



## COURSE OUTLINE: MTF107 - SMAW WELDING I

Prepared: Corey Garson

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>Academic Year:</b>	2023-2024
<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>	56
<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>	<p><b>4051 - METAL FABRICATION</b></p> <p>VLO 2 Apply knowledge of various welding and metal cutting techniques and theories to produce components and sub-assemblies.</p> <p>VLO 3 Prepare materials by utilizing fabrication machinery and equipment.</p> <p>VLO 5 Understand and use a variety of destructive and non-destructive methods to test welds.</p> <p>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.</p> <p>VLO 8 Work responsibly and effectively in accordance with government safety regulations, manufacturer's recommendations and approved industry standards.</p> <p><b>4053 - WELDING TECHNIQUES</b></p> <p>VLO 1 Perform work responsibly and in compliance with the Occupational Health and Safety Act.</p> <p>VLO 3 Recognize and understand use of welding symbols.</p> <p>VLO 6 Perform weld applications utilizing Shielded Metal Arc (SMAW), Flux Core (FCAW) and Gas Metal Arc (GMAW Mig Welding) welding equipment.</p>
<b>Please refer to program web page for a complete listing of program outcomes where applicable.</b>	



	<p>VLO 7 Use welding techniques according to industry standards.</p> <p>VLO 8 Create high quality welds on various types of materials and create joints in the flat, horizontal, vertical and overhead positions.</p> <p>VLO 9 Identify defect in welds, demonstrate how to prevent them and define procedures for correction of defective weld quality.</p>				
<b>Essential Employability Skills (EES) addressed in this course:</b>	<p>EES 4 Apply a systematic approach to solve problems.</p> <p>EES 5 Use a variety of thinking skills to anticipate and solve problems.</p> <p>EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p>				
<b>Course Evaluation:</b>	<p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.</p>				
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	<p>1.Late hand in penalties will be -10% per day.</p> <p>2.If a student misses a test, 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 sitting. If this procedure is not followed the student will receive a mark of zero on the test with no make-up option.</p> <p>3.Re-writes are NOT allowed for any written assignment, quiz or test.</p> <p>4.Course attendance is mandatory. Any student that is not present for the first 3 classes in each course, will be deemed to have not completed the required safety orientation for the course and will not be permitted to continue. One percent (1 %) per hour will be deducted from the final course grade for unexcused* absence. Any unexcused attendance beyond 15% of the total allocated course hours will result in the student receiving a failing grade for the course.</p> <p>Valid reasons would include: Doctors note Family Death or Serious Illness supported by a written note.</p> <p>Unexcused absence* will be determined in a case by case basis by the instructor of each course.</p>				
<b>Books and Required Resources:</b>	<p>IPT's Metal Trades &amp; Welding Publisher: IPT Publishing &amp; Training Ltd</p> <p>Kit: ILM Post-Secondary Package Publisher: Alberta Government AK Graphics, Sault College Print Shop</p>				
<b>Course Outcomes and Learning Objectives:</b>	<table border="1"> <thead> <tr> <th>Course Outcome 1</th> <th>Learning Objectives for Course Outcome 1</th> </tr> </thead> <tbody> <tr> <td>Apply safe work practices according to Occupational</td> <td>1.1 Identify hazards for welding and cutting operations.</td> </tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	Apply safe work practices according to Occupational	1.1 Identify hazards for welding and cutting operations.
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	<p>Health and Safety Act (OHS) legislation.</p>	<p>1.2 Identify the use of personal protective equipment for welding and cutting operations.</p> <p>1.3 Explain the hazards involved with welding fumes and gases.</p> <p>1.4 Identify welding fume ventilation methods.</p> <p>1.5 Explain the effects of electricity and precautions used to prevent injury.</p> <p>1.6 Describe the procedure for welding or cutting in confined spaces or potentially dangerous enclosures.</p> <p>1.7 Interpret sections of the occupational Health and Safety Act General Safety Regulations</p>
	<p><b>Course Outcome 2</b></p>	<p><b>Learning Objectives for Course Outcome 2</b></p>
	<p>Describe the safety practices for hazardous materials and fire protection in your trade.</p>	<p>2.1 Describe the roles, responsibilities, features and practices related to the Workplace Hazardous Materials Information System (WHMIS) program.</p> <p>2.2 Describe the three key elements of WHMIS.</p> <p>2.3 Describe handling, storing and transporting procedures when dealing with hazardous materials.</p> <p>2.4 Describe safe venting procedures when working with hazardous materials.</p> <p>2.5 Describe fire hazards, classes, procedures and equipment related to fire protection.</p>
	<p><b>Course Outcome 3</b></p>	<p><b>Learning Objectives for Course Outcome 3</b></p>
	<p>Identify joints and weld types.</p>	<p>3.1 Identify the five basic joints.</p> <p>3.2 Describe the types of welds and their dimensions.</p> <p>3.3 Identify joint and weld type variations.</p> <p>3.4 Outline the considerations in the design of a joint for welding.</p>
	<p><b>Course Outcome 4</b></p>	<p><b>Learning Objectives for Course Outcome 4</b></p>
	<p>Interpret welding symbols.</p>	<p>4.1 Explain the purpose of welding symbols.</p> <p>4.2 Define weld symbol, welding symbol and supplementary symbols.</p> <p>4.3 Interpret weld symbols and welding symbols.</p> <p>4.4 Identify the dimensioning of welding symbols.</p> <p>4.5 Interpret non-destructive testing symbols.</p>

	<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>
	Identify SMAW equipment.	5.1 Define SMAW related terms. 5.2 Identify welding cables and accessories for welding power sources. 5.3 Identify the effect of arc length on amperage and voltage.
	<b>Course Outcome 6</b>	<b>Learning Objectives for Course Outcome 6</b>
	Select mild steel electrodes for SMAW.	6.1 Define the terms associated with SMAW electrodes. 6.2 Identify the CSA and AWS classification and specifications for SMAW electrodes. 6.3 Identify the types and functions of SMAW electrode coatings. 6.4 Describe the functions of slag. 6.5 Describe care, handling and storage procedures for these electrodes. 6.6 Identify mild steel SMAW electrodes and their applications.
	<b>Course Outcome 7</b>	<b>Learning Objectives for Course Outcome 7</b>
	Perform fillet and groove welds on mild steel.	7.1 Weld stringer/ weave beads in the flat and horizontal positions. 7.2 Weld in the 1F and 2F positions. 7.3 Weld in the 1G and 2G positions. 7.4 Use CWB test procedures. 7.5 Weld the 1GF and 2GF joint configurations with backing plate.

**Evaluation Process and Grading System:**

<b>Evaluation Type</b>	<b>Evaluation Weight</b>
Employability Skills	10%
Flat CWB	15%
Flat Lap	15%
Flat Tee	15%
Horizontal CWB	15%
Horizontal Lap	15%
Horizontal Tee	15%

**Date:**

May 31, 2023

**Addendum:**

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



