MECHANICAL TECHNICIAN - PRECISION SKILLS

Program Outline

Major:	MTPS
Length:	2 Years
Delivery:	4 Semesters, plus 1 work term
Credential:	Ontario College Diploma, Co-op
Effective:	2014-2015
Location:	Barrie
Start:	Fall (Barrie)

Description

Students safely set-up and operate standard machine tools and complex machining equipment, such as CNC lathes and mills. Knowledge and skills learned, are used to repair or manufacture components, assist with design of jigs, fixtures, tools, moulds and dies, perform troubleshooting to enact repairs on production tooling, and use accurate testing methods to ensure accuracy of manufactured components.

Career Opportunities

This program prepares the graduate for the Aerospace, Energy, Mining, and Automotive industries, to name a few. With careers such as CNC Programmers, CNC Set Up Technicians, Tool and Die, Mould Making, Millwright and General Machinist as well as many other precision manufacturing opportunities. As employees, your responsibilities may include design, custom production, maintenance and troubleshooting of complex tooling, moulds, dies and/or related tooling. Demand in Canada for individuals with excellent precision skills is always high, greater than the supply.

Program Learning Outcomes

The graduate has reliably demonstrated the ability to:
- analyze and solve basic technical problems related to mechanical environments;

- calculate and convert Imperial and SI measurement units correctly using both manual methods and electronic technology;
- use engineering terminology correctly and accurately in written and oral communication;
- identify the technical criteria necessary to resolve problems;
- apply basic knowledge of mechanical engineering concepts to the analysis and resolution of technical problems;
- apply elements of mathematics involving, basic algebra, trigonometry, geometry, and statistics to the solution of technical problems;
- use appropriate testing and measurement equipment to assist in troubleshooting;
- acquire relevant technical information from a variety of sources (e.g., technical manuals, Internet, suppliers, coworkers).

Practical Experience:
Co-operative Education is a mandatory component of all Co-op programs at Georgian College; it has been designed as a process by which students integrate their academic education with work experience related to their program of study. This integration affects much more than simply earning a salary, including the adjustment to the work environment and the development of professionalism. It also reinforces skills and theory learned during academic semesters, develops professional contacts, job knowledge and career path, improves human relations and communication skills and promotes personal maturity and financial independence.

Students are requested to register, attend and participate in their scheduled co-operative education classes. These classes are scheduled for all first year students and are expected to be completed in order to proceed successfully to their first co-op work experience. To ensure students are eligible to proceed onto any co-op work experience students should refer to Promotional Status and Eligibility for Co-op as outlined in the College Calendar. Co-op policies and procedures can be located on our website: www.georgianc.on.ca/careers/for-students/

Georgian College follows the Co-operative Education guidelines set out by the Canadian Association for Co-operative Education (CAFCE) and Education at Work Ontario (EWO) by supporting the learning outcomes designed for the program specific graduate profile and curriculum as set out by the Ministry of Training, Colleges and Universities.

The Program Progression:
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Fall Intake – Barrie

Sem 1 | Sem 2  | Work Term | Sem 3 | Sem 4
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Fall  | Winter | Summer    | Fall  | Winter
2014  | 2015   | 2015      | 2015  | 2016
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Admission Requirements:
You must meet ONE of the following requirements to be eligible for admission to these programs:

Secondary school applicants:
- OSS Curriculum: OSSD or equivalent with Grade 12 English (C) or (U) (ENG4C, ENG4U); plus any Grade 11* or 12 College level Mathematics (MBF3C, MAP4C or MCT4C) or 11* or 12 University level Mathematics (MCF3M, MCV4U, MHF4U, MCB4U, MGA4U or MDM4U). (*Minimum of 60% in Grade 11 College or University level Mathematics MBF3C or MCF3M). Also recommended: Grade 11 or Grade 12 Technological Design (TDJ3M, TDJ4M); Grade 11 or Grade 12 Manufacturing Engineering Technology (TMJ3C and/or TMJ4C).

Non-Secondary school applicants (19 years or older):
- Any credit Communication course and most credit mathematics courses taken at Georgian College
- College preparatory programs including those taken at Georgian College: Technology foundation and Technology fundamentals*
- Equivalent courses in English and mathematics taken through secondary school or Independent Learning Centres (at the general, advanced, college or university level)
- Academic and Career Entrance Certificate (ACE) program with communications and business, apprentice or technical mathematics*
- Mature student testing in English and mathematics that meets the minimum standards for admission (available through most testing services)*
- Ontario High School Equivalency Certificate (GED)
- English, Literature or Communication credit courses and most mathematics credit courses from accredited colleges/universities

Home school applicants:
- Applicants can write the mature student testing in English and mathematics that meets the minimum standards for admission (available through testing services)*

* available from Georgian College. For a complete listing please contact the Office of the Registrar.

