

**Central Carolina Community College
Program Planning Guide**

Electronics Engineering Technology

Credential: Associate in Applied Science Degree in Electronics Engineering Technology (A40200)

This curriculum prepares individuals to become technicians who design, build, install, test, troubleshoot, repair, and modify developmental and production electronic components, equipment, and systems such as industrial/computer controls, manufacturing systems, telecommunication systems, and power electronic systems.

A broad-based core of courses, including basic electricity, solid-state fundamentals, digital concepts and microprocessors ensures the student will master the competencies necessary to perform entry-level tasks. Emphasis is placed on developing the student's ability to think, analyze, and troubleshoot.

Graduates will qualify for employment as engineering assistants or electronic technicians with job titles including electronic engineering associate, electronic engineering technician, field service technician, maintenance technician, electronic tester, electronic systems integrator, bench technician, and production control technician.

Program Length: 5 semesters

Career Pathway Options: Associate in Applied Science Degree in Electronics Engineering Technology

Program Sites: Lee Campus - Day Program

| Suggested Course Schedule: | HOURS | | | Grade | Semester | Notes |
|-----------------------------------|------------------------------------|------------|---------------|--------------|-----------------|--------------|
| | Class | Lab | Credit | | | |
| 1st Semester (Fall) | | | | | | |
| CIS 110 | Introduction to Computers | 2 | 2 | 3 | | |
| EGR 131 | Introduction 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 | | |
| 2nd Semester (Spring) | | | | | | |
| ELC 127 | Software for Technicians | 1 | 2 | 2 | | |
| ELN 131 | Electronic Devices | 3 | 3 | 4 | | |
| ELN 133 | Digital Electronics | 3 | 3 | 4 | | |
| MAT 122 | Algebra/Trigonometry II | 2 | 2 | 3 | | |
| PHY 131 | Physics – Mechanics | 3 | 2 | 4 | | |
| | | 12 | 12 | 17 | | |
| 3rd Semester (Summer) | | | | | | |
| ELN 132 | Linear IC Applications | 3 | 3 | 4 | | |
| PHY 133 | Physics – Sound and Light | 3 | 2 | 4 | | |
| | | 6 | 5 | 8 | | |
| 4th Semester (Fall) | | | | | | |
| CET 225 | Digital Signal Processing | 2 | 2 | 3 | | |
| ELN 232 | Introduction to Microprocessors | 3 | 3 | 4 | | |
| ELN 234 | Communication Systems | 3 | 3 | 4 | | |
| ENG 114 | Professional Research & Reporting | 3 | 0 | 3 | | |
| | Social/Behavioral Science Elective | 3 | 0 | 3 | | |
| | | 14 | 8 | 17 | | |
| 5th Semester (Spring) | | | | | | |
| ELN 247 | Electronic Applications Project | 1 | 3 | 2 | | |
| ELN 275 | Troubleshooting | 1 | 2 | 2 | | |
| ISC 221 | Statistical Quality Control | 3 | 0 | 3 | | |

Central Carolina Community College Program Planning Guide

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|------------------|-------------------------------|----|---|----|--|--|--|
| PCI 170 | DAQ and Control | 3 | 3 | 4 | | | |
| | Humanities/Fine Arts Elective | 3 | 0 | 3 | | | |
| <i>See Below</i> | Major Elective | | | 3 | | | |
| | | 11 | 8 | 17 | | | |

Major Elective Listing (select 3 SHC)

| | | | | | | | |
|---------|------------------------------------|---|---|---|--|--|--|
| CET 111 | Computer Upgrade/Repair I | 2 | 3 | 3 | | | |
| CSC 134 | C++ Programming | 2 | 3 | 3 | | | |
| CSC 151 | JAVA Programming | 2 | 3 | 3 | | | |
| DFT 151 | CAD I | 2 | 3 | 3 | | | |
| ELC 128 | Intro to Programmable Logic Contr. | 2 | 3 | 3 | | | |
| ELC 213 | Instrumentation | 3 | 2 | 4 | | | |
| ELN 236 | Fiber Optics & Lasers | 3 | 2 | 4 | | | |
| NET 110 | Networking Concepts | 2 | 2 | 3 | | | |
| NOS 110 | Operating Systems Concepts | 2 | 2 | 3 | | | |

Total Semester Hours Credit: 76

Course Descriptions Electronics Engineering:

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 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.

C-L-SHC

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 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.

DFT 151 CAD I 2-3-3

Local Prerequisite: DFT 111 or Instructor Approval

This course introduces CAD software as a drawing tool. Topics include drawing, editing, file management, and plotting. Upon completion, students should be able to produce and plot a CAD drawing.

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 127 Software for Technicians 1-3-2

This course introduces computer software which can be used to solve electrical/electronics problems. Topics include electrical/electronics calculations and applications. Upon completion, students should be able to utilize a personal computer for electrical/electronics-related applications.

ELC 128 Introduction to PLC 2-3-3

This course introduces the programmable logic controller (PLC) and its associated applications. Topics include ladder logic diagrams, input/output modules, power supplies, surge protection,

Central Carolina Community College Program Planning Guide

selection/installation of controllers, and interfacing of controllers with equipment. Upon completion, students should be able to install PLCs and create simple programs.

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.

ELC 213 Instrumentation 3-2-4

Local Prerequisite: ELC 111, ELC 112, or ELC 131

This course covers the fundamentals of instrumentation used in industry. Emphasis is placed on electric, electronic, and other instruments. Upon completion, students should be able to install, maintain, and calibrate instrumentation

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.

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 236 Fiber Optics and Lasers 3-2-4

This course introduces the fundamentals of fiber optics and lasers. Topics include the transmission of light; characteristics of fiber optic and lasers and their systems; fiber optic production; types of lasers; and laser safety. Upon completion, students should be able to understand fiber optic communications and basic laser fundamentals.

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 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.

Central Carolina Community College

Program Planning Guide

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.

ISC 221 Statistical Qual Control 3-0-3

This course covers the principles and techniques of statistical process control for the improvement of productivity. Emphasis is placed on basic statistics for quality control, organization and procedures for efficient quality control including inspections, process control, and tests of significance. Upon completion, students should be able to apply statistical principles and techniques to enhance production.

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.

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.

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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 fields.

PHY 133 Physics-Sound and Light 3-2-4

Prerequisite: PHY 131

This algebra/trigonometry-based course is a study of fundamental physical concepts as applied to engineering technology fields. Topics include systems of units, problem solving methods, graphical analysis, wave motion, sound, light, and modern physics. Upon completion, students should be able to apply the principles studied to applications in engineering technology fields.