

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Machine Shop Fundamentals

CODE NO. : MCH140

SEMESTER: 1

PROGRAM: Pre-Trades and Technology

AUTHOR: Neal Moss

DATE: Jan. 2008 **PREVIOUS OUTLINE DATED:**

APPROVED:

CHAIR

DATE

TOTAL CREDITS:

PREREQUISITE(S):

HOURS/WEEK:

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*For additional information, please contact Corey Meunier, Chair
School of the Natural Environment, Technology and Skilled Trades
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I. 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, manufacturing and maintenance setting with a focus on building parts or making repairs in industry. Special attention will be placed on accurate measurement and inspection.

Students will be introduced to basic hydraulics and components. The skills developed will allow the student to set up and operate a basic hydraulic system safely and effectively.

A 95% attendance is recommended to successfully complete this course

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. ***Work safe in a shop environment whether running machines or doing bench work.***

Potential Elements of the Performance:

- Use all shop safety rules.
- Wear and use proper safety equipment.
- Operate machines in a safe manner.
- Practice safe working habits.

2. ***Use all of the various measuring tools to verify dimensions of machined parts.***

Potential Elements of the Performance:

- Use measuring tools such as scales, inside and outside micrometers and vernier calipers.
- Use transfer measuring tools such as inside and outside calipers, telescopic gauges, small hole gauges and dividers.

3. ***Perform basic layout using various tools and methods.***

Potential Elements of the Performance:

- Perform layout using combination set, scales, protractors, height gauges, surface gauges and dividers.
- Mark layout using scribes, prick and centre punches.

4. ***Safely operate various grinders used in industry.***

Potential Elements of the Performance:

- Operate pedestal grinders.
- Operate hand grinders.
- Operate surface grinders.
- Safely change grinding wheels.
- Safely dress grinding wheels.

5. ***Select and operate different types of drill presses and hand drills.***

Potential Elements of the Performance:

- Operate sensitive and radial arm drill presses safely.
- Select and operate pneumatic and electric hand drills and perform safe drilling.
- Select proper size drills for drilling and tapping.
- Sharpen a twist drill bit.
- Perform operations such as drilling, reaming, spot facing and counter boring.
- Perform safe work holding using clamps, vises, angle plates, vee blocks and parallels.

6. ***Safely operate various cutoff and band saws.***

Potential Elements of the Performance:

- Operate horizontal band saw.
- Operate vertical contour band saw.
- Operate electric chop saw.
- Inspect and change blades as required.
- Select proper speeds and feeds for sawing.

7. ***Safely use assorted hand tools.***

Potential Elements of the Performance:

- Select and use various wrenches (Screwdrivers, hex, torx etc.)
- Select and use proper files, chisels, punches etc.
- Identify worn or defective hand tools.

8. ***Safely perform bench work.***

Potential Elements of the Performance:

- Proper use and care of files.
- Proper care and use of hack saws.
- Select and use different taps and dies based on application.

9. ***Safely operate metal cutting lathes using assorted work holding devices.***

Potential Elements of the Performance:

- Use and care of 3 jaw and 4 jaw independent chucks.
- Select different centres such as live, dead or bell.
- Care and use of collet chucks and mandrels.
- Setup and use steady and follower rests.
- Machine between centres using a lathe dog and face plate.

10. ***Safely perform various machining operations on the lathe.***

Potential Elements of the Performance:

- Operate lathe performing facing, turning and boring.
- Using calculations and formulas select proper speeds and feeds.
- Using proper formulas perform threading and taper turning.
- Safely perform knurling, grooving and parting off.

11. ***Safely operate Hydraulic Training Equipment***

Potential Elements of the Performance

- Operate Hydraulic training equipment safely.
- Assemble a basic hydraulic system.
- Understand the effects of pressure and flow on a hydraulic system.

III. TOPICS:

1. Working safely in a shop environment.
2. Use and care of measuring tools.
3. Performing basic layout.
4. Safe use of grinders.
5. Selection and operation of drill presses.
6. Safe operation of various saws.
7. Use and care of hand tools.
8. Performing safe bench work.
9. Work holding devices for the lathe.
10. Safely performing operations on the lathe.
11. Safely operate Hydraulic Training Equipment.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**Machine Shop Fundamentals textbook****Scientific calculator****Safety glasses****Safety boots****Shop coats (Not mandatory but recommended to protect clothing)****Hair net required when hair is below collar length.****(Hair may also be put up underneath a ball cap)*****NOTE***

Students are expected to wear safety equipment in the shop, failure to do so will result in denial to work in the shop on that occasion. While working in the shop do not wear rings or exposed jewelry or shorts.

CELL PHONES MUST NOT BE USED IN THE SHOP.**V. EVALUATION PROCESS/GRADING SYSTEM:***Projects* 70%*Attendance* 20%*Participation and attitude* 10%*Total* 100%

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

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical	

U	placement or non-graded subject area. Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

VI. SPECIAL NOTES:

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 professor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 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.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

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.

<include 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 a challenge exam or portfolio.

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.