

## Program Number 31-462-2 Technical Diploma • Two Terms

### ABOUT THE PROGRAM

Machines are important in our lives—directly or indirectly. Broken or inefficient machines slow the pace of manufacturing and, ultimately, profits. To remain competitive in today's fast-paced industrial/manufacturing environment, equipment needs to be maintained to run at peak performance. If you like to troubleshoot problems, put theory to work hands-on, and have interests in math and mechanical processes, a career in industrial maintenance may be your key to success.

### 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](http://gotoltc.edu/future-students/transfer).

### ADMISSION AND PROGRAM ENROLLMENT STEPS

- Submit online application.
- Submit transcripts (high school & other colleges). NOTE: Official transcripts required for acceptance of transfer credits; Financial Aid may require.
- Complete the online Student Success Questionnaire.
- Meet to plan your first semester schedule, review your entire plan of study, and complete Program To Do's.

### APPROXIMATE COSTS

- \$138.90 per credit tuition (WI resident) plus \$8.33 per credit student activity fee. \$10 per credit online, iFlex or hybrid fee. Material fee varies depending on course. Other fees vary by program. Visit [gotoltc.edu/financial-aid/tuition-and-fees](http://gotoltc.edu/financial-aid/tuition-and-fees) for details.

### FINANCIAL AID

This program is eligible for financial aid. Visit [gotoltc.edu/Financial-Aid](http://gotoltc.edu/Financial-Aid) or talk with your Admissions Advisor about how to apply for aid.

### SPECIAL NOTE

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

### RELATED PROGRAMS

- Millwright Apprenticeship
- Electro-Mechanical Maintenance Technology
- Electro-Mechanical Automation Technology

### CONTACT

LTC Admissions Advisor  
920.693.1162 • [CareerCoach@gotoltc.edu](mailto:CareerCoach@gotoltc.edu)

Catalog No.	Class Title	Credit(s)
<b>Term 1</b>		
10804113	College Technical Math 1A OR 10804198 Calculus 1*	3
10462109	Maintenance Introduction	1
10462111	Maintenance Print Reading	2
10462107	Tools and Measurement	1
10620122	Industrial Wiring	2
10420194	Machine Tool Introduction	2
10442100	Welding Introduction	1
10457103	Fabrication Introduction	1
10462115	Layout and Rigging	1
		<b>14</b>
<b>Term 2</b>		
10462123	Pumps, Fluid/Air Handling	2
10620155	Hydraulics and Pneumatics	3
10420103	Lathes 1	1
10420105	Mills 1	1
10462125	Bearings and Lubrication	3
10462119	Power Transmission	2
10462121	Troubleshooting and Machine Repair	3
10801196	Oral/Interpersonal Communication	3
		<b>18</b>

**TOTAL 32**

\*Calculus 1 is designed for students planning to transition to a 4-year college following LTC program completion.

*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 2020-2021 rates and are subject to change prior to the start of the academic year.*



**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. PREREQUISITES: 10804113 College Tech Math 1A and 10462109 Maintenance Introduction or 31462309 Industrial Maintenance Introduction

**COLLEGE TECHNICAL MATHEMATICS 1A**...prepares the student to solve linear, quadratic, and relational equations; graph; formula rearrangement; solve systems of equations; percent; proportions; and operations on polynomials. Emphasis will be on the application of skills to technical problems. PREREQUISITES: 10834110 Elementary Algebra w Apps or 10804107 College Mathematics or 31457318 Ind Mtnc Trades Math or 31420320 Machine Tool Math or math placement assessment equivalent

**FABRICATION INTRODUCTION**...introduces the learner to various types of structural steel, sheet metal, and pipe, and prepares the learner to perform fabrication from assembly prints, including cutting, welding, bending, straightening, and repair. COREQUISITE: 10442100 Welding Introduction or PREREQUISITES: 31442346 IM Intro to Welding or 31442300 Welding Intro and COREQUISITE: 10462109 Maintenance Intro or PREREQUISITE: Industrial Maintenance Intro

**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. PREREQUISITES: 10462109 Maintenance Intro or 31462309 Industrial Maintenance Intro and 10804113 College Tech Math 1A

**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.

**LATHES 1**...introduces the student to the characteristics and attributes of turning tools: follow engine lathe safety rules, identify engine lathe components, perform facing and center drilling operations, perform turning operations. COREQUISITE: 10462107 Tools and Measurement or PREREQUISITE: 31462325 Maintenance Tools and Measurement and PREREQUISITE: 10420194 Machine Tool Intro or 31420394 IM Machine Tool Intro

**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. COREQUISITE: 10462109 Maintenance Intro or PREREQUISITE: 31462309 Ind Mtnc Intro and COREQUISITE: 10804113 College Tech Math 1A and COREQUISITE: 10462111 Maintenance Print Reading or PREREQUISITE: 31462388 IM Print Reading

**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.

**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. PREREQUISITE: 31462325 Maintenance Tools and Measurement or COREQUISITE: 10462107 Tools and Measurement

**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.

**MILLS 1**...prepares the learner to identify vertical milling machine components, select cutting tools and workholding device(s), apply safety rules, set up the vertical milling machine, and mill square surfaces. COREQUISITE: 10420103 Lathes 1 or PREREQUISITE: 31420395 IM Machine Tool Lathes and Mills

**ORAL/INTERPERSONAL COMMUNICATION**...provides students with the skills to develop speaking, verbal and nonverbal communication, and listening skills through individual speeches, group activities, and other projects. COREQUISITE: 10838105 Intro Reading and Study Skills or Reading placement assessment equivalent

**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. COREQUISITE: 10462119 Bearings and Lubrication

**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. PREREQUISITES: 10462115 Layout and Rigging or 31462302 IM Layout and Rigging and COREQUISITE: 10620155 Hydraulics and Pneumatics Tools and Measurement...prepares the learner to use hand tools, precision measuring instruments, and torque tools.

**TROUBLESHOOTING AND 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. COREQUISITES: 10462119 Power Transmission and 10462123 Pumps, Fluid/Air Handling and PREREQUISITE: 10620122 Industrial Wiring

**WELDING INTRODUCTION**...introduces the learner to the world of welding, weld shop safety practices, welding terminology, and welding machine setup to industry standards. Learners will be introduced to the three major welding processes: SMAW, GMAW, and GTAW and will build skills welding with each process in the flat, and horizontal positions while using the common welding joints found in industry. The learner will process material using the two major hand held cutting processes - the Oxyfuel and PAC cutting processes