CENTRAL CAROLINA COMMUNITY COLLEGE

Program Planning Guide
Computer Engineering Technology, Associate in Applied Science Degree (A40160)

Program Length: 5 semesters
Career Pathway Options: Associate in Applied Science Degree in Computer Engineering Technology
Program Site/s: Lee Main Campus, Day Program

Suggested Course Schedule:

		Hours				
		Class	Lab	Clinical	Credit	Notes:
1st Semester (Fall)						
ACA 122	Student Success Course	0	2	0	1	
EGR 131	Intro to Electronics Tech	1	2	0	2	
ELC 131	Circuit Analysis I	3	3	0	4	
ELC 131A	Circuit Analysis I Lab	0	3	0	1	
ENG 111	Writing & Inquiry	3	0	0	3	
Mathematics - select one:					3	
MAT 171	Precalculus Algebra	3	2	0		
MAT 121	Algebra/Trigonometry I	2	2	0		
					14	or 15
2nd Semester (Spring)						
ELN 131	Analog Electronics I	3	3	0	4	
ELN 133	Digital Electronics	3	3	0	4	
NOS 130	Windows Single User	2	2	0	3	
Mathematics - select one:					3	
MAT 172	Precalculus Trigonometry	3	2	0		
MAT 122	Algebra/Trigonometry II	2	2	0		
Physics - select one:					4	
PHY 151	College Physics I	3	2	0		
PHY 131	Physics-Mechanics	3	2	0		
					18	or 19
3rd Semester (Summer)						
ELN 132	Analog Electronics II	3	3	0	4	
Communications Elective					3	
COM 231	Public Speaking	3	0	0		
ENG 112	Writing/Research in the Discipline	3	0	0		Recommended
ENG 114	Professional Research & Reporting	3	0	0		
					7	
4th Semester (Fall)						
CET 225	Digital Signal Processing	2	2	0	3	
CTS 120	Hardware/Software Support	2	3	0	3	
ELN 232	Introduction to Microprocessors	3	3	0	4	
Social/Behavioral Science Elective		3	0	0	3	
Programming Elective - select one:					3	
CSC 121	Python Programming	2	3	0		
CSC 134	C++ Programming	2	3	0		
CSC 139	Visual Basic Programming	2	3	0		
CSC 151	JAVA Programming	2	3	0		
					16	

5th Semester (Spring)						
CTI 120	Network and SEC Foundation	2	2	0	3	
CTS 220	Advanced Hardware/Software Support	2	3	0	3	
ELN 275	Troubleshooting	1	3	0	2	
PCI 170	DAQ and Control	3	3	0	4	
Humanities/Fine Arts Elective		3	0	0	3	
Technical Elective - select one:					2	
CIS 110	Introduction to Computers	2	2	0		
CSC 121	Python Programming	2	3	0		
CSC 134	C++ Programming	2	3	0		
CSC 139	Visual Basic Programming	2	3	0		
CSC 151	JAVA Programming	2	3	0		
ELN 234	Communication Systems	3	3	0		
ELN 247	Electronics Application Project	1	3	0		
NET 125	Networking Basics	1	4	0		
NET 126	Routing Basics	1	4	0		
NOS 120	Linux/UNIX Single User	2	2	0		
					17	

Total Semester Hours Credit Required for Graduation: 72

ACA 122 College Transfer Success 0-2-1
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 and ICAA as a premajor and/or elective course requirement.

CET 225 Digital Signal Processing 2-2-3
Local Prerequisite: ELN 133
This course introduces concepts and applications of digital signal processing. Topics include Fourier analysis, signal sampling, digital filtering, IIR filters, FIR filters, and DSP programming. Upon completion, students should be able to implement and troubleshoot DSP systems in hardware and software.

CIS 110 Introduction to Computers 2-2-3
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. This course has been approved for transfer under the CAA and ICAA as a general education course in Mathematics.

COM 231 Public Speaking 3-0-3
This course provides instruction and experience in preparation and delivery of speeches within a public setting and group discussion. Emphasis is placed on research, preparation, delivery, and evaluation of informative, persuasive, and special occasion public speaking. Upon completion, students should be able to prepare and deliver well-organized speeches and participate in group discussion with appropriate audiovisual support. This course has been approved for transfer under the CAA and ICAA as a universal general education transfer component (UGETC) course in Communications.

CSC 121 Python Programming 2-3-3
This course introduces computer programming using the Python programming language. Emphasis is placed on common algorithms and programming principles utilizing the standard library distributed with Python. Upon completion, students should be able to design, code, test, and debug Python language programs.

