Program Planning Guide

Industrial Systems Technology, Associated in Applied Science (A50240)

Program Length: 5 semesters
Program Sites: Lee Main Campus, Day Program
Career Pathway Options: Associate in Applied Science in Industrial Systems Technology

Suggested Course Schedule		Class	Lab	Work	Credits	Notes:
1st Semester (fall)						
BPR 111	Print Reading	1	2	0	2	
CIS 111	Basic PC Literacy	1	2	0	2	
ELC 112	DC/AC Electricity	3	6	0	5	
MEC 111	Machine Processes I	1	4	0	3	
MNT 110	Intro to Maintenance Procedures	1	3	0	2	
Humanities/Fine Arts Elective		3	0	0	3	
	Total Semester Hours	**10**	**17**	**0**	**17**	
2nd Semester (spring)						
ACA 122	College Transfer Success	0	2	0	1	
ELC 128	Intro to PLC	2	3	0	3	
ENG 111	Writing and Inquiry	3	0	0	3	
MNT 111	Maintenance Practices	2	2	0	3	
PHY 121	Applied Physics I	3	2	0	4	
WLD 112	Basic Welding Processes	1	3	0	2	
WLD 117	Industrial SMAW	1	4	0	3	
	Total Semester Hours	**12**	**16**	**0**	**19**	
3rd Semester (summer)						
AHR 120	HVACR Maintenance	1	3	0	2	
ELN 260	Prog Logic Controllers	3	3	0	4	
ISC 110	Workplace Safety	1	0	0	1	
HYD 110	Hydraulics/Pneumatics I	2	3	0	3	
	Total Semester Hours	**7**	**9**	**0**	**10**	

Effective Term: 2023FA

4th Semester (fall)						
ELC 117	Motors and Controls	2	6	0	4	
ENG 116	Technical Report Writing	3	0	0	3	
HYD 121	Hydraulics/Pneumatics II	1	3	0	2	
ELC 228	PLC Application	2	6	0	4	
	Total Semester Hours	**8**	**15**	**0**	**13**	
5th Semester (spring)						
ELC 229	Applications Project	1	3	0	2	
ELN 231	Industrial Controls	2	3	0	3	
MNT 240	Industrial Equip Troubleshoot	1	3	0	2	
WBL 111	Work-Based Learning I	0	0	10	1	
Social/Behavioral Science Elective		3	0	0	3	
	Total Semester Hours	**7**	**9**	**10**	**11**	
Total Semester Hours Credit Required for Graduation: 70						

Course Descriptions

ACA 122 College Transfer Success
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/ICAA as a premajor and/or elective course requirement.

AHR 120 HVACR Maintenance
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 Print Reading
This course introduces the basic principles of print reading. Topics include line types, orthographic projections, dimensioning methods, and notes. Upon completion, students should be able to interpret basic prints and visualize the features of a part or system.

CIS 111 Basic PC Literacy
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.

ELC 112 DC/AC Electricity
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, and analyze simple DC/AC circuits.

ELC 117 Motors and Controls
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 completion, students should be able to properly select, connect, and troubleshoot motors and control circuits.

ELC 128 Introduction to PLC
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 understand basic PLC systems and create simple programs.

ELC 228 PLC Applications
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
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 231 Industrial Controls
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.

ELN 260 Prog Logic Controllers
This course provides a detailed study of PLC applications, with a focus on design of industrial controls using the PLC. Topics include PLC components, memory organization, math instructions, documentation, input/output devices, and applying PLCs in industrial control systems. Upon completion, students should be able to select and program a PLC system to perform a wide variety of industrial control functions.

ENG 111 Writing and Inquiry
This course is designed to develop the ability to produce clear writing in a variety of genres and formats using a recursive process. Emphasis includes inquiry, analysis, effective use of rhetorical strategies, thesis development, audience awareness, 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/ICAA as a general education course in English Composition.

ENG 116 Technical Report Writing
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 of 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.

HYD 110 Hydraulics/Pneumatics I
This course introduces the basic components and functions of hydraulic and pneumatic systems. Topics include standard symbols, pumps, control valves, control assemblies, actuators, FRL, maintenance procedures, and switching and control devices. Upon completion, students should be able to understand the operation of a fluid power system, including design, application, and troubleshooting.

