Engineering Technologies

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 Main Campus - Day

Course Requirements for Computer Engineering Technology Degree

I. General Education Requirements (15 SHC)		C-L-SHC
ENG 111	Writing and Inquiry	3-0-3
Mathematics; take one course:		
MAT 121	Algebra/Trigonometry I	2-2-3
MAT 171	Precalculus Algebra	3-2-4
Humanities/Fine Arts Elective		3-0-3
Social/Behavioral Science Elective		3-0-3
Communications; Take one course		
ENG 112	Writing/Research in the Disciplines	3-0-3
ENG 114	Professional Research and Reporting	3-0-3
COM 231	Public Speaking	3-0-3

2. Major Requirements (25 SHC)		
ELC 131	Circuit Analysis I	3-3-4
ELN 131	Analog Electronics I	3-3-4
ELN 133	Digital Electronics	3-3-4
CTS 120	Hardware/Software Support	2-3-3
ELN 232	Introduction to Microprocessors	3-3-4
NOS 130	Windows Single User	2-2-3
Programming Elective; Take one course:		
CSC 121	Python Programming	2-3-3
CSC 134	C++ Programming	2-3-3
CSC 139	Visual BASIC Programming	2-3-3
CSC 151	JAVA Programming	2-3-3

III. Other Major Requirements (31 SHC)		
CET 225	Digital Signal Processing	2-2-3
CTI 120	Network and SEC Foundation	2-2-3
CTS 220	Adv. Hardware Software Support	2-3-3
EGR 131	Intro to Electronics Tech	1-2-2
ELC 131A	Circuit Analysis I Lab	0-3-1
ELN 132	Analog Electronics II	3-3-4
ELN 275	Troubleshooting	1-3-2
PCI 170	DAQ and Control	3-3-4
Take one PHY course from:		
PHY 131	Physics-Mechanics	3-2-4
PHY 151	College Physics I	3-2-4
Take one MAT course from:		
MAT 122	Algebra/Trigonometry II	2-2-3
MAT 172	Precalculus Trigonometry	3-2-4
Technical Elective; Take one course:		
CIS 110	Introduction to Computers	2-2-3
CSC 121	Python Programming	2-3-3
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

4. Other Requirements (1 SHC)		
Take one course:		
ACA 122	College Transfer Success	1-0-1

Total Semester Hours Credit Required for Graduation: 72

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 Main Campus - Day Program

Course Requirements for Electronics Engineering Technology Degree

1. General Education Requirements (15 SHC)		**C-L-SHC**
ENG 111	Writing and Inquiry	3-0-3
Mathematics; take one course:		
MAT 121	Algebra/Trigonometry I	2-2-3
MAT 171	Precalculus Algebra	3-2-4
Humanities/Fine Arts Elective		3-0-3
Social/Behavioral Science Elective		3-0-3
Communications; Take one course:		
ENG 112	Writing/Research in the Disciplines	3-0-3
ENG 114	Professional Research and Reporting	3-0-3
COM 231	Public Speaking	3-0-3

2. Major Requirements (24 SHC)		
ELC 131	Circuit Analysis I	3-3-4
ELN 131	Analog Electronics I	3-3-4
ELN 133	Digital Electronics	3-3-4
ELN 132	Analog Electronics II	3-3-4
ELN 232	Introduction to Microprocessors	3-3-4
ELN 234	Communication Systems	3-3-4

3. Other Major Requirements (34 SHC)		
CET 225	Digital Signal Processing	2-2-3
CIS 110	Introduction to Computers	2-2-3
EGR 131	Introduction to Electronics Tech.	1-2-2
ELC 131A	Circuit Analysis I Lab	0-3-1
ELN 247	Electronic Applications Project	1-3-2
ELN 275	Troubleshooting	1-3-2
ISC 221	Statistical Quality Control	3-0-3
PCI 170	DAQ and Control	3-3-4
Take two PHY course from:		
PHY 131	Physics-Mechanics	3-2-4
PHY 151	College Physics I	3-2-4
PHY 133	Physics-Sound & Light	3-2-4
PHY 152	College Physics II	3-2-4
Take one MAT course from:		
MAT 122	Algebra/Trigonometry II	2-2-3
MAT 172	Precalculus Trigonometry	3-2-4

