SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	Shielded Metal Arc Welding (SMAW) 1		
CODE NO. :	MTF107	**SEMESTER:**	ONE
PROGRAM:	Metal Fabricator Technician / Welding Techniques		
AUTHOR: **INSTRUCTOR:**	Steve Witty Cliff Moss		
DATE:	January 2016	**PREVIOUS OUTLINE DATED:**	September 2015

APPROVED:

"Corey Meunier"

CHAIR

TOTAL CREDITS:	Four
PREREQUISITE(S):	N/A
HOURS/WEEK:	Four

I. COURSE DESCRIPTION:

A trades curriculum that has been designed to provide students with a combination of theoretical knowledge and hands on skill in relation to the safe use and operation of the SMAW (shielded metal arc welding /stick) welding process.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

1. Identify and select Personal Protective Equipment for Arc Welding Operations.

- identify proper eye, hand and face protection
- identify proper footwear and clothing
- identify and select filter lenses
- describe the effects of exposure to ultra violet and / or infra red radiation
- locate and identify shop ventilation controls
- locate and identify emergency exits
- locate and identify manifold shut-off valves for the shop gas system
- identify hazards associated with the SMAW process
- understand emergency shop evacuation procedures

2. Demonstrate and describe how to set up and operate a typical SMAW Workstation.

- identify, select and adjust welding helmets and lenses
- identify SMAW electrodes according to type, size, current type, polarity and welding position according to AWS and CSA designation
- identify and describe the various types of welding machine according to construction, duty cycle and current type
- perform a routine inspection of assigned workstation to determine the condition of welding machine, cables, electrode holders and related equipment
- understand the hazards of open circuit voltage (OCV) and arc voltage
- identify / set welding machine controls to their designated value(s)
- describe techniques for arc ignition, electrode manipulation and travel speeds
- produce trial weld beads to identify possible defects and verify current settings

3. Demonstrate the ability to produce sound welds as well as identify / troubleshoot and make corrective adjustments for weld defects.

- describe potential fire, fume and explosion hazards associated with the SMAW process
- perform appropriate adjustments to SMAW equipment specific to the demands of single and multi-pass fillet welds
- make single and multi-pass fillet welds on mild steel

- perform appropriate adjustments to SMAW equipment specific to the demands of single and multi-pass groove welds
- make single and multi-pass groove welds on mild steel
- perform destructive tests on welded joints to verify overall soundness
- describe, identify and take corrective actions for common weld defects

4. CSA and AWS Classification of SMAW Electrodes

- identify, select electrodes by
  - Classification
  - Diameter
  - Desired Weld Appearance
  - Mechanical properties
- Identify and select the correct operating current for electrodes based upon
  - Diameter
  - Joint Design
  - Required Strength
- Identify the correct storage and handling procedures for each of the following electrode types
  - Low Hydrogen
  - Non-Low Hydrogen

5. Demonstrate the ability to pass a CWB "S" class Test*

- describe the physical dimensions of the CWB test plate assembly including:
  - bead sequence
  - position and number of stop / restarts
  - the acceptance criteria for the size and shape of the completed weld

- describe the physical bend test procedure to include:
  - plate thickness, width and length
  - bevel angle
  - root opening
  - number and size of bend test coupons

- describe the welding procedure to include:
  - preparation and condition of bend coupons
  - identification of face vs root bend coupons
  - acceptance criteria for possible defects

*S-Class Plate Test for students w/o a valid S-Class CWB Ticket
*T-Class Plate Test for students with a valid S-Class CWB Ticket

III. TOPICS:

1. Personal Protective Equipment and Safety
2. SMAW equipment safety and set-up
3. SMAW basic operations
4. SMAW electrodes
5. CWB test procedures

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Impact Resistant Safety Glasses (CSA Approved)
- High Cut (6 inch min) Safety Work Boot (CSA Approved)
- Weld Gloves (CSA Approved)

V. EVALUATION PROCESS/GRADING SYSTEM:

NOTES:

1. Late hand in penalties will be 10% per day. Assignments will not be accepted past one week late unless there are extenuating and legitimate circumstances.
2. If a student misses a test/lab he/she must have a valid reason (i.e. medical or family emergency – documentation shall be required). In addition, the instructor MUST be notified PRIOR to the test or lab sitting. If this procedure is not followed the student will receive a mark of zero on the test/lab with no make-up option.
3. Re-writes are NOT allowed for any written assignment, quiz or test.
4. Repeats are NOT allowed for any shop test.
5. Course attendance is mandatory. One percent (1 %) per hour will be deducted from the final course grade for unexcused* absence.

Valid reasons would include:

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

FINAL COURSE GRADES:

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

Factor	***Value***
Practical Tests	100%
Flat Lap	15%
Flat Tee	15%
Flat CWB	20%
Horizontal Lap	15%
Horizontal Tee	15%
Horizontal CWB	20%
Attendance	-1% per Unexcused Hour
Shop Clean-up	-1% per Incident

The following semester grades will be assigned to students:

Grade	**Definition**	*Grade Point Equivalent*
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.

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.