

Program Planning Guide

Sustainability Technologies, Associate in Applied Science (A40370)

Program Length: 5 semesters

Career Pathway Options: Associate in Applied Science in Sustainability Technologies

Program Site/s: Chatham Main Campus

Suggested Course Schedule:

		Hours				Notes:
		Class	Lab	Clinical	Credit	
1st Semester (Fall)						
ACA	Student Success Course	1	0	0	1	
ALT 120	Renewable Energy Tech	2	2	0	3	
ELC 111	Intro to Electricity	2	2	0	3	
MAT 121	Algebra/Trigonometry I	2	2	0	3	
SST 110	Intro to Sustainability	3	0	0	3	
SST 120	Energy Use Analysis	2	2	0	3	
		12	8	0	16	

2nd Semester (Spring)

ALT 250	Thermal Systems	2	2	0	3	
ARC 111	Intro to Arch Technology	1	6	0	3	
CIS 110	Introduction to Computers	2	2	0	3	
CST 150	Building Science	2	2	0	3	
ELC 220	Photovoltaic Sys Tech	2	3	0	3	
SST 210	Issues to Sustainability	3	0	0	3	
		12	15	0	18	

3rd Semester (Summer)

SST 140	Green Building Design & Concepts	3	0	0	3	
SST 250 OR	Sustain Capstone Project	1	6	0	3	
WBL 111	Work-based Learning I	0	10	0	1	
		3/4	6/10	0	4/6	

4th Semester (Fall)

BIO 140	Environmental Biology	3	0	0	3	
BIO 140A	Environmental Biology Lab	0	3	0	1	
CST 111	Construction I	3	3	0	4	
ISC 110	Workplace Safety	1	0	0	1	
ENG 111	Writing & Inquiry	3	0	0	3	
	Social/Behavior Science Elective	3	0	0	3	
		13	6	0	15	

5th Semester (Spring)

CST 112	Construction II	3	3	0	4	
ENG 114	Professional Research & Reporting	3	0	0	3	
SST 130	Modeling Renewable Energy	2	2	0	3	
	Humanities/Fine Arts Elective	3	0	0	3	
	Technical Elective	3	0	0	3	
		14	5	0	16	

Technical Electives (Select a minimum of 3 SHC)						
AGR 139	Intro to Sustainable Ag	3	0	0	3	
ALT 110	Biofuels I	3	0	0	3	
ALT 210	Biofuels II	3	2	0	4	
ALT 211	Biofuels Analytics	2	4	0	4	
BUS 280	REAL Small Business	4	0	0	4	
ELC 221	Adv PV Sys Designs	2	3	0	3	
MNT 230	Pumps and Piping	1	3	0	2	

Total Semester Hours Credit Required for Graduation: 69/71

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Course Descriptions

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ACA 122 College Transfer Success 0-2-1

This course provides information and strategies necessary to develop clear academic and professional goals beyond the community college experience. Topics include the CAA, college policies and culture, career exploration, gathering information on senior institutions, strategic planning, critical thinking, and communications skills for a successful academic transition. Upon completion, students should be able to develop an academic plan to transition successfully to senior institutions. This course has been approved for transfer under the CAA and ICAA as a premajor and/or elective course requirement.

AGR 139 Intro to Sustainable Ag 3-0-3

This course will provide students with a clear perspective on the principles, history, and practices of sustainable agriculture in our local and global communities. Students will be introduced to the economic, environmental, and social impacts of agriculture. Upon completion, students should be able to identify the principles of sustainable agriculture as they relate to basic production practices.

ALT 110 Biofuels I 3-0-3

This course is designed to provide an introduction to the fundamentals of bio-based fuels. Emphasis is placed on proper handling and use guidelines, basic chemistry of biofuels, production methods, and the social, environmental, and economic impacts of biofuels. Upon completion, students should be able to demonstrate a general understanding of biofuels.

ALT 120 Renewable Energy Tech 2-2-3

This course provides an introduction to multiple technologies that allow for the production and/or conservation of energy from renewable sources. Topics will include hydroelectric, wind power, passive and active solar energy, tidal energy, appropriate building techniques, and energy conservation methods. Upon completion, students should be able to demonstrate an understanding of renewable energy production and its impact of humans and their environment.

ALT 210 Biofuels II 3-0-3

Prerequisite: ALT 110

This course provides an in-depth study of commercial biofuels production and various methods for manufacturing biofuels on a large scale. Topics include advanced production technologies, feedstock selection and pretreatment, quality control, energy balance, and biofuels business models. Upon completion, students should possess a practical knowledge of commercial biofuels production and facility operation.

ALT 211 Biofuels Analytics 2-4-4

Prerequisite: ALT 110

This course is designed to address quality control management during all phases of the biofuels production process. Topics include feedstock analysis, in-process quality monitoring, and standards compliance with national and international biofuels specifications. Upon completion, students should be able to demonstrate safe and accurate laboratory practices as well as an understanding of various quality control techniques.

ALT 250 Thermal Systems 2-2-3

This course introduces concepts, tools, techniques, and materials used to convert thermal energy into a viable, renewable energy resource. Topics include forced convection, heat flow and exchange, radiation, the various elements of thermal system design, regulations, and system installation and maintenance. Upon completion, students should be able to demonstrate an understanding of geothermal and solar thermal systems and corresponding regulations.