Technical Elective; Take 3 SHC:3		
CSC 121	Python Programming	2-3-3
CSC 134	C++ Programming	2-3-3
CSC 151	JAVA Programming	2-3-3
CTI 120	Network and SEC Foundations	2-2-3
CTS 120	Hardware/Software Support	2-3-3
DFT 151	CAD I	2-3-3
ELC 128	Introduction to PLCs	2-3-3
ELN 236	Fiber Optics and Lasers	3-2-4
LEO 111	Lasers and Applications	1-3-2
NOS 130	Windows Single User	2-2-3

4. Other Required Hours (1 SHC)
Take one course:

ACA 122	College Transfer Success	1-0-1

Total Semester Hours Credit Required for Graduation: 74

Electronics Engineering Technology Credential: Certificate in Electronics Technology C40200

This curriculum prepares individuals to work as skilled assemblers, inspectors, or testers in consumer or industrial electronics environments. Work tasks include mounting, soldering, and wiring of electronics components, assembling sub-units, and final assembly and inspection of complete systems. Coursework includes basic electricity, mathematics, solid-state electronics, and basic assembly skills. Graduates should qualify for employment as an electronics assembler, electronics tester, or electronics inspector.

Program Length: 3 semesters
Career Pathway Options: Associate in Applied Science Degree in Electronics Engineering Technology , Certificate in Electronics Technology
Program Sites: Lee Main Campus - Day Program; Harnett Main Campus – Day Program

Course Requirements for Electronics Technology Certificate

1. General Education Requirements (3 SHC)		**C-L-SHC**
Mathematics; take one:		
MAT 121	Algebra/Trigonometry I	2-2-3
MAT 171	Precalculus Algebra	3-2-4

2. Major Requirements (12 SHC)		
ELC 131	Circuit Analysis I	3-3-4
ELN 131	Analog Electronics I	3-3-4
ELN 132	Analog Electronics II	3-3-4

3. Other Major Requirements (3 SHC)		
EGR 131	Introduction To Electronics Technology	1-2-2
ELC 131A	Circuit Analysis I Lab	0-3-1

Total Semester Hours Credit Required for Graduation: 18

Laser and Photonics Technology Credential: Associate in Applied Science Degree in Laser and Photonics Technology A40280

The Laser and Photonics Technology curriculum is designed to develop the practical knowledge and skills required to be a successful technician in business and industry. Coursework includes mathematics, science, communication, electronics and optics courses. An in-depth sequence of laboratory

learning experiences develops the hands-on skills needed for specifying, operating and maintaining laser and photonics-based systems.

Current and emerging job opportunities exist in the areas of fiber optic communications, materials processing, laser surgery, research and a variety of related areas. Program graduates often begin work as technicians in product testing, field service, product development or sales.

Program Length: 5 semesters
Career Pathway Options: Associate in Applied Science in Laser and Photonics Technology
Program Sites: Harnett Main Campus - Day Program

Course Requirements for Laser and Photonics Technology Degree

1. General Education Requirements (15 SHC)		**C-L-SHC**
ENG 111	Writing and Inquiry	3-0-3
Mathematics; take one course:		
MAT 121	Algebra/Trigonometry I	2-2-3
MAT 171	Precalculus Algebra	3-2-4
Humanities/Fine Arts Elective		3-0-3
Social/Behavioral Science Elective		3-0-3
Communication; Take one course:		
ENG 112	Writing/Research in the Disciplines	3-0-3
ENG 114	Professional Research and Reporting	3-0-3
COM 231	Public Speaking	3-0-3

2. Major Requirements (25 SHC)		
ELC 131	Circuit Analysis I	3-3-4
ELN 131	Analog Electronics I	3-3-4
ELN 133	Digital Electronics	3-3-4
LEO 111	Lasers and Applications	1-3-2
LEO 211	Photonics Technology	5-6-7
LEO 212	Photonics Applications	3-3-4

3. Other Major Requirements (34 SHC)		
CIS 110	Introduction to Computers	2-2-3
EGR 131	Introduction to Electronics Tech.	1-2-2
ELC 127	Software for Technicians	1-3-2
ELC 131A	Circuit Analysis I Lab	0-3-1
ELN 132	Analog Electronics II	3-3-4
ELN 232	Intro to Microprocessors	3-3-4
ELN 275	Troubleshooting	1-3-2
ISC 221	Statistical Quality Control	3-0-3
LEO 213	Advanced Photonics Applications	3-3-4
Take one PHY course from:		
PHY 131	Physics-Mechanics	3-2-4
PHY 151	College Physics I	3-2-4
Take one MAT course from:		
MAT 122	Algebra/Trigonometry II	2-2-3
MAT 172	Precalculus Trigonometry	3-2-4
Technical Elective, take 2 SHC from:		
WBL 111	Work-Based Learning I	0-10-1
WBL 121	Work-Based Learning II	0-10-1
WBL 122	Work-Based Learning II	0-20-2
LEO 222	Photonics Applications Project	1-3-2

