

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: Machine Shop Theory 1

CODE NO. : MCH143 **SEMESTER:** ONE

PROGRAM: Mechanical Engineering Technician – Manufacturing
Mechanical Engineering Technology
Mechanical Techniques – Industrial Maintenance
(Millwright) and Machine Shop

AUTHOR: Neal Moss neal.moss@saultcollege.ca

DATE: September 2014 **PREVIOUS OUTLINE DATED:** September 2013

APPROVED:

TOTAL CREDITS: ONE **CHAIR** **DATE**

PREREQUISITE(S): NIL

HOURS/WEEK:

Copyright ©2014 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 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 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.***Potential Elements of the Performance:**

- Measure using gage blocks.
- Measure angles using sine bar.
- The correct use gauges.
- How to use comparison measurement.
- Measure with light waves.
- Understand surface finish measurement.

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.
- Understand the need for various types stones.
- 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.
- 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 the correct sized wrenches.
- Identify the correct screwdriver style
- Identify different types of files.
- Identify hand tools used in Mechanical trades.
- Care and maintenance of hand tools.

8. 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.
- Identify various work holding devices on a lathe.
- Calculate speeds and feeds.
- Calculate thread parameters using formulas.
- Calculate information required to cut tapers.

9. The Milling machine, determine speeds, feeds and type of cutting tool to suit the application.

Potential Elements of the Performance:

- Milling machine safety.
- Milling machine operation.
- Identify parts of the Milling machine.
- Identify various work holding devices on a Milling machine.
- Calculate speeds and feeds.
- Identify 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. 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. Milling machine operation
10. Lubricants

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Machining Fundamentals textbook
- Machining Fundamentals workbook
- Scientific calculator (***not a cell phone***)
- Binder with paper
- Pens and pencils

**No Cell Phones are Permitted in
The Classroom or Shops**

V. EVALUATION PROCESS/GRADING SYSTEM:

<i>Tests and Homework Assignments</i>	<i>80%</i>
<i>Attendance (min 80%) see notes below</i>	<i><u>20%</u></i>

Attendance - 1% will be deducted for every unapproved hour, or Late / Leaving Early

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%	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:Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room and shall be recorded as absent. Late students will be granted admission at the break.

Due to the safety concerns of this course, students who do not attend a minimum of 80% (12 classes) of the scheduled classes will be given an "F" grade for this course. **After 3 missed classes students lose the full 20% for the Attendance/housekeeping portion of marks.**

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.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.