



**I. COURSE DESCRIPTION:**

This course will focus on the student's hands on ability and skill to safely operate and use various machines and hand tools used in the mechanical trades. Students will be applying their theoretical knowledge to performing layout and manufacturing components from drawings. Special attention will be placed on safe work habits and accurate measurement.

**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:

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

**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.
- Safely change grinding wheels.
- Safely change grinding and cut-off discs
- Safely dress grinding wheels.

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

Potential Elements of the Performance:

- Operate radial arm drill
- Operate drill press
- Operate all styles of hand held drills

**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 paring off.

**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.

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

- Machining fundamentals
- Machining fundamentals work book
- 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)

**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 OR CLASSROOM**

**V. EVALUATION PROCESS/GRADING SYSTEM:**

|                                 |  |
|---------------------------------|--|
| <i>Projects</i>                 | <i>80%</i>                                 |
| <i>Attendance/House Keeping</i> | <i><u>20%</u> (12/15 See special note)</i> |
| <b>Total</b>                    | <b>100%</b>                                |

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

The following semester grades will be assigned to students:

| <b>Grade</b> | <b>Definition</b>  | <b>Grade Point<br/>Equivalent</b> |
|--------------|--|-----------------------------------|
| 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:

**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.**

**Due to Safety concerns of this course, after 3 safety violations, the student will be removed from the class and receive an “F” grade.**

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.

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.