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. Course work 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 Campus - Day Program

**Course Requirements for Laser and Photonics Technology Degree**

**I. General Education Academic Core (15 SHC)**  
C-L-SHC

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 111</td>
<td>Writing and Inquiry</td>
</tr>
<tr>
<td>MAT 121</td>
<td>Algebra/Trigonometry I</td>
</tr>
<tr>
<td>*Communication Elective</td>
<td>3-0-3</td>
</tr>
<tr>
<td>Humanities/Fine Arts Elective</td>
<td>3-0-3</td>
</tr>
<tr>
<td>Social/Behavioral Science Elective</td>
<td>3-0-3</td>
</tr>
</tbody>
</table>

**II. Major Hours (59 SHC)**

A. Core (12 SHC)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELC 131</td>
<td>Circuit Analysis I</td>
</tr>
<tr>
<td>ELN 131</td>
<td>Analog Electronics I</td>
</tr>
<tr>
<td>ELN 133</td>
<td>Digital Electronics</td>
</tr>
</tbody>
</table>

B. Program Major (13 SHC)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEO 111</td>
<td>Lasers and Applications</td>
</tr>
<tr>
<td>LEO 211</td>
<td>Photonics Technology</td>
</tr>
<tr>
<td>LEO 212</td>
<td>Photonics Applications</td>
</tr>
</tbody>
</table>

C. Other Major Hours Required for Graduation (34 SHC)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 110</td>
<td>Introduction to Computers</td>
</tr>
<tr>
<td>EGR 131</td>
<td>Introduction to Electronics Tech.</td>
</tr>
<tr>
<td>ELC 127</td>
<td>Software for Technicians</td>
</tr>
<tr>
<td>ELC 131A</td>
<td>Circuit Analysis I Lab</td>
</tr>
<tr>
<td>ELN 132</td>
<td>Analog Electronics II</td>
</tr>
<tr>
<td>ELN 232</td>
<td>Intro to Microprocessors</td>
</tr>
<tr>
<td>ELN 275</td>
<td>Troubleshooting</td>
</tr>
<tr>
<td>ISC 221</td>
<td>Statistical Quality Control</td>
</tr>
</tbody>
</table>

**III. Other Required Hours (1 SHC)**

Choose one course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA 111</td>
<td>College Student Success</td>
</tr>
<tr>
<td>ACA 115</td>
<td>Success and Study Skills</td>
</tr>
<tr>
<td>ACA 122</td>
<td>College Transfer Success</td>
</tr>
</tbody>
</table>

Total Semester Hours Required for Graduation: 75

*Communications Electives (Choose 3 SHC)

<table>
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<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 112</td>
<td>Writing/Research in the Disciplines</td>
</tr>
<tr>
<td>ENG 114</td>
<td>Professional Research and Reporting</td>
</tr>
<tr>
<td>COM 231</td>
<td>Public Speaking</td>
</tr>
</tbody>
</table>

**Technical Electives (Choose 2 SHC)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBL 111</td>
<td>Work-Based Learning I</td>
</tr>
<tr>
<td>WBL 121</td>
<td>Work-Based Learning II</td>
</tr>
<tr>
<td>WBL 122</td>
<td>Work-Based Learning II</td>
</tr>
<tr>
<td>LEO 222</td>
<td>Photonics Applications Project</td>
</tr>
</tbody>
</table>

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: Pittsboro Campus

**Course Requirements for Sustainability Technologies Degree**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEO 213</td>
<td>Advanced Photonics Applications</td>
</tr>
<tr>
<td>MAT 122</td>
<td>Algebra/Trigonometry II</td>
</tr>
<tr>
<td>PHY 131</td>
<td>Physics - Mechanics</td>
</tr>
<tr>
<td><strong>Technical Elective</strong></td>
<td>2</td>
</tr>
</tbody>
</table>

Total Semester Hours Required for Graduation: 75

*Communications Electives (Choose 3 SHC)