Non-secondary school applicants who are 19 years of age or over by the first day of classes, and who lack the academic entrance qualifications, may be considered for entrance to an appropriate post-secondary diploma or certificate program as mature applicants. Mature applicants must meet all program specific prerequisites including all selection criteria; equivalencies are stated above. Applicants who are unsure whether they meet admission requirements should contact the Office of the Registrar. In

addition, those applying as mature students and having no documentation of Grade 12 education must supply, if required, proof of age, such as a copy of an official birth certificate or driver's licence. Refer to Section 2.5 and 2.6 of the Academic Calendar for further details.

Credit transfer and course exemptions:
Applicants who have taken courses from a recognized and accredited post-secondary institution and/or have relevant life/learning experience may be eligible for credit transfer/course exemptions. Courses/experience must match at least 80% of the learning outcomes of a Georgian College course with a minimum grade of 60% or C achieved in previous coursework; some program exceptions apply (see program outline). For further information please visit the Credit Transfer Centre website: georgiancollege.ca/admissions/credit-transfer/

Graduation Requirements:
18 Mandatory Courses
2   Communications Courses
3   General Education Courses
1   Co-op Work Term

Graduation Eligibility:
To graduate from this program, the passing weighted average for promotion through each semester, from year to year and to graduate is 60%. Additionally, a student must attain a minimum of 50% or a letter grade of P (Pass) or S (Satisfactory) in each course in each semester.

Mandatory Courses
CNCT1005   CNC Process and Fixturing Technology
CNCT1010   CNC Applications 1
CNCT1011   CNC Applications 2
CNCT1012   CAD CAM Design 1
CNCT2009   CAD Cam Design 2
CNCT2010   CNC Manufacturing (Design and Applications)
MATH1018   Introduction to Technical Mathematics
TDIE1000   Blueprint Reading
TDIE1001   Basic Machine Tool Application
TDIE1005   Advanced Machine Tool Theory
TDIE1008   Basic Tool Making Theory
TDIE1011   Metallurgy

TDIE1013   Basic Machine Tool Theory
TDIE1014   Advanced Machine Tool Applications
TDIE2000   Hydraulics and Pneumatics
TDIE2003   Integration of Manufacturing Processes
TDIE2008   Advanced Tool Making Theory
TDIE2009   Basic Tool Making Applications - Jigs and Fixtures

Communications Courses
To be selected at time of registration from the College list, as determined by testing.

General Education Courses
To be selected from College list

Co-op Work Term
COOP1021   Mechanical Technician Work Term 1

Course Descriptions:
CNCT1005 CNC Process and Fixturing Technology   28.0 Hours
This course introduces students to machine part planning and associated manufacturing technology. Using graphic software students create and design the machining processes to enable a production cycle to take place. Topics will include: CAD, machine part process, holding technology and machine tool life management.

CNCT1010 CNC Applications 1   42.0 Hours
This course will provide the student with basic training in CNC programming, safe setup and operation of a CNC Lathe and CNC Mill. This is a fundamental course designed to introduce students to CNC Machine Operation & Mechanic Programming.

CNCT1011 CNC Applications 2   42.0 Hours
This course is designed to provide practical and theoretical training to students in the Computer Numerical Control (CNC) programming and operational field. Students write CNC programs using the machine code at the 2-3 axis level, and apply it to the machine operations. Aspects covered include: safety, review of base machine code & CNC concepts, circular interpolation, offsets, cutter compensation, subroutines and tooling.
P- CNCT1010 CNC Applications 1

CNCT1012 CAD CAM Design 1   42.0 Hours
This course is designed to provide training in two dimensional design using a CAD/CAM software application. This course introduces the student to the management and creation of design elements to develop the structure for a Computer Numerical Control

(CNC) program. Topics to be covered include: design application structure, editing and modification of existing design.
P- TDIE1000 Blueprint Reading

CNCT2009 CAD Cam Design 2   42.0 Hours
This course is designed to provide applied training to students in the Computer Numerical Control (CNC) program using a CAD/CAM software application. Students develop machine tool paths for CNC lathes and machining centres as used in today's industrial machines. Topics to be covered include: Safety Procedures, Geometry Building, Machining Methodology, Tool Management, Tool Path Creation and Editing and Postprocessor Management, in creating CNC machine code for 2-3 Axis generation.

CNCT2010 CNC Manufacturing (Design and Applications) 168.0 Hours
Successful students design and manufacture projects and components using current CNC and conventional machine tools, to tight dimensional tolerances. Students produce a working tool or prototype project complete with drawings and must show proper assembly techniques. The project must be completed and tested as a mandatory requirement of the course.
P- TDIE2009 Basic Tool Making Applications - Jigs and Fixtures

MATH1018 Introduction to Technical Mathematics   42.0 Hours
This course provides a foundation in mathematics in engineering technology and related programs. Students will develop skill in mathematical thinking and problem solving, and appropriately apply technology in the solution of engineering related problems using algebra, geometry, right angle trigonometry, trigonometric functions of any angle, systems of linear equations, and exponential and logarithmic functions. Additional time to strengthen and reinforce mathematical competencies will be made available to those students who require it.

