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COURSE NAME

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COURSE NUMBER**I. COURSE DESCRIPTION:**

This course is designed to give the student an understanding of the theoretical aspect of machining and manufacturing including feeds and speeds formulae, threading and gear cutting formulae. Trade calculations are also built into this course which is patterned to C.A.M.C.'s (Canadian Aviation Machining Council) occupational analysis.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain the metal removal industry and describe the various jobs associated with it.

Potential Elements of the Performance:

- Discuss how modern machine technology affects the workforce
- Explain the evolution of tools
- Explain the machining processes
- Describe the role of the machinist

2. Have an awareness of safety in the operation of the machines used in this trade

Potential Elements of the Performance:

- Justify the importance of shop safety
- Explain why it is important to develop safe work habits
- Recognize and correct unsafe work practices
- Apply safe work practices when employed in a machine shop
- Select the appropriate fire extinguisher for a particular type of fire

3. Understand measurement (Metric and Imperial) and be able to use the various measuring tools to do their work

Potential Elements of the Performance:

- Measure to 1/64" (0.5mm) with a steel rule
- Measure to 0.0001" (0.002 mm) using a Vernier micrometer
- Measure to 0.001" (0.02 mm) using Vernier measuring tools
- Measure angles to 0 degrees 5 minutes using a universal Vernier bevel protractor
- Identify and use various types of gages found in a machine shop
- Use a dial indicator
- Employ the various caliper measuring tools found in a machine shop

**LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE**

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COURSE NUMBER**CONTINUED.....**

4. Decide what type of work requires layout, what it involves and how to machine to layout.  
Potential Elements of the Performance:
  - Explain why layouts are needed
  - Identify common layout tools
  - Use layout tools safely
  - Make basic layouts/list safety rules for layout work
  
5. Use and care for the various hand tools used in the machining trade.  
Potential Elements of the Performance:
  - Identify the most commonly used machine shop hand tools
  - Select the proper hand tool for the job
  - Maintain hand tools properly
  - Explain how to use hand tools safely
  
6. Calculate drill speeds and feeds, as well as how to use the various cutting tools associated with drilling and clearance angles on each.  
Potential Elements of the Performance:
  - Select and safely use the correct drills and drilling machine for a given job
  - Make safe setups on a drill press
  - Explain the safety rules that pertain to drilling operation
  - List various drill series
  - Sharpen a twist drill
  
7. Identify grinding wheels and when to use the different types for the correct material. Also how to dress and care for grinding wheels and grinders.  
Potential Elements of the Performance:
  - Identify the various types of offhand grinders
  - Dress and true a grinding wheel
  - Prepare a grinder for safe operation
  - Use an offhand grinder safely
  - List safety rules for offhand grinding
  
8. Select blades for various materials and the correct speed to run them at.  
Potential Elements of the Performance:
  - Identify the various types of sawing and cutoff machines
  - Select the correct machine for the job to be done
  - Mount a blade and prepare the machine for use
  - Position the work for the most efficient cutting
  - Safety operate sawing and cutoff machines

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9. Set up work in a lathe, determine feeds and speeds using the various cutting tools and accessories  
Potential Elements of the Performance:
- Describe how a lathe operates
  - Identify the various parts of a lathe
  - Safely set up and operate a lathe using various work-holding devices
  - Sharpen lathe cutting tools
10. Machine and measure the various tapers and threads using the correct technique  
Potential Elements of the Performance:
- Describe how a taper is turned on a lathe
  - Calculate tailstock setover for turning a taper
  - Safely set up and operate a lathe for taper turning
  - Describe the various forms of screw threads
  - Cut screw threads on a lathe
11. Become familiar with some of the speciality operations that can be done on a lathe  
Potential Elements of the Performance:
- Safely set up and operate a lathe using various work-holding devices
  - Properly set up steady and follower rests
  - Perform drilling, boring, knurling, grinding and milling operations on a lathe
  - Demonstrate familiarity with industrial applications of the lathe
12. Calculate feeds and speeds for milling and become familiar with the different arbours and work hold devices  
Potential Elements of the Performance:
- Describe how milling machines operate
  - Identify the various types of milling machines
  - Select the proper cutter for the job to be done
  - Calculate cutting speeds and feeds

### III. TOPICS:

1. An Introduction to Machining Technology
2. Shop Safety
3. Measurement
4. Layout

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**TOPICS: Continued.....**

5. Hand Tools
6. Drills and Drilling Machines
7. Offhand Grinding
8. Sawing and Cutoff Machines
9. The Lathe
10. Cutting Tapers and Screw Threads on the Lathe
11. Other Lathe Operations
12. Milling Machines

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

Machining Fundamentals, John R. Walker, G. W. Walker  
 Machining Fundamentals Workbook, John R. Walker, G. W. Walker  
 Calculator, binder, paper, pens

**V. EVALUATION PROCESS/GRADING SYSTEM:**

Evaluation:

Tests	70%
Quizzes & Assignments	20%
Organizational Skills	10%

In addition to completing the above requirements, students must be in attendance a minimum of 95% of all classes.

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 – 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies &amp; Procedures Manual – Deferred Grades and Make-up</i> ).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to report grades.	

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## VI. SPECIAL NOTES:

### Bursary:

Two student bursaries are awarded each year to the students based on highest applied academic standards with perfect attendance.

### Time Sheets

In an effort to help students maximize their time in the shop we are insisting that they fill out a time sheet each week with a record of the number of hours spent on every project they worked on during that week. These will be handed in at the end of each week for review with the professor.

### Assignments & Projects:

Assignments and projects will be submitted to the professor at the time specified. Late assignments and projects will receive a grade of zero except in the case where the students has experienced extenuating circumstances and has contacted the professor prior to the due date.

### Guidelines on Conduct:

**Reliability:** Neither industrial work places of the College can or will tolerate tradesmen (students) taking time off without adequate reason or without maximum possible notice. A very real part of reliability is the ability to carry out responsibilities with minimum supervision.

**Attendance/Punctuality:** Attendance is mandatory for all classes unless specifically excused. This also includes any organized field trips both locally and out of town. Medical absence must be substantiated with a written note from either a Doctor or the College Health Nurse.

Punctuality is important as demonstrations may occur at the beginning of classes.

### Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

### Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

## VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

## VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.

MACHINE SHOP THEORY

MCH117

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