



Curriculum Map (Section 3)

Instructions:

Each college must complete a curriculum map for each award or college issued credential in each signature program. Each award type should have its own map. Some maps may contain duplicate information as the credentials may be stackable or in some cases mirrored between credit and non-credit. Columns and rows should be added or removed as necessary.

Title information:

Signature Program: Please enter the I-AM Signature program category of the program

Credential: Enter the appropriate value from the following: “Non-credit Certificate”, “Credit Certificate”, “Diploma” or “Associate’s Degree”

For Credit Certificates, Diplomas and AAS Degrees:

Left Column: List each of the overall program objectives for the credential

Top Row: List each course that makes up the credential. Use discipline area/course number format, e.g. WEL228

Filling in the Table: Across each row, please mark an “x” in each box where the program objective is covered in whole or in part by a course competency.

For Non-credit Certificates:

Left Column: List each of the overall program objectives for the credential

Top Row: List each section of the course (by module, unit, week or day – whichever is most appropriate) that makes up the credential. Use a standard naming system for the sections of the course, ex. Module 1, Module 2. The sectioning of the course should match the course syllabus to the extent possible, for ease of reference.

Filling in the Table: Across each row, please mark an “x” in each box where the program objective is covered in whole or in part by a section of the program.

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I-AM Curriculum Map

Signature Program: Industrial Maintenance

Award: **Electromechanical Technician Diploma** – Credit Program

Credits/Contact Hours: 37 hours

	ELE 101	EGT 142	EGT 143	ELE 112	ELT 102	ELT 208	IND 462	IND 141	BPT 114	ELT 250	EGT 210	ELE 312	MFG 465	MFG 466	WEL 330		
Program Outcomes																	
Troubleshoot, repair and maintain industrial machinery and equipment.	X	X	X	X	X	X	X	X								X	
Operate, test and repair systems, pneumatic systems, hydraulic systems and other manufacturing and processing equipment and systems.	X								X	X	X	X	X	X			

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I-AM Curriculum Map

Signature Program: Industrial Maintenance

Award: **Electrical Maintenance Technician Certificate** – Credit Program

Credits/Contact Hours: 11 hours

	ELE 101	ELE 112	ELT 208	ELT 250	ELE 312									
Program Outcomes														
Repair and perform maintenance on electrical equipment.	X	X	X											
Apply skills as they relate to wiring, motors and motor controls in manufacturing and production facilities.	X			X	X									

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I-AM Curriculum Map

Signature Program: Industrial Maintenance

Award: **Mechanical Maintenance Technician Certificate** – Credit Program

Credits/Contact Hours: 10 hours

	ELE 101	EGT 142	EGT 210	EGT 143	IND 462										
Program Outcomes															
Repair and perform maintenance on mechanical machinery and equipment.	X	X		X											
Apply skills as they relate to hydraulics, pneumatics and pumps in manufacturing and production facilities.	X		X		X										

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I-AM Curriculum Map

Signature Program: Industrial Maintenance

Award: **Electrical Maintenance Technician** Certificate – Non-Credit Program

Credits/Contact Hours: 256 hours

Electrical Maintenance Level I	48 hrs
Electrical Maintenance Level II	56 hrs
Electrical Maintenance Level III	76 hrs
Electrical Maintenance Level IV	76 hrs
	<hr/>
	256 Hrs

The Electrical Maintenance Certificate combines the disciplines of Industrial Safety, Electrical Concepts, Blueprint Reading, Motor Controls, Industrial Wiring, and Programmable Logic Controllers. Each of the levels contains portions of each of these disciplines to present a holistic and competency driven approach to the mastering of the skills necessary for an Electrical Maintenance Technician. Each level is designed to be delivered in such a way that the student attends the levels in a sequential order to ensure a complete understanding of the material. This training can be transcribed into college credit.

LEVEL I

Content and skills include: safety orientation, personal protective equipment, fundamentals of electricity, electrical circuit components, manual input devices , output devices, electric motor control, three-phase power, disconnects and protective devices, three-phase motors, manual motor control and overload protection, manual motor control, manual motor starter operation, overload protection, plc orientation, plc operation , plc programming languages, numbering systems , plc memory organization, plc program analysis, print reading fundamentals, industrial electrical and electrical symbols.

LEVEL II

Content and skills include: lockout/tagout, power tool safety, electrical safety, voltage measurement, introduction to series and parallel circuits, current and resistance measurement, power in series circuits, power in parallel circuits, electric motor control, control transformers, introduction to transformers, control transformer operation, control transformer applications in machine control, control ladder logic, ladder diagram basics, logic elements , plc seal-in program logic, documentation and advanced editing , basic input and output interfacing, electronic device interfacing, electrical drawings and plans, facility construction and maintenance systems.

