CENTRAL CAROLINA COMMUNITY COLLEGE

Science, Technology, Engineering & Math (STEM)

Program Planning Guide

Information Technology-Network and Cybersecurity Management Associate in Applied Science Degree (A25590NS)

Program Length: 6 semesters
Program Sites: Lee Main Campus - Day Program with some evening courses available
Career Pathway Options: Associate in Applied Science Degree in Information Technology-Network and Cybersecurity Management; Specialized Networking Certificate Programs

Suggested Course Schedule		Class	Lab	Work	Credits	Notes:
1st Semester (fall)						
ACA 122	College Transfer Success	0	2	0	1	
CTI 110	Web, Pgm & Db Foundation	2	2	0	3	
CTI 120	Network & Sec Foundation	2	2	0	3	
CTS 115	Info Systems Business Concept	3	0	0	3	
NOS 130	Windows Single User	2	2	0	3	
SEC 110	Security Concepts	2	2	0	3	
	Total Semester Hours	11	10	0	16	
2nd Semester (spring)						
NET 125	Intro to Networks	1	4	0	3	
NOS 120	Linux/UNIX Single User	2	2	0	3	
NOS 230	Windows Administration I	2	2	0	3	
SEC 150	Secure Communications	2	2	0	3	
Mathematics requirement, select one:						
MAT 143	Quantitative Literacy	2	2	0	3	
MAT 171	Precalculus Algebra	3	2	0	4	
	Total Semester Hours	9/10	12	0	15/16	
3rd Semester (summer)						
NET 126	Switching and Routing	1	4	0	3	
ENG 111	Writing and Inquiry	3	0	0	3	
	Total Semester Hours	**4**	**4**	**0**	**6**	

Effective Term: 2023FA

4th Semester (fall)						
CIS 115	Intro to Programming & Logic	2	3	0	3	
NOS 220	Linux/UNIX Administration I	2	2	0	3	
SEC 160	Security Administration I	2	2	0	3	
Technical Elective, select one:						
CIS 110	Introduction to Computers	2	2	0	3	
DBA 110	Database Concepts	2	3	0	3	
NET 225	Enterprise Networking	1	4	0	3	
	Total Semester Hours	**7/8**	**9/10/11**	**0**	**12**	
5th Semester (spring)						
CTI 289	CTI Capstone Project	1	6	0	3	
SEC 175	Perimeter Defense	1	4	0	3	
SEC 210	Intrusion Detection	2	2	0	3	
Communications Elective		3	0	0	3	
	Total Semester Hours	**7**	**12**	**0**	**12**	
6th Semester (summer)						
Humanities/Fine Arts Elective		3	0	0	3	
Social/Behavioral Science Elective		3	0	0	3	
	Total Semester Hours	6	0	0	6	
Total Semester Hours Credit Required for Graduation: 64						

Course Descriptions

ACA 122 College Transfer Success
This course provides information and strategies necessary to develop clear academic and professional goals beyond the community college experience. Topics include the CAA, college policies and culture, career exploration, gathering information on senior institutions, strategic planning, critical thinking, and communications skills for a successful academic transition. Upon completion, students should be able to develop an academic plan to transition successfully to senior institutions. This course has been approved for transfer under the CAA/ICAA as a premajor and/or elective course requirement.

CIS 110 Introduction to Computers
This course introduces computer concepts, including fundamental functions and operations of the computer. Topics include identification of hardware components, basic computer operations, security issues, and use of software applications. Upon completion, students should be able to demonstrate an understanding of the role and function of computers and use the computer to solve problems.

CIS 115 Introduction to Programming and Logic
Prerequisites: MAT-003 P3 grade
This course introduces computer programming and problem solving in a structured program logic environment. Topics include language syntax, data types, program organization, problem solving methods, algorithm design, and logic control structures. Upon completion, students should be able to manage files with operating system commands, use top-down algorithm design, and implement algorithmic solutions in a programming language. This course has been approved for transfer under the CAA and ICAA as a general education course in Mathematics.

CTI 110 Web, Pgm, & Db Foundation
This course covers the introduction of the tools and resources available to students in programming, mark-up language and services on the Internet. Topics include standard mark-up language Internet services, creating web pages, using search engines, file transfer programs; and database design and creation with DBMS products. Upon completion students should be able to demonstrate knowledge of programming tools, deploy a web-site with mark-up tools, and create a simple database table.

CTI 120 Network & Sec Foundation
This course introduces students to the Network concepts, including networking terminology and protocols, local and wide area networks, and network standards. Emphasis is placed on securing information systems and the various implementation policies. Upon completion, students should be able to perform basic tasks related to networking mathematics, terminology, media and protocols.