4. Other Requirements (1 SHC)		
Take one course:		
ACA 122	College Transfer Success	1-0-1

Total Semester Hours Credit Required for Graduation: 75

Mechanical Engineering Technology Credential: Associate in Applied Science in Mechanical Engineering Technology A40320

A course of study that prepares the students to use basic engineering principles and technical skills to design, develop, test, and troubleshoot projects involving mechanical systems. Includes instruction in principles of mechanics, applications to specific engineering systems, design testing procedures, prototype and operational testing and inspection procedures, manufacturing system-testing procedures, test equipment operation and maintenance, computer applications, critical thinking, planning and problem solving, and oral and written communications. Graduates of the curriculum will find employment opportunities in the manufacturing or service sectors of engineering technology. Engineering technicians may obtain professional certification by application to organizations such as ASQC, SME, and NICET.

Program Length: 5 semesters
Program Location: Lee Main Campus, Day

Course Requirements for Mechanical Engineering Technology Degree:

1. General Education (15 SHC)		C-L-SHC
ENG 111	Writing & Inquiry	3-0-3
Communications – Take one course:		
COM-110	Introduction to Communications	3-0-3
COM 120	Intro Interpersonal Com	3-0-3
COM 231	Public Speaking	3-0-3
ENG 112	Writing/Research in the Disc	3-0-3
ENG 114	Prof Research & Reporting	3-0-3
ENG 115	Oral Communication	3-0-3
ENG 116	Technical Report Writing	3-0-3
Mathematics – Take one course:		
MAT 121	Algebra/Trigonometry I	2-2-3
MAT 171	Precalculus Algebra	3-2-4
Humanities/Fine Arts requirement		3-0-3
Social/Behavioral Science Requirement		3-0-3

2. Major Requirements (24 SHC)		
DFT 151	CAD I	2-3-3
DFT 154	Intro to Solid Modeling	2-3-3
EGR 250	Statics/Strength of Mater	4-3-5
HYD 110	Hydraulics/Pneumatics I	2-3-3
MEC 161	Manufacturing Processes I	3-0-3
MEC 180	Engineering Materials	2-3-3

Physics – Take one course:

PHY 131	Physics-Mechanics	3-2-4
PHY 151	College Physics I	3-2-4

3. Other Major Requirements (31 SHC)

CIS 110	Introduction to Computers	2-2-3
DDF 211	Design Process I	1-6-4
DDF 212	Design Process II	1-6-4
DFT 152	CAD II	2-3-3
DFT 153	CAD III	2-3-3
DFT 254	Intermed Solid Model/Render	2-3-3
EGR 285	Design Project	0-4-2
MEC 111	Machine Processes I	1-4-3
MEC 275	Engineering Mechanisms	2-2-3

Mathematics – Take one course:

MAT 122	Algebra/Trigonometry II	2-2-3
MAT 172	Precalculus Trigonometry	3-2-4

4. Other Requirements (1 SHC)

ACA 122	College Transfer Success	1-0-1

Total Semester Hours Credit required for graduation: 71

Mechanical Engineering Technology Credential: Certificate in Mechanical Engineering Technology C40320

A course of study that prepares the students to use basic engineering principles and technical skills to design, develop, test, and troubleshoot projects involving mechanical systems. Includes instruction in principles of mechanics, applications to specific engineering systems, design testing procedures, prototype and operational testing and inspection procedures, manufacturing system-testing procedures, test equipment operation and maintenance, computer applications, critical thinking, planning and problem solving, and oral and written communications. Graduates of the curriculum will find employment opportunities in the manufacturing or service sectors of engineering technology. Engineering technicians may obtain professional certification by application to organizations such as ASQC, SME, and NICET.

Program Length: 2 semesters
Program Location: Lee Main Campus

Course Requirements for Mechanical Engineering Technology Certificate:

1. General Education (0 SHC)

2. Major Requirements (6 SHC)

DFT-151	CAD I	2-3-3
DFT-154	Intro to Solid Modeling	2-3-3

3. Other Major Requirements (10 SHC)

DDF-211	Design Process I	1-6-4
MEC-111	Machine Processes I	1-4-3
DFT-152	CAD II	2-3-3

Total Semester Hours Credit required for graduation: 16

Mechanical Engineering Technology Credential: Certificate in Mechanical Engineering Technology, Engineering Graphics C40320EG

A course of study that prepares the students to use basic engineering principles and technical skills to design, develop, test, and troubleshoot projects involving mechanical systems. Includes instruction in principles of mechanics, applications to specific engineering systems, design testing procedures, prototype and operational testing and inspection procedures, manufacturing system-testing procedures, test equipment operation and maintenance, computer applications, critical thinking, planning and problem solving, and oral and written communications. Graduates of the curriculum will find employment opportunities in the manufacturing or service sectors of engineering technology. Engineering technicians may obtain professional certification by application to organizations such as ASQC, SME, and NICET.