CSC 134 C++ Programming 2-3-3
This course introduces computer programming using the C++ programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger. Upon completion, students should be able to design, code, test and debug at a beginning level. This course has been approved for transfer under the CAA and ICAA as a premajor and/or elective course requirement.

CSC 139 Visual BASIC Programming 2-3-3
This course introduces computer programming using the Visual BASIC programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger. Upon completion, students should be able to design, code, test and debug at a beginning level. This course has been approved for transfer under the CAA and ICAA as a premajor and/or elective course requirement.

CSC 151 JAVA Programming 2-3-3
This course introduces computer programming using the JAVA programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger. Upon completion students should be able to design, code, test, debug JAVA language programs. This course has been approved for transfer under the CAA and ICAA as a premajor and/or elective course requirement.

CTI 120 Network & Sec Foundation 2-2-3
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.

CTS 120 Hardware/Software Support 2-3-3
This course covers the basic hardware of a personal computer, including installation, operations and interactions with software. Topics include component identification, memory-system, peripheral installation and configuration, preventive maintenance, hardware diagnostics/repair, installation and optimization of system software, commercial programs, system configuration, and device-drivers. Upon completion, students should be able to select appropriate computer equipment and software, upgrade/maintain existing equipment and software, and troubleshoot/repair non-functioning personal computers.

CTS 220 Advanced Hardware/Software Support 2-3-3
Prerequisite: CTS 120
This course provides advanced knowledge and competencies in hardware and operating system technologies for computer technicians to support personal computers. Emphasis is placed on configuring and upgrading; diagnosis and troubleshooting; as well as preventive maintenance of hardware and system software. Upon completion, students should be able to install, configure, diagnose, perform preventive maintenance, and maintain basic networking on personal computers.

EGR 131 Introduction To Electronics Technology 1-2-2
This course introduces the basic skills required for electrical/electronics technicians. Topics include soldering/desoldering, safety practices, test equipment, scientific calculators, AWG wire table, the resistor color code, electronic

devices, problem solving, and use of hand tools. Upon completion, students should be able to solder/desolder, operate test equipment, apply problem solving techniques, and use a scientific calculator.

ELC 131 Circuit Analysis I 3-3-4
Local Corequisite: Take one set: 1) MAT 121 and ELC 131A; 2) ELC 131A and MAT 171
This course introduces DC and AC electricity with an emphasis on circuit analysis, measurements, and operation of test equipment. Topics include DC and AC principles, circuit analysis laws and theorems, components, test equipment operation, circuit simulation, and other related topics. Upon completion, students should be able to interpret circuit schematics; design, construct, verify, and analyze DC/AC circuits; and properly use test equipment.

ELC 131A Circuit Analysis I Lab 0-3-1
Corequisite: ELC 131
This course provides laboratory assignments as applied to fundamental principles of DC/AC electricity. Emphasis is placed on measurements and evaluation of electrical components, devices and circuits. Upon completion, the students will gain hands-on experience by measuring voltage, current, and opposition to current flow utilizing various meters and test equipment.

ELN 131 Analog Electronics I 3-3-4
Local Prerequisite: ELC 112 or ELC 131
This course introduces the characteristics and applications of semiconductor devices and circuits. Emphasis is placed on analysis, selection, biasing, and applications. Upon completion, students should be able to construct, analyze, verify, and troubleshoot analog circuits using appropriate techniques and test equipment.

ELN 132 Analog Electronic II 3-3-4
Local Prerequisite: ELN 131 or ELC 140
This course covers additional applications of analog electronic circuits with an emphasis on analog and mixed signal integrated circuits (IC). Topics include amplification, filtering, oscillation, voltage regulation, and other analog circuits. Upon completion, students should be able to construct, analyze, verify, and troubleshoot analog electronic circuits using appropriate techniques and test equipment.

ELN 133 Digital Electronics 3-3-4
Local Prerequisite: EGR 131 or ELC 131 or Instructor Approval
This course covers combinational and sequential logic circuits. Topics include number systems, Boolean algebra, logic families, medium scale integration (MSI) and large scale integration (LSI) circuits, analog to digital (AD) and digital to analog (DA) conversion, and other related topics. Upon completion, students should be able to construct, analyze, verify, and troubleshoot digital circuits using appropriate techniques and test equipment.

ELN 232 Introduction to Microprocessors 3-3-4
Local Prerequisite: ELN 133 or Instructor Approval
This course introduces microprocessor architecture and microcomputer systems including memory and input/output interfacing. Topics include low-level language programming, bus architecture, I/O systems, memory systems, interrupts, and other related topics. Upon completion, students should be able to interpret, analyze, verify, and troubleshoot fundamental microprocessor circuits and programs using appropriate techniques and test equipment.

ELN 234 Communication Systems 3-3-4
Local Prerequisite: Take one: ELN 132 or ELN 140
This course introduces the fundamentals of electronic communication systems. Topics include the frequency spectrum, electrical noise, modulation techniques, characteristics of transmitters and receivers, and digital communications. Upon completion, students should be able to interpret analog and digital communication circuit diagrams, analyze transmitter and receiver circuits, and use appropriate communication test equipment.

ELN 247 Electronic Application Project 1-3-2
Local Prerequisite: ELN 133, ELN 132 or ELN 140
This course provides a structured approach to an application-oriented electronics project. Emphasis is placed on selecting, planning, implementing, testing, and presenting an application-oriented project. Upon completion, students should be able to present and demonstrate an electronics application-oriented project.

ELN 275 Troubleshooting 1-3-2
Local Prerequisites: ELN 133 and ELN 132
This course covers techniques of analyzing and repairing failures in electronic equipment. Topics include safety, signal tracing, use of service manuals, and specific troubleshooting methods for analog, digital, and other electronics-based circuits and systems. Upon completion, students should be able to logically diagnose and isolate faults and perform necessary repairs to meet manufacturers' specifications.

ENG 111 Writing and Inquiry 3-0-3
Prerequisites: DRE 098 or ENG 002
Local Prerequisites: Take one: 1) ENG 011; 2) ENG 002; 3) DRE 098; 4) ENG 090; 5) ENG 095
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 and ICAA as a universal general education transfer component (UGETC) course in English Composition.

ENG 112 Writing/Research in the Disciplines 3-0-3
Prerequisite: ENG 111
This course, the second in a series of two, introduces research techniques, documentation styles, and writing strategies. Emphasis is placed on analyzing information and ideas and incorporating research findings into documented writing and research projects. Upon completion, students should be able to evaluate and synthesize information from primary and secondary sources using documentation appropriate to various disciplines. This course has been approved for transfer under the CAA and ICAA as a universal general education transfer component (UGETC) course in English Composition.

ENG 114 Professional Research and Reporting 3-0-3
Prerequisite: ENG 111
This course, the second in a series of two, is designed to teach professional communication skills. Emphasis is placed on research, listening, critical reading and thinking, analysis, interpretation, and design used in oral and written presentations. Upon completion, students should be able to work individually and collaboratively to produce well-designed business and professional written and oral presentations. This course has been approved for transfer under the CAA and ICAA as a general education course in English Composition.

MAT 121 Algebra/Trigonometry I 2-2-3
Prerequisite: Take one set:
***Set 1:** DMA 010, DMA 020, DMA 030, DMA 040, DMA 050, and DMA 060; **Set 2:** DMA 025, DMA 040, DMA 050, DMA 060; **Set 3:** DMA 025, DMA 045, DMA 060; **Set 4:** DMA 010, DMA 020, DMA 030, DMA 045, DMA 060; **Set 5:** MAT 003;*
Local RISE corequisites: Take one group:
1) MAT-021; 2) MAT-003; 3) DMA-010, DMA-020, DMA-030, DMA-040, DMA-050, DMA-060; 4) MAT-121; 5) MAT-161
7). DMA-010, DMA-020, DMA-030, DMA-040, DMA-050, DMA-065;
7. DMA-010, DMA-020, DMA-030, DMA-045, DMA-065;
8) DMA-025, DMA-045, DMA-060, DMA-070, DMA-080;
9) DMA-025, DMA-040, DMA-050, DMA-065; 10) MAT-060, MAT-070; 11) MAT-060, MAT-080; 12) MAT-060, MAT-090;
13. MAT-095
This course provides an integrated approach to technology and the skills required to manipulate, display, and interpret mathematical functions and formulas used in problem solving. Topics include the properties of plane and solid geometry, area and volume, and basic proportion applications; simplification, evaluation, and solving of algebraic equations and inequalities and radical functions; complex numbers; right triangle trigonometry; and systems of equations. Upon completion, students will be able to demonstrate the ability to use mathematics and technology for problem-solving, analyzing and communicating results.

