

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE. ON



SAULT COLLEGE  
OF APPLIED ARTS AND TECHNOLOGY  
MACHINE SHOP

COURSE TITLE: Aviation Machine Shop Practical

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CODE MO: MCH 1-4Q \_\_\_\_\_ SEMESTER: One

PROGRAM: Aviation Machining. Sault College Program Code 4064

**AUTHOR: Robert Zuonato** \_\_\_\_\_

**PATE; January. 1996** \_\_\_\_\_ **PREVIOUS OUTLINE DATED;**

**APPROVED:** A^&A^A^  
Dean, School of Engineering

Qb-oy-d /  
Date

TOTAL CREDITS: 1f1

PREREQUISITES: Admission Into the program

LENGTH OF COURSE: 10 HOURS/WEEK for 18 Weeks

*Afote; TfiJs course was designed'around'lh\* CZAA^C( Canadukn A^aifon Maintenance C&tfiaS? standards developed forAufa0on mach/hJhff.*

1. Course Description: This course will allow the student to develop the skills required to operate the various machines and equipment necessary to work safely and productively in a machining and manufacturing setting. With a focus on building parts or making repairs in the aviation industry. The program is designed around C A. M.C.(Canadian Aviation Maintenance Council) occupational analysis. Special attention will be placed on accurate measurement and inspection.

- 11 A Learning outcomes and elements of the performance:  
(Generic Skills learning Outcomes placement on the course outline will be determined and communicated at a later date.)

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

- 1) Work safely in both hangar and shop situations.
- 2) Use all of the various measuring tools to accurately take sizes of machined parts.
- 3) Use all tools required for "Layout." and also develop an understanding of when to use "layout".
- 4) Operate lathe to using various work holding devices.
- 5) Operate lathe to do various machining operations.
- 6) Operate various types of "Drill Presses"\* to do the different drilling operations.
- 7) Use and care for "Hand Tools" such as wrenches, screw drivers and hammers etc.
- 8) Use care for and re-sharpen the many types of "cutting tools" used in machining.
- 9) Operate different types of "Grinders" safely and efficiently.
- 10) Select proper "Grinding Wheel" to suit job application.
- 11) Operate different types of "Saws" safely and efficiently.
- 12) Select proper saw blade for operation performed.
- 13) Operate and set up various types of "Milling" machines.
- 14) Select "milling cutter" best suited for particular machining operation.
- 15) Operate various types of inspection tools quickly and accurately.

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**11. (B) Learning outcomes and elements of the performance:**

(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

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

- 1) Work in a safe manner in all aspects of hangar and shop situations.
- 2.(A) Use direct measuring tools - such as :
  - 6 and 12 inch scales.
  - Outside and inside micrometers
  - Bevel protractors
  - Vernier calipers
  - Vernier height cages
  - Thread micrometers
2. (B) Use transfer measuring tools such as:
  - Inside and outside calipers
  - Hermaphrodite calipers
  - Telescopic cages
  - Small hole cages
  - Dividers
3. Use layout tools such as:
  - Combination set
  - Protractors
  - Height cages
  - Surface cages
  - Dividers
  - Prick Punch
  - Solid Square

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**11. (b) LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

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

4. Use work holding devices on lathe such as:
  - 3 jaw chuck - Regular and Rev. jaws
  - 4 jaw independent chuck
  - Centers - live - dead - driving
  - Collet chuck
  - Mandrel
  - Face Plate and lathe dog
  - Magnetic chuck
  - Steady and follower rests.
  
5. Do various machining operations on lathes such as:
  - Turning
  - Facing
  - Boring
  - Threading
  - Taper Turning
  - Knurling
  - Grooving and parting off
  - Trepanning

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**11 B LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

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

6. (a) -Operate sensitive drill press.
  - Operate radial arm drill press
  - Select and sharpen drills for various types of metal and job situations
  - Spot face counter bore, ream and tap using a drill press
  - Use drill jigs to locate hole positions
  - Make set-ups using vee blocks, parallels, angle plates using appropriate clamps.
  
