

Program Number 32-462-1 Technical Diploma • Four Terms

ABOUT THE PROGRAM

Times are changing in the field of maintenance. Facilities are running with both manual and automated equipment and both need to be maintained and repaired. If you like to troubleshoot, work with your hands, and have an interest in math and electrical and mechanical processes, a career in maintenance is for you. Your expertise and knowledge is needed in today's modern, automated facilities.

PROGRAM OUTCOMES

- Demonstrate safe work procedures.
- Install industrial equipment and systems.
- Maintain industrial equipment and systems.
- Troubleshoot industrial equipment and systems.
- Repair industrial equipment and systems.
- Communicate technical information.

CAREER AND EDUCATION ADVANCEMENT OPPORTUNITIES

LTC credits transfer to over 30 universities. For more information visit gotoltc.edu/future-students/transfer.

ADMISSION TO DO'S

- Work with Career Coach to:
 - Submit application and \$30 fee.
 - Submit official transcripts (high school and other colleges).

PROGRAM TO DO'S

- Work with Academic Advisor to:
 - Complete Functional Abilities Statement of Understanding form.
 - Meet to plan your first semester schedule, review your entire plan of study, and complete Program To Do's.

APPROXIMATE COSTS

- \$134.20 per credit tuition (WI resident) plus \$7.38 per credit student activity fee. \$10 per credit online fee. Material fee varies depending on course. Other fees vary by program. Visit gotoltc.edu/financial-aid/tuition-and-fees for details.

FINANCIAL AID

This program is eligible for financial aid. Visit gotoltc.edu/Financial-Aid or talk with your Career Coach about how to apply for aid.

SPECIAL NOTE

Students need to supply their own safety glasses and welding gloves.

RELATED PROGRAMS

- Electro-Mechanical Technology
- Millwright Apprenticeship
- Industrial Electrician Apprenticeship
- Maintenance Technician Apprenticeship

CONTACT

LTC Career Coach
920.693.1162 • CareerCoach@gotoltc.edu

Catalog No.	Class Title	Credit(s)
Term 1		
31462317	Trades Math Industrial Maintenance 1	1
31462318	Trades Math Industrial Maintenance 2	1
31462309	Industrial Maintenance Introduction	1
31462388	Industrial Maintenance Print Reading	1
31462325	Maintenance Tools and Measurement	1
10620122	Industrial Wiring	2
31420394	Industrial Maintenance Machine Tool Introduction	2
31801359	Communication Skills for the Workplace	2
31809362	Psychology for Life	1
		12
Term 2		
31462308	Industrial Maintenance Pumps, Fluid/Air Handling	2
31442346	Industrial Maintenance Introduction to Welding	1
31442347	Industrial Maintenance Introduction to Fabrication	1
10620155	Industrial Maintenance Hydraulics and Pneumatics	3
31420395	Industrial Maintenance Machine Tool Lathes and Mills	2
31462310	Industrial Maintenance Bearings and Lubrication	2
31462305	Industrial Maintenance Power Transmission	3
31462314	Troubleshooting/Mach Repair	3
		17
Term 3		
31462302	Industrial Maintenance Layout and Rigging	1
31462319	Preventive and Predictive Maintenance	1
10620168	Robotics Introduction	2
10620169	Robotic Maintenance	1
10660105	DC Fundamentals	2
10804115	College Technical Mathematics 1	5
		12
Term 4		
10620135	Electrical Robotic Maintenance	1
31420308	Intro to CNC Turning Center	1
31449301	OSHA 30	1
10620104	Fluid Power 2	3
10620138	Programmable Controllers - Allen Bradley	3
10620141	Industrial Controls and Motors	3
10660110	AC Fundamentals	2
		14
		TOTAL 55

Curriculum and Program Acceptance requirements are subject to change. Program start dates vary; check with your advisor for details. The tuition and fees are approximate based on 2018-2019 rates.



