

# Sustainability Technologies

The Sustainability Technologies curriculum is designed to prepare individuals for employment in solar energy installation and design, renewable energy, energy management, sustainable construction, corporate sustainability, environmental monitoring, and related industries. Major emphasis is placed on minimizing impact on the natural environment while increasing social capital, and promoting sustainable economics.

Course work includes: environmental monitoring, solar technologies, green building practices, energy auditing and management, safety, problem solving, and landscape analysis. Computer application addresses the construction, modeling and analysis of specific scenarios relating to creating a sustainable environment.

Graduates should qualify for numerous positions within the solar energy, renewable energy, green building, energy management, design, and engineering industry. Employment opportunities include, but are not limited to, the following: solar energy technicians, solar energy designers, sustainability technicians, energy auditors, environmental engineering technicians, construction management and renewable energy specialists.

For specific information about potential positions and wages in Sustainability Technologies employment, visit the Central Piedmont Career Coach (<https://cpcc.emsicc.com/programs/sustainability-technologies-academic-program-for-credit/198260?radius=&region=50%20Mile%20Radius>) website.

## Sustainability Technologies (A40370)

### Degree Awarded

The Associate in Applied Science degree – Sustainability Technologies is awarded by the college upon completion of this program.

### Admissions

- A high school diploma or equivalent is required.
- Central Piedmont placement tests are required in English and mathematics. Developmental classes in mathematics and English courses are available for students to build basic skills and knowledge.
- Counseling and orientation appointments follow placement testing.
- Students should see a faculty advisor before registration.
- Many courses have prerequisites or co-requisites; check the Courses section for details.

### Note

Students who do not take program-related courses for a one-year period must re-enter the program under requirements of the college catalog in effect at the time of re-entry.

### Contact Information

Sustainability Technologies is in the Science Division. For more information, contact the Program Chair, Matt Miller, at 704.330.6836 or visit the Sustainability Technologies (<http://www.cpcc.edu/science/sustainability-technologies>) page on the Science (<http://www.cpcc.edu/science>) website.

### General Education Requirements

ENG 111	Writing and Inquiry	3.0
COM 110	Introduction to Communication	3.0
or COM 231	Public Speaking	

Select 3 credits from the following courses: 3.0

ENG 112	Writing and Research in the Disciplines	
ENG 113	Literature-Based Research	
ENG 114	Professional Research & Reporting	

Select one of the following: 3.0

MAT 121	Algebra/Trigonometry I	
MAT 171	Precalculus Algebra	
MAT 271	Calculus I	

Select 3 credits from the following courses: 3.0

ECO 251	Principles of Microeconomics	
ECO 252	Principles of Macroeconomics	

HIS 111 World Civilizations I

HIS 112 World Civilizations II

HIS 131 American History I

HIS 132 American History II

POL 120 American Government

PSY 150 General Psychology

SOC 210 Introduction to Sociology

Select 3 credits of the following: 3.0

ART 111 Art Appreciation

ART 114 Art History Survey I

ART 115 Art History Survey II

HUM 120 Cultural Studies

HUM 130 Myth in Human Culture

MUS 110 Music Appreciation

MUS 112 Introduction to Jazz

PHI 215 Philosophical Issues

PHI 240 Introduction to Ethics

REL 110 World Religions

### Major Requirements

ENV 110 Environmental Science 3.0

SST 110 Introduction to Sustainability 3.0

SST 120 Energy Use Analysis 3.0

SST 210 Issues in Sustainability 3.0

ENV 110A Environmental Science Laboratory 1.0

ENV 226 Environmental Law 3.0

ARC 114 Architectural CAD 2.0

SST 250 Sustainability Capstone Project 3.0

ARC 225 Architectural Building Information Modeling I 2.0

PHY 110 Conceptual Physics 3.0

PHY 110A Conceptual Physics Lab 1.0

LID 111 Low Impact Development Design Principles 3.0

or ELC 111 Introduction to Electricity

### Energy/Bldng Track

Complete one of two groups (See below) 12.0

### Technical Electives

Select 7 credits from the following: 7.0

SST 140 Green Building and Design Concepts

ARC 111	Introduction to Architectural Technology
BUS 139	Entrepreneurship I
BUS 230	Small Business Management
WBL 112	Work-Based Learning I
WBL 122	Work-Based Learning II
ENV 120	Earth Science
GEO 131	Physical Geography I
GEO 111	World Regional Geography
GEL 120	Physical Geology
GEL 230	Environmental Geology
ALT 110	Biofuels I
ARC 112	Construction Materials & Methods
CIV 230	Construction Estimating
LAR 120	Sustainable Development
LAR 111	Introduction to Landscape Architecture Technology
LAR 113	Residential Landscape Design
EGR 120	Engineering and Design Graphics
MEC 111	Machine Processes I
MEC 161	Manufacturing Processes I
MEC 180	Engineering Materials
BIO 140	Environmental Biology
BIO 140A	Environmental Biology Lab
CHM 131	Introduction to Chemistry
CHM 131A	Introduction to Chemistry Lab
CHM 132	Organic and Biochemistry
SRV 111	Surveying II
AHR 111	HVACR Electricity
AHR 112	Heating Technology
AHR 113	Comfort Cooling
ELC 112	DC/AC Electricity
ELC 113	Residential Wiring
ELC 118	National Electrical Code
BPR 130	Print Reading-Construction
CMT 214	Planning and Scheduling
CMT 216	Costs and Productivity
ARC 111	Introduction to Architectural Technology
ARC 210	Intro to Sustain Design
ARC 230	Environmental Systems
CAR 110	Introduction to Carpentry
CAR 114	Residential Building Codes
CIV 111	Soils and Foundations
DBA 110	Database Concepts
ENV 218	Environmental Health
ENV 224	Land Resource Management
GIS 121	Georeferencing & Mapping
MEC 275	Engineering Mechanisms
PHY 131	Physics-Mechanics
PHY 132	Physics-Electricity & Magnetism
SRV 110	Surveying I
CMT 210	Construction Management Fundamentals
BPR 130	Print Reading-Construction
SRV 210	Surveying III

