

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON



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OF APPLIED ARTS AND TECHNOLOGY

MACHINE SHOP

COURSE TITLE: Aviation Machine Shop Theory

CODE NO: MCH 107 - 5 **SEMESTER:** One

PROGRAM: Aviation Machining. Sault College Program Code 4084

AUTHOR: Greg White

DATE: January, 1996 **PREVIOUS OUTLINE DATED:** _____

APPROVED: *L.P. Crozeth* 96-01-23
Dean, School of Engineering Date

TOTAL CREDITS: 5

PREREQUISITES: Admission into the program

LENGTH OF COURSE: 5 HOURS/WEEK for 18 Weeks

Note: This course was designed around the CAMC (Canadian Aviation Maintenance Council) standards developed for Aviation machining.

COURSE NAME

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I. COURSE DESCRIPTION : This course helps the student to develop the necessary academic and theoretical basis to transfer practical shop experiences to various machining operations and situations. The theory in conjunction with the other courses of study in the program are designed around CAMC's (Canadian Aviation Maintenance Council) occupational analysis. This course will also allow the student the opportunity to learn, practice and demonstrate a number of the generic skill requirements as outlined in the provincial generic skill learning outcomes documents.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE :
(Generic Skills elements of performance, teachings, experiences are so indicated
G.S.#'s

A. Learning Outcomes:

1. Demonstrates sufficient knowledge to work safely in both hangar and shop operations.
2. Demonstrates the ability to use various shop formulae to determine sizes, speeds, feeds etc. accurately and efficiently to complete various machining functions using acceptable machining sequencing.
3. Utilizes various hand tools and layout tools safely and competently to manufacture machined components to generally recognized shop practices.
4. Utilizes various measuring tools competently to inspect and manufacture machined components to generally recognized shop practices.
5. Demonstrates knowledge of machining operations on lathes and lathe operations to manufacture machined components to generally recognized shop practices.
6. Demonstrates knowledge of machining operations on drills and drilling operations to manufacture machined components to generally recognized shop practices.
7. Demonstrates knowledge of machining operations on mills and milling machine operations to manufacture machined components to generally recognized shop practices.
8. Demonstrates knowledge of machining operations on grinders and grinding operations to manufacture machined components to generally recognized shop practices.

B. Learning Outcomes and Elements of the Performance:

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

1. Demonstrates sufficient knowledge to work safely in both hangar and shop operations.
(Corresponds to CAMC Task 1)

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- recognize and alleviate potential hazards
 - recognize and handle hazardous materials in conformance with WHMIS legislation
 - comply with government safety standards and regulations
 - recognize and utilize various types of personal protective safety equipment
 - recognize and utilize operating procedures for emergency safety equipment (fire extinguishers and lockouts)
2. Demonstrates the ability to use various shop formulae to determine sizes, speeds, feeds etc. accurately and efficiently to complete various machining functions using acceptable machining sequencing.
- change to various units of measurement accurately
 - determine the initial cutting speeds and feeds consistent with industry standards and accepted practice.
 - determine machining sequences
 - determine volume, weights and time estimates for manufacturing
3. Utilizes various hand tools and layout tools safely and competently to manufacture machined components to generally recognized shop practices.
(Corresponds to CAMC Task 5)
- identify handtools and their parts
 - demonstrate knowledge of handtool capability application and durability
 - demonstrate knowledge of tool geometry and shapes dependent on operation
 - demonstrate knowledge of handheld electric and pneumatic handheld tools
 - demonstrate knowledge of handheld power tools function and accessories
 - demonstrate knowledge of various layout tools and procedures to accurately and competently utilize them in generally accepted shop practice
4. Utilizes various measuring tools competently to inspect and manufacture machined components to generally recognized shop practices.
- demonstrate knowledge of measuring tool limits, accuracy and application
 - demonstrate techniques for measuring lengths, angles, diameters, depths and surface quality
 - demonstrates knowledge of vernier calipers, micrometers, bevel protractors, dial indicators, sine bars, gauge blocks and specialized measuring tools and instruments
5. Demonstrates knowledge of machining operations on lathes and lathe operations to manufacture machined components to generally recognized shop practices.
(Corresponds to CAMC Task 15)
- demonstrates knowledge of various lathes, their parts and function of the parts