CTI 289 CTI Capstone Project
Prerequisites: Take all: CTI 110, CTI 120, CTS 115
This course provides students an opportunity to complete a significant integrated technology project from the design phase through implementation with minimal instructor support. Emphasis is placed on technology policy, process planning, procedure definition, systems architecture, and security issues to create projects for the many areas in which computer technology is integrated. Upon completion, students should be able to create, implement, and support a comprehensive technology integration project from the planning and design phase through implementation.

CTS 115 Information Systems Business Concept
The course introduces the role of IT in managing business processes and the need for business process and IT alignment. Emphasis is placed on industry need for understanding business challenges and developing/managing information systems to contribute to the decision making process based on these challenges. Upon completion, students should be able to demonstrate knowledge of the 'hybrid business manager' and the potential offered by new technology and systems. This course has been approved for transfer under the CAA and ICAA as a premajor and/or elective course requirement.

DBA 110 Database Concepts
This course introduces database design and creation using a DBMS product. Emphasis is placed on data dictionaries, normalization, data integrity, data modeling, and creation of simple tables, queries, reports, and forms. Upon completion, students should be able to design and implement normalized database structures by creating simple database tables, queries, reports, and forms.

ENG 111 Writing and Inquiry
Prerequisite: Take one set: Set 1: DRE 097; Set 2: ENG 002; Set 3: BSP 4002
Corequisite: Take ENG 011
This course is designed to develop the ability to produce clear writing in a variety of genres and formats using a recursive process. Emphasis includes inquiry, analysis, effective use of rhetorical strategies, thesis development, audience awareness, and revision. Upon completion, students should be able to produce unified, coherent, well-developed essays using standard written English. This course has been approved for transfer under the CAA/ICAA as a general education course in English Composition.

MAT 143 Quantitative Literacy
Prerequisite: Take one set: Set 1: DMA 010, DMA 020, DMA 030, and DRE 098; Set 2: DMA 010, DMA 020, DMA 030, and ENG 002; Set 3: DMA 010, DMA 020, DMA 030, and BSP 4002; Set 4: DMA 025 and DRE 098; Set 5: DMA 025 and ENG 002; Set 6: DMA 025 and BSP 4002; Set 7: MAT 003 and DRE 098; Set 8: MAT 003 and ENG 002; Set 9: MAT 003 and BSP 4002; Set 10: BSP 4003 and DRE 098; Set 11: BSP 4003 and ENG 002; Set 12: BSP 4003 and BSP 4002
Corequisite: Take MAT 043
This course is designed to engage students in complex and realistic situations involving the mathematical phenomena of quantity, change and relationship, and uncertainty through project- and activity-based assessment. Emphasis is placed on authentic contexts which will introduce the concepts of numeracy, proportional reasoning, dimensional analysis, rates of growth, personal finance, consumer statistics, practical probabilities, and mathematics for citizenship. Upon completion, students should be able to utilize quantitative information as consumers and to make personal, professional, and civic decisions by decoding, interpreting, using, and communicating quantitative information found in modern media and encountered in everyday life. This course has been approved for transfer under the CAA/ICAA as a general education course in Mathematics (Quantitative).

MAT 171 Precalculus Algebra
Prerequisites: Take one set: Set 1: DMA 010, DMA 020, DMA 030, DMA 040, DMA 050; Set 2: DMA 010, DMA 020, DMA 030, DMA045; Set 3: DMA 025, DMA 045; Set 4: DMA 025, DMA 040, DMA 050; Set 5: MAT 121; Set 6: MAT 003; Set 7: BSP 4003
Corequisite: Take MAT 071
This course is designed to develop topics which are fundamental to the study of Calculus. Emphasis is placed on solving equations and inequalities, solving systems of equations and inequalities, and analysis of functions (absolute value, radical, polynomial, rational, exponential, and logarithmic) in multiple representations. Upon completion, students should be able to select and use appropriate models and techniques for finding solutions to algebra-related problems with and without technology. This course has been approved for transfer under the CAA/ICAA as a general education course in Mathematics.

NET 125 Introduction to Networks
This course introduces the architecture, structure, functions, components, and models of the Internet and computer networks. Topics include introduction to the principles of IP addressing and fundamentals of Ethernet concepts, media, and operations. Upon completion, students should be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.

NET 126 Switching and Routing
This course covers the architecture, components, and operations of routers and switches in small networks and introduces wireless local area networks (WLAN) and security concepts. Emphasis is placed on configuring and troubleshooting routers and switches for advanced functionality using security best practices and resolving common network issues utilizing both IPv4 and IPv6 protocols. Upon completion, students should be able to configure VLANs and Inter-VLAN routing applying security best practices, troubleshoot inter-VLAN routing on Layer 3 devices, configure redundancy on a switched network using STP and EtherChannel, configure WLANs using a WLC and L2 security best practices and configure IPv4 and IPv6 static routing on routers.