Program Length: 4 semesters
Program Location: Lee Main Campus

Course Requirements for Mechanical Engineering Technology, Engineering Graphics Certificate:

1. General Education (0 SHC)

2. Major Requirements (3 SHC)

DFT-154	Intro to Solid Modeling	2-3-3

3. Other Major Requirements (10 SHC)

DFT-153	CAD III	2-3-3
DDF-211	Design Process I	1-6-4
DFT-254	Intermed Solid Model/Render	2-3-3

Total Semester Hours Credit required for graduation: 13

Sustainability Technologies Credential: Associate in Applied Science Degree in Sustainability Technologies A40370

The Sustainability Technologies curriculum is designed to prepare individuals for employment in environmental, construction, alternative energy, manufacturing, or related industries, where key emphasis is placed on energy production and waste reduction along with sustainable technologies.

Course work may include alternative energy, environmental engineering technology, sustainable manufacturing and green building technology. Additional topics may include sustainability, energy management, waste reduction,

renewable energy, site assessment, and environmental responsibility.

Graduates should qualify for positions within the alternative energy, construction, environmental, and/or manufacturing industries. Employment opportunities exist in both the government and private industry sectors where graduates may function as manufacturing technicians, sustainability consultants, environmental technicians, or green building supervisors.

Program Length: 5 semesters
Career Pathway Options: Associate in Applied Science in Sustainability Technologies
Program sites: Chatham Main Campus

Course Requirements for Sustainability Technologies Degree

1. General Education Requirements (15 SHC)		C-L-SHC
ENG 111	Writing and Inquiry	3-0-3
Humanities/Fine Arts Elective		3-0-3
Social/Behavioral Science Elective		3-0-3
Communications - Take one course:		
ENG 112	Writing/Research in the Disc	3-0-3
ENG 114	Professional Research and Reporting	3-0-3
COM 110	Introduction to Communication	3-0-3
Mathematics; Take one course:		
MAT 121	Algebra/Trigonometry I	2-2-3
MAT 171	Precalculus Algebra	3-2-4

2. Major Requirements (12 SHC)		
BIO 140	Environmental Biology	3-0-3
SST 110	Intro to Sustainability	3-0-3
SST 120	Energy Use Analysis	2-2-3
SST 210	Issues in Sustainability	3-0-3

3. Concentration Requirements (12 SHC)		
ALT 120	Renewable Energy Tech	2-2-3
ALT 250	Thermal Systems	2-2-3
ELC 220	Photovoltaic Systems Tech	2-3-3
SST 130	Modeling Renewable Energy	2-2-3

4. Other Major Requirements (29 SHC)		
ARC 111	Intro to Arch Technology	1-6-3
BIO 140A	Environmental Biology Lab	3-3-4
CIS 110	Introduction to computers	2-2-3
CST 111	Construction I	3-3-4
CST 112	Construction II	3-3-4
CST 150	Building Science	2-2-3
ELC 111	Introduction to Electricity	2-2-3
ISC 110	Workplace Safety	1-0-1
SST 140	Green Building Design and Concepts	3-0-3
Take one course from:		
SST 250	Sustain Capstone Project	1-6-3
WBL 111	Work-Based Learning I	0-10-1
Technical Electives, take 3 SHC from:		
ALT 110	Biofuels I	3-0-3
ALT 210	Biofuels II	3-2-4
ALT 211	Biofuels Analytics	2-4-4
ELC 221	Adv PV Sys Designs	2-3-3
MNT 230	Pumps and Piping Systems	1-3-2
BUS 280	REAL Small Business	4-0-4
AGR 139	Intro to Sustainable Ag	3-0-3

5. Other Requirements (1 SHC)		
Take one course:		
ACA 122	College Transfer Success	1-0-1

Total Semester Hours Credit Required for Graduation: 69

Sustainability Technologies Credential: Sustainability Certificate in Sustainability Technologies C40370S

The Sustainability Technologies certificate is designed to prepare individuals for employment in environmental, construction, alternative energy, and other industries, where key emphasis is placed on energy analysis and waste reduction along with sustainable technologies.

