



## COURSE OUTLINE: MTF107 - SMAW WELDING I

Prepared: Dave Holley

Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	MTF107: SHIELDED METAL ARC WELDING I
<b>Program Number: Name</b>	4051: METAL FABRICATION 4053: WELDING TECHNIQUES
<b>Department:</b>	IRONWKR APPR./WELDING RELATED
<b>Semesters/Terms:</b>	18F
<b>Course Description:</b>	In this course, students are taught the processes of shielded metal arc welding (SMAW), including how to safely set up, use and maintain equipment operated in this type of welding. It will also cover how to select filler metals/electrodes needed to suit base metal for welding. Proper techniques on how to weld in the flat and horizontal positions are also developed throughout the course.
<b>Total Credits:</b>	4
<b>Hours/Week:</b>	4
<b>Total Hours:</b>	60
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>Substitutes:</b>	MTF104
<b>This course is a pre-requisite for:</b>	MTF137, MTF210
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4051 - METAL FABRICATION</b>
<b>Please refer to program web page for a complete listing of program outcomes where applicable.</b>	VLO 2 Apply knowledge of various welding and metal cutting techniques and theories to produce components and sub-assemblies.
	VLO 3 Prepare materials by utilizing fabrication machinery and equipment.
	VLO 7 Complete all work in compliance with health and safety legislation and prescribed organizational practices and procedures to ensure safety of self and others.
	VLO 8 Work responsibly and effectively in accordance with government safety regulations, manufacturer's recommendations and approved industry standards.
<b>Essential Employability Skills (EES) addressed in this course:</b>	EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
<b>Course Evaluation:</b>	Passing Grade: 50%, D
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	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



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- 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:  
 Doctors note  
 Family Death or Serious Illness supported by a written note.

**Course Outcomes and Learning Objectives:**

Course Outcome 1	Learning Objectives for Course Outcome 1
<p>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</p>	<p>1. Identify and select Personal Protective Equipment for Arc Welding Operations.</p> <ul style="list-style-type: none"> <li>- identify proper eye, hand and face protection</li> <li>- identify proper footwear and clothing</li> <li>- identify and select filter lenses</li> <li>- describe the effects of exposure to ultra violet and / or infra red radiation</li> <li>- locate and identify shop ventilation controls</li> <li>- locate and identify emergency exits</li> <li>- locate and identify manifold shut-off valves for the shop gas system</li> <li>- identify hazards associated with the SMAW process</li> <li>- understand emergency shop evacuation procedures</li> </ul> <p>2. Demonstrate and describe how to set up and operate a typical SMAW Workstation.</p> <ul style="list-style-type: none"> <li>- identify, select and adjust welding helmets and lenses</li> <li>- identify SMAW electrodes according to type, size, current type, polarity and welding position according to AWS and CSA designation</li> <li>- identify and describe the various types of welding machine according to construction, duty cycle and current type</li> <li>- perform a routine inspection of assigned workstation to determine the condition of welding machine, cables, electrode holders and related equipment</li> <li>- understand the hazards of open circuit voltage (OCV) and arc voltage</li> <li>- identify / set welding machine controls to their designated value(s)</li> <li>- describe techniques for arc ignition, electrode manipulation and travel speeds</li> <li>- produce trial weld beads to identify possible defects and verify current settings</li> </ul> <p>3. Demonstrate the ability to produce sound welds as well as identify / troubleshoot and make corrective adjustments for weld defects.</p> <ul style="list-style-type: none"> <li>- describe potential fire, fume and explosion hazards associated with the SMAW process</li> <li>- perform appropriate adjustments to SMAW equipment specific to the demands of single and multi-pass fillet welds</li> <li>- make single and multi-pass fillet welds on mild steel</li> <li>- perform appropriate adjustments to SMAW equipment specific</li> </ul>



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 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

**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight	Course Outcome Assessed
Flat CWB	20%	
Flat Lap	15%	
Flat Tee	15%	
Horizontal CWB	20%	



	Horizontal Lap	15%	
	Horizontal Tee	15%	

**Date:** July 31, 2018

Please refer to the course outline addendum on the Learning Management System for further information.