

**Central Carolina Community College  
Program Planning Guide**

**Computer Engineering Technology**

**Credential: Associate in Applied Science Degree in Computer Engineering Technology (A40160)**

The Computer Engineering Technology curriculum provides the skills required to install, service, and maintain computers, peripherals, networks, and microprocessor and computer controlled equipment. It includes training in both hardware and software, emphasizing operating systems concepts to provide a unified view of computer systems.

Coursework includes mathematics, physics, electronics, digital circuits, and programming with emphasis on the operation, use, and interfacing of memory and devices to the CPU. Additional topics may include communications, networks, operating systems, programming languages, Internet configuration and design, and industrial applications.

Graduates will qualify for employment opportunities in electronics technology, computer service, computer networks, server maintenance, programming, and other areas requiring a knowledge of electronic and computer systems. Graduates will also qualify for certification in electronics, computers, or networks.

Program Length: 5 semesters

Career Pathway Options: Associate of Applied Science Degree in Computer Engineering Technology

Program Sites: Lee Campus - Day

<b>Suggested Course Schedule:</b>	<b>HOURS</b>			<b>Grade</b>	<b>Semester</b>	<b>Notes</b>
	<b>Class</b>	<b>Lab</b>	<b>Credit</b>			
<b>1st Semester (Fall)</b>						
CIS 110	Introduction to Computers	2	2	3		
EGR 131	Intro to Electronics Tech	1	2	2		
ELC 131	DC/AC Circuit Analysis	4	3	5		
ENG 111	Expository Writing	3	0	3		
ENG 111A	Expository Writing Lab	0	2	1		
MAT 121	Algebra/Trigonometry I	2	2	3		
		12	11	17		
<b>2nd Semester (Spring)</b>						
ELN 131	Electronic Devices	3	3	4		
ELN 133	Digital Electronics	3	3	4		
MAT 122	Algebra/Trigonometry II	2	2	3		
NOS 110	Operating Systems Concepts	2	2	3		
PHY 131	Physics-Mechanics	3	2	4		
		13	12	18		
<b>3rd Semester (Summer)</b>						
ELN 132	Linear LC Applications	3	3	4		
ENG 114	Professional Research & Reporting	3	0	3		
		6	3	7		
<b>4th Semester (Fall)</b>						
CET 111	Computer Upgrade/Repair I	2	3	3		
CET 225	Digital Signal Processing	2	2	3		
ELN 232	Introduction to Microprocessors	3	3	4		
	Social/Behavioral Science Elective	3	0	3		
See Below	Programming Elective	2	3	3		
		12	11	16		

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### 5th Semester (Spring)

CET 211	Computer Upgrade/Repair II	2	3	3			
ELN 275	Troubleshooting	1	2	2			
	Humanities/Fine Arts Elective	3	0	3			
NET 110	Networking Concepts	2	2	3			
PCI 170	DAQ and Control	3	3	4			
See Below	Technical Elective			2			
		11	10	17			

### Programming Electives (choose 3 SHC)

CSC 134	C++ Programming	2	3	3			
CSC 139	Visual BASIC Programming	2	3	3			
CSC 151	JAVA Programming	2	3	3			

### Technical Electives (Select 2 SHC)

CSC 134	C++ Programming	2	3	3			
CSC 139	Visual BASIC Programming	2	3	3			
CSC 151	JAVA Programming	2	3	3			
ELN 234	Communication Systems	3	3	4			
ELN 247	Electronics Application Project	1	3	2			
NET 125	Networking Basics	1	4	3			
NET 126	Routing Basics	1	4	3			
NOS 120	Linux/UNIX Single User	2	2	3			
NOS 130	Windows Single User	2	2	3			

Total Semester Hours Credit: 75

### Course Descriptions:

#### **CET 111 Computer Upgrade/Repair I 2-3-3**

This course covers repairing, servicing, and upgrading computers and peripherals in preparation for industry certification. Topics include CPU/memory/bus identification, disk subsystems, hardware/software installation/configuration, common device drivers, data recovery, system maintenance, and other related topics. Upon completion, students should be able to safely repair and/or upgrade computer systems to perform within specifications.

#### **CET 211 Computer Upgrade/Repair II 2-3-3**

*Local Prerequisite: CET 111*

This course covers concepts of repair service and upgrade of computers and peripherals in preparation for industry certification. Topics may include resolving resource conflicts and system bus specifications, configuration and troubleshooting peripherals, operating system configuration and optimization, and other related topics. Upon completion, students should be able to identify and resolve system conflicts and optimize system performance.

#### **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 premajor and/or elective course requirement.

#### **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

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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.

**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      DC/AC Circuit Analysis      4-3-5**

*Local Corequisite: MAT 121 or MAT 161*

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.

**ELN 131      Semiconductor Applications      3-3-4**

*Local Corequisite: ELC 112, ELC 131, or ELC 140*

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 discrete component circuits using appropriate techniques and test equipment.

**ELN 132      Linear IC Applications      3-3-4**

*Local Prerequisite: ELN 131 or BMT 113 or ELC 140*

This course introduces the characteristics and applications of linear integrated circuits. Topics include op-amp circuits, waveform generators, active filters, IC voltage regulators, and other related topics. Upon completion, students should be able to construct, analyze, verify, and troubleshoot linear integrated circuits using appropriate techniques and test equipment.

**ELN 133      Digital Electronics      3-3-4**

*Local Prerequisite: ELN 131 or Instructor Approval*

This course covers combinational and sequential logic circuits. Topics include number systems, Boolean algebra, logic families, MSI and LSI circuits, AC/DC 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.

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**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: 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 131 and either 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 either ELN 132 or ELN 140*

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      Expository Writing      3-0-3**

*Prerequisites: Take one set: RED 090 and ENG 090, ENG 095, or appropriate placement test scores.*

*Corequisites: ENG 111A*

This course is the required first course in a series of two designed to develop the ability to produce clear expository prose. Emphasis is placed on the writing process including audience analysis, topic selection, thesis support and development, editing, 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 general education course in English Composition.

**ENG 111A      Expository Writing Laboratory      0-2-1**

*Prerequisites: Take one set: RED 090 and ENG 090, ENG 095, or appropriate placement test scores.*

*Corequisites: ENG 111*

This writing laboratory is designed to apply the skills introduced in ENG 111. Emphasis is placed on the editing and revision components of the writing process. Upon completion, students

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should be able to apply those skills in the production of final drafts in ENG 111. The computer is used as a writing and design tool for this course.

### **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. The computer is used as a writing and design tool for this course. 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: MAT 060 and MAT 070, MAT 060 and MAT 080, MAT 060 and MAT 090, MAT 095, MAT 120, MAT 121, MAT 161, MAT 171, MAT 175, or appropriate placement test scores.*  
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 simplification, evaluation, and solving of algebraic and radical functions; complex numbers; right triangle trigonometry; systems of equations; and the use of technology. Upon completion, students should be able to demonstrate an understanding of the use of mathematics and technology to solve problems and analyze and communicate results.

### **MAT 122 Algebra/Trigonometry II 2-2-3**

*Prerequisite: Take one: MAT 121, MAT 161, MAT 171, or MAT 175*  
This course extends the concepts covered in MAT 121 to include additional topics in algebra, function analysis, and trigonometry. Topics include exponential and logarithmic functions, translation and scaling of functions, Sine Law, Cosine Law, vectors and statistics. Upon completion, students should be able to demonstrate an understanding of the use of technology to solve problems and to analyze and communicate results.

### **NET 110 Networking Concepts 2-2-3**

This course introduces students to the networking field. Topics include network terminology and protocols, local-area networks, wide-area networks, OSI model, cabling, router programming, Ethernet, IP addressing, and network standards. Upon completion, students should be able to perform tasks related to networking mathematics, terminology, and models, media, Ethernet, subnetting, and TCP/IP Protocols.

### **NET 125 Networking Basics 1-4-3**

This course introduces the networking field. Emphasis is placed on network terminology and protocols, local-area networks, wide-area networks, OSI model, cabling, router programming, Ethernet, IP addressing, and network standards. Upon completion, students should be able to perform tasks related to networking mathematics, terminology, and models, media, Ethernet, subnetting, and TCP/IP Protocols.

### **NET 126 Routing Basics 1-4-3**

*Prerequisite: NET 125*

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 110 Operating System Concepts 2-3-3**

This course introduces students to a broad range of operating system concepts, including installation and maintenance. Emphasis is placed on operating system concepts, management, maintenance, and resources required. Upon completion of this course, students will have an understanding of OS concepts, installation, management, maintenance, using a variety of operating systems.

### **NOS 120 Linux/UNIX Single User 2-2-3**

*Prerequisite: NOS 110 or CET 211*

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**

*Prerequisite: NOS 110 or CET 211*

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**

*Local Prerequisite: ELN 132*

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: Take one: MAT 121, MAT 161, MAT 171, or MAT 175*

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 field.