HYD 121 Hydraulics/Pneumatics II
Prerequisite: Take HYD 110
This course is a continuation of HYD 110 and provides further investigation into fluid power systems. Topics include advanced system components, troubleshooting, and other related topics. Upon completion, students should be able to demonstrate an understanding of the installation, application, operation, and maintenance of fluid power components and systems.

ISC 110 Workplace Safety
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.

MEC 111 Machine Processes I
This course introduces shop safety, hand tools, machine processes, measuring instruments, and the operation of machine shop equipment. Topics include use and care of tools, safety, measuring tools, and the basic setup and operation of common machine tools. Upon completion, students should be able to manufacture simple parts to specified tolerance.

MNT 110 Intro to Maintenance Procedures
This course covers basic maintenance fundamentals for power transmission equipment. Topics include equipment inspection, lubrication, alignment, and other scheduled maintenance procedures. Upon completion, students should be able to demonstrate knowledge of accepted maintenance procedures and practices according to current industry standards.

MNT 111 Maintenance Practices
This course provides in-depth theory and practical applications relating to predictive and preventive maintenance programs. Emphasis is placed on equipment failure analysis, maintenance management software, and techniques such as vibration and infrared analysis. Upon completion, students should be able to demonstrate an understanding of modern analytical and documentation methods.

MNT 240 Industrial Equipment Troubleshoot
This course covers the various service procedures, tools, instruments, and equipment necessary to analyze and repair typical industrial equipment. Emphasis is placed on electro-mechanical and fluid power equipment troubleshooting, calibration, and repair, including common techniques and procedures. Upon completion, students should be able to troubleshoot and repair industrial equipment.

PHY 121 Applied Physics I
This algebra-based course introduces fundamental physical concepts as applied to industrial and service technology fields. Topics include systems of units, problem-solving methods, graphical analyses, vectors, motion, forces, Newton's laws of motion, work, energy, power, momentum, and properties of matter. Upon completion, students should be able to demonstrate an understanding of the principles studied as applied in industrial and service fields.

WLD 112 Basic Welding Processes
This course introduces basic welding and cutting. Emphasis is placed on beads applied with gases, mild steel fillers, and electrodes and the capillary action of solder. Upon completion, students should be able to set up welding and oxy-fuel equipment and perform welding, brazing, and soldering processes.

WLD 117 Industrial SMAW
This course introduces the SMAW (stick) process for joining carbon steel components for industrial applications. Topics include padding, fillet, and groove welds in various positions with SMAW electrodes. Upon completion, students should be able to safely perform SMAW fillet and groove welds on carbon steel plate with prescribed electrodes.

WBL 111 Work-Based Learning I
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.

Approved Humanities/Fine Arts Electives
Associate in Applied Science Degree/Diploma

ART 111	Art Appreciation
ART 114	Art History Survey I
ART 115	Art History Survey II
DRA 111	Theatre Appreciation
ENG 125	Creative Writing I
ENG 231	American Literature I
ENG 232	American Literature II
ENG 241	British Literature I
ENG 242	British Literature II
HUM 110	Technology & Society
HUM 115	Critical Thinking
HUM 120	Cultural Studies
HUM 122	Southern Culture
HUM 150	American Women's Studies
HUM 160	Introduction to Film
MUS 110	Music Appreciation
MUS 112	Introduction to Jazz
PHI 240	Introduction to Ethics
REL 110	World Religions
REL 211	Intro to Old Testament
REL 212	Intro to New Testament

Approved Social/Behavioral Science Electives
Associate in Applied Science Degree/Diploma

ANT 210	General Anthropology
ANT 220	Cultural Anthropology
ECO 151	Survey of Economics
ECO 251	Principles of Microeconomics
ECO 252	Principles of Macroeconomics
HIS 111	World Civilization I
HIS 112	World Civilization II
HIS 131	American History I
HIS 132	American History II
HIS 222	African-American History I
HIS 223	African-American History II
HIS 226	The Civil War
HIS 236	North Carolina History
POL 120	American Government
PSY 150	General Psychology
PSY 237	Social Psychology
PSY 241	Developmental Psychology
PSY 246	Adolescent Psychology
PSY 281	Abnormal Psychology
SOC 210	Introduction to Sociology
SOC 213	Sociology of the Family
SOC 220	Social Problems
SOC 225	Social Diversity
SOC 232	Social Context of Aging
SOC 240	Social Psychology