AC FUNDAMENTALS...prepares the student to analyze electrical circuits using AC math, analyze AC waveforms, measure and analyze AC power, analyze capacitors and inductors in DC and AC circuits, analyze AC circuits containing reactance and calculate resonance, apply the elements and properties of basic measuring circuits, and describe transformer characteristics. PREREQUISITES: 10660105 DC Fundamentals

COLLEGE TECHNICAL MATHEMATICS 1...prepares the student to solve linear, quadratic, and rational equations; graphing; formula rearrangement; solve systems of equations; percent; proportions; measurement systems; computational geometry; right and oblique triangle trigonometry; trigonometric functions on the unit circle; and operations on polynomials. Emphasis will be on the application of skills to technical problems. This course is the equivalent of successful completion of College Tech Math 1a and 1b. PREREQUISITES: 10834110 Elementary Algebra w Apps or 31457318 Ind Mntc Trades Math or 31420320 Machine Tool Math or equivalent.

COMMUNICATION SKILLS FOR THE WORKPLACE...prepares the student to develop paper job-search tools and job-related writing skills to increase job stability; introduces the students to team-building skills to resolve organizational problems; introduces the student to the skills of effective listening; prepares the student to respond to workplace criticism and praise; and introduces the student to interpersonal relationship skills, including effective interviewing skills, customer relations, and management/employee relations.

DC FUNDAMENTALS...prepares the student to convert values to scientific and engineering notations; calculate math quantities; describe basic atomic theory; identify basic electrical terms; use established symbols standards; describe DC voltage characteristics and current sources and electrical resistance; measure and analyze electrical quantities in series and parallel circuits; and desolder/solder single lead components. COREQUISITES: 10804115 College Technical Math 1 or 10804113 College Tech Math 1A and 10804114 College Tech Math 1B or 10804118 Intermediate Algebra w Applications and 10624105 or 10624105HS Health Physics Calculations and Statistics

ELECTRICAL ROBOTIC MAINTENANCE...investigates error codes using the Fanuc A size cabinet with a R30IB controller. Students will identify the cause of the various codes and be trained in the repair. Students will also be trained in motor / gear replacement and robot mastering.

FLUID POWER 2...enhances the learner's ability to read schematics containing fluid power component symbols; assemble systems using schematics; analyze system's operation using a schematic; evaluate the general characteristics and terms of fluids under pressure, fluid conditioning, conductors, reservoirs, accumulators, pressure control; and troubleshoot malfunctioning pressurized systems. PREREQUISITE: 10620103 Fluid Power 1 or 10620155 Industrial Maintenance Hydraulics and Pneumatics

INDUSTRIAL CONTROLS AND MOTORS...prepares the learner to select control devices by function and operation; illustrate electrical circuits using symbols, diagrams, and abbreviations; explain the operation of magnetic solenoids and apply motor control techniques and introduces the student to three-phase power motor circuits for industrial applications. COREQUISITES: 10660110 AC Fundamentals

INDUSTRIAL MAINTENANCE BEARINGS AND LUBRICATION...prepares the learner to properly identify, remove, install, and maintain both plain and rolling element bearings used with either a radial or axial load, including ball, cylindrical roller, tapered roller, linear, and thrust bearings; use manufacturers' resources for proper usage and life of bearings; and look at proper types, properties, and application methods of lubrication. PREREQUISITE: 31462309 or 31462300 Ind Mntc Intro and 31462325 Mntc Tools and Measurement; and COREQUISITES: 31420320 Machine Tool Math or 31462317 Trades Math Indus Mntc 1 and 31462318 Trades Math Indus Mntc 2

INDUSTRIAL MAINTENANCE HYDRAULICS AND PNEUMATICS...prepares the learner to identify hydraulic and pneumatic component symbols and terms, adjust a pressure relief valve, analyze the operation of a pilot operated relief valve; analyze Pascal's law; evaluate flow, velocity, work and power in industrial hydraulic and pneumatic circuits; analyze meter-in, meter-out, and bypass flow control circuits; identify basic hydraulic and pneumatic control valves; and assemble hydraulic circuits. PREREQUISITE: 31462309 or 31462300 IM Introduction and 31462317 Trades Math IM 1 and 31462318 Trades Math IM 2 or COREQUISITE: 10804115 College Tech Math