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LEVEL III

Content and skills include: ergonomics, hazard communication, confined space entry, electromagnetism, inductance, capacitance, characteristics of capacitance, inductor and capacitor applications, troubleshooting, control relays, magnetic motor starters, two-wire control, three-wire start/stop control, introduction to troubleshooting, control component troubleshooting, motor starter troubleshooting, power component troubleshooting, introduction to event sequencing, continuous cycle logic, multiple actuator event sequencing, program development, modes of operation, stop functions, industrial control system prints, and industrial power system prints.

LEVEL IV

Content and skills include: walking and working surfaces, fall protection, emergency action plans, caught-in and stuck-by, introduction to transformers, sizing a transformer, transformer types, motor control systems troubleshooting, system troubleshooting methods, troubleshooting application, manual motor reversing, reversing magnetic motor starter, interlocking for reversing motor control, modes of operation, h-o-a control, plc retentive timer instructions, non-retentive timer instructions, time-driven sequencing, timer applications, counts up instruction, count down instruction, latch and unlatch instructions, and industrial equipment prints.

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I-AM Curriculum Map

Signature Program: Industrial Maintenance

Award: **Mechanical Maintenance Technician** Certificate – Non-Credit Program

Credits/Contact Hours: 256 hours

Mechanical Maintenance Level I	48 hrs
Mechanical Maintenance Level II	56 hrs
Mechanical Maintenance Level III	76 hrs
<u>Mechanical Maintenance Level IV</u>	<u>76 hrs</u>
	256 hrs

The Mechanical Maintenance Certificate combines the disciplines of *Hydraulics, Belts, Drives, Pulleys, Power Transmission, Drives, and Pumps*. Each of the levels contains portions of each of these disciplines to present a holistic and competency driven approach to the mastering of the skills necessary for a Mechanical Maintenance Technician. Each level is designed to be delivered in such a way that the student attends the levels in a sequential order to ensure a complete understanding of the material. This training can be transcribed into college credit.

Mechanical Maintenance LEVEL I

Content and skills includes: introduction to hydraulics, power unit operation, hydraulic_circuit connections, basic cylinder circuits, overview of the dcv, two-position DCVs, pilot-operated DCVs, cam-operated DCVs, mechanical power transmission safety, machine installation, motor mounting, shaft speed measurement, keyseat fasteners, key assembly, torque and power measurement, mechanical efficiency, conventional v-belt drives, multiple v-belt drives, wedge v-belt drives, variable speed v-belt drives, v-belt configurations, and introduction to pumps.

Mechanical Maintenance LEVEL II

Content and skills include: hydraulic pumps, needle valves, basic hydraulic motor circuits, hydraulic schematics, hydraulic cylinder types, regeneration circuits, pressure-compensated flow control valves, synchronization circuits, introduction to shafts, introduction to bearings, shaft alignment, belt drive concepts, v-belt operation, belt tensioning, belt tension measurement, v-belt size specification, v-belt component identification, v-belt drive selection, v-belt maintenance and troubleshooting, timing belt drives, high torque drive belt drives, synchronous belt drive selection, synchronous belt maintenance and troubleshooting, cavitation, pseudo-cavitation, and centrifugal pump maintenance.

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Mechanical Maintenance LEVEL III

Content and skills include: pressure vs. cylinder force, hydraulic leverage, fluid friction, absolute vs. gage pressure, pilot-operated relief valve operation, hydraulic pump unloading applications, remote pressure control, chain drive concepts, chain drive operation, chain tensioning and measurement, fixed center chain installation, gear drive concepts and designs, spur gear operation, spur gear installation and analysis, lubrication concepts, oils and greases, lubricant management, elastomeric and flange couplings, rim and face shaft alignment method, system friction head, pump system operating characteristics, and pump suction side design.

Mechanical Maintenance LEVEL IV

Content and skills include: hydraulic relief and check valves, flow control valves, meter-in and meter-out circuits, flow control circuit design, flow rate vs. cylinder speed, sequence valves, sequence valve applications, pressure reducing valves, prv applications, pressure port check valve circuit, pilot-operated check valves, pilot-operated check valve applications, pilot-operated check valve circuit design, accumulator operation, accumulator circuits, accumulator applications, accumulator sizing, multiple shaft gear analysis, multiple shaft drive installation, sleeve couplings, chain couplings, grid and gear couplings, coupling selection, silent chain drives, multiple strand systems, chain selection, chain lubrication, chain maintenance and troubleshooting, pump impeller diameter and speed calculations, pump power, and pump selection.

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