7. Select proper hand tools and use them safely.
  - Hammers
  - Screw drivers
  - Wrenches
  - Socket sets
  - Pry bars
  - Punches & chisels
  - Files
  
8. Select sharpen care for and use all types of cutting tools such as:
  - Lathe turning and boring, H.S.S. and carbide tools
  - Milling cutter, H.S.S.. and carbide
  - Drills, reamers, taps, broaches, counterbores
  
9.
  - To operate and set up tool post grinder (lathe)
  - Operate surface grinders
  - Operate cylindrical grinders
  - Operate tooland cutter grinders
  
10.
  - Select proper grinding wheels for shape, grade grit, bond and speed
  - Balance and dress wheels where applicable
  - Check wheels for cracks and defects.

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- 11. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**  
(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

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

11.
  - Operate horizontal band saw for cutting off stock
  - Operate circular cold cut saw
  - Operate vertical contour band saw with file attachment
  - Weld blades for vertical band saw.
  
12.
  - Select band saw blades for pitch, tooth form, set and width to correspond with material type and thickness.
  - Adjust and set band speed for various material types and thickness.
  
13.
  - Set up and operate vertical milling machine to:
    - Slab mill and face mill
    - Cut key seats
    - Drill, bore and counterbore holes
    - Mill angular surfaces
    - Do form cutting
  - Select work holding accessories
  - Set up and operate horizontal nulling machines to:
    - Gang mill
    - Face mill a "cube"
    - Index and machine "Gear teeth" and "splines"
    - Line bore holes

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**11.(B) LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

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14. Select milling cutters such as:
  - Woodruff key seat cutters
  - End mills for roughing and finishing
  - Gear tooth cutters
  - Sprocket cutters
  - Shell end mills
  - Carbide face mills
  - Slitting saws
  - Fly cutters
  - Dovetail cutters
  - Tea slot cutters
  
15. Use inspection equipment to check quality of work such as:
  - Hardness testers
  - Optical comparators
  - Surface finish comparators
  - Tensile testers
  - Torsion testers
  - Dial bore gages
  - Plug gages
  - Magnaflux and die penetrant inspection methods for ND.T. (non destructive testing)

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**111. TOPICS:**

All of the topic areas listed above will be covered in the course, but not necessarily in the order listed .More time may be devoted to certain topics depending on students individual needs .

Depending on specific requirements of the aviation machining industry and direction given by **C.A.M.C.** (Canadian aviation maintenance council) it may be necessary to expand on various topic areas .

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

TEXT : Machine Tool Practices 5th. edition Kibbe Neele  
Publisher Prentice Hall

Calculator, 6 inch scale, safety glasses, safety boots and  
hair nets when hair is long enough to touch the collar.

Note I Besides wearing the appropriate safety equipment students working in the shop cannot wear rings, jewelry .ties or loose clothing since they can become entangled in revolving machinery causing injury or dismemberment to the operator.

**V. GRADING:**

<b>A+</b>	Consistently Outstanding	(90 -100%)
<b>A</b>	Outstanding Achievement	(80 - 89%)
<b>B</b>	Consistently above average	(70 - 79%)
<b>C</b>	Satisfactory or acceptable achievement	(60 - 69%)
<b>R</b>	Repeat: The student has not met the requirements of the course	(less than 60%)
<b>CR</b>	Credit exemption	
<b>X</b>	A temporary grade to carry over into next semester given only for extreme circumstances	

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**VI. SPECIAL NOTES:**

**Special Needs**

If you are a student with special needs (e.g., physical limitations, visual and hearing impairments), you are encouraged to discuss required accommodations with the professor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 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 post-secondary institutions.

**Disclaimer for Meeting the Needs of the Learners**

Substitute Course Information is available at the Registrar's Office.

Any Other Special Notes appropriate to your course.

**VII. PRIOR LEARNING ASSESSMENT**

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

- A. Complete **a** machining project in a reasonable **amount** of **time** to **the** specifications set out in the drawing and the satisfaction of the machine shop faculty person.
  
- B Obtain 60% on a written test on the theoretical aspects of machining.

GUIDELINES OF CONDUCT & APPEARANCE

Neither industrial work places or 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 a minimum of supervision.

**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 College health nurse.

**DRUGS**

Drugs and machinery do not mix. The use of drugs will result in immediate dismissal from the College.

**ALCOHOL**

The use of alcohol is accepted provided no drink is taken at least 12 hours before class. Coming to class with a hangover is dangerous to safety and will not be tolerated.