

Brief Program Description The Mechatronics & Industrial Automation Technician program is a 9 week program designed to help students develop the skills and knowledge needed for work as entry-level mechatronics and industrial automation technicians.

Mechatronics is where mechanical, electronic, control, and software engineering converge. Also known as electro-mechanical maintenance technicians, mechatronics technicians combine knowledge of mechanical technology with knowledge of electrical and electronic circuits. They install, troubleshoot, repair, and upgrade electronic and computer-controlled mechanical systems, such as robotic assembly machines. Mechatronics technicians work closely with electrical and mechanical engineers. They work primarily in manufacturing, engineering services, and research and development.

Students complete courses in the following areas:

1. **Electrical**
The electrical unit provides students with a knowledge base for the automation unit in this certificate program. Students learn about the production of electricity and how it is transmitted and distributed. Students also gain advanced knowledge of electrical theory and its application to a variety of practical situations.
2. **Automation**
Automation is the use of devices, machines and control systems in order to decrease the need for human work. Automated systems are used in numerous industries due to their economic benefits. Understanding automation and its benefits, as well as the power sources used in automated systems, is integral to the success of an automation technician. In this unit, students learn about industrial automation, pneumatic systems, air compression, vacuum technology, pneumatic applications, hydraulic systems, programmable logic controllers, process controls and robotics.
3. **Math**
Students develop the math skills required for work as mechatronics industrial automation technicians. Topics covered include basic math skills such as fractions and decimals, the Metric System, the Cartesian Coordinate System and geometry.

4. Safety

In this unit, students learn about workplace safety procedures, including occupational health and safety standards, hazard analysis, personal protective equipment (PPE), hazardous material safety, work area safety, including fall protection systems, electrical and fire safety, tool and machine safety.

Upon successful completion of the program, students receive a Mechatronics & Industrial Automation Technician certificate.

Career Occupation

Industrial Instrument Technicians (NOC 2243)

Hiring Industries

- aerospace
- automotive
- building maintenance
- civil infrastructure
- construction
- consumer products
- electrical equipment
- logistics and distribution
- manufacturing
- marine
- materials processing
- medical devices
- military

Admission Requirements

Minimum Canadian Language Benchmark (CLB) 7 or equivalent

Program Prerequisites

none

Learning Objectives

Upon successful completion of this program, the learner will be able to:

- consult manufacturers' manuals, circuit diagrams and blueprints to determine tests and maintenance procedures for instruments
- inspect and test the operation of instruments and systems to diagnose faults using pneumatic, electrical and electronic testing devices and precision measuring instruments
- repair and adjust system components such as sensors, transmitters and programmable logic controllers or remove and replace defective parts
- calibrate components and instruments according to manufacturers' specifications
- perform scheduled preventative maintenance work and complete test and maintenance reports

Teaching Methods

Instruction is delivered through a series of asynchronous interactive online courses. Each course is comprised of a number of modules that

students must master before they are able to proceed to the next module or course.

Method(s) of Student Evaluation	Students must demonstrate mastery (a score of 100% on quizzes) for each course. Student success is measured through the successful completion of all courses in the program.
Completion Requirements	Students must: <ul style="list-style-type: none">• complete all of the courses listed in the Mechatronics Industrial Automation Technician program outline• demonstrate mastery of all course modules
Required Program Materials	This program requires: internet access using either: <ul style="list-style-type: none">• Google Chrome• Mozilla Firefox• Internet Explorer Headphones
Program Duration	2.3 months completing 3 modules a day (149 hours)
Homework Hours	none, all work is completed online
Delivery Methods	<i>Indicate how the course is delivered:</i> <input type="checkbox"/> <i>In-class instruction</i> <input checked="" type="checkbox"/> <i>Distance education (online)</i> <input type="checkbox"/> <i>Combined delivery (both in-class and distance)</i>

