



**I. COURSE DESCRIPTION:**

A curriculum dealing with a combination of theoretical knowledge and practical (hands on) skill related to the safe use and operation of typical :

- a) Shielded Metal Arc Welding equipment
- b) Gas Metal Arc Welding Equipment.

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

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

**1. *Identify equipment and procedures required to assure personal safety while engaged in shop activities.*****Potential Elements of the Performance:**

- identify proper eye protection as well as the need to wear it at all times while in the welding shop
- identify proper hand and face protection as well as the need to wear it during any and all cutting, heating and welding operations
- identify recommended fabrics and materials for personal protective clothing
- identify proper footwear and clothing
- identify the dangers associated with contact lenses, butane lighters, exposed metal jewellery, long hair and beards
- identify the location of commonly used welding tools, face shields and leather jackets
- locate and identify shop lighting and ventilation switches
- locate and identify emergency exits
- understand procedures for evacuation of shop areas in the case of emergencies

**2. *Set up and Operation of a SMAW Workstation*****Potential Elements of the Performance:**

- identify, select and adjust welding helmets and filter lenses
- identify electrodes according to type, size and AWS / CSA numbering systems
- identify CSA standards for the storage and handling of electrodes
- identify techniques for adjusting welding current and polarity
- perform a routine inspection of assigned workstation(s) to determine the condition of cables, electrode holder and related equipment
- report / correct deficiencies prior to commencement of work
- describe techniques for arc ignition, electrode manipulation and travel speed
- produce trial beads in the flat and horizontal positions to verify machine settings and operator technique

**3. Perform SMAW Procedures (in the flat and horizontal positions) as well as Identify / Correct Weld Defects.**

Potential Elements of the Performance:

- produce single and multi-pass fillet welds
- produce single and multi-pass groove welds
- identify and describe common weld defects as well as take corrective action(s) to eliminate their presence
- produce destructive tests on fillet or groove welds to determine weld metal soundness
- identify and explain ASME and CSA acceptance standards for weld soundness.

**4. Perform SMAW Procedures in the Vertical Up Weld Position.**

Potential Elements of the Performance:

- produce single and multi-pass fillet welds
- produce single and multi-pass groove welds
- identify and describe common weld defects as well as take corrective action(s) to eliminate their presence
- produce destructive tests on fillet or groove welds to determine weld metal soundness

**5. Set up and Operation of a GMAW Workstation.**

Potential Elements of the Performance:

- identify potential fire, fume and explosion hazards associated with the Gas Metal Arc Welding Process
- explain why a constant voltage machine is used for the GMAW process
- identify electrode types, sizes and AWS / CSA specifications
- identify common shielding gases used with the process
- perform a routine inspection of assigned workstations to determine the condition of wire feeder, cables, torch body, hoses and regulators
- report / correct deficiencies prior to commencement of work
- describe techniques for arc ignition, electrode manipulation and travel speed
- produce trial beads in the flat and horizontal positions to verify machine settings and operator technique

**6. Perform GMAW Procedures (in the flat and horizontal positions) as well as Identify / Correct Weld Defects.**

- produce single and multi-pass fillet welds and groove welds
- identify and describe common weld defects as well as take corrective action(s) to eliminate their presence
- perform in-service to drive roll tension, contact tip and nozzle

- produce destructive tests on fillet or groove welds to determine weld metal soundness
- identify and explain ASME and CSA acceptance standards for weld soundness.

**7. Perform GMAW Procedures in the Vertical Down Weld Position.**

- produce single and multi-pass fillet welds and groove welds
- identify and describe common weld defects as well as take corrective action(s) to eliminate their presence
- perform in-service to drive roll tension, contact tip and nozzle
- produce destructive tests on fillet or groove welds to determine weld metal soundness

**III. TOPICS:**

1. Personal and Shop Safety
2. SMAW Practices and Procedures
3. GMAW Practices and Procedures
4. Destructive Testing of Welds
5. AWS / CSA Acceptance Criteria for Welds

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

- CSA Approved (Impact Resistant) Safety Glasses
- CSA Approved (8 inch High Cut) Safety Work Boots
- CAS Approved (Gauntlet Type) Welding Gloves
- Appropriate Work Wear ( see Welding Shop Guidelines)
- Modules: Course Pack TCT701

## V. EVALUATION PROCESS/GRADING SYSTEM:

### Part 1 NOTES:

1. Re-writes are NOT allowed for any written assignment, quiz or test.
2. Repeats are NOT allowed for any shop test
3. Course attendance is mandatory. One percent (1 %) per hour will be deducted from the final course grade for apprentices with more than 4 hours of unexcused\* absence.

[ Any absence without a written, valid reason will be deemed unexcused.]

Valid reasons would include:

- Doctor's note
- Apprenticeship Ministry note
- Family Death or Serious Illness supported by a written note.

### Part 2 Final Course Grades:

The final course grade will be determined by means of the following list of weighted factors:

<b>Factor</b>	<b>Value</b>
Shop Assignments and Tests	65 %
CWB S-Class Test(s)	35 %
Attendance	-1 % per Unexcused Hour
Shop Clean-up	-1 % per Incident

The following semester grades will be assigned to students:

<b>Grade</b>	<b><u>Definition</u></b>	<b><i>Grade Point Equivalent</i></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.

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

#### **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.*

#### **VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.