

Curriculum Standard for Sustainability Technologies			
Career Cluster: Science, Technology, Engineering, and Mathematics**			
Cluster Description: Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.			
Pathway: Engineering and Technology		Effective Term: Fall 2013 (2013*03)	
Program Majors Under Pathway			
Program Major / Classification of Instruction Programs (CIP) Code		Credential Level(s) Offered	Program Major Code
Sustainability Technologies	CIP Code: 15.0503	AAS/Diploma/Certificate	A40370
Pathway Description:			
<p>The Sustainability Technologies curriculum is designed to prepare individuals for employment in environmental, construction, renewable energy, or related industries, where key emphasis is placed on energy production and waste reduction along with sustainable technologies.</p> <p>Course work includes renewable energy, green building technology, and environmental technologies. Additional topics may include sustainability, energy management, waste reduction, renewable energy, site assessment, and environmental responsibility.</p> <p>Graduates should qualify for positions within the renewable energy, construction, and/or environmental industries. Employment opportunities exist in both the government and private industry sectors where graduates may function as renewable energy technicians, sustainability consultants, environmental technicians, or green building supervisors.</p>			
Program Description: Choose one of the following 4 <sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:			
N/A			

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

**I. General Education Academic Core**

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of general education; 3 semester hours must be in communications. General education is optional in certificate programs.

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<p>Courses listed below are recommended general education courses for this curriculum standard. Colleges may choose to include additional or alternative general education courses to meet local curriculum needs.</p> <p><i>*Recommended certificate and diploma level curriculum courses. These courses may not be included in associate degree programs.</i></p> <p><b>Communications:</b></p> <table style="width: 100%;"> <tr><td>*COM 101</td><td>Workplace Communication</td><td>3 SHC</td></tr> <tr><td>COM 110</td><td>Introduction to Personal Communications</td><td>3 SHC</td></tr> <tr><td>COM 120</td><td>Intro Interpersonal Com</td><td>3 SHC</td></tr> <tr><td>COM 231</td><td>Public Speaking</td><td>3 SHC</td></tr> <tr><td>*ENG 101</td><td>Applied Communications I</td><td>3 SHC</td></tr> <tr><td>*ENG 102</td><td>Applied Communications II</td><td>3 SHC</td></tr> <tr><td>ENG 110</td><td>Freshman Composition</td><td>3 SHC</td></tr> <tr><td>ENG 111</td><td>Expository Writing</td><td>3 SHC</td></tr> <tr><td>ENG 114</td><td>Professional Research &amp; Reporting</td><td>3 SHC</td></tr> <tr><td>ENG 116</td><td>Technical Report Writing</td><td>3 SHC</td></tr> </table> <p><b>Humanities/Fine Arts:</b></p> <table style="width: 100%;"> <tr><td>*HUM 101</td><td>Values in the Workplace</td><td>2 SHC</td></tr> <tr><td>HUM 110</td><td>Technology and Society</td><td>3 SHC</td></tr> <tr><td>HUM 115</td><td>Critical Thinking</td><td>3 SHC</td></tr> <tr><td>HUM 230</td><td>Leadership Development</td><td>3 SHC</td></tr> <tr><td>PHI 230</td><td>Introduction to Logic</td><td>3 SHC</td></tr> <tr><td>PHI 240</td><td>Introduction to Ethics</td><td>3 SHC</td></tr> </table> <p><b>Social/Behavioral Sciences:</b></p> <table style="width: 100%;"> <tr><td>ECO 151</td><td>Survey of Economics</td><td>3 SHC</td></tr> <tr><td>ECO 251</td><td>Prin of Microeconomics</td><td>3 SHC</td></tr> <tr><td>GEO 110</td><td>Introduction to Geography</td><td>3 SHC</td></tr> <tr><td>GEO 111</td><td>World Regional Geography</td><td>3 SHC</td></tr> <tr><td>GEO 131</td><td>Physical Geography I</td><td>4 SHC</td></tr> <tr><td>*PSY 101</td><td>Applied Psychology</td><td>3 SHC</td></tr> <tr><td>*PSY 102</td><td>Human Relations</td><td>2 SHC</td></tr> <tr><td>PSY 118</td><td>Interpersonal Psychology</td><td>3 SHC</td></tr> <tr><td>PSY 135</td><td>Group Processes</td><td>3 SHC</td></tr> <tr><td>PSY 150</td><td>General Psychology</td><td>3 SHC</td></tr> <tr><td>*SOC 105</td><td>Social Relationships</td><td>3 SHC</td></tr> <tr><td>SOC 210</td><td>Introduction to Sociology</td><td>3 SHC</td></tr> <tr><td>SOC 215</td><td>Group Process</td><td>3 SHC</td></tr> </table> <p><b>Natural Sciences/Mathematics:</b></p> <table style="width: 100%;"> <tr><td>MAT 120</td><td>Geometry and Trigonometry</td><td>3 SHC</td></tr> <tr><td>MAT 121</td><td>Algebra/Trigonometry I</td><td>3 SHC</td></tr> <tr><td>MAT 161</td><td>College Algebra</td><td>3 SHC</td></tr> <tr><td>MAT 171</td><td>Precalculus Algebra</td><td>3 SHC</td></tr> <tr><td>MAT 175</td><td>Precalculus</td><td>4 SHC</td></tr> <tr><td>MAT 223</td><td>Applied Calculus</td><td>3 SHC</td></tr> <tr><td>MAT 271</td><td>Calculus I</td><td>4 SHC</td></tr> </table>	*COM 101	Workplace Communication	3 SHC	COM 110	Introduction to Personal Communications	3 SHC	COM 120	Intro Interpersonal Com	3 SHC	COM 231	Public Speaking	3 SHC	*ENG 101	Applied Communications I	3 SHC	*ENG 102	Applied Communications II	3 SHC	ENG 110	Freshman Composition	3 SHC	ENG 111	Expository Writing	3 SHC	ENG 114	Professional Research & Reporting	3 SHC	ENG 116	Technical Report Writing	3 SHC	*HUM 101	Values in the Workplace	2 SHC	HUM 110	Technology and Society	3 SHC	HUM 115	Critical Thinking	3 SHC	HUM 230	Leadership Development	3 SHC	PHI 230	Introduction to Logic	3 SHC	PHI 240	Introduction to Ethics	3 SHC	ECO 151	Survey of Economics	3 SHC	ECO 251	Prin of Microeconomics	3 SHC	GEO 110	Introduction to Geography	3 SHC	GEO 111	World Regional Geography	3 SHC	GEO 131	Physical Geography I	4 SHC	*PSY 101	Applied Psychology	3 SHC	*PSY 102	Human Relations	2 SHC	PSY 118	Interpersonal Psychology	3 SHC	PSY 135	Group Processes	3 SHC	PSY 150	General Psychology	3 SHC	*SOC 105	Social Relationships	3 SHC	SOC 210	Introduction to Sociology	3 SHC	SOC 215	Group Process	3 SHC	MAT 120	Geometry and Trigonometry	3 SHC	MAT 121	Algebra/Trigonometry I	3 SHC	MAT 161	College Algebra	3 SHC	MAT 171	Precalculus Algebra	3 SHC	MAT 175	Precalculus	4 SHC	MAT 223	Applied Calculus	3 SHC	MAT 271	Calculus I	4 SHC	<b>6 SHC</b>	<b>3-6 SHC</b>	<b>Optional</b>
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**II. Major Hours.** AAS, diploma, and certificate programs must include courses which offer specific job knowledge

and skills. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit. Below is a description of each section under Major Hours.

- A. Technical Core.** The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- C. Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

<i>Sustainability Technologies (A40370)</i>	AAS	Diploma	Certificate
<b>Minimum Major Hours Required:</b>	<b>49 SHC</b>	<b>30 SHC</b>	<b>12 SHC</b>
<b>A. Technical Core:</b> <i>A diploma offered under this AAS degree requires a minimum of 12 SHC extracted from the required subject/course core of the AAS degree.</i> <b>Required Courses:</b> ENV 110 Environmental Science 3 SHC <i>or</i> BIO 140 Environmental Biology 3 SHC SST 110 Intro to Sustainability 3 SHC SST 120 Energy Use Analysis 3 SHC SST 210 Issues in Sustainability 3 SHC  <b>Required Subject Areas: Select one.</b> <b>Renewable Energy.</b> ALT 120 Renewable Energy Tech 3 SHC ELC 220 Photovoltaic Sys Tech 3 SHC ALT 250 Thermal Systems 3 SHC SST 130 Modeling Renewable Energy 3 SHC  <b>Green Building.</b> CST 111 Construction I 4 SHC SST 140 Green Building & Design Concepts 3 SHC CST 150 Building Science 3 SHC ARC 131 Building Codes 3 SHC <i>or</i> CMT 120 Codes and Inspections 3 SHC  <b>B. Program Major(s): Not Applicable</b>	<b>24-25 SHC</b>	<b>12 SHC</b>	
<b>C. Other Major Hours: <i>To be selected from the following prefixes:</i></b> AHR, ALT, ARC, AGR, ATR, BAS, BIO, BPR, BUS, CAR, CEG, CHM, CIS, CIV, CMT, COE, CSC, CST, DBA, DFT, EGR, EHS, ELC, ELN, ENV, EPP, FMW, FOR, GEL, GEO, GIS, HOR, ISC, LAR, LID, LSG, MAC, MEC, MNT, NET, OMT, PAD, PHS, PHY, PLU, PME, PMT, SRV, SST, WAT and WBL  <i>Up to three semester hour credits may be selected from the following prefixes: ARA, ASL, CHI, FRE, GER, ITA, JPN, LAT, POR, RUS and SPA.</i>			

### III. Other Required Hours

*A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.*

### IV. Employability Competencies

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- A. Interpersonal Skills and Teamwork** – The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- B. Communication** – The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- C. Integrity and Professionalism** – Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- D. Problem-solving** – The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- E. Initiative and Dependability** – Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing** – The ability to acquire, evaluate, organize, manage, and interpret information.
- G. Adaptability and Lifelong Learning** – The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship** – The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

*\*An **Employability Skills Resource Toolkit** has been developed by NC-NET for the competencies listed above.*

*Additional information is located at: <http://www.nc-net.info/employability.php>*

*\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: [http://www.nc-net.info/NC\\_career\\_clusters\\_guide.php](http://www.nc-net.info/NC_career_clusters_guide.php) or <http://www.careertech.org>.*

*Summary of Required Semester Hour Credits (SHC) for each credential:*

	<b>AAS</b>	<b>Diploma</b>	<b>Certificate</b>
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
<b>Total Semester Hours Credit (SHC)</b>	<b>64-76</b>	<b>36-48</b>	<b>12-18</b>