ARC 111 Intro to Arch Technology 1-6-3

This course introduces basic architectural drafting techniques, lettering, use of architectural and engineer scales, and sketching. Topics include orthographic, axonometric, and oblique drawing techniques using architectural plans, elevations, sections, and details; reprographic techniques; and other related topics. Upon completion, students should be able to prepare and print scaled drawings within minimum architectural standards.

BIO 140 Environmental Biology 3-0-3

Corequisite: BIO 140A

This course introduces environmental processes and the influence of human activities upon them. Topics include ecological concepts, population growth, natural resources, and a focus on current environmental problems from scientific, social, political, and economic perspectives. Upon completion, students should be able to demonstrate an understanding of environmental interrelationships and of contemporary environmental issues. This course has been approved for transfer under the CAA and ICAA as a general education course in Natural Sciences.

BIO 140A Environmental Biology Laboratory 0-3-1

Corequisite: BIO 140

This course provides a laboratory component to complement BIO 140. Emphasis is placed on laboratory and field experience. Upon completion, students should be able to demonstrate a practical understanding of environmental interrelationships and of contemporary environmental issues. This course has been approved for transfer under the CAA and ICAA as a general education course in Natural Sciences.

BUS 280 REAL Small Business 4-0-4

This course introduces hands-on techniques and procedures for planning and opening a small business, including the personal qualities needed for entrepreneurship. Emphasis is placed on market research, finance, time management, and day-to-day activities of owning/operating a small business. Upon completion, students should be able to write and implement a viable business plan and seek funding.

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 general education course in Mathematics.

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CST 111 Construction I 3-3-4

This course covers standard and alternative building methods to include wall framing. Topics include safety and footings, foundations, floor framing systems, and wall framing systems commonly used in the construction industry. Upon completion, students should be able to safely erect all framing necessary to begin roof framing.

CST 112 Construction II 3-3-4

Prerequisites: CST 111

This course covers building methods and materials used to dry-in a building. Topics include safety, ceiling/roof framing applications, roof finishes, windows, and exterior doors. Upon completion, students should be able to safely erect different roof types and properly install windows and exterior doors, roofing, and exterior finish materials.

CST 150 Building Science 2-2-3

This course introduces concepts and techniques for the design and interaction of the mechanical systems of high performance buildings. Topics include building envelope, heating, ventilation and air conditioning (HVAC), indoor air quality, lighting, plumbing and electrical. Upon completion, students should be able to understand building systems interaction and performance.

ELC 111 Introduction to Electricity 2-2-3

This course introduces the fundamental concepts of electricity and test equipment to non-electrical/electronics majors. Topics include basic DC and AC principles (voltage, resistance, current, impedance); components (resistors, inductors, and capacitors); power; and operation of test equipment. Upon completion, students should be able to construct and analyze simple DC and AC circuits using electrical test equipment.

ELC 114 Commercial Wiring 2-6-4

Local Prerequisites: ELC 113

This course provides instruction in the application of electrical tools, materials, and test equipment associated with electrical installations. Topics include the NEC; safety; electrical blueprints; planning, layout, and installation of equipment and conduits; and wiring devices such as panels and overcurrent devices. Upon completion, students should be able to properly install equipment and conduit associated with electrical installations.

ISC 110 Workplace Safety 1-0-1

This course introduces the basic concepts of workplace safety. Topics include fire, ladders, lifting, lock-out/tag-out, personal protective devices and other workplace safety issues related to OSHA compliance. Upon completion, students should be able to demonstrate an understanding of the components of a safe workplace.

MAT 121 Algebra/Trigonometry I 2-2-3

Prerequisite: DMA 010, DMA 020, DMA 030, DMA 040, DMA 050, and DMA 060

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 the properties of plane and solid geometry, area and volume, and basic proportion applications; simplification,

evaluation, and solving of algebraic equations and inequalities and radical functions; complex numbers; right triangle trigonometry; and systems of equations. Upon completion, students will be able to demonstrate the ability to use mathematics and technology for problem-solving, analyzing and communicating results.

MNT 230 Pumps and Piping Systems 1-3-2

This course covers pump installation and maintenance and related valves and piping systems. Topics include various types of pump systems and their associated valves, piping requirements, and other related topics. Upon completion, students should be able to select and install pump and piping systems and demonstrate proper maintenance and troubleshooting procedures.

SST 110 Intro to Sustainability 3-0-3

This course introduces sustainability issues and individual contributions toward environmental sustainability. Topics include management processes needed to maximize renewable/nonrenewable 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 2-2-3

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 2-2-3

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 & Design Concepts 3-0-3

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.

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SST 210 Issues in Sustainability 3-0-3

Prerequisites: SST 110

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.

SST 250 Capstone Project 1-6-3

Prerequisites: SST 110

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.

WBL 111 Work-Based Learning I 0-10-1

Local Prerequisite: Approval of Instructor or Department Chairperson

This course provides a work-based learning experience with a college-approved employer in an area related to the student's program of study. Emphasis is placed on integrating classroom learning with related work experience. Upon completion, students should be able to evaluate career selection, demonstrate employability skills, and satisfactorily perform work-related competencies.