Course includes renewable energy, sustainability measures and green building technology. Additional topics may include green certification programs, energy management, green building design, renewable energy options, and environmental responsibility.

Graduates should qualify for positions within the construction, renewable energy or sustainability field. Employment opportunities exist in both the government and private industry sectors where graduates may function as sustainability consultants, energy analysts, or entry level green building and renewable energy technicians.

Program Length: 3 semesters
Career Pathway Options: Associate in Applied Science in Sustainability Technologies
Program sites: Chatham Main Campus

Course Requirements for Sustainability Certificate

1. Major Requirements (12 SHC)		C-L-SHC
ALT 120	Renewable Energy Tech	2-2-3
SST 110	Intro to Sustainability	3-0-3
SST 120	Energy Use Analysis	2-2-3
SST 210	Issues in Sustainability	3-0-3

2. Other Major Requirements (3 SHC)		
SST 140	Green Building Design and Concepts	3-0-3

Total Semester Hours Credit Required for Graduation: 15

Sustainability Technologies Credential: Green Building Certificate in Sustainability Technologies C40370GB

The Green Building certificate is designed to prepare individuals for employment in construction where key emphasis is placed on sustainable building and design and green building certification programs.

Coursework will include an introduction to sustainability as well as trade specific classes in green building. Graduates should quality for positions within the construction and green certification industries. Some courses include testing options for industry recognized certificates.

Employment opportunities exist in both government and private industry sectors where graduates may function as sustainability consultants, green building technicians, or weatherization technicians.

Program Length: 3 semesters
Career Pathway Options: Associate in Applied Science in Sustainability Technology
Program Sites: Chatham Main Campus

Course Requirements for Green Building Certificate

1. Major Requirements (3 SHC)		
SST 120	Energy Use Analysis	2-2-3
2. Concentration Requirements (3 SHC)		
SST 130	Modeling Renewable Energy	2-2-3
3. Other Major Requirements (12 SHC)		
CST 111	Construction I	3-3-4
CST 112	Construction II	3-3-4
CST 150	Building Science	2-2-3
ISC 110	Workplace Safety	1-0-1

Total Semester Hours Credit required for Graduation: 18

Sustainability Technologies Credential: Biofuels Certificate in Sustainability Technologies C40370B

This program is designed to equip students with the skills needed to attain a technical position in the biofuels industry.

Students learn the fundamentals of biofuels as well as laboratory and mechanical skills need to conduct quality control testing and diagnose biofuels related problems.

Upon completion of the certificate students will be employable in a variety of biofuels markets, including fuel production, analysis, marketing, and distribution.

Program Length: 2 semesters
Career Pathway Options: Associate in Applied Science in Sustainability Technologies
Program sites: Chatham Main Campus

Course Requirements for Biofuels Certificate:

1. Major Requirements (3 SHC)		
ALT 120	Renewable Energy Tech	2-2-3
2. Other Major Requirements (13 SHC)		
ALT 110	Biofuels I	3-0-3
ALT 210	Biofuels II	3-2-4
ALT 211	Biofuels Analytics	2-4-4
MNT 230	Pumps and Piping	1-3-2

Total Semester Hours Credit Required for Graduation: 16

Sustainability Technologies Credential: Renewable Energy Certificate in Sustainability Technologies C40370RE

The Renewable Energy certificate is designed to prepare individuals for employment in renewable energy, or related industries, where key emphasis is placed on energy production along with sustainable technologies.

Coursework includes an introduction to sustainability as well as trade specific classes in renewable energy. Some courses include testing options for industry recognized certificates.

Graduates should qualify for positions within the renewable energy, construction, or environmental industries. Employment opportunities exist in both the government and private industry sectors where graduates may function as PV, solar thermal, or biofuels technicians.

Program Length: 2 semesters
Career Pathway Options: Associate in Applied Science in Sustainability Technologies
Program Sites: Chatham Main Campus

Course Requirements for Renewable Energy Certificate

I. Major Requirements (12 SHC)		C-L-SHC
ALT 120	Renewable Energy Tech	2-2-3
ALT 250	Thermal Systems	2-2-3
ELC 220	Photovoltaic Systems Technology	2-3-3
SST 130	Modeling Renewable Energy	2-2-3
2. Other Major Requirements (6 SHC)		
ALT 110	Biofuels I	3-0-3
ELC 111	Intro to Electricity	2-2-3

Total Semester Hours Credit required for Graduation: 18