

Area of Interest: Advanced Technology

## Manufacturing Engineering Technician

Ontario College Diploma

Program Code: 1518X01FWO

2 Years

Ottawa Campus

### Our Program

**Prepare for a variety of dynamic technical positions within the manufacturing industry.**

The two-year Manufacturing Engineering Technician Ontario College Diploma program prepares you for technical positions in the manufacturing industry. Gain a broad overview of manufacturing and industrial engineering principles, with a focus on product manufacturing, and learn from professionals with strong industrial backgrounds.

As a student in this program, you experience a combination of classroom, lab and machine shop environments and cultivate ideas from conception to production within various streams. These include, but are not limited to:

- solid modelling
- computer numerical control (CNC) programming
- computer-aided manufacturing (CAM)
- process engineering
- fabrication
- project management
- quality control

Learn how to use tools specific to the industry such as software and machinery, Computer-Aided Design and Computer-Aided Manufacturing, and CNC machinery. In your final term, undertake projects with external or internal industry partners where you analyze, plan and execute deliverables.

Graduates may work in several capacities within the industry, finding employment as a:

- CNC programmer
- CNC machinist
- quality control inspector
- tech associate
- production scheduler
- CAD drafter and designer
- process engineering in manufacturing firms and corporations
- manufacturing plant technician

### SUCCESS FACTORS

This program is well-suited for students who:

- Have knowledge of the career opportunities and study expectations of the program.
- Possess strong numeracy skills.
- Are interested in mechanical functions and manufacturing.
- Have solid conceptualization skills.
- Enjoy using problem-solving skills to find solutions.
- Are detailed-oriented and mechanically inclined.
- Have an aptitude for programming.
- Have an interest in working in machine shops and similar industrial environments.

## Employment

Graduates may find employment in positions such as CNC operators and CNC programmers, production schedulers, machinists, quality control inspectors, CAD drafters and designers and process engineering technician, ranging from small manufacturing firms to large multi-national manufacturing corporations.

## Learning Outcomes

The graduate has reliably demonstrated the ability to:

- Analyze and solve routine technical problems related to manufacturing environments through the application of engineering principles.
- Conduct routine analysis of components, processes, and systems through the application of engineering principles and practices.
- Interpret and prepare graphics and other technical documents to appropriate engineering standards.
- Use computer hardware and software to support the engineering environment.
- Apply knowledge of manufacturing materials, operations, and processes to support the production of components.
- Apply knowledge of machinery, tools and other equipment to manufacture and assemble components.
- Conduct quality control and quality assurance procedures as required.
- Recognize the environmental, economic, legal, safety, and ethical implications of manufacturing projects.
- Use and maintain documentation, inventory, and records systems.
- Contribute to the implementation of a manufacturing project.
- Develop strategies and plans to improve job performance and work relationships.
- Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship.

## Program of Study

| <b>Level: 01</b>                              | <b>Courses</b>                                  | <b>Hours</b> |
|---|---|--------------|
| CAD8300                                       | Computer Aided Design/Drafting (CAD/D)          | 56.0         |
| ELN8613                                       | Basic Electronic Assembly                       | 28.0         |
| ELN9104                                       | DC and AC Electronics                           | 84.0         |
| ENL1813T                                      | Communications I                                | 42.0         |
| GEN0351                                       | Strategies for Learning                         | 42.0         |
| MAT8001M                                      | Math for Engineering Technicians                | 56.0         |
| MFG8528                                       | Metrology                                       | 42.0         |
| <b>Level: 02</b>                              | <b>Courses</b>                                  | <b>Hours</b> |
| CAM8515                                       | Computer Aided Manufacturing I                  | 28.0         |
| ENG0005                                       | Introduction to Quality Assurance               | 28.0         |
| ENG8317                                       | Statics and Mechanics of Materials              | 56.0         |
| MFG8519                                       | Machine Shop I                                  | 70.0         |
| ROB8220                                       | Industrial Pneumatics                           | 56.0         |
| WEL9107                                       | Introduction to Fuel Gas and Electrical Welding | 42.0         |
| <b>Choose one from equivalencies: Courses</b> | <b>Hours</b>                                    |              |
| GED1518                                       | General Education Elective                      | 42.0         |
| <b>Level: 03</b>                              | <b>Courses</b>                                  | <b>Hours</b> |
| CAD8305                                       | CAD Applications and GDT                        | 42.0         |
| CAM8505                                       | CNC Machining I                                 | 56.0         |
| CAM8525                                       | Computer Aided Manufacturing II                 | 28.0         |
| DSN8501                                       | Additive Manufacture and 3D Printing            | 28.0         |
| ENG8335                                       | Materials Science                               | 28.0         |
| MFG0003                                       | Manufacturing Application Theory                | 28.0         |
| MFG8514                                       | Machine Shop II                                 | 84.0         |
| <b>Level: 04</b>                              | <b>Courses</b>                                  | <b>Hours</b> |
| CAM8506                                       | CNC Machining II                                | 56.0         |
| CAM8535                                       | Computer Aided Manufacturing III                | 28.0         |
| DSN0037                                       | Tool Design                                     | 28.0         |
| ELN9216                                       | Programmable Logic Controllers 1                | 42.0         |
| ENG8336                                       | Metallurgy and Heat Treatment Lab               | 28.0         |
| ENL8720                                       | Technical Communication for Technicians         | 42.0         |