<table>
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<td>LEO 222</td>
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A. General Education Courses (15 SHC)  

ENG 111 Writing and Inquiry 3-0-3  
*ENG 114 Professional Research and Reporting 3-0-3  
Humanities/Fine Arts Elective 3-0-3  
**MAT 121 Algebra/Trigonometry I 2-2-3  
Social/Behavioral Science Elective 3-0-3  

*Students may substitute ENG 113.  
**Students may substitute MAT 171

B. Required Major Core Courses (13 SHC)  

BIO 140 Environmental Biology 3-0-3  
BIO 140A Environmental Biology Lab 0-3-1  
SST 110 Intro to Sustainability 3-0-3  
SST 120 Energy Use Analysis 2-2-3  
SST 210 Issues in Sustainability 3-0-3  

C. Other Major Hours Required (36/38 SHC)  

ALT 120 Renewable Energy Tech 2-2-3  
ALT 250 Thermal Systems 2-2-3  
ARC 111 Intro to Arch Technology 1-6-3  
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  
ELC 220 Photovoltaic Systems Tech 2-2-3  
SST 130 Modeling Renewable Energy 2-2-3  
SST 140 Green Building Design and Concepts 3-0-3  
SST 250 Sustain Capstone Project 1-6-3  
- or -  
WBL 111 Work-Based Learning 0-10-1  

Student Success – Select One  
ACA 111 College Student Success 1-0-1  
ACA 115 Success and Study Skills 0-2-1  
ACA 122 College Transfer Success 1-0-1  

Technical Electives (Select minimum 3 hours)  

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  

Total Semester Hours Credit Required for Graduation: 68/70

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: 2 semesters  
Career Pathway Options: Associate in Applied Science in Sustainability Technologies  
Program Sites: Pittsboro Campus

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 qualify 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: 2 semesters  
Career Pathway Options: Associate in Applied Science in Sustainability Technology  
Program Sites: Pittsboro Campus
Course Requirements for Green Building Certificate
Required Courses (17 SHC)
ARC 111 Intro to Arch Technology 1-6-3
CST 111 Construction I 3-3-4
CST 112 Construction II 3-3-4
CST 150 Building Science 2-2-3
SST 140 Green Building & Designs Concepts 3-0-3

Total Semester Hours Credit Required for Graduation: 17

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: Pittsboro Campus

Course Requirements for Biofuels Certificate:
Required Major Core Courses (16 SHC)
ALT 120 Renewable Energy Tech 2-2-3
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: Pittsboro Campus

Course Requirements for Renewable Energy Certificate
ALT 110 Biofuels I 3-0-3
ALT 120 Renewable Energy Tech 2-2-3
ALT 250 Thermal Systems 2-2-3
ELC 111 Intro to Electricity 2-2-3
ELC 220 Photovoltaic Systems Technology 2-3-3
SST 130 Modeling Renewable Energy 2-2-3

Total Semester Hours Credit Required for Graduation: 18

Industrial Technologies
Computer Aided Drafting Technology
Credential: Associate in Applied Science Degree in Computer-Aided Drafting Technology A50150
The Computer Aided Drafting Technology curriculum prepares graduates for employment as drafters or designers in a wide range of fields including mechanical and manufacturing engineering. Computer aided drafters and designers assist in the design and development of manufactured products.

This course-of-study prepares students to apply technical skills and advanced computer software and hardware to develop plans and related documentation, and manage the hardware and software of a CAD system. It includes instruction in architectural drafting, computer-aided-drafting (CAD), creating and managing two and three-dimensional models, and linking CAD documents to other software applications and operating systems.

In addition to coursework in computer aided drafting, students will study computer applications, machining, design, planning and problem solving, as well as oral and written communication.

Graduates of the curriculum should qualify for CAD jobs in architectural and engineering consulting firms and industrial design businesses.

Program Length: 5 semesters
Career Pathway Options: Associate in Applied Science in Computer-Aided Drafting Technology