INDUSTRIAL MAINTENANCE INTRODUCTION...prepares the learner to apply basic safety, mechanics, force, friction, work, and energy; learn terminology related to maintenance; introduction to threaded and non-threaded fasteners and concrete anchoring; learn to use precision measuring tools; introduction to single-phase and three-phase motor wiring. COREQUISITE: 31462325 Maintenance Tools and Measurement

INDUSTRIAL MAINTENANCE INTRO TO FABRICATION...introduces the learner to various methods of steel fabrications. The learner will read and interpret simple drawings to produce steel fabrications from assembly drawings and sketches. The learner will assemble steel fabrication assemblies by using sheet metal, hand tools, and power hand tools. The learner will cut material while using stationary and CNC material processing equipment. By following written procedures, the learner will fit and weld simple steel assemblies. PREREQUISITES: 31462309 or 31462300 Ind Mntc Intro, 31462325 Mntc Tools and Measurement, 31462388 Ind Mntc Print Rdg and 31442346 Ind Mntc Wldg or 31442300 or Welding Intro

INDUSTRIAL MAINTENANCE INTRODUCTION TO WELDING...introduces the learner to the welding field, including practicing safety and care of equipment and supplies used in common arc welding processes, practice in setup and technique for basic SMAW, GTAW, and GMAW equipment in common positions and on common joints; introduces oxy-fuel and plasma arc cutting.

INDUSTRIAL MAINTENANCE LAYOUT AND RIGGING...prepares the learner to perform layout skills for industrial maintenance to include machine layout, proper rigging, installation, and leveling with emphasis on baseline layout, machine rigging and installation, machine leveling, and alignment procedures. Participants will obtain lift truck operation certification upon completion. PREREQUISITES: 31462309 or 31462300 Industrial Maintenance Introduction and COREQUISITES: 31420320 Machine Tool Math or 31462317 Trades Math IM 1 and 31462318 Trades Math IM 2.

INDUSTRIAL MAINTENANCE MACHINE TOOL INTRODUCTION...prepares the learner with the skills to identify basic types of machining processes, follow standard shop safety rules, use semi-precision and precision measuring tools, perform workpiece layout procedures, identify metal composition and classification, follow cutoff machine safety rules, operate vertical and horizontal cutoff machines, follow sensitive drill press safety rules, identify drill press components, interpret attributes of hole-producing tools, and operate a sensitive drill press.

INDUSTRIAL MAINTENANCE MACHINE TOOL LATHES AND MILLS...prepares the learner to identify the characteristics and attributes of turning tools, apply engine lathe and milling machine safety rules, identify engine lathe and milling machine components, perform facing, turning, and cutoff operations, select and use various workholding devices and cutting tools, perform hole-producing operations, set up a vertical milling machine, mill square surfaces, precision steps and slots, and mill keyseats on a shaft. PREREQUISITE: 31420394 Ind Maint Machine Tool Introduction

INDUSTRIAL MAINTENANCE POWER TRANSMISSION...introduces the learner to belt, chain, and gear drives used in industrial maintenance applications, including v-belts, flat belts, timing belts, conveyor chains, roller chains, bevel gears, worm gears, helical gears, spur gears, couplings, and alignment with emphasis on identification, installation, repair, and maintenance. PREREQUISITES: 31462309 Industrial Maintenance Introduction or 31462300 Industrial Maintenance Introduction and 31462325 Mntc Tools and Measurement and COREQUISITE: 31462310 Industrial Maintenance Bearings and Lube

INDUSTRIAL MAINTENANCE PRINT READING...prepares the learner to read prints; make isometric sketches; interpret orthographic projection drawings, to include sections, surface finishes, and tolerancing. The course when delivered in the evening is self-paced, open-entry/exit, and designed for individualized student needs.