GED0019

Becoming an Entrepreneur: Is It for Me?

42.0

## Fees for the 2023/2024 Academic Year

Tuition and related ancillary fees for this program can be viewed by using the Tuition and Fees Estimator tool at <https://www.algonquincollege.com/fee-estimator> .

Further information on fees can be found by visiting the Registrar's Office website at <https://www.algonquincollege.com/ro> .

Fees are subject to change.

Additional program related expenses include:

- Books and supplies cost approximately \$1,250 and can be purchased at the campus store. Selected books are available for a reduced price through ebook initiatives at <http://www.coursesmart.com/> .
- All students are responsible to supply their own CSA-approved safety eye wear and leather steel toe work boots. Any other types of footwear are not acceptable.

## Admission Requirements for the 2024/2025 Academic Year

### College Eligibility

- Ontario Secondary School Diploma (OSSD) or equivalent. Applicants with an OSSD showing senior English and/or Mathematics courses at the Basic Level, or with Workplace or Open courses, will be tested to determine their eligibility for admission; OR
- Academic and Career Entrance (ACE) certificate; OR
- General Educational Development (GED) certificate; OR
- Mature Student status (19 years of age or older and without a high school diploma at the start of the program). Eligibility may be determined by academic achievement testing for which a fee of \$50 (subject to change) will be charged.

### Program Eligibility

- English, Grade 12 (ENG4C or equivalent).
- Mathematics, (Grade 12 MCT4C) or (Grade 11 MCR3U) or equivalent.
- At least two science courses from Grade 11 and/or Grade 12.
- Applicants with international transcripts must provide proof of the subject-specific requirements noted above and may be required to provide proof of language proficiency. Domestic applicants with international transcripts must be evaluated through the International Credential Assessment Service of Canada (ICAS) or World Education Services (WES).
- IELTS-International English Language Testing Service (Academic) Overall band of 6.0 with a minimum of 5.5 in each band; OR TOEFL-Internet-based (iBT) Overall 80, with a minimum of 20 in each component: Reading 20; Listening 20; Speaking 20; Writing 20; OR Duolingo English Test (DET) Overall 110, minimum of 110 in Literacy and no score below 95.

Not sure if you meet all of the requirements? Academic Upgrading may be able to help with that: <https://www.algonquincollege.com/access/> .

Proficiency, Internet browsing and searching, and proficiency with an office software suite (word processing, spreadsheets, etc.) prior to the start of the program.

Should the number of qualified applicants exceed the number of available spaces, applicants will be selected on the basis of their proficiency in English and mathematics.

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**Application Information****MANUFACTURING ENGINEERING TECHNICIAN**  
**Program Code 1518X01FWO**

Applications to full-time day programs must be submitted with official transcripts showing completion of the academic admission requirements through:

ontariocolleges.ca  
60 Corporate Court  
Guelph, Ontario N1G 5J3  
1-888-892-2228

Students currently enrolled in an Ontario secondary school should notify their Guidance Office prior to their online application at <http://www.ontariocolleges.ca/>.

Applications for Fall Term and Winter Term admission received by February 1 will be given equal consideration. Applications received after February 1 will be processed on a first-come, first-served basis as long as places are available.

International applicants please visit this link for application process information: <https://algonquincollege.force.com/myACint/>.

