

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Machine Shop Theory 1

CODE NO. : MCH 143 **SEMESTER:** 1

PROGRAM: Mechanical Engineering Technician

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DATE: Jan. 2009 **PREVIOUS OUTLINE DATED:** Sept./08

APPROVED:

	“Corey Meunier”	_____
	CHAIR	DATE

TOTAL CREDITS: 4

PREREQUISITE(S): Nil

HOURS/WEEK:

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For additional information, please contact Corey Meunier, Chair

School of Technology & Skilled Trades

(705) 759-2554, Ext. 2610

I. COURSE DESCRIPTION:

This course will focus on the student's ability and understanding of the theoretical aspects of machining and manufacturing. This course will cover precision measurement, hand tools, speeds, feeds, threading and various machines used in industry, in the repair and manufacture of equipment and components. Students will also gain knowledge of various types, properties and applications of lubricants.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. ***Have an awareness of safety in the operation of machines and tools used in the mechanical trades.***

Potential Elements of the Performance

Gain an understanding of shop safety.

- Develop safe work habits.
- Recognize and correct unsafe work conditions.
- Identify hazards when operating machine shop equipment.
- Identify hazards while working with hand, electric and air powered hand tools

2. ***Understand measurement and be able to use and care for various measuring tools using both Metric and Imperial systems.***

Potential Elements of the Performance:

- Measure to 1/64" (0.5 mm) 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.
- Properly use various dial indicators.
- Measure correctly using feeler gauges

3. Accurately perform layout operations as per Drawings and Sketches

Potential Elements of the Performance:

- Perform layout using combination set, scales, protractors, height gauges, surface gauges and dividers.
- Safe use of layout tools while performing layouts.
- Mark layout using scribes, prick and centre punches.

4. Safely operate various grinders used in industry.

Potential Elements of the Performance:

- Identify various types of grinders.
- Understand the need for various types stones
- Dress a grinding wheel.
- Change a grinding wheel.
- Grinder safety.

5. Identify the different types of drill presses and hand drills.

Potential Elements of the Performance:

- Drill Press safety
- Selecting type of drilling machine.
- Calculate proper speeds and feeds for drilling based on the drill type and material selection.
- Discuss the various drill series available
- Sharpening a Twist drill
- Practice safe work holding while drilling.

6. Safely operate various cutoff and band saws.

Potential Elements of the Performance:

- Choose the type of saw based on application.
- Identify various saws available.
- Inspect and safely change blades on different saws.
- Select proper speeds and feed and tooth pitch for sawing.

7. Safely use assorted hand tools.

Potential Elements of the Performance:

- Hand tool safety.
- Select and use various wrenches
- Select and use various screwdrivers
- Identify different types of files.
- Identify hand tools used in the Mechanical Trades.
- Care and maintenance of hand tools.

8 Theory of set-ups for work on the lathe, determine speeds, feeds and calculate thread parameters and tapers using formulae.

Potential Elements of the Performance:

- Lathe safety.
- Lathe operation.
- Identify parts of the lathe and common accessories.
- Calculate speeds and feeds.
- Calculate thread parameters using formulae.
- Perform taper turning calculations.

9 Theory of set-ups for work on the milling machine, determine speeds, feeds and applications for various cutting tools.

Potential Elements of the Performance:

- Milling machine safety
- Milling machine operation.
- Calculate speeds and feeds on a milling machine
- Identify and use various work holding devices on a milling machine.
- Identify and use various cutting tools for the correct application.

10 Understand the types, properties and applications of lubricants.

Potential Elements of the Performance:

- Identify lubricants used in different machines.
- Identify the different types of lubricants.
- Importance of viscosity in lubricants.
- Identify lubricants used in machining operations
- Practice safe handling of lubricants

III. TOPICS:

1. Working safely in a shop environment.
2. Use and care of measuring tools.
3. Performing basic layout.
4. Safe use and care of grinders.
5. Selection and operation of drill presses and hand drills.
6. Safe operation of various saws.
7. Safely use hand tools.
8. Theory of Safe machining in a lathe using various formulae.
9. Theory of Safe machining on the milling machine.
10. Application of various Lubricants..

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- **Machining Fundamentals textbook**
- **Machining Fundamentals workbook**
- **Scientific calculator**
- **Binder with paper**

Please 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, exposed jewelry or shorts.

CELL PHONES MUST NOT BE USED IN THE SHOP**V. EVALUATION PROCESS/GRADING SYSTEM:**

<i>Tests/Quizzes</i>	<i>60%</i>
<i>Assignments</i>	<i>30%</i>
<i>Attendance/Participation</i>	<i>10%</i>
Total	100%

The following semester grades will be assigned to students:

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

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services 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.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. 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.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.