Program Organization

Course No.	Course Name		No. of Hours
STU-1001	180 Skills Orientation - 180 Skills	Greatest Day Ever	0.6
STU-1002	Using a Learning Management System	How to Take a Course	0.8
STU-1003	Using a Learning Management System	How to Navigate the LMS	1.0
STU-1004	Learning Online	Tips for Succeeding in Online Learning	0.8
AUT-1001	Introduction to Industrial Automation	Introduction to Automation	0.8
AUT-1002	Introduction to Industrial Automation	Automated Process	1.1
AUT-1003	Introduction to Industrial Automation	Automated System	1.7
MTH-1001	Basic Math	Introduction to Basic Math	0.7
MTH-1002	Basic Math	Arithmetic Operations	1.4
MTH-1003	Basic Math	Numbers and the Number Line	1.1
MTH-1004	Fractions	Introduction to Fractions	1.1
MTH-1005	Fractions	Working with Fractions	1.4
MTH-1006	Decimals	Decimal Numbers	1.0
MTH-1007	Positive and Negative Numbers	Positive and Negative Numbers	0.9
MTH-1008	Cartesian Coordinates	Cartesian Coordinates	0.9
MTH-1009	The Metric System	The Metric System	1.1
SAF-1002	Introduction to Safety	Making Work a Safer Place	1.6
SAF-1003	Introduction to Safety	Help! What to Do in an Emergency	1.2
SAF-1004	Personal Protective Equipment Safety	Personal Protective Equipment	1.5
SAF-1005	Personal Protective Equipment Safety	Eye and Face Protection	1.0
SAF-1006	Personal Protective Equipment Safety	Head Protection	0.9
SAF-1007	Personal Protective Equipment Safety	Foot and Leg Protection	0.9
SAF-1008	Personal Protective Equipment Safety	Hand and Arm Protection	1.1
SAF-1009	Personal Protective Equipment Safety	Body Protection	0.8
SAF-1010	Personal Protective Equipment Safety	Hearing Protection	0.9
SAF-1011	Personal Protective Equipment Safety	Respiratory Protection	1.2
SAF-1012	Hazardous Material Safety	Hazardous Materials	1.5
SAF-1013	Hazardous Material Safety	HazCom	1.4
SAF-1014	Hazardous Material Safety	Hazardous Waste	0.7
SAF-1016	Workplace Safety	Work Area Safety	1.2
SAF-1017	Workplace Safety	Permit-Related Safety	1.0

Course No.	Course Name		No. of Hours
SAF-1018	Workplace Safety	Fall Prevention	1.3
SAF-1019	Workplace Safety	Ladder Safety	1.1
SAF-1020	Electrical and Fire Safety	Electrical Safety	1.4
SAF-1021	Electrical and Fire Safety	Lockout/Tagout	1.0
SAF-1022	Electrical and Fire Safety	Fire Safety	0.9
SAF-1023	Electrical and Fire Safety	Fire Extinguishers	0.9
SAF-1027	Tool and Machine Safety	Hand Tool Safety	1.0
SAF-1028	Tool and Machine Safety	Power Tool Safety	1.1
SAF-1029	Tool and Machine Safety	Sheet Metal and Compressed Gas Safety	0.8
SAF-1030	Tool and Machine Safety	Machine Safety	1.3
SAF-1031	Tool and Machine Safety	Safety Devices	1.0
PNE-1001	Introduction to Pneumatics	Introduction to Pneumatics	1.3
PNE-1002	Introduction to Pneumatics	Pneumatic Systems	1.3
PNE-1003	Introduction to Pneumatics	The Properties of Gases	1.8
PNE-1004	Introduction to Pneumatics	Air Compression and Distribution - Part One	1.9
PNE-1005	Introduction to Pneumatics	Air Compression and Distribution - Part Two	1.5
PNE-2001	Components of a Pneumatic System	Compressed Air Treatment	1.4
PNE-2002	Components of a Pneumatic System	Pneumatic Actuators	2.4
PNE-2003	Components of a Pneumatic System	Directional Control Valves	1.8
PNE-2004	Components of a Pneumatic System	Vacuum Technology	2.1
PNE-2005	Components of a Pneumatic System	Measuring Pneumatic Variables	1.3
PNE-3001	Pneumatic Applications	Pneumatic Applications	1.8
ELE-1001	Introduction to Electricity	Production of Electricity	1.7
ELE-1002	Introduction to Electricity	Transmission and Distribution of Electricity	1.1
ELE-1003	Introduction to Electricity	Uses of Electricity	1.2
ELE-1004	Introduction to Electricity	Atomic Structure	0.8
ELE-1005	Introduction to Electricity	Electrical Circuits	0.8
ELE-1006	Introduction to Electricity	Electrical Current	0.8
ELE-1007	Introduction to Electricity	Voltage	0.7
ELE-1008	Introduction to Electricity	Electrical Power	0.7
ELE-1009	Introduction to Electricity	Resistance	0.9
ELE-1010	Introduction to Electricity	Ohm's Law	0.7
ELE-1011	Introduction to Electricity	Watt's Law	0.8
ELE-2019	Electrical Measurement Conversion	Electrical Measurement and Unit Conversion	0.9