For further information on the admissions process, contact:

Registrar's Office  
Algonquin College  
1385 Woodroffe Ave

Ottawa, ON K2G 1V8  
Telephone: 613-727-0002  
Toll-free: 1-800-565-4723  
TTY: 613-727-7766  
Fax: 613-727-7632  
Contact: <https://www.algonquincollege.com/ro>

## Additional Information

The first level of this program is common with two other programs, Mechanical Engineering Technology and Electromechanical Engineering Technician - EMET. This provides students with the option of transitioning to either of these programs prior to the start of the second level.

Students wishing to transfer to Electromechanical Engineering Technician - EMET may do so with permission from the program coordinator prior to the start of their second level. Students wishing to transition to Mechanical Engineering Technology need to maintain a good academic standing during the first semester and obtain a grade of at least C in MAT8001M (Math) and MFG8528 (Metrology). Students also need to speak to the coordinator of Mechanical Engineering Technology about additional math modules they may need.

**Note:** Proficiency in Internet browsing and searching, and proficiency with an office software suite (word processing, spreadsheets, etc.) prior to the start of the program is recommended. The Student Learning Centre offers training in these skills if needed. While programming experience is not a requirement to enter the program, aptitude for programming is necessary and includes strong language, problem solving and logic skills.

## Contact Information

### Program Coordinator(s)

- Hooman Abdi, <mailto:hoomana@algonquincollege.com> , 613-727-4723, ext. 3473

## Course Descriptions

### CAD8300 Computer Aided Design/Drafting (CAD/D)

Drawings and blueprints are the language of design for engineered parts and structures, therefore creating, interpreting, and understanding drawings is critical to working in the engineering field. Students are introduced to (CAD/D) Computer-Aided Design/Drafting. Students use a commercial 3D CAD/D system (SolidWorks) to parametrically model mechanical parts and assemblies. Area and mass property information is determined and verified by students. Motion inter-dependencies and physical dynamics within the model are established to create realistic virtual models. Commercial-off-the-shelf third party components are sourced, imported and utilized as required. Students create drawing layouts which typically include the orthographic, section, auxiliary and detailed views necessary to thoroughly describe a part/assembly. Students learn how to annotate their drawings in strict accordance with the ANSI/ASME Y14.5 drafting standard.

Prerequisite(s): none  
Corerequisite(s):none

### CAD8305 CAD Applications and GDT

Students use a commercial CAD/D system (SolidWorks) to parametrically model mechanical parts, assemblies and systems. Rudimentary statistics and probabilities are introduced to analyze error and tolerance in a design. Established design fits and their associated engineering tolerances are used to define functional mates between assembled parts. Tolerance accumulation and stack-up analysis are performed on assemblies. Students learn how to annotate working drawings in compliance with the ANSI/ASME Y14.5 and Y14.41 Geometric Dimensioning and Tolerancing (GD&T) standards. The creation of specialized types of CAD models is also taught; these applications include programmed parts, sheet metal developments, welded structures and rudimentary FEA.

Prerequisite(s): CAD8300  
Corerequisite(s):none

**CAM8505 CNC Machining I**

Through instruction and assistance, students operate computer numerical control machines, load and edit part programs, follow instruction sheets, set up the tooling and fixtures required to manufacture component parts and practise CNC related mathematics. Students operate CNC simulators, prepare inspection sheet, and perform/report quality control procedures on their machined parts.

Prerequisite(s): none

Corerequisite(s):CAM8525

**CAM8506 CNC Machining II**

The manufacturing industry relies heavily on computer-aided technologies. Students develop a technical understanding required for their program, practice advanced operation techniques of computer numerical machining centers and setup of tooling and fixtures. Students work on 3D models or part drawings and generated toolpaths on CAM software, simulate CNC files using the software and practice CNC related mathematics. Students work on CNC simulators, prepare inspection sheet, and perform/report quality control procedures on their machined parts. Students can modify the program generated and adjust it based on corrections needed to meet the quality control procedure.

Prerequisite(s): CAM8505

Corerequisite(s):CAM8535

**CAM8515 Computer Aided Manufacturing I**

The use of Computer Numerical Control (CNC) machinery has become a standard in the manufacturing industry. Through instruction and discussion of concepts, applications and coding systems of CNC machines, students examine CNC manufacturing methods and develop the technical understanding required to operate such machinery. Students also write and edit part programs, generate G-codes in software such as Mastercam and Fusion 360, verify the correct tool operations, and check the simulated CNC operations ready to execute on a CNC machine.