INDUSTRIAL MAINTENANCE PUMPS, FLUID/AIR HANDLING...prepares the learner to identify, install, repair, and maintain common pumps and plumbing applications, including centrifugal pumps, diaphragm pumps, packing and seals, tubing, and installing hose and piping used with fluid and air handling. PREREQUISITE: 31462309 or 31462300 IM Intro, 31462325 Mntc Tools/Measure, 31462388 IM Print Rdg, 31462317 Trades Math IM 1 and 31462318 Trades Math IM 2, or 31420320 MT Math and COREQUISITE: 10620155 IM Hyd/Pneum

INDUSTRIAL WIRING...prepares the learner to follow safety procedures; maintain a safe and healthy work environment; construct electrical circuits; measure electrical quantities using a VOM and/or DVM; analyze measured values using electrical circuit laws; construct typical industrial control circuits; and analyze typical industrial control circuits.

INTRO TO CNC TURNING CENTER...prepares the learner to follow Computer Numerical Control (CNC) turning center safety rules, apply coordinate systems, identify CNC turning center components and tooling; load programs into the CNC turning center, load cutting tools, enter offsets for tools and workpiece, and operate a CNC turning center. COREQUISITE: 31420341 Machine Tool Lathes 1B or PREREQUISITE: 31420395 Ind Mntc Machine Tool Lathes and Mills

MAINTENANCE TOOLS AND MEASUREMENT...prepares the learner to use hand tools, precision measuring instruments, and torque tools.

OSHA 30...gives basic overview of OSHA's role in prevention and elimination of work-related illnesses and injuries. Includes information about employer & employee rights and responsibilities, and a brief look at safety on the job site in relation to cranes, electrical, excavation, fall protection, materials handling, personal protection equipment, stairs-ladders-scaffolds, and power tools.

PREVENTIVE AND PREDICTIVE MAINTENANCE...provides students the opportunity to research the items to be inspected in a preventive maintenance program. Students develop preventive maintenance schedules and perform actual inspections of mechanical, fluid power, and electrical systems. Techniques for troubleshooting periodic maintenance are explored. PREREQUISITE: 31462314 Troubleshooting/Machine Repair

PROGRAMMABLE CONTROLLERS - ALLEN BRADLEY...prepares the student to understand basic PLC structure and terminology; learn to create and troubleshoot basic PLC programs using the RSLOGIX 500 software and the RSLINX communication software; become familiar with communicating with programming SLC-500 PLCs. Course is highly computer based.

PSYCHOLOGY FOR LIFE...prepares learner to select behavior modification techniques, demonstrate techniques for enhancing memory, analyze expressions of emotion, use conflict for common good, employ techniques to reduce conflict/frustration, use several methods to reduce stress, interpret personality types, ascertain contributors to perception, and apply methods of problem-solving.

ROBOTIC MAINTENANCE...introduces the students to the robot teach pendant and robot jogging. Students will be taught to replace servo motors, recalibrate the robot and back up robot software and programs.

ROBOTICS INTRODUCTION...introduces the student to robotic axes, movement control, navigating the teach pendant, robotic frames, basic programming commands such as conditional branching, wait and call instructions.

TRADES MATH INDUSTRIAL MAINTENANCE 1...prepares the learner to use scientific calculators for the applications of common fraction and mixed number problems, decimal problems, inch and metric conversion problems, basic percentage problems, powers and roots, and pre-algebra problems. This course is self-paced when delivered in the evening.

TRADES MATH INDUSTRIAL MAINTENANCE 2...provides the learner with the necessary skills to use scientific calculators for the application of pre-algebra, algebra, geometry, and trigonometry. The course is self-paced, open entry/exit, and designed for individualized student needs. PREREQUISITE: 31462317 Trades Math Industrial Maintenance 1

TROUBLESHOOTING/MACHINE REPAIR...prepares the learner to perform essential troubleshooting, repair, and preventive maintenance of various machine tools and installations used in industrial maintenance and to integrate the skills learned in the other maintenance courses to perform complete repair of machine tools. PREREQUISITE: 31462309 or 31462300 IM Intro, 31462325 Mntc Tools/Meas, 31462305 IM Pwr Trans, 10620122 Ind Ctrls Intro, 31462308 IM Pmps, Fld/Air Hndlg and 31462310 IM Bearings/Lube