

Curriculum Standard for Electrical Systems Technology

Career Cluster: Architecture and Construction**

Cluster Description: Programs that prepare individuals to apply technical knowledge and skills related to the fields of architecture, construction, and associated professions. Includes instruction that can be applied to a variety of careers in the design-construction industry, including employment with architectural and engineering firms, residential and commercial builders/contractors, and other construction related occupations.

Pathway: Construction

Effective Term: Fall 2016 (2016*03)

Program Majors Under Pathway

Program Major / Classification of Instruction Programs (CIP) Code	Credential Level(s) Offered	Program Major Code
Electrical Systems Technology CIP Code: 46.0302	AAS/Diploma/Certificate	A35130

Pathway Description:

This curriculum is designed to provide training for persons interested in the installation and maintenance of electrical systems found in residential, commercial, and industrial facilities.

Coursework, most of which is hands-on, will include such topics as AC/DC theory, basic wiring practices, programmable logic controllers, industrial motor controls, applications of the National Electric Code, and other subjects as local needs require.

Graduates should qualify for a variety of jobs in the electrical field as an on-the-job trainee or apprentice assisting in the layout, installation, and maintenance of electrical systems.

*Program Description: Choose one of the following 4th 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.

Approved by the State Board of Community Colleges on August 16, 2012; Editorial Revision 11/15/12; Editorial Revision 12/14/12; Editorial Revision 01/07/13; Editorial Revision 08/21/13; Prefix Addition 08/01/15; SBCC Revised 05/20/16; Prefix addition 10/31/16; SBCC Revised 03/17/17; Prefix addition 09/29/17; Prefix Addition 04/11/18; CCRC Revised--Electronic Only (RISE Initiative) 10/24/19.

I. General Education Academic Core

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 1D SBCCC 400.10]: 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.

Electrical Systems Technology

Recommended General Education Academic Core	AAS	Diploma	Certificate
Minimum General Education Hours Required:	15 SHC	6 SHC	0 SHC
<p><i>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.</i></p> <p><i>*Recommended certificate and diploma level curriculum courses. These courses may <u>not</u> be included in associate degree programs.</i></p> <p>Communication:</p> <ul style="list-style-type: none"> * COM 101 Workplace Communication 3 SHC COM 110 Introduction to 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 Prof Research & Reporting 3 SHC ENG 116 Technical Report Writing 3 SHC <p>Humanities/Fine Arts:</p> <ul style="list-style-type: none"> * 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 <p>Social /Behavioral Sciences:</p> <ul style="list-style-type: none"> ECO 151 Survey of Economics 3 SHC ECO 251 Prin of Microeconomics 3 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 Processes 3 SHC <p>Natural Sciences/Mathematics:</p> <ul style="list-style-type: none"> MAT 110 Math Measurement & Literacy 3 SHC MAT 121 Algebra/Trigonometry I 3 SHC MAT 143 Quantitative Literacy 3 SHC MAT 152 Statistical Methods I 4 SHC MAT 171 Precalculus Algebra 4 SHC PHY 110 Conceptual Physics 3 SHC PHY 121 Applied Physics I 4 SHC 	6 SHC	3-6 SHC	Optional
	3 SHC	0-3 SHC	Optional
	3 SHC	0-3 SHC	Optional
	3 SHC	0-3 SHC	Optional

II. Major Hours. AAS, diploma, and certificate programs must include courses which offer specific job knowledge and skills. Work-based learning 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.

Electrical Systems Technology (A35130)	AAS	Diploma	Certificate
Minimum Major Hours Required:	49 SHC	30 SHC	12 SHC
A. Technical Core: <i>Courses required for the diploma are designated with *</i> Required Courses: <ul style="list-style-type: none"> * Wiring. Select one: <ul style="list-style-type: none"> ELC 113 Residential Wiring 4 SHC ELC 114 Commercial Wiring 4 SHC ELC 115 Industrial Wiring 4 SHC * Motor Controls. Select one: <ul style="list-style-type: none"> ELC 117 Motors and Controls 4 SHC ELN 231 Industrial Controls 3 SHC * DC/AC. Select one: <ul style="list-style-type: none"> ELC 112 DC/AC Electricity 5 SHC or ELC 131 Circuit Analysis I 4 SHC <i>and</i> ELC 131A Circuit Analysis I Lab 1 SHC or ELC 138 DC Circuit Analysis 4 SHC <i>and</i> ELC 139 AC Circuit Analysis 4 SHC Automated Controls. Select one: <ul style="list-style-type: none"> ELC 128 Introduction to PLC 3 SHC ELN 260 Prog Logic Controllers 4 SHC 	27-32 SHC	12-16 SHC	
Required Subject Areas: Select one. <i>For AAS degree, select one subject area plus additional courses from the prefixes listing within the same subject area for a minimum of (12) semester hours of credit:</i> Electrical Systems. Select 12 SHC from any ELC prefix course. Photovoltaic Systems. <ul style="list-style-type: none"> ALT 120 Renewable Energy Tech 3 SHC ELC 118 National Electrical Code 2 SHC ELC 220 Photovoltaic Sys Tech 3 SHC ELC 221 Adv PV Sys Design 3 SHC Electronics. <ul style="list-style-type: none"> ELN 131 Analogue Electronics I 4 SHC or ELN 137 Electr Devices & Circuits 5 SHC or ELN 229 Industrial Electronics 4 SHC 			
B. Program Major(s): Not Applicable			

C. Other Major Hours: To be selected from the following prefixes:
 AHR, ALT, ARC, ATR, BAT, BIO, BPR, BUS, CET, CHM, CIS, CMT, CSC, CST, CTI, DFT, EGR, ELC, ELN, EUS, HEA, HYD, ISC, MAT, MAC, MCO, MEC, MNT, NET, OMT, PCI, PHY, PLA, PLU, SST, WBL, WLD, and WOL

Up to two semester hour credits may be selected from ACA.

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.

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 or <http://www.careertech.org>.*

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

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