Prerequisite(s): CAD8300 and MFG8528

Corerequisite(s):none

**CAM8525 Computer Aided Manufacturing II**

Students develop the technical understanding required for building competence in Computer Aided Manufacturing (CAM). Through instruction and assistance, students add proper tooling, generate standard toolpath using advanced programming techniques, such as computer-aided design and computer-aided manufacturing systems (CAD/CAM). Different operations will be added for milling and turning (lathe) on a part in CAM software. Students perform troubleshooting processes to adjust the toolpaths added based on setup sheets and verification of the machined part in the software.

Prerequisite(s): CAM8515

Corerequisite(s):CAM8505

**CAM8535 Computer Aided Manufacturing III**

Students develop CNC programs for milling and turning machining operations with more details and create a computer aided manufacturing (CAM) model and generate the machining codes using the CAM software such as MasterCam, GibbsCAM and Fusion 360. Students plan for converting the CAD model into a CAM model for simulating the manufacturing information in milling and turning operations. Utilization of tool management interfaces to properly select, assign, and create custom tool representations are developed by recalling the techniques necessary, identifying the tool group, and testing the tool's application.

Prerequisite(s): CAM8525

Corerequisite(s):CAM8506



**DSN0037 Tool Design**

Students are exposed to a significant amount of drafting. Topics include design of cutting tools, gauges and gauge design, principles of locating and clamping, work-holder standards and special purpose, design analysis procedures, manufacturing process as related to tool design, tooling materials and their applications, design of sheet metal, shearing, bending and forming and drawing dies.

Prerequisite(s): CAD8305

Corerequisite(s):none

**DSN8501 Additive Manufacture and 3D Printing**

Additive Manufacturing (AM) is the newest emerging technology within manufacturing. AM is the creation of an object by adding layer-upon-layer of material to build desired components. While many technologies exist to produce these components they all revolve around designing within solid modeling by 3D CAD software. Material consumption and mechanical properties of 3D printed parts are important factors in the design and manufacturing processes. Students are exposed to Generative Design (GD) where they can explore design solutions for part optimization. They will be familiarized with the knowledge of defining constraints to achieve light weighting structures and performance improvements. Software such as Fusion 360 and Netfabb will be used for 3D part design, optimization, and preparation of 3D part files for additive manufacturing. Students build upon the skills already gained in CAD modeling and manufacturing techniques to learn how to design for this exciting method of manufacturing.

Prerequisite(s): none

Corerequisite(s):none

**ELN8613 Basic Electronic Assembly**

Electronic circuits are the heart of modern electromechanical and automation control circuits, and soldering is crucial to the assembling of those circuits and their electrical connections to the equipment they control. Soldering and electronic assembly skills, including the assembly, repair, and troubleshooting of soldered electronic components, are skills in demand across all branches of the automation and electromechanical engineering world. Students apply a variety of soldering techniques. Brief lecture sessions provide the theoretical background followed by practical skills demonstration. Students perform labs to develop various soldering skills for specific electronic applications such as traditional Through-Hole and Surface Mount Technology.

Prerequisite(s): none

Corerequisite(s):none

**ELN9104 DC and AC Electronics**

An understanding of entry-level electronics is essential to all engineering fields. Students explore basic electrical components and how they are used in electrical circuits. Discovering and using resistors, capacitors and inductors to build circuits from schematic diagrams, students perform tests and measurements to promote their understanding of fundamental electronics. Through following the flow of energy in complete circuits, students apply troubleshooting strategies to identify, localize and correct malfunctions. Students use digital multimeters, oscilloscopes and signal generators to create and measure circuit characteristics. Students evaluate circuits using Ohm's Law, Kirchhoff's laws, superposition and other theorems. RL, RC and RLC circuits are examined. Good lab safety practices are stressed. Students provide written reports on their findings.

Prerequisite(s): none

Corerequisite(s):none

**ELN9216 Programmable Logic Controllers 1**

Programmable Logic Controllers play a prominent role in automating the production processes in many diverse manufacturing industries ranging from automotive to aerospace. Students learn the fundamentals of PLC operations, PLC hardware and its configuration and connection of input/output modules and Industrial ladder programming techniques. Students develop programs to



solve typical industrial applications using logic instructions, counters, timers, and mathematical instructions. The student will write, enter, and execute application programs using the programmable controllers and Human Machine Interface (HMI).

Prerequisite(s): ELN9104 and ROB8220

Corerequisite(s):none

### **ENG0005 Introduction to Quality Assurance**

Organizations require formal control processes and systems to ensure quality of products and services. Students gain an understanding of numerous quality control strategies, such as Lean Manufacturing and basic ISO standards and practices. In our data-driven society, statistics are everywhere, guiding personal and professional decisions. Students are introduced to the basics of statistics as well as how and when to use them. Topics covered include, mean, standard deviation, margin of error, normal distributions, Pareto charts and an overview of Statistical Process Control. Through the discussion of case studies, students gain an appreciation of the costs of quality.

