

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



COURSE OUTLINE

COURSE TITLE: WELDING

CODE NO. : IRN710 **SEMESTER:** N/A

PROGRAM: Ironworker Apprentice – Intermediate Level

AUTHOR: Steve Witty

DATE: September 2016 **PREVIOUS OUTLINE DATED:** January 2011

APPROVED:

“Corey Meunier”
Chair

Aug 2016
DATE

TOTAL CREDITS: FIVE

PREREQUISITE(S): Successful completion of the ‘Intermediate Ironworker’ level of in-school training or its equivalent.

HOURS/WEEK: FIVE

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For additional information, please contact **Corey Meunier, Chair**
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I. COURSE DESCRIPTION: COURSE DESCRIPTION:

This curriculum has been designed to provide apprentices with a combination of theoretical knowledge and practical (hands on) skill in the safe use and operation of SMAW welding procedures and equipment. Its terminal objective is to develop the skills necessary to pass a CWB Plate Test in the required position(s).

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 work boots, gloves and eye protection
- identify recommended fabrics and materials for personal protective clothing
- understand the general organization and layout of the welding shop facility
- locate and identify shop lighting and ventilation controls
- locate and identify emergency exits
- identify and select proper shades of welding / cutting lens
- identify, select and adjust helmets for proper fit and vision
- understand procedures for evacuation of shop areas in the case of emergencies

2. *Demonstrate a sound working knowledge of how to perform SMAW procedures and to correct / troubleshoot 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
- identify common weld defects based upon fracture and / or bend test results
- describe and diagnose the cause(s) of common weld defects

3. Demonstrate a sound working knowledge of how to prepare fillet and groove weld joints according to AWS and CSA workmanship standards.

Potential Elements of the Performance:

- describe fillet welds according to:
 - leg size
 - throat size
 - profile
 - size / strength vs. strength
 - the negative effects of undercut
 - quality and soundness
 - fit up and design
- describe groove welds according to:
 - throat size
 - profile
 - size / shape vs. strength
 - the negative effects of under-fill
 - quality and soundness
 - fit up and design
 - the use of backing strips

4. Demonstrate a sound working knowledge of how to perform and pass a CWB Plate Test*

Potential Elements of the 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

III. TOPICS:

1. Personal and Shop Safety
2. OFG Cutting and Scarfing Practices
3. Shielded Metal Arc Welding Equipment and Techniques
4. Joint Design for Fillet and Groove Welds
5. CWB S-Class and T-Class Test Procedures

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. C.S.A. Approved (6" High) Safety Work Boots
2. C.S.A. Approved Safety Glasses
3. Appropriate Work Wear – (as per the Welding Department Guidelines)
4. Welding Gloves (Gauntlet Type)
5. Theory Modules: Course Pack IRN704

V. EVALUATION PROCESS/GRADING SYSTEM:**Part 1 NOTES:**

1. 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 (as determined by instructor).
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.

[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:

<i>Factor</i>	<i>Value</i>
Shop Assignments	35 %
CWB S-Class Test(s)	35 % (No valid CWB S-Class Ticket)
CWB T-Class Test(s)	35 % (Possess a valid CWB S-Class Ticket)
Theory Quiz & Test	30 %
Attendance	-1% per Unexcused Hour
Shop Clean-up	-1% per Incident

If you have a valid SMAW – CWB S-Class ticket in the required position(s) you will be required to pass the CWB T-Class Test(s) in the required position(s).

The following semester grades will be assigned to students:

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

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.

VII. COURSE OUTLINE ADDENDUM:

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