Course No.	Course Name		No. of Hours
ELE-1012	DC Electricity	Direct Current	0.7
ELE-1013	DC Electricity	Batteries	0.7
ELE-1014	DC Electricity	Circuit Analysis	1.6
ELE-1015	AC Electricity	Electromagnetism	1.1
ELE-1016	AC Electricity	AC Waveform Generation	0.7
ELE-1017	AC Electricity	Electromagnetic Devices	1.0
ELE-1018	AC Electricity	Transformers	0.9
ELE-1019	AC Electricity	Capacitors	0.8
ELE-1020	Solid State Electricity	Semiconductors	0.9
ELE-1021	Solid State Electricity	Solid State Devices	1.4
ELE-2001	Introduction to Wiring	Wires, Connectors, and Circuit Protection	1.5
ELE-2002	Introduction to Wiring	Connecting Transformers	1.2
ELE-2003	Introduction to Electric Motors	DC Motors	1.4
ELE-2004	Introduction to Electric Motors	AC Single-Phase Motors	0.7
ELE-2005	Introduction to Electric Motors	Three-Phase AC Motors	0.9
ELE-2006	Electrical Connectors	Electrical Connectors and Fasteners	1.3
ELE-2012	Sensor Technology	Introduction to Sensors Technology	1.4
ELE-2013	Sensor Technology	Sensor Technology	1.2
ELE-2014	Sensor Technology	Proximity Sensors	1.4
ELE-2015	Sensor Technology	Position, Speed, and Acceleration Sensors	1.7
ELE-2016	Sensor Technology	Industrial Process Sensors	1.6
ELE-2017	Sensor Technology	Advanced Sensors	1.6
HYD-1001	Introduction to Hydraulics	Introduction to Hydraulics	1.1
HYD-1002	Introduction to Hydraulics	Hydraulic Theory	1.3
HYD-1003	Introduction to Hydraulics	Hydraulic Fluids	0.9
HYD-1004	Introduction to Hydraulics	Hydraulic Systems	1.4
HYD-2001	Components of a Hydraulic System	Hydraulic Actuators	1.1
HYD-2002	Components of a Hydraulic System	Classification of Hydraulic Valves	2.2
HYD-2003	Components of a Hydraulic System	Hydraulic Piping and Instrumentation	1.0
HYD-2004	Components of a Hydraulic System	Hydroelectric Symbology and Circuits	1.5
PLC-1001	Programmable Logic Controllers	Introduction to Programmable Controllers	1.0

Course No.	Course Name		No. of Hours
PLC-1002	Programmable Logic Controllers	Introduction to Digital Electronics	1.5
PLC-2001	Programmable Logic Controllers	Types and Functions of Programmable Controllers	0.8
PLC-2002	Programmable Logic Controllers	General Structure of PLC	1.4
PLC-2003	Programmable Logic Controllers	Physical Integration of the PLC	1.3
PLC-2004	Programmable Logic Controllers	Internal Structure of the CPU	1.2
PLC-2005	Programmable Logic Controllers	Basic Concepts of PLC Programming	1.6
PLC-2006	Programmable Logic Controllers	Common PLC Applications	1.7
AUT-2001	Process Controls	Introduction to Process Controls	1.1
AUT-2002	Process Controls	Process Control Systems	1.7
AUT-2003	Process Controls	Set Point/Comparator	1.0
AUT-2004	Process Controls	Controller (PID Control)	1.5
AUT-2005	Process Controls	Multivariate Processes	1.2
ROB-1001	Robotics	Introduction to Robotics	1.1
ROB-1002	Robotics	Robot Safety	1.5
ROB-2001	Robotics	Robot Axes	1.7
ROB-2002	Robotics	Robot Manipulator	1.3
ROB-2003	Robotics	Controller and End Effectors	1.7
ROB-2004	Robotics	Robot Programs	1.3
ROB-2005	Robotics	Industrial Robot Applications	1.2
TOTAL HOURS:			137