Prerequisite(s): none

Corerequisite(s):none

### **ENG8317 Statics and Mechanics of Materials**

As technicians are called upon to solve problems, it's important that they understand how changes to applied forces, to mass or other physical characteristics will impact the tools and equipment they are using. Students are introduced to the concepts of force and stress and learn to apply these concepts to a variety of engineering problems. This course will also provide a foundation for future studies of Mechanisms. Statics topics include free body diagrams, force, moment, couples, static equilibrium, centroids and distributed loads. Mechanics of materials topics include normal stress, shear stress, strain and Hooke's Law. Students will solve complex problems by creating free body diagrams and applying Newton's Laws to determine the effects of loads on structures such as beams, frames and machines.

Prerequisite(s): none

Corerequisite(s):none

### **ENG8335 Materials Science**

As rapid advances in materials continue, from polymers used in composite components on aircraft, to high strength aluminum used in EV's to make vehicles lighter, a thorough understanding of how to determine a materials suitability for an application is crucial. Students interpret mechanical properties of materials and their microscopic structural behaviours. Crystal structures, atomic bonding, dislocation theory, heat treatments, phase and TTT diagrams for some alloys are explained. Ferrous and non-ferrous alloys naming convention and their applications are discussed, and the students are familiarized with select national and international standard institutes. Students learn concepts such as failure and strengthening mechanisms. Ceramics, polymers and composite materials and their properties and applications are discussed.

Prerequisite(s): none

Corerequisite(s):none

### **ENG8336 Metallurgy and Heat Treatment Lab**

Heat treating can change metal product properties. Some alloy properties can be improved by heat treatment processes. Students experiment with heat treatment processes in a lab. Ferrous and non-ferrous materials properties are tested and reported and students compare the results with published data. Students are familiarized with techniques used in industry to obtain better mechanical properties for metals. Students use destructive and non-destructive tests to observe and report materials properties.

Prerequisite(s): ENG8335

Corerequisite(s):none

### **ENL1813T Communications I**

Communication remains an essential skill sought by employers, regardless of discipline or field of study. Using a practical, vocation-oriented approach, students focus on meeting the requirements of effective communication. Through a combination of lectures, exercises, and independent learning, students practise writing, speaking, reading, listening, locating and documenting information and using technology to communicate professionally. Students develop and strengthen communication skills that contribute to success in both educational and workplace environments.

Prerequisite(s): none  
Corerequisite(s):none

### **ENL8720 Technical Communication for Technicians**

Clear, concise and detailed communication is essential for technical workplaces. Students plan and execute a variety of formal and informal visual, oral and written communication tasks. Exercises and activities foster confidence and competence in workplace communication.

Prerequisite(s): ENL1813T  
Corerequisite(s):none

### **GED0019 Becoming an Entrepreneur: Is It for Me?**

The ever-changing global economy presents many challenges for job seekers, but it also provides opportunities for entrepreneurs. The process of turning an idea into an opportunity forms the nucleus of entrepreneurship, with the aim of enhancing the socio-economic experience of the public. Students are exposed to the various aspects of entrepreneurship and the effects they have on themselves and the global community. Through classroom discussions, presentations and online activities, students develop their understanding of the pros and cons of entrepreneurship. Students evaluate their career ambitions through introspective reflection to determine if they have the drive and desire to pursue a career as an entrepreneur.

Prerequisite(s): none  
Corerequisite(s):none

### **GED1518 General Education Elective**

Students choose one course, from a group of general education electives, which meets one of the following five theme requirements: Arts in Society, Civic Life, Social and Cultural Understanding, Personal Understanding and Science and Technology.

Prerequisite(s): none  
Corerequisite(s):none

### **GEN0351 Strategies for Learning**

Self-Regulated Learning is important not only for academic success but also in the development of lifelong learning skills, and can be defined as an active constructive process whereby learners monitor, regulate, and control their cognition, motivation, and behaviour. Through a variety of assignments and in class activities, students learn how to transform their mental abilities into academic skills by investigating notetaking, time management, goal setting and feedback. Case studies allow students to consider how to employ SRL in their own learning. Students explore effective learning techniques and move toward implementing these techniques to improve their study habits.

