

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Machine Shop Theory

CODE NO. :

SEMESTER: 1

PROGRAM: Mechanical Techniques I

AUTHOR: Peter Corbett

DATE: Sept. 2006 **PREVIOUS OUTLINE DATED:**

APPROVED:

DEAN

DATE

TOTAL CREDITS:

PREREQUISITE(S):

HOURS/WEEK:

Copyright ©2005 The Sault College of Applied Arts & Technology
Reproduction of this document by any means, in whole or in part, without prior written permission of Sault College of Applied Arts & Technology is prohibited.
For additional information, please contact Colin Kirkwood, Dean
School of Technology, Skilled Trades, Natural Resources & Business
(705) 759-2554, Ext. 2688

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 types, properties and applications of lubricants.

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. ***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 various measuring tools in both imperial and metric.***

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.

3. ***Accurately layout using drawings and sketches***

Potential Elements of the Performance:

- Explain importance of layouts.
- Identify common layout tools.
- Safe use of layout tools while performing layouts.

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

Potential Elements of the Performance:

- Identify various types of grinders.
- Dress a grinding wheel.
- Change a grinding wheel.
- Grinder safety.

5. ***Identify the different drill presses and hand drills.***

Potential Elements of the Performance:

- Drill press safety.
- Selecting type of drilling machine.
- Discuss various drill series available.
- Calculate proper speed and feed based on drill type and material selection.
- Sharpening a twist drill bit.
- Selecting and using taps and dies.
- 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.
- Sawing safety.

7. **Select and use proper hand tools based on application.**

Potential Elements of the Performance:

- Hand tool safety.
- Identify various wrenches (Screwdrivers, hex, torx etc.)
- Identify different types of files.
- Identify hand tools used in Mechanical trades.
- Care and maintenance of hand tools

8. **Setup work in the lathe, determine speeds, feeds and calculate thread parameters and tapers using formulas.**

Potential Elements of the Performance:

- Lathe safety.
- Lathe operation.
- Identify parts of the lathe.
- Utilization of various work holding devices on a lathe.
- Calculate speeds and feeds.
- Calculate thread parameters using formulas.
- Calculate information required to cut tapers.

9. **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. Shop and machine safety.
2. Measurement.
3. Accurate layout.
4. Care and operation of grinders.
5. Care and operation of various band saws and cutoff saws.
6. Safe use of drill presses and hand drills.
7. Care and selection of hand tools.
8. Lathe operation.
9. Lubricants

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Machine Shop Fundamentals textbook
Machine Shop Fundamentals workbook
Scientific calculator
Binder with paper
Pens and pencils

V. EVALUATION PROCESS/GRADING SYSTEM:

<i>Tests</i>	60%
Assignments	20%
Attendance	10%
Participation and attitude	<u>10%</u>
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 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: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.