

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: MACHINE SHOP FUNDAMENTALS

CODE NO. : MCH140 **SEMESTER:** TWO

PROGRAM: PRE-TRADES AND TECHNOLOGY

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DATE: January 2017 **PREVIOUS OUTLINE DATED:** January 2016

APPROVED: *“Corey Meunier”* Jan 2017
CHAIR **DATE**

TOTAL CREDITS: 4

PREREQUISITE(S): N/A

HOURS/WEEK: 3

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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.

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

Potential Elements of the Performance:

- Operate sensitive 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.
- Perform safe work holding using clamps, vises, angle plates, vee blocks and parallels.

5. Safely operate various cutoff and band saws.

Potential Elements of the Performance:

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

6. 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.

7. 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 centers' such as live, dead or bell.
- Care and use of collet chucks and mandrels.
- Set-up work pieces using a dial indicator

8. Safely perform various machining operations on the lathe.

Potential Elements of the Performance:

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

9. Safely perform basic pneumatic operations using Pneumatic Trainers.

Potential Elements of the Performance

- Describe the basic components of a pneumatic system.
- Describe a simple pneumatic system.
- Safely set-up and operate Pneumatic Trainer as per design.

10. Safely perform basic hydraulic operations using Hydraulic Trainers.

Potential Elements of the Performance

- Describe the basic components of a hydraulic system.
- Describe a simple hydraulic system.
- Safely set-up and operate Hydraulic Trainer as per design.

III. TOPICS:

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

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Machine Shop Fundamentals textbook

Scientific calculator (**cell phones are not to be used as calculators**)

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 and will be recorded as absent . While working in the shop do not wear rings or exposed jewelry or shorts.

CELL PHONES MUST NOT BE USED IN THE SHOP OR CLASSROOM

V. EVALUATION PROCESS/GRADING SYSTEM:

| | |
|---|-------------------------------|
| <i>Projects and</i> | 40% |
| <i>Attendance (see Special Notes section)</i> | 15% |
| <i>Participation, Housekeeping, Attitude</i> | |
| <i>Skills Sign Off</i> | 15% |
| <i>Tests and Quizzes</i> | <u>30%</u> |
| <i>Total</i> | 100% |
| Attendance (min. 80% req.) | -1% per unexcused Hour |
| Safety violations | -2% per violation |

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: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.

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.

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.

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.