

# SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



SAULT  
COLLEGE

## COURSE OUTLINE

**COURSE TITLE:** Material and Process Quality 1

**CODE NO. :** MTF103 **SEMESTER:** ONE

**PROGRAM:** Metal Fabricator Technician/Welding Techniques

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**DATE:** Sept 2010 **PREVIOUS OUTLINE DATED:** Jan 10

**APPROVED:**

*“Corey Meunier”*  
CHAIR

**DATE**

**TOTAL CREDITS:** TWO

**PREREQUISITE(S):** N/A

**HOURS/WEEK:** TWO

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## I. **COURSE DESCRIPTION:**

The general objective of this course is to provide Welding students with a working knowledge of the theory behind the procedures that are used in the making and working with carbon steels, aluminum and alloys. We will look at the effects of heat acting upon metals and the distortions that may result. Labs are used to determine types of metals using various testing procedures. We will look at weld quality and understand the procedures to obtain consistent quality.

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

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

### 1. ***Define Metals and Alloys***

#### Potential Elements of the Performance:

- Define and describe the Iron Making Process
- Define and describe the Steel Making Process

### 2. ***Define the following properties of metals and alloys:***

#### Potential Elements of the Performance:

- Define and describe each of the following mechanical and physical properties and / or terms:
  - Elasticity
  - Yield Point / Strength
  - Tensile ,Compressive, Shear, Bearing strength
  - Conductivity
  - Corrosion
  - Ductility
  - Malleability
  - Hardness
  - Impact Strength

### 3. ***MECHANICAL PROPERTIES AND TESTING OF STEEL***

#### Potential Elements of the Performance:

- Explain the procedures and interpretation of hardness testing for Rockwell hardness
- Explain how elevated temperatures affect strength.
- Explain the procedure and interpretation of toughness testing and how low temperature affect toughness.
- Explain the phenomena of fatigue and creep.

**4. Distortion**Potential Elements of the Performance:

- Identify and describe the effects of temperature on metals and alloys.
- Identify and describe procedures to reduce or eliminate the distortion resulting from welding.

**5. Introduction To Steel Specifications Systems**Potential Elements of the Performance:

- Explain what a standard is.
- Explain what a specification is.
- Explain how the numbering system in the AISI/SAE steel specification systems relates to chemical content of steel alloys

**6. Weld Quality**Potential Elements of the Performance:

- Define welding discontinuities and their effects on weld quality
- Identify types and causes of Geometric and dimensional discontinuities.
- Explain Documenting, Procedures and other functions to assure weld quality.

**III. TOPICS:**

1. Ironmaking , Steelmaking
2. Properties of Metals and Alloys
3. Mechanical Properties and Testing of Materials
4. Distortion
5. Steel Specifications Systems
6. Weld Quality

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

- **Course Bundle MTF 103**

**The following personal protection equipment is required in the Lab or Shop.**

- High Cut (8") Safety Boots (CSA approved)
- Impact Resistant Safety Glasses (CSA approved)
- Coveralls or Shop Coat (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)

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

Attitude, Attendance & Participation	= 20%
Assignments	= 15%
Quizzes	= 15%
3 Tests	= 50%

Attendance	-1% (per Hour) – late = 1 hour
Safety Violations	-1% (per Occurrence) – see notes below

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%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
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.**

### **No Cell Phones are Permitted in The Classroom or Labs**

### Safety:

Sault College recognizes that the Health and Safety of the Students and Staff is of the utmost importance. Recognizing that safety is everyone's responsibility and there is never a reason to compromise safety, is an important step in reducing accidents. To minimize potential hazards in the shop and various labs, safety rules will be strictly enforced.

Students must continuously wear all Sault College required **Personal Protective Equipment (PPE)** while working in the shop or lab as required by the Instructor. Students are required to wearing their required PPE prior to entering the lab. Failure to do this will result in the expulsion from the shop or lab activity and a zero attendance mark will be recorded. A student who repeatedly neglects to wear PPE as required is in violation of the Sault College Academic code of Conduct and may be sanctioned accordingly.(see Student Code of Conduct & Appeal Guidelines). For instance, first violation-verbal warning, second violation –written warning and the third violation-suspension from the Shop or Lab. For each infraction a 1% penalty is applied (as per the Evaluation/Grading System above.)

## VII. COURSE OUTLINE ADDENDUM:

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