

Industrial Maintenance Technician

Program Number: 32-462-1

Two-Year Technical Diploma

Manufacturing Program Cluster

School of Applied Technology

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.

Application Process

To apply to the program, students must submit a complete application. A completed application consists of 1.) Application; 2.) Application fee; and 3.) High school transcripts – or - GED/HSED test scores – or – college transcript showing an Associate, Bachelor, or higher degree from an institution other than Madison College.

Unique Requirements for Admission

There are no unique requirements for admission to this program.

Unique Requirements for Graduation

Students must meet two 2.0 GPA requirements to graduate. 1.) GPA for entire program must be 2.0 or above; 2.) GPA of combined occupational courses (462) must be 2.0 or above.

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. Requires concurrent enrollment in or completions of: Machine Tool Math 1 (10-804-110) OR College Math (10-804-107) OR COMPASS Algebra score of 40 or higher.

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. Pre-reqs: DC/AC Circuits (23-414-316); Drawing Interp (32-421-392); Safety Compliance (32-462-301); and Code Compliance (32-463-318).

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. Pre-reqs: DC/AC Circuits (32-414-316); Drawing Interp (32-421-392); Safety Compliance (32-462-301); and Code Compliance (32-463-318).

Curriculum

The courses listed below outline the requirements for graduation for students entering this program in the 2012-2013 academic year. Requirements for graduation may vary depending on the semester in which a student is admitted to their program. Current/continuing students should consult their degree progress report available through their student center account for specific graduation requirements. Program requirements are subject to change.

FIRST YEAR		Credits	Hrs/week
First Semester			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
32-462-306	Industrial Fluid Power 1Δ.....	1	1-1
32-462-341	Industrial Fluid Power 2□.....	2	2-2
32-462-301	Safety Compliance.....	1	2-0
10-804-107	College Math	3	4-0
Semester Total		14	

Second Semester		Credits	Hrs/week
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
32-462-316	Industrial Fluid Distribution Systems	2	2-2
32-462-318	Code Compliance.....	1	2-0
10-103-133	Excel - Beginning.....	1	1-1
10-104-189	Customer Relations	2	3-0
Semester Total		13	

SECOND YEAR		Credits	Hrs/week
First Semester			Lec-Lab
32-414-318	Electronic Circuits for Maintenance.....	3	3-3
32-414-319	Programmable Logic Controllers.....	3	3-3
32-401-308	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		Credits	Hrs/week
32-414-320	Programmable Logic Controllers 2.....	3	3-3
32-414-321	Interfacing Sensors with Computer Controls.....	3	3-3
32-401-309	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
Semester Total		18	

Δ Meets for 6 weeks.
□ Meets for 11 weeks.
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.

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Program Courses (continued)

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. Pre-req: Program Logic Controllers 1 (32-414-320).

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. Pre-reqs: DC/AC Circuits (23-414-316); Drawing Interp (32-421-392); Safety Compliance (32-462-301); and Code Compliance (32-463-318).

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. Concurrent enrollment or completion of Industrial Electricity and Controls (32-462-340)

32-462-306 Industrial Fluid Power 1 1 credit
32-462-341 Industrial Fluid Power 2 2 credits
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. Requires concurrent enrollment or completion of Machine Tool Math 1 (10-804-110) OR College Math (10-804-107) OR COMPASS Algebra score of 40 or higher. NOTE: Industrial Maintenance program students should take Fluid Power 1, and 2, in the same semester.

32-401-308 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.

32-401-309 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*. Pre-req: Heating and Air. 1 (32-462-308).

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. Prerequisites: DC/AC Circuits (32-414-316); Drawing Interp (32-421-392); Safety Compliance (32-462-301); and Code Compliance (32-462-318).

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. Co- or Pre-req of Machine Tool Math 1 (10-804-381) or equivalent. Requires concurrent enrollment in or completions of: Machine Tool Math 1 (10-804-110) OR College Math (10-804-107) OR COMPASS Algebra score of 40 or higher.

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. Pre-req: Program Logic Controllers 1 (32-414-319).

32-401-315 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. Pre-req: Heating and Air. 1 (32-462-308).

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. Requires concurrent enrollment in or completions of: Machine Tool Math 1 (10-804-110) OR College Math (10-804-107) OR COMPASS Algebra score of 40 or higher.

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. Prerequisites: Safety Compliance (32-462-301); and Code Compliance (32-462-318).

32-462-301 Safety Compliance 1 credit
Course focuses on workplace safety as well as OSHA compliance.

32-462-318 Code Compliance 1 credit
Focuses on laws governing workplace safety and environmental concerns such as those covered by EPA, DILHR and the DNR. Reviews general 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. Pre-req: Indus. Main. Mech 1 (32-462-311).

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 motors, transformers and various electro-mechanical devices to enhance AC power distribution and control topics. Introduces programmable logic controllers in the on/off mode. Prerequisites: DC/AC Circuits (32-414-316); Drawing Interp (32-421-392); Safety Compliance (32-462-301); and Code Compliance (32-462-318). Note: Industrial Maintenance program students should take this class with Industrial Equipment Mechanisms (32-462-303).

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

More detailed and updated information on this program may be available at: madisoncollege.org. 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.

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