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- **demonstrates the ability to identify the various types of lathe operations and sequencing to safely and accurately manufacture components in a variety of settings**
 - **demonstrates knowledge of various workholding devices and lathe accessories and their utilization to manufacture components.**
 - **demonstrates knowledge of preventative maintenance of the machine tool and adjustments to accurately and safely manufacture components**
6. **Demonstrates knowledge of machining operations on drills and drilling operations to manufacture machined components to generally recognized shop practices.**
(Corresponds to CAMC Task 14)
- **demonstrates knowledge of various drilling machines, their parts and function of the parts**
 - **demonstrates the ability to identify the various types of drilling operations and sequencing to safely and accurately manufacture components in a variety of settings**
 - **demonstrates knowledge of various workholding devices and drilling accessories and their utilization to manufacture components.**
 - **demonstrates knowledge of preventative maintenance of the machine tool and adjustments to accurately and safely manufacture components**
7. **Demonstrates knowledge of machining operations on mills and milling machine operations to manufacture machined components to generally recognized shop practices.**
(Corresponds to CAMC Task 16, 17 & 18)
- **demonstrates knowledge of various milling machine, their parts and function of the parts**
 - **demonstrates the ability to identify the various types of mill operations and sequencing to safely and accurately manufacture components in a variety of settings**
 - **demonstrates knowledge of various workholding devices and mill accessories and their utilization to manufacture components.**
 - **demonstrates knowledge of preventative maintenance of the machine tool and adjustments to accurately and safely manufacture components**
8. **Demonstrates knowledge of machining operations on grinders and grinding operations to manufacture machined components to generally recognized shop practices.**
(Corresponds to CAMC Task 19)
- **demonstrates knowledge of various grinders, their parts and function of the parts**

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- demonstrates the ability to identify the various types of grinding operations and sequencing to safely and accurately manufacture components in a variety of settings
- demonstrates knowledge of various workholding devices and grinding accessories and their utilization to manufacture components.
- demonstrates knowledge of preventative maintenance of the machine tool and adjustments to accurately and safely manufacture components

III. TOPICS :

The topics and topic areas will vary depending on the needs of the student and the work that is being done in the shop. These topics as listed above sometimes overlap several areas of skill development and are not necessarily intended to be explored in isolated units or in a particular area.

IV. REQUIRED STUDENT RESOURCES :

Text: Machine Tool Practice, 5th Edition, Kibbe, Neely, pub. Prentice Hall
Students are expected to attend class with notebooks, text and a calculator

V. GRADING :

A final grade will be given as a letter in accordance with the following percentage equivalent:

A+	Consistently Outstanding	(90 - 100%)
A	Outstanding Achievement	(80 - 89 %)
B	Consistently above average achievement	(70 - 79 %)
C	Satisfactory or acceptable achievement in all areas subject to assessment	(60 - 69 %)
R	Repeat : The student has not achieved the objectives of the course and the course must be repeated.	(Less than 60 %)
CR	Credit exemption	
X	a temporary grade to carry over into next semester given only for extreme circumstances	
R	= did not meet course requirements at this time	

COURSE NAMECOURSE CODE**VI. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS, ETC.)**

A final grade will be derived as follows:

WHIMIS and safety Quiz	= 10%
Test 2 (mid term)	= 15%
Test 3 (final)	= 15%
5 mini-quiz random throughout semester	= 25%
Technical Report and presentation	= 10%
Written Assignment (s)	= 10%
Attendance including homework **	= 15%

** Note : Attendance is not only a measure of physical presence at a certain hour but also the students cooperation and initiative. As attendance is expected the student will be will lose 1% for every hour missed or late without a justified excuse

TIME FRAME:

Aviation Machine Shop theory MCH - 107 involves 4 periods per week for the entire semester as well as one self directed hour in which the student is expected to complete particular assignments, Students are expected to attend class and participate in class activities.

VI. SPECIAL NOTES:**Special Needs**

If you are a student with special needs (e.g.. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or councilor so that support services may be arranged.

Academic Dishonesty

Students should refer to the definition of "academic dishonesty" in the "Statement of Student Rights and Responsibilities".

Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or other such penalty, up to and including expulsion from the course as may be decided by the professor.