



**I. COURSE DESCRIPTION:**

The general objective of this course is to give students a basic introduction to manufacturing processes, process sequences and an introduction to the 5Ms of industrial processing.

The course centers on the steel production and steel manufacturing industries, but the concepts introduced are applicable to most manufacturing environments.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

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

**1. Process**

Potential Elements of the Performance:

- Give the definitions of process and process sequence.
- Describe linear processes.
- Describe parallel processes.

**2. The 5Ms of Manufacturing Systems**

Potential Elements of the Performance:

- Describe each of the 5M elements in manufacturing processes and how they interrelate in a total quality management system.

**3. Steel Production Processes**

Potential Elements of the Performance:

- Describe the production flow through an integrated steel plant from incoming raw materials to shipped product.
- Describe the various steel production processes work.
- Explain how the various processes work.
- Where alternate processes are available, explain the technical and economic advantages and disadvantage of each alternate.

**4. Steel Manufacturing Processes**

Potential Elements of the Performance:

- Recognize and describe various manufacturing processes used for the production of goods made from steel.
- Describe the demands made on the material in each of the various processes covered.
- Explain in technical and economic terms why one process may be used as opposed to a possible alternate process.

**TOPICS:**

**1. Processes:**

- i. Definition
  - ii. Process Sequence
  - iii. Series (linear) processes
- Parallel process

**2. The 5 Ms of Manufacturing Systems:**

- i. Man
  - ii. Material
  - iii. Machines
  - iv. Methods
  - v. Measurement
- Relationship to Quality Management System

**3. Steel production processes**

- i. Cokemaking
  - ii. Ironmaking
  - iii. Steelmaking
  - iv. Casting
  - v. Hot Rolling
  - vi. Pickling
  - vii. Cold Rolling
  - viii. Annealing
- Shipping

**4. Steel manufacturing processes**

and demands made on material

- i. Cutting:
  - a. Shearing
  - b. Flame cutting
  - c. Plasma Cutting
  - d. Laser cutting
- ii. Metal forming:
  - a. Punching
  - b. Blanking
  - c. Bending
  - d. Press forming
  - e. Roll forming
  - f. Drawing
  - g. Hydroforming
- iii. Joining:
  - a. Bolting
  - b. Riveting
  - c. Arc welding
  - d. Resistant spot welding
  - e. Seam welding
  - f. Friction Welding
  - g. Laser welding
  - h. Brazing
  - i. Soldiering
- iv. Machining:
  - a. Milling and Drilling
  - b. Turning
  - c. Grinding
- v. Casting:
  - a. Sand casting
  - b. Permanent mould casting
  - c. Lost wax casting

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

To be provided by instructor on LMS

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

Assignments, Class Participation and Homework - 40%

Tests - 60%

The following semester grades will be assigned to students:

<b>Grade</b>	<b><u>Definition</u></b>	<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.

Cell Phone Use

**Cell phones in the classroom are to be put on Silent or Vibrate during lectures, and labs.**

**Ringling or texting during class will result in a deduction of 5% from the final grade per event.**

**During Tests, Cell Phones are to be SHUT OFF and put away, and are not to be used as a calculator.**

**Should your phone ring during a test you will be asked to hand your test in and immediately leave the classroom.**

**A Grade of 0% will be issued for that test.**

**VII. COURSE OUTLINE ADDENDUM:**

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