

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



COURSE OUTLINE

COURSE TITLE: Welding

CODE NO. : MET721 **LEVEL:** 2

PROGRAM: Plumbing /Steam Fitter Apprenticeship (Intermediate)

AUTHOR: Steve Witty
INSTRUCTOR: Bill Hanchuck

DATE: January 2015 **PREVIOUS OUTLINE DATED:** January 2010

APPROVED: *"Corey Meunier"*
CHAIR

TOTAL CREDITS: 3

PREREQUISITE(S): Successful completion of the 'Plumbing – Basic' level of in-school training or its equivalent.

HOURS/WEEK: 3 Hrs / Week

Copyright ©2015 The Sault College of Applied Arts & Technology

Reproduction of this document by any means, in whole or in part, without prior written permission of Sault College of Applied Arts & Technology is prohibited.

*For additional information, please contact Corey Meunier, Chair
School of The Natural Environment, Technology & Skilled Trades
(705) 759-2554, Ext. 2610*

- COURSE DESCRIPTION:** This curriculum that has been designed to provide apprentices with a sound working knowledge and level of skill in the safe use and operation of typical SMAW welding equipment. It's terminal objective will be to develop within the apprentice the skill required to produce welds capable of passing both visual and destructive testing .
- I.**
- II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1. ***Demonstrate by means of practical shop assignments a sound working knowledge of both personal and shop safety.***

Potential Elements of the Performance:

- identify proper eye, hand, and face protection
- identify proper footwear and clothing
- locate and identify shop ventilation devices
- locate and identify emergency fire exits
- identify the location of shut-off valves for the shop manifold gas system
- understand procedures for evacuation of shop areas in case of
- describe potential fire, fume and explosion hazards associated to the SMAW process

2. ***Demonstrate by means of practical shop assignments a sound working knowledge of how to set up and operate a typical SMAW workstation.***

Potential Elements of the Performance:

- identify, select and adjust welding helmets and filter lenses
- identify electrode according to type, size and AWS / CSA numbering system
- identify ASME / CSA standards for the storage and handling of electrodes
- identify techniques for adjusting both welding current and polarity
- perform a routine inspection of assigned workstations to determine the condition of cables, electrode holder and related equipment
- correct deficiencies prior to the commencement of work
- explain basic of SMAW joint designs and base metal edge / surface preparation
- describe techniques for arc ignition, setting electrode angle and travel speed
- produce trial beads in the flat and horizontal positions
- identify possible weld defects and verify initial settings

3. ***Demonstrate by means of practical shop assignments a sound working knowledge of how to troubleshoot / correct defects.***

Potential Elements of the Performance:

- perform adjustments to SMAW equipment specific to the demands of single and multi-pass fillet welds and groove welds
- describe and diagnose common weld defects
- take corrective action to eliminate the presence of weld defects
- perform destructive test on fillet welds to determine weld soundness
- identify and explain ASME and CSA acceptance standards for weld soundness
- identify and explain limited repair and service to electrode cables, holders, power sources and protective equipment

4. ***Demonstrate by means of practical shop assignments a sound working knowledge of how to pass visual examination and destructive testing of weld samples.***

Potential Elements of the Performance:

- describe the physical dimensions of a Vee-Groove test plate assembly including:
 - plