This course focuses on the primary aspects of data communications networking, including a study of the Open Systems Interconnection (OSI) and Internet models. Students will start learn Basic Wireless Concepts and Configuration, Introduction to Wider Area Networks (WANs), Point to Point Protocol (PPP), VLAN Trunk Protocol (VTP), Spanning Tree Protocol (STP), Distributed Computing, Teleworker Services, IP Addressing Services, Inter-VLAN Routing and Frame Relay.

Textbook: Cisco CCNA: Introduction to Networks

CSC 305 Networking II

Prerequisite: CSC 245 Networking I

Description: A continuation of fundamental networking concepts students learned in Computer Networking I. This course provides hands-on lab exercises to reenforce and introduce students to networking concepts such as dynamic subnetting, VLAN configuration, routing protocol configuration, local area network management, and networking device communication.

Textbook: Cisco CCNA: Switching, Routing, and Wireless Essentials

CSC 312 - Computer Systems & Architecture

Prerequisite: CSC 202 Programming II

Description: A first course in digital systems, including a treatment of logic and digital circuits as well as design using register-level components. Data representation, device characteristics, and register transfer notation are covered in a manner that stresses application of basic problem-solving techniques to both hardware and software design. Requirement specifications, the design process, and issues associated with the use of graphical interfaces are also discussed.

Textbook:

Tony Gaddis, Starting Out with Python (MyProgrammingLab Access) 4th Ed

Tony Gaddis, Starting Out with Python (w/ Bind-In Acc) 4th

CSC 315 - Computer Organization with Assembly Language

Prerequisite: CSC 312 Computer Systems & Architecture

Description: A first course in computer organization and assembly language programming. Students are exposed to the register-level architecture of a modern processor and gain experience programming in the assembly language for that processor. Topics associated with data representation, I/O devices, and bus transactions that have been previously maintained are reinforced and amplified.

Textbook: Richard C. Detmer. 80X86 Assembly Language and Computer Architecture (2nd Edition).

CSC 330 - Data Structure & Analysis of Algorithms

Prerequisite: CSC 202 Programming II

Description: A course in algorithms that treats such topics as appropriate choice of data structures, recursive algorithms, complexity issues, and issues associated with computability and decidability. Intractable problems, such found in artificial intelligence, are discussed. An introduction to parallel algorithms is also included.

Textbook: Y. Daniel Liang, Introduction to Java: Programming and Data Structures, 12th Ed, Pearson

CSC 350 Defensive Security

Prerequisite: CSC 305 Networking II

Description: This course provides theoretical and practical aspects to protecting and defending physical and wireless-based networks. Students will acquire skills related to configuring and managing network-based and host-

based security mechanisms. Topics include, but not limited to, vulnerability identification, stateful and stateless firewall configuration, intrusion detection, wireless network security configuration, and data backup and recovery.

Textbook: EC-Council CND Part 1-4

CSC 355 Software Security

Prerequisite: CSC 202 Programming II

Description: This course will make use of hands-on exercises in compiled and web-based software to illustrate attack methodologies and techniques that lead to software vulnerabilities that violate fundamental security principles. Attacks and mitigation strategies related to filter evasion, session management, input validation, buffer overflows, and related areas will be emphasized.

Textbook: none

CSC 405 Malware Analysis I

Prerequisite: CSC 305 Networking II, CSC 315 Computer Organization with Assembly Language and CSC 355 Software Security

Description: This course provides fundamental knowledge of secure software development methodologies and applied security topics related to compiled programs. In-depth coverage of source code auditing, fuzzing, introduction to reverse engineering, and exploitation will be emphasized.

Textbook:

CSC 410 Ethical Hacking I

Prerequisite: CSC 350 Defensive Security

Description: This course provides theoretical and practical aspects of Network Penetration Testing. The course includes in-depth details and hands on labs for each of the five distinct phases of an ethical hack including reconnaissance, scanning and vulnerability assessment, gaining access and exploitation, maintaining access, and covering tracks. An applied approach with a focus on current tools and methodologies will be stressed. Special attention is paid toward topics including, but not limited to, network scanning, enumeration, and vulnerability assessment.