NET 225 Enterprise Networking
This course is designed to cover the architecture, components, operations, and security to scale for large, complex networks, including wide area network (WAN) technologies. Emphasis is placed on configuring, troubleshooting, and securing enterprise network devices and understanding how application programming interfaces (API) and configuration management tools enable network automation. Upon completion, students should be able to configure link state routing protocols, implement ACLs to filter traffic and secure administrative access, configure NAT services on the router to provide address scalability, explain techniques to provide address scalability and secure remote access for WAN, and explain how automation affects evolving networks.

NOS 120 Linux/UNIX Single User
This course develops the necessary skills for students to develop both GUI and command line skills for using and customizing a Linux workstation. Topics include Linux file system and access permissions, GNOME Interface, VI editor, X Window System expression pattern matching, I/O redirection, network and printing utilities. Upon completion, students should be able to customize and use Linux systems for command line requirements and desktop productivity roles.

NOS 130 Windows Single User
This course introduces operating system concepts for single-user systems. Topics include hardware management, file and memory management, system configuration/ optimization, and utilities. Upon completion, students should be able to perform operating systems functions at the support level in a single-user environment.

NOS 220 Linux/UNIX Administration I
This course introduces the Linux file system, group administration, and system hardware controls. Topics include installation, creation and maintaining file systems, NIS client and DHCP client configuration, NFS, SMB/Samba, Configure X, Gnome, KDE, basic memory, processes, and security. Upon completion, students should be able to perform system administration tasks including installation, configuring, and attaching a new Linux workstation to an existing network.

NOS 230 Windows Administration I
This course covers the installation and configuration of a Windows Server operating system. Emphasis is placed on the basic configuration of core network services, Active Directory and group policies. Upon completion, students should be able to install and configure a Windows Server operating system.

SEC 110 Security Concepts
This course introduces the concepts and issues related to securing information systems and the development of policies to implement information security controls. Topics include the historical view of networking and security, security issues, trends, security resources, and the role of policy, people, and processes in information security. Upon completion, students should be able to identify information security risks, create an information security policy, and identify processes to implement and enforce policy.

SEC 150 Secure Communications
This course provides an overview of current technologies used to provide secure transport of information across networks. Topics include data integrity through encryption, Virtual Private Networks, SSL, SSH, and IPSec. Upon completion students should be able to implement secure data transmission technologies.

SEC 160 Security Administration I
This course provides an overview of security administration and fundamentals of designing security architectures. Topics include networking technologies, TCP/IP concepts, protocols, network traffic analysis, monitoring, and security best practices. Upon completion, students should be able to identify normal network traffic using network analysis tools and design basic security defenses.

SEC 175 Perimeter Defense
This course introduces the principles of securing networks using routers and firewalls. Topics include networking protocols, threat mitigation, firewall configuration, authentication, authorization, intrusion detection, encryption, IPSec, VPNs, and remote access technologies. Upon completion, students should be able to secure internal networks using router and firewall technologies.

SEC 210 Intrusion Detection
This course introduces the student to intrusion detection methods in use today. Topics include the types of intrusion detection products, traffic analysis, and planning and placement of intrusion detection solutions. Upon completion, students should be able to plan and implement intrusion detection solution for networks and host-based systems.

Approved Humanities/Fine Arts Electives
Associate in Applied Science Degree/Diploma

ART 111	Art Appreciation
ART 114	Art History Survey I
ART 115	Art History Survey II
DRA 111	Theatre Appreciation
ENG 125	Creative Writing I
ENG 231	American Literature I
ENG 232	American Literature II
ENG 241	British Literature I
ENG 242	British Literature II
HUM 110	Technology & Society
HUM 115	Critical Thinking
HUM 120	Cultural Studies
HUM 122	Southern Culture
HUM 150	American Women's Studies
HUM 160	Introduction to Film
MUS 110	Music Appreciation
MUS 112	Introduction to Jazz
PHI 240	Introduction to Ethics
REL 110	World Religions
REL 211	Intro to Old Testament
REL 212	Intro to New Testament

Communications Electives:

COM 231	Public Speaking
ENG 112	Writing/Research in the Disc
ENG 114	Prof Research & Reporting

Approved Social/Behavioral Science Electives
Associate in Applied Science Degree/Diploma

ANT 210	General Anthropology
ANT 220	Cultural Anthropology
ECO 151	Survey of Economics
ECO 251	Principles of Microeconomics
ECO 252	Principles of Macroeconomics
HIS 111	World Civilization I
HIS 112	World Civilization II
HIS 131	American History I
HIS 132	American History II
HIS 222	African-American History I
HIS 223	African-American History II
HIS 226	The Civil War
HIS 236	North Carolina History
POL 120	American Government
PSY 150	General Psychology
PSY 237	Social Psychology
PSY 241	Developmental Psychology
PSY 246	Adolescent Psychology
PSY 281	Abnormal Psychology
SOC 210	Introduction to Sociology
SOC 213	Sociology of the Family
SOC 220	Social Problems
SOC 225	Social Diversity
SOC 232	Social Context of Aging
SOC 240	Social Psychology