Prerequisite(s): none  
Corerequisite(s):none

### **MAT8001M Math for Engineering Technicians**

Students learn foundational mathematics required in many College technical programs. Students solve measurement problems involving a variety of units and ratio and proportion problems. They manipulate algebraic expressions and solve linear, quadratic, exponential and logarithmic equations. Students study the trigonometry of right triangles and vectors. Students acquire the knowledge to work with numerical systems and internal machine representations, binary/hex/

octal/decimal math, Boolean logic and truth tables. Students learn to use and manipulate complex numbers in rectangular, polar and exponential forms. Delivered in a modular format, this course is equivalent to the completion of all of the following math modules MAT8100 - a, b, c, e, f, h, i, k, and l.

Prerequisite(s): none  
Corerequisite(s):none

### **MFG0003 Manufacturing Application Theory**

In-depth knowledge of principles and safety relating to manufacturing machines is essential in setup and use of machinery. Students explore strategies and methodologies of component manufacturing including various assembly and secondary processes. In relation to manufacturing of components and products, students examine topics, such as material removal, tooling uses, advanced manufacturing techniques, project planning and layout procedures for application in lab.

Prerequisite(s): none  
Corerequisite(s):MFG8514

### **MFG8514 Machine Shop II**

Correct inspection and operation of machinery are dependent on strong knowledge of safety, setup, speeds, feeds, and form-tools. Students apply assembly practices and procedures to manufacture advanced components on a variety of equipment from a variety of materials. Through application, students use build-to-print principles with engineering drawings for assembly of manufactured components to develop knowledge and skills in the manufacturing field.

Prerequisite(s): MFG8519  
Corerequisite(s):MFG0003

### **MFG8519 Machine Shop I**

Manufacturing is complex and dynamic, and professionals must continuously demonstrate skill, adaptability, creativity, and collaboration. By examining how components and products are created, students will discover numerous manufacturing processes using many different types of materials. Machine shop fundamentals are covered. Students focus on metal removal operations and the selection of machine tools for specific operations, including the use of drill presses, lathes, milling machines, grinders and various hand tools encompassing speed and feed calculations. To effectively function safely in a manufacturing environment, it is necessary to develop the knowledge and skills in maintaining machinery, performing manufacturing, and developing components and products. While practicing shop safety, students' machine basic level projects providing practical experience in a manufacturing environment. Students operate standard machine tools and apply hands-precision measurement and layout tools. The importance of machine safety and personal safety are a key part of manufacturing; the use of PPE, WHMIS regulations and safe operation of equipment will be emphasized.

Prerequisite(s): CAD8300 and MFG8528  
Corerequisite(s):none

### **MFG8528 Metrology**

Metrology is an important part of science, technology and engineering fields. In general, It involves measurements that the industrial sectors rely on for safety and quality control. Students are introduced to the science of measurement. Through theory and lab exercises the student will learn the importance of quality and accuracy of manufactured components using many different types of measuring equipment. Fundamental topics include systems of measurement, units, linear measurement, and angular measurement. Labs are used to provide students with the opportunity to gain a practical and theoretical understanding of a variety of measuring instruments. Students are familiarized with the basic concepts of data analysis, using graphing, linear regression, and statistics to demonstrate lab results and form conclusions.

Prerequisite(s): none  
Corerequisite(s):none

**ROB8220 Industrial Pneumatics**

The current trend towards ever-increasing automation requires a workforce trained in all aspects of automated systems, including pneumatics and electro-pneumatics. Pneumatics is the use of air to do work. Students build pneumatic and electro-pneumatic circuits that mimic real life industrial situations. Simulation software complements the hands-on lab experience. Pneumatic and electro-pneumatic valves such as timers, directional and flow control valves controlled by solenoids and relays are used extensively throughout the course. Students make use of ladder logic diagrams to develop the logistical requirements of various industrial applications, including meeting safety standards. Students work in teams to apply their skills by designing an industrial application for a culminating project.

Prerequisite(s): none  
Corerequisite(s):none

**WEL9107 Introduction to Fuel Gas and Electrical Welding**

Welding is a skill essential to a variety of professions. Students develop competent welding skills at a basic level using oxyacetylene equipment, Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding, (GMAW) and Gas Tungsten Arc Welding (GTAW). Students are provided with instructions on the safety, proper setup and operation of equipment. Students learn basic principles of flame types and temperatures, metal preparation, gas selection and electrode classification.

Prerequisite(s): none  
Corerequisite(s):none