ELC 221	Advanced Photovoltaic System Designs
CEG 210	Construction Materials & Methods
CEG 230	Subdivision Planning & Design
CEG 212	Introduction to Environmental Technology
ELC 220	Photovoltaic System Technology
ELC 230	Wind and Hydro Power Systems
EGR 250	Statics/Strength of Mater
CEG 211	Hydrology & Erosion Control
MEC 275	Engineering Mechanisms
GIS 111	Introduction to GIS
GIS 240	Air Photo Interpretation
GIS 249	Remote Sensing
GIS 125	CAD for GIS
BIO 111	General Biology I
<hr/>	
Total Credits	67

## Energy/Bldg Tracks

### Group 1

ALT 120	Renewable Energy Technologies	3.0
SST 130	Modeling Renewable Energy	3.0
ALT 250	Thermal Systems	3.0
ELC 220	Photovoltaic System Technology	3.0
<hr/>		
Total Credits		12

### Group 2

CST 111	Construction I	4.0
CST 150	Building Science	3.0
CMT 120	Codes and Inspections	3.0
SST 140	Green Building and Design Concepts	3.0
<hr/>		
Total Credits		13

**No diplomas are offered in Sustainability Technologies.**

## Sustainability Technology Certificates (C40370)

- Sustainability Technologies Certificate – Specialization in Renewable Energy (C40370-C1) (p. 2)
- Sustainability Technologies Certificate – Specialization in Energy and the Environment (C40370-C5) (p. 2)

## Sustainability Technologies Certificate – Specialization in Renewable Energy (C40370-C1)

### Major Requirements

SST 110	Introduction to Sustainability	3.0
SST 120	Energy Use Analysis	3.0
SST 130	Modeling Renewable Energy	3.0
ELC 220	Photovoltaic System Technology	3.0
ALT 120	Renewable Energy Technologies	3.0
<hr/>		
Total Credits		15

## Sustainability Technologies Certificate – Specialization in Energy and the Environment (C40370-C5)

### Major Requirements

SST 110	Introduction to Sustainability	3.0
SST 120	Energy Use Analysis	3.0
ALT 120	Renewable Energy Technologies	3.0
ENV 110	Environmental Science	3.0
ENV 110A	Environmental Science Laboratory	1.0
ENV 226	Environmental Law	3.0
Total Credits		16

### **SST 110. Introduction to Sustainability. 3.0 Credits.** Class-3.0.

Clinical-0.0. Lab-0.0. Work-0.0

This course introduces sustainability issues and individual contributions toward environmental sustainability. Topics include management processes needed to maximize renewable/non-renewable energy resources, economics of sustainability, and reduction of environmental impacts. Upon completion, students should be able to discuss sustainability practices and demonstrate an understanding of their effectiveness and impacts.

### **SST 120. Energy Use Analysis. 3.0 Credits.** Class-2.0. Clinical-0.0.

Lab-2.0. Work-0.0

This course introduces the principles of analyzing energy use, energy auditing tools and techniques, conservation techniques, and calculating energy savings. Topics include building system control theory, calibrating digital controls, energy loss calculations, and applicable conservation techniques. Upon completion, students should be able to demonstrate an understanding of energy use, audits, and controls in the analysis of energy consumption.

### **SST 130. Modeling Renewable Energy. 3.0 Credits.** Class-2.0.

Clinical-0.0. Lab-2.0. Work-0.0

This course introduces software and other technologies used for modeling renewable energy systems. Topics include renewable energy modeling software applications, data analysis, renewable energy sources, and cost of renewable energy systems. Upon completion, students should be able to use appropriate technology to model the effectiveness of renewable energy systems.

### **SST 140. Green Building and Design Concepts. 3.0 Credits.** Class-3.0.

Clinical-0.0. Lab-0.0. Work-0.0

This course is designed to introduce the student to sustainable building design and construction principles and practices. Topics include sustainable building rating systems and certifications, energy efficiency, indoor environmental quality, sustainable building materials and water use. Upon completion, students should be able to identify the principles and practices of sustainable building design and construction.

### **SST 210. Issues in Sustainability. 3.0 Credits.** Class-3.0. Clinical-0.0.

Lab-0.0. Work-0.0

This course introduces the long-term impacts and difficulties of applying sustainability concepts in an organization, business, or society. Topics include the application of sustainable technologies and the analysis of affordability, efficiencies, recycling, and small and large-scale design. Upon completion, students should be able to recognize the possible limitations of sustainable technologies and be prepared to reconcile such conflicts.

Prerequisites: Take SST 110

### **SST 250. Sustainability Capstone Project. 3.0 Credits.** Class-1.0.

Clinical-0.0. Lab-6.0. Work-0.0

This course introduces an integrated team approach to a sustainability topic of interest to students, faculty, or professional community. Topics include problem identification, proposal preparation, conceptual design, and an effective project work schedule. Upon completion, students should be able to integrate the many facets of a topic based on environmental sustainability into a completed project.

Prerequisites: Take SST 110