

Industrial Maintenance Technician

Program Number: 32-462-1

Two-Year Technical Diploma

Manufacturing Program Cluster

Center for Construction, Manufacturing, Apprenticeship & Transportation

Program offered at Madison Campuses

For information call: (608) 246-6102 or
(800) 322-6282 Ext. 6102

About the Program

The Industrial Maintenance Technician Program provides students with the knowledge and skills necessary to assemble, install, troubleshoot, repair and modify machinery and automated systems that are computer or electronically controlled in both manufacturing and facilities environments. This program also has extensive training in refrigeration/HVAC, EPA certification and programmable logic controllers. Career enhancement also is vital in today's manufacturing environment.

Program Courses

32-414-316 DC/AC Circuits for Maintenance 3 credits

Introduces the practical DA/AC concepts including electrical quantities and components and measurement instruments for AC and DC circuits. Students analyze and construct circuits and measure voltage, current, resistance and power for both AC and DC sources. Covers fundamentals of NEC wiring, soldering and relay ladder logic. Corequisite: 31-804-381.

32-414-318 Electronic Circuits for Maintenance 3 credits

Presents semiconductor devices with an emphasis on their practical use. Students construct and troubleshoot power supplies, amplifiers, electronic switches, relay drivers, photo-optical isolators and power control electronics. Students learn to identify and troubleshoot diodes, bipolar transistors (BJTs), field-effect transistors (FETs), silicon controlled rectifiers (SCRs and Triacs), light-emitting diodes (LEDs) and other components found in industrial electronics. Prerequisites: 32-462-303, 31-804-382 and 31-806-363.

32-414-319 Programmable Logic Controllers 1 3 credits

Fundamentals of programmable logic controller (PLC) installation, interfacing, operation, and programming. Students learn about PLCs connected to Windows-based PCs running state-of-the-art programming tools. Students study discrete and analog input and output; hardware sensor interfacing and troubleshooting techniques; fundamentals of digital systems and will program PLCs using timer, counter, latch, data movement, sequencing, integer arithmetic and other instructions. Prerequisite: 32-414-316.

32-414-320 Programmable Logic Controllers 2 3 credits

Advanced programmable logic controller (PLC) installation, interfacing, operation, and programming. Students learn how to connect advanced PLCs in a typical industrial PLC network utilizing Ethernet, DH+, RS232 and RIO communication paths. Data sharing and distributed PLC programming techniques along with fundamentals of touch panel programming and operation are studied. Prerequisite: 32-414-319.

32-414-321 Interfacing Sensors with Computer Controls 3 credits

Applies various sensors to analog input modules of programmable controllers and to A/D converters for computer systems. Prerequisite: 32-414-318.

Curriculum

FIRST YEAR

First Semester	Credits	Hrs/week Lec-Lab
32-414-316 DC/AC Circuits for Maintenance	3	3-3
32-420-330 Metal Processes 1	2	3-1
32-421-392 Drawing Interpretation for Industrial Maintenance	2	2-2
10-103-133 Excel - Beginning.....	1	1-1
32-462-316 Industrial Fluid Distribution Systems	2	2-22
32-462-318 Safety Management	1	4-0
31-804-381 Machine Tool Mathematics 1	2	4-0
Semester Total	13	

Second Semester

32-462-335 Metal Processes for Maintenance	2	1-3
32-462-303 Industrial Equipment Mechanisms	1	1-1
32-462-340 Industrial Electricity and Controls	4	4-4
32-462-306 Industrial Fluid Power 1	1	1-1
32-462-341 Industrial Fluid Power 2	1	1-1
32-462-342 Industrial Fluid Power 3	1	1-1
31-801-356 Communications 1	1	2-0
31-804-382 Machine Tool Mathematics 2	1	2-0
31-806-363 Science 1	2	2-2
31-809-352 Human Relations	2	3-0
Semester Total	16	

SECOND YEAR

First Semester

32-414-318 Electronic Circuits for Maintenance.....	3	3-3
32-414-319 Programmable Logic Controllers.....	3	3-3
32-462-308 Heating and Air Conditioning 1.....	3	4-2
32-462-311 Industrial Maintenance Mechanic 1	3	1-5
32-462-313 Maintenance Management.....	2	4-0
32-462-317 Building Service Maintenance	3	4-2
Semester Total	17	

Second Semester

32-414-320 Programmable Logic Controllers 2.....	3	3-3
32-414-321 Interfacing Sensors with Computer Controls.....	3	3-3
32-462-309 Heating and Air Conditioning 2.....	3	4-2
32-462-314 Manufacturing Systems, Application and Control	3	4-2
32-462-315 Building Management Systems.....	3	4-2
32-462-322 Industrial Maintenance Mechanic 2*	3	1-5
31-801-357 Communications 2.....	1	2-0
Semester Total	19	

*Internship Course.

Note: Students are placed in English or mathematics courses based on their scores on the COMPASS or ASSET test or on completion of the appropriate prerequisites.



Program Courses (continued)

32-420-330 Metal Processes 1 2 credits

This basic metalworking course is designed to provide the student with instruction in metalworking processes. Instructional units include safety, layout and measuring, machining, oxy-acetylene welding, brazing and cutting, arc welding and properties of metals.

32-421-392 Drawing Interpretation – Industrial Maintenance 2 credits

Studies basic principles of interpreting engineering drawings and schematics. Through interpretation and sketching, students develop a visualization of the part, section or assembly. Uses drawings pertinent to the trade along with examples and discussions of manufacturing procedures.