MAT 122 Algebra/Trigonometry II 2-2-3
Prerequisite: MAT 121
This course is designed to cover concepts in algebra, function analysis, and trigonometry. Topics include exponential and logarithmic functions, transformations of functions, Law of Sines, Law of Cosines, vectors, and statistics. Upon completion, students should be able to demonstrate the ability to use mathematics and technology for problem-solving, analyzing and communicating results.

MAT 171 Precalculus Algebra 3-2-4
Prerequisite: Take one set:
1. DMA-010, DMA-020, DMA-030, DMA-040, DMA-050, DMA-060, DMA-070, and DMA-080; 2. DMA-010, DMA-020, DMA-030, DMA-040, DMA-050, and DMA-065; 3. DMA-010, DMA-020, DMA-030, DMA-045, DMA-060, DMA-070, and DMA-080
4. DMA-010, DMA-020, DMA-030, DMA_045, & DMA-065;
5. DMA-025, DMA-040, DMA-050, DMA-060, DMA-070, & DMA-080; 6. DMA-025, DMA-040, DMA-050, & DMA-065;
7. DMA-025, DMA-045, DMA-060, DMA-070, & DMA-080;
8. DMA-025, DMA-045, & DMA-065; 9. MAT-212; 10. MAT-003
Local RISE Corequisites: Take one group: 1. MAT-071; 2. MAT-003; 3. DMA-010, DMA-020, DMA-030, DMA-040, DMA-050, DMA-060, DMA-070, DMA-080; 4. MAT-121; 5. MAT-161;
6. DMA-010, DMA-020, DMA-030, DMA-040, DMA-050, DMA-065;
7. DMA-010, DMA-020, DMA-030, DMA-045, DMA-065;
8. DMA-025, DMA-045, DMA-065; 9. DMA-025, DMA-040, DMA-050, DMA-060, DMA-070, DMA-080; 10. DMA-025, DMA-045, DMA-060, DMA-070, DMA-080; 11. DMA-010, DMA-020, DMA-030, DMA-045, DMA-060, DMA-070, DMA-080; 12. DMA-025, DMA-040, DMA-050, DMA-065; 13. MAT-060, MAT-080;
14. MAT-060, MAT-090; 15. MAT-095
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 and ICAA as a universal general education transfer component (UGETC) course in Mathematics.

MAT 172 Precalculus Trigonometry 3-2-4
Prerequisite: MAT 171
This course is designed to develop an understanding of topics which are fundamental to the study of Calculus. Emphasis is placed on the analysis of trigonometric functions in multiple representations, right and oblique triangles, vectors, polar coordinates, conic sections, and parametric equations. Upon completion, students should be able to select and use appropriate models and techniques for finding solutions to trigonometry-related problems with and without technology. This course has been approved for transfer under the CAA and ICAA as a universal general education transfer component (UGETC) course in Mathematics.

NET 125 Introduction to Networks 1-4-3
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 Routing Basics 1-4-3
This course focuses on initial router configuration, router software management, routing protocol configuration, TCP/IP, and access control lists (ACLs). Emphasis will be placed on the fundamentals of router configuration, managing router software, routing protocol, and access lists. Upon completion, students should have an understanding of routers and their role in WANs, router configuration, routing protocols, TCP/IP, troubleshooting, and ACLs.

NOS 120 Linux/UNIX Single User 2-2-3
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 2-2-3
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.

PCI 170 DAQ and Control 3-3-4
This course is a survey of data acquisition and control applications in an industrial setting. Topics include remote I/O systems, PC-based data acquisition, real-time monitoring, and other related topics. Upon completion, students should be able to demonstrate an understanding of data acquisition circuits.

PHY 131 Physics-Mechanics 3-2-4
Prerequisite: MAT 121, or MAT 171
This algebra/trigonometry-based course introduces fundamental physical concepts as applied to engineering technology fields. Topics include systems of units, problem solving methods, graphical analysis, vectors, motion, forces, Newton's laws of motion, work, energy, power, momentum, and properties of matter. Upon completion, students should be able to apply the principles studied to applications in engineering technology fields.

PHY 151 College Physics I 3-2-4
Prerequisite: MAT 171 or MAT 271
This course uses algebra and trigonometry-based mathematical models to introduce the fundamental concepts that describe the physical world. Topics include units and measurement, vectors, linear kinematics and dynamics, energy, power, momentum, fluid mechanics, and heat. Upon completion, students should be able to demonstrate an understanding of the principles involved and display analytical problem solving ability for the topics covered. This course has been approved for transfer under the CAA and ICAA as a universal general education transfer component (UGETC) course in Natural Sciences.