TDIE1000 Blueprint Reading   28.0 Hours
Students will read, interpret and sketch mechanical engineering components and assembly prints. Students will demonstrate a comprehension of orthographic, isometric, oblique and auxiliary projections used on mechanical drawings.

TDIE1001 Basic Machine Tool Application 112.0 Hours
This course is a practical application of knowledge pertaining to the safe set-up and operation of standard metal cutting machine tools, the correct and safe selection of cutting tools, R.P.M., federates and machining processes. This description is derived from information issued by the Ministry of Training, Colleges and Universities.
C- TDIE1002 Replaced by TDIE 1012 200710 or P- TAD4124 Basic Machine Tool Theory or P- TAD4116 Basic Machine Tool Theory or C- TDIE1012 Basic Machine Tool Theory or C- TDIE1013 Basic Machine Tool Theory

TDIE1005 Advanced Machine Tool Theory   28.0 Hours

This course is a study of the theoretical application and operation of standard metal cutting machine tools in conjunction with basic tool making techniques required for manufacturing and assembly of presswork tools. This description is drawn from information issued by the Ministry of Education and Training in the Tool & Die Maker and Mouldmaker training profile for apprentices.
(P- TDIE1002 Replaced by TDIE 1012 200710 or P- TDIE1012 Basic Machine Tool Theory or P- TDIE1013 Basic Machine Tool Theory) and (P- TDIE1001 Basic Machine Tool Application or P- TDIE1006 Basic Machine Tool Application)

TDIE1008 Basic Tool Making Theory   28.0 Hours
This course provides theory in the design and manufacture of metal cutting and forming tools. Topics covered include die set construction, elementary blanking and piercing dies.

TDIE1011 Metallurgy   28.0 Hours
This course is designed to introduce students to the metallurgy fundamentals required for careers in the Precision Metal Machining industries, such as Tool and Die Maker, CNC Technology, and Mould Making.

TDIE1013 Basic Machine Tool Theory   42.0 Hours
This course is a study of the theoretical application and operation of standard metal cutting machine tools in conjunction with basic techniques required for manufacturing and assembly of tools.

TDIE1014 Advanced Machine Tool Applications 126.0 Hours
This course is a practical application of knowledge pertaining to the safe set-up and operation of standard metal cutting machine tools, the correct and safe selection of cutting tools, R.P.M., feed rates and machining process. This description is derived from information issued by the Ministry of Training, Colleges and Universities for the training profile for Tool and Die Makers Apprentices.
P- TDIE1001 Basic Machine Tool Application

TDIE2000 Hydraulics and Pneumatics   42.0 Hours
Industrial Hydraulic and Pneumatic applications will be the focal point of this course. Topics covered include Fluid Power Principles, their components and their functions. Presentation of introductory concepts will be accompanied by students performing practical lab work on Industrial Fluid Power components and systems.

TDIE2003 Integration of Manufacturing Processes   28.0 Hours
This course is a study of the theoretical applications and operations of the required processes of manufacturing that are used in present day part production. Tooling and assembling practices, including those used in Die making, Moulding, Automated Machinery, and computer Numerical Controlled Machinery CNC will be investigated and reported by students.

P- CNCT1000 CNC - Theory or P- MLDM2000 Basic Mould Making Theory or P- TDIE1008 Basic Tool Making Theory

TDIE2008 Advanced Tool Making Theory   42.0 Hours
This course provides advanced training in the design and manufacture of precision metal cutting and forming tools and moulds. Topics covered include plastic shrinkage, venting as well as bend allowance during forming, stock material utilization and strip layout.
P- TDIE1008 Basic Tool Making Theory

TDIE2009 Basic Tool Making Applications - Jigs and Fixtures 140.0 Hours
This course introduces students to the tooling often required in industry such as jigs and fixtures. Students interpret a product drawing and precision machine components to tolerance, in the manufacture of practical projects. Students will learn the proper set up techniques to manufacture their advanced projects using common work holding devices.
P- TDIE1004 Advanced Machine Tool Application or P- TDIE1014 Advanced Machine Tool Applications

Course Description Legend
P = Prerequisite; C = Concurrent prerequisite; CO= Corequisite

Information contained in College documents respecting programs is correct at the time of publication. Academic content of programs and courses is revised on an ongoing basis to ensure relevance to changing educational objectives and employment market needs. The college reserves the right to add or delete programs, options, courses, timetables or campus locations subject to sufficient enrolment, and the availability of courses.