32-462-303 Industrial Equipment Mechanisms 1 credit

Studies basic principles of physics specific to electro-mechanical systems. Emphasizes measurement, lubrication, energy, power, machines and fluid and chemical properties, as well as installation, timing and synchronization of machine drive components. Includes hands-on disassembly and assembly of industrial components. Studies motors, transformers and various electro-mechanical devices to enhance AC power distribution and control topics. Introduces programmable logic controllers in the on/off mode. Prerequisite: 32-414-316 and second semester standing or instructor consent.

32-462-306 Industrial Fluid Power 1 1 credit

Fundamentals of fluid power (hydraulic and pneumatic) and its components as well as principles, functions and terminology. Covers the application of basic fluid power systems to various machines along with maintenance and troubleshooting.

32-462-308 Heating and Air Conditioning 1 3 credits

Covers basic environmental equipment maintenance. Presents applications of HVAC components, refrigeration controls, condensers, hydronics, boilers, heat exchangers, dampers, compressors, plumbing, pumps, measurement, blowers and preventive maintenance/repair. Also covers EPA CFC certification.

32-462-309 Heating and Air Conditioning 2 3 credits

Advanced environmental equipment installation and maintenance course which puts the theory learned in 32-462-308 into practice including boiler competencies. Prerequisite: 32-462-308 or instructor consent.

32-462-311 Industrial Maintenance Mechanic 1 3 credits

Emphasizes basic tools used for maintenance. Presents information on lock out/tag out, confined space and safe rigging practices, manufacturing machine types and operations, torque, metal properties and hardness, gaskets, pumps, gears, motors, pulleys and alignment.

32-462-313 Maintenance Management 2 credits

Emphasizes maintenance management and quality control techniques to give maintenance students an understanding of their roles in an organization. Covers maintenance record keeping, parts ordering and shop operation.

32-462-314 Manufacturing Systems, Application and Control 3 credits

Introduces computer control systems and fundamentals of motion control. Presents programmable logic controllers (PLCs) along with design, integration and troubleshooting techniques. Prerequisite: 32-414-319 or instructor consent.

32-462-313 Maintenance Management 2 credits

Emphasizes maintenance management and quality control techniques to give maintenance students an understanding of their roles in an organization. Covers maintenance record keeping, parts ordering and shop operation.

32-462-314 Manufacturing Systems, Application and Control 3 credits

Introduces computer control systems and fundamentals of motion control. Presents programmable logic controllers (PLCs) along with design, integration and troubleshooting techniques. Prerequisite: 32-414-319 or instructor consent.

32-462-315 Building Management Systems 3 credits

Studies computer-based energy and building control systems in detail. Includes sensing devices, pneumatic and otherwise, as well as basic energy efficiency calculating. Also presents and discusses cost- and energy-saving ideas and plans. Prerequisite: 32-462-309 or instructor consent.

32-462-316 Industrial Fluid Distribution Systems 2 credits

Covers installation and repair of fluidic systems. Includes fittings, thread cutting, pipe sweating, roll grooving, solder, plastic cementing, repair equipment and tools. Pumps, valves, water supply systems and fire protection distribution systems covered.

32-462-317 Building Service Maintenance 3 credits

Covers safety, schematics, wall framing, electrical services, insulation, drywall applications, painting, floor applications, roofing and siding applications. Includes the study of appropriate applications of material to facilities.

32-462-318 Safety Management 1 credit

Focuses on laws governing workplace safety and environmental concerns such as those covered by OSHA, EPA, DILHR and the DNR. Reviews general and model codes (NEC, NFPA, ANSI, etc.) as well as shop safety.

32-462-322 Industrial Maintenance Mechanic 2 3 credits

Emphasizes on-the-job installing, troubleshooting and maintaining manufacturing systems with special focus on automated systems. This course is completed as an internship. Prerequisite: 32-462-311 or consent of instructor.

32-462-335 Metal Processes for Maintenance 2 credits

Includes machine shop operations, sheet metal work, soldering and brazing, forging and heat treatment, grinding, tool sharpening, metal casting and other metal applications as related to industrial machinery repair. Prerequisite: 32-420-330 or instructor consent.

32-462-340 Industrial Electricity and Controls 4 credits

Studies basic principles of physics specific to electro-mechanical systems. Emphasizes measurement, lubrication, energy, power, machines and fluid and chemical properties, as well as installation, timing and synchronization of machine drive components. Includes hands-on disassembly and assembly of industrial components. Studies motors, transformers and various electro-mechanical devices to enhance AC power distribution and control topics. Introduces programmable logic controllers in the on/off mode. Prerequisite: 32-414-316 and second semester standing or instructor consent.

32-462-341 Industrial Fluid Power 2 1 credit

Fundamentals of fluid power (hydraulic and pneumatic) and its components as well as principles, functions and terminology. Covers the application of basic fluid power systems to various machines along with maintenance and troubleshooting.

32-462-342 Industrial Fluid Power 3 1 credit

Fundamentals of fluid power (hydraulic and pneumatic) and its components as well as principles, functions and terminology. Covers the application of basic fluid power systems to various machines along with maintenance and troubleshooting.

Career Potential:

- Facility Maintenance
- Production Maintenance
- Lead Production Mechanic
- Heating and Air Conditioning Technician

With additional education and/or work experience, graduates may find employment as:

- Maintenance Manager
- Production Supervisor

Related Courses Available to the Public

- EPA Refrigerant Recovery Certificate
- Refrigeration courses
- Heating, venting and air conditioning courses

For information, call (608) 246-6821.

More detailed and updated information on this program may be available at: malcmadison.edu. The college reserves the right to make changes in the regulations and courses announced in this publication without notice.

Madison Area Technical College provides equal opportunity in education and employment.