Current Textbook: EC-Council CEH Part 1-2

CSC 415 Cellular & Mobile Communications

Prerequisite: CSC 245 Networking I

Description: Mobile and cellular technologies have become integral to modern society and serve a critical role in the functionality of many systems. This course provides a foundation in how data is processed, stored, and transmitted in mobile and wireless environments. Topics covered include an overview of cellular devices, embedded operating systems, mobile and wireless communication protocols, mobile identifiers, location-based services, mobile and wireless security considerations, and more.

Textbook:

CSC 420 Senior Project I

Prerequisite: CSC 202 Programming II and CSC 330 Data Structure & Algorithm Analysis

Description: This course provides students the skills to successfully manage a team, organize a technical project, and identify technical requirements. Students will be presented with topics related to software lifecycles, software and database modeling, and soft skill development.

Textbook:

CSC 435 - Programming Languages and Compilers

Prerequisite: CSC 202 Programming II and CSC 330 Data Structure & Algorithm Analysis

Description: A course that treats language-design issues and language translators after students have had exposure to variety of programming languages and problem-solving paradigms, so that linguistic issues and programming paradigms can be treated at a more advanced level.

Textbook: Kenneth C. Louden, Kenneth A. Lambert, Programming Languages: Principles and Practices, 3rd Ed.

CSC 445 - Software Engineering

Prerequisite: CSC 330 Data Structures & Analysis of Algorithms

Description: A course that treats topics associated with the design and implementation of large software systems including object-oriented design. A continued emphasis on problem-solving concepts is integrated with a treatment of software life cycles, requirement specifications, and verification and validation issues. Social and ethical issues faced by the computing professional are discussed in the context of software engineering.

Textbook: Software Engineering; Rutgers University; 2012

CSC 455 Malware Analysis II

Prerequisite: CSC 405 Malware Analysis I

Description: This course provides hands-on experience for Malware Analysis. Topics covered in this course include an introduction to both static and dynamic malware analysis techniques. Industry standard tools will be used to expose students to malware analysis concepts such as analyzing, debugging, tracing, and reverse engineering unknown binaries.

Textbook:

CSC 460 Ethical Hacking II

Prerequisite: CSC 410 Ethical Hacking I

Description: A continuation of Ethical Hacking I. Special attention is paid toward topics including, but not limited to, session hijacking, evading network security appliances, web server and application hacking, IoT hacking, wireless and mobile hacking, and cloud hacking.

Textbook: EC-Council CEH Part 3-4

CSC 465 - Operating Systems

Prerequisite: CSC 202 Programming II

Description: A course in systems software that is largely concerned with operating systems. Such topics as process management, device management, and memory management are discussed, as are relevant issues associated with security and protection, networking, and distributed operating systems.

Current Textbook: Operating Systems Internals and Design Principles; 8th Ed; William Stallings

CSC 485 Applied Cyber Operations in Enterprise Environments

Prerequisite: CSC 305 Networking II and CSC 115 Computer Hardware, Virtualization, & Data Communication

Description: This course exposes students to a hands-on environment leveraging common platforms. The course will expose students to concepts that relate to enterprise level operational processes, security and virtualization which include ST&E, C&A, A&A, contingency planning, disaster recovery, cloud computing, virtualization, database, and resource planning. In order to fulfill these areas, students will be exposed to several tools and services that an administrator would need to be familiar with such as web servers, load balancing, database management and email services. Students will learn to budget for and evaluate systems as required in order to support an organization's mission.

Textbook:

CSC 490 Senior Project II

Prerequisite: CSC 420 Senior Project I

Description: This course provides students the opportunity to build small-scale real-world systems to reinforce the skills they learned throughout the duration of their degree. Professor involvement will be limited to allow students freedom in their project. However, students will be required to select an appropriately scoped project commiserate with the knowledge and skills gained during their degree program.

Textbook: