

## Central Carolina Community College

### Program Planning Guide

#### Industrial Systems Technology

#### Credential: Associate in Applied Science Degree in Industrial Systems Technology (A50240)

The Industrial Systems Technology curriculum is designed to prepare or upgrade individuals to safely service, maintain, repair and install equipment. Instruction includes theory and skill training needed for inspecting, testing, troubleshooting, and diagnosing industrial systems. Students will learn multi-craft technical skills in blueprint reading, mechanical systems maintenance, electricity, hydraulics/pneumatics, welding, machining or fabrication, as well as various diagnostic and repair procedures. Practical application in these industrial systems will be emphasized and additional advanced coursework may be offered.

Upon completion of this curriculum, graduates should be able to individually, or with a team, safely install, inspect, diagnose, repair and maintain industrial process and support equipment. Students will also be encouraged to develop their skills as life-long learners.

Program Length: 5 semesters

Career Pathway Options: Associate in Applied Science in Industrial Systems Technology

Program Sites: Lee Campus - Day Program

Suggested Course Schedule:	HOURS			Grade	Semester	Notes
	Class	Lab	Credit			
<b>1st Semester (Fall)</b>						
BPR 111	Blueprint Reading	1	2	2		
ELC 112	DC/AC Electricity	3	6	5		
	Humanities/Fine Arts Elective	3	0	3		
MEC 111	Machine Processes I	1	4	3		
MNT 110	Intro to Maintenance Procedures	1	3	2		
WLD 112	Basic Welding Processes	1	3	2		
		10	18	17		
<b>2nd Semester (Spring)</b>						
CIS 111	Basic PC Literacy	1	2	2		
ELN 229	Industrial Electronics	3	3	4		
ENG 111 <sup>(1)</sup>	Expository Writing	3	0	3		
ENG 111A	Expository Writing Lab	0	2	2		
MAT 115	Mathematical Models	2	2	3		
OR PHY 121	Applied Physics I	3	2	4		
WLD 115	SMAW (Stick) Plate	2	9	5		
		11/12	16/18	17/19		
<b>3rd Semester (Summer)</b>						
AHR 120	HVACR Maintenance	1	3	2		
BPR 115	Electric/Fluid Power Diagrams	1	2	2		
ISC 110	Workplace Safety	1	0	1		
OR ISC 112	Industrial Safety	2	0	2		
HYD 110	Hydraulics/Pneumatics	2	3	3		
See Below	Technical Elective			2		
		5/6	8	10/11		
<b>4th Semester (Fall)</b>						
ELC 117	Motors and Controls	2	6	4		
ELC 128	Introduction to PLC	2	3	3		
See Below	Communications Elective	3	0	3		
HYD 121	Hydraulics/Pneumatics II	1	3	2		
MNT 230	Pumps and Piping Systems	1	3	2		
WLD 212	Inert Gas Welding	1	3	2		
		10	18	16		

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### 5th Semester (Spring)

ELC 228	PLC Applications	2	6	4			
ELC 229	Applications Project	1	3	2			
ELN 331	Industrial Controls	2	3	3			
MNT 240	Industrial Equipment Troubleshooting	1	3	2			
See Below	Technical Elective			1			
	Social/Behavioral Science Elective	3	0	3			
		9	15	15			

### Communications Elective (select 3 SHC)

ENG 112	Argument-Based Research	3	0	3			
ENG 113	Literature-Based Research	3	0	3			
ENG 114	Prof Research & Reporting	3	0	3			
ENG 116	Technical Report Writing	3	0	3			

### Technical Electives (Choose 3 SHC)

COE 111	Co-op Work Experience I	0	10	1			
COE 112	Co-op Work Experience II	0	20	2			
COE 121	Co-op Work Experience II	0	10	1			
MNT 111	Maintenance Practices	2	2	3			

Total Semester Hours Credit: 75/77

### Course Descriptions:

#### **AHR 120 HVACR Maintenance 1-3-2**

This course introduces the basic principles of industrial air conditioning and heating systems. Emphasis is placed on preventive maintenance procedures for heating and cooling equipment and related components. Upon completion, students should be able to perform routine preventive maintenance tasks, maintain records, and assist in routine equipment repairs.

#### **BPR 111 Blueprint Reading 1-2-2**

This course introduces the basic principles of blueprint reading. Topics include line types, orthographic projections, dimensioning methods, and notes. Upon completion, students should be able to interpret basic blueprints and visualize the features of a part.

#### **BPR 115 Electric/Fluid Power Diagrams 1-2-2**

This course covers sketching of detail and assembly drawings and reading of hydraulic, pneumatic, electrical, mechanical, and piping schematics. Emphasis is placed on interpretation and communication skills utilizing sketches, symbols, diagrams, and other related topics. Upon completion, students should be able to read, demonstrate an understanding of, and draw sketches and schematics commonly used in industry.

#### **CIS 111 Basic PC Literacy 1-2-2**

This course provides an overview of computer concepts. Emphasis is placed on the use of personal computers and software applications for personal and fundamental workplace use. Upon completion, students should be able to demonstrate basic personal computer skills.

#### **COE 111 Co-op Work Experience I 0-10-1**

This course provides work 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.

#### **COE 112 Co-op Work Experience I 0-20-2**

This course provides work 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.

#### **COE 121 Co-op Work Experience II 0-10-1**

This course provides work 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.

#### **ELC 112 DC/AC Electricity 3-6-5**

This course introduces the fundamental concepts of and computations related to DC/AC electricity. Emphasis is placed on DC/AC circuits, components, operation of test equipment, and other related topics. Upon completion, students should be able to construct, verify, troubleshoot, and repair DC/AC circuits.

#### **ELC 117 Motors and Controls 2-6-4**

This course introduces the fundamental concepts of motors and motor controls. Topics include ladder diagrams, pilot devices, contactors, motor starters, motors, and other control devices. Upon

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completion, students should be able to properly select, connect, and troubleshoot motors and control circuits.

### **ELC 128 Introduction to PLC 2-3-3**

This course introduces the programmable logic controller (PLC) and its associated applications. Topics include ladder logic diagrams, input/output modules, power supplies, surge protection, selection/installation of controllers, and interfacing of controllers with equipment. Upon completion, students should be able to install PLCs and create simple programs.

### **ELC 228 PLC Applications 2-6-4**

*Local Prerequisite: ELC 128*

This course covers programming and applications of programmable logic controllers. Emphasis is placed on programming techniques, networking, specialty I/O modules, and system troubleshooting. Upon completion, students should be able to specify, implement, and maintain complex PLC controlled systems.

### **ELC 229 Applications Project 1-3-2**

*Local Prerequisite: ELC 112, ELC 113, or ELC 140*

This course provides an individual and/or integrated team approach to a practical project as approved by the instructor. Topics include project selection and planning, implementation and testing, and a final presentation. Upon completion, students should be able to plan and implement an applications-oriented project.

### **ELN 229 Industrial Electronics 3-3-4**

*Local Prerequisite: ELC 112, ELC 131, or ELC 140*

This course covers semiconductor devices used in industrial applications. Topics include the basic theory, application, and operating characteristics of semiconductor devices. Upon completion, students should be able to install and/or troubleshoot these devices for proper operation in an industrial electronic circuit.

### **ELN 231 Industrial Controls 2-3-3**

*Local Prerequisite: ELC 112, ELC 131, or ELC 140*

This course introduces the fundamental concepts of control of rotating machinery and associated peripheral devices. Topics include rotating machine theory, ladder logic, electromechanical and solid state relays, motor controls, pilot devices, three-phase power systems, and other related topics. Upon completion, students should be able to interpret schematics and demonstrate an understanding of electromechanical and electronic control of rotating machinery.

### **ENG 111 Expository Writing 3-0-3**

*Prerequisites: Take one set: RED 090 and ENG 090, ENG 095, or appropriate placement test scores.*

*Corequisites: ENG 111A*

This course is the required first course in a series of two designed to develop the ability to produce clear expository prose. Emphasis is placed on the writing process including audience analysis, topic selection, thesis support and development, editing, and revision. Upon completion, students should be able to produce unified, coherent, well-developed essays using standard written English. This course has been approved for transfer under the CAA and ICAA as a general education course in English Composition.

### **ENG 111A Expository Writing Laboratory 0-2-1**

*Prerequisites: Take one set: RED 090 and ENG 090, ENG 095, or appropriate placement test scores.*

*Corequisites: ENG 111*

This writing laboratory is designed to apply the skills introduced in ENG 111. Emphasis is placed on the editing and revision components of the writing process. Upon completion, students should be able to apply those skills in the production of final drafts in ENG 111. The computer is used as a writing and design tool for this course.

### **ENG 112 Argument-Based Research 3-0-3**

*Prerequisite: ENG 111*

This course, the second in a series of two, introduces research techniques, documentation styles, and argumentative strategies. Emphasis is placed on historical developments and their impact on the modern world through religion, politics, economics, and social developments. Upon completion, students should be able to compare and contrast western and non-western cultures. This course has been approved for transfer under the CAA and ICAA as a general education course in English Composition.

### **ENG 113 Literature-Based Research 3-0-3**

*Prerequisite: ENG 111*

This course, the second in a series of two, expands the concepts developed in ENG 111 by focusing on writing that involves literature-based research and documentation. Emphasis is placed on critical reading and thinking and the analysis and interpretation of prose, poetry, and drama: plot, characterization, theme, cultural context, etc. Upon completion, students should be able to construct mechanically-sound, documented essays and research papers that analyze and respond to literary works. Students should be able to respond to literature orally in class discussions and in small group and individual presentations. This course has been approved for transfer under the CAA and ICAA as a general education course in English Composition.

### **ENG 114 Professional Research and Reporting 3-0-3**

*Prerequisite: ENG 111*

This course, the second in a series of two, is designed to teach professional communication skills. Emphasis is placed on research, listening, critical reading and thinking, analysis, interpretation, and design used in oral and written presentations. Upon completion, students should be able to work individually and collaboratively to produce well-designed business and professional written and oral presentations. The computer is used as a writing and design tool for this course. This course has been approved for transfer under the CAA and ICAA as a general education course in English Composition.

### **ENG 116 Technical Report Writing 3-0-3**

*Prerequisite: Take one: ENG 110 or ENG 111*

This course, the second in a series of two, introduces layout and design of technical reports used in business and industry. Emphasis is placed on audience analysis, data collection and analysis, technical writing style and organization, oral presentation or technical data, and the appropriate use of graphics in written and oral presentations. Upon completion, students should be able to produce written and oral reports using a variety of technical communication models.

