COURSE OUTLINE: MTF137 - SMAW WELDING 2

Prepared: Dave Holley
Approved: Corey Meunier, Dean, Technology, Trades, and Apprenticeship

Course Code: Title	MTF137: SHIELDED METAL ARC WELDING 2
Program Number: Name	4051: METAL FABRICATION 4053: WELDING TECHNIQUES
Department:	IRONWKR APPR./WELDING RELATED
Academic Year:	2024-2025
Course Description:	Perform CWB S class 3GF, 4GF (Vertical and Overhead) positions, in accordance with government safety regulations and approved industry standards with a focus of meeting or exceeding the CAS test requirements.
Total Credits:	3
Hours/Week:	3
Total Hours:	42
Prerequisites:	MTF107
Corequisites:	There are no co-requisites for this course.
This course is a pre-requisite for:	MTF204, MTF210
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4051 - METAL FABRICATION** 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 5 Understand and use a variety of destructive and non-destructive methods to test welds. 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. **4053 - WELDING TECHNIQUES** VLO 1 Perform work responsibly and in compliance with the Occupational Health and Safety Act. VLO 3 Recognize and understand use of welding symbols. VLO 6 Perform weld applications utilizing Shielded Metal Arc (SMAW), Flux Core (FCAW) and Gas Metal Arc (GMAW Mig Welding) welding equipment. VLO 7 Use welding techniques according to industry standards. VLO 8 Create high quality welds on various types of materials and create joints in the flat, horizontal, vertical and overhead positions.

	VLO 9	Identify defect in welds, demonstrate how to prevent them and define procedures for correction of defective weld quality.
Essential Employability Skills (EES) addressed in this course:	EES 4	Apply a systematic approach to solve problems.
	EES 5	Use a variety of thinking skills to anticipate and solve problems.
	EES 8	Show respect for the diverse opinions, values, belief systems, and contributions of others.
	EES 9	Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.
	EES 10	Manage the use of time and other resources to complete projects.
	EES 11	Take responsibility for ones own actions, decisions, and consequences.

Course Evaluation:

Passing Grade: 50%, D

A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.

Other Course Evaluation & Assessment Requirements:

1.Late hand in penalties will be -10% per day.
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.
3.Re-writes are NOT allowed for any written assignment, quiz or test.
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.

Valid reasons would include:
Doctors note
Family Death or Serious Illness supported by a written note.

Unexcused absence* will be determined in a case by case basis by the instructor of each course.

Books and Required Resources:

CWB Post Secondary Package by CWB Education
Publisher: CWB Group

IPT`s Guide To Blueprint Interpretation by Grant E. Jacobs
Publisher: IPT Publishing & Training Ltd.

Welding Supplies available at LINDE and Air Liquide Sault Ste. Marie by Welding Supplies

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
A trades curriculum that has been designed to provide students with a combination of theoretical knowledge and hands on skill in relation	Potential Elements of the Performance: - 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 infrared

	to the safe use and operation of the SMAW welding process in the Vertical and Overhead positions	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 Demonstrate and describe how to set up and operate a typical SMAW Workstation. - Potential Elements of the Performance: - 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 Demonstrate the ability to produce sound welds as well as identify / troubleshoot and make corrective adjustments for weld defects. Potential Elements of the Performance: - describe potential fire, fume and explosion hazards associated to 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 CSA and AWS Classification of SMAW Electrodes.

		Potential Elements of the Performance: - identify, select electrodes by - Classification - Diameter - Desired Weld Appearance - 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 Demonstrate the ability to pass a CWB Plate Test* Vertical & Overhead Positions. Potential Elements of Performance: - 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 Apprentices w/o a valid S-Class CWB Ticket *T-Class Plate Test for Apprentices with a valid S-Class CWB Ticket

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
3F Vertical CWB	15%
3F Vertical Lap	15%
3F Vertical Tee	15%
4F Overhead CWB	15%
4F Overhead Lap	15%
4F Overhead Tee	15%
Employability Skills	10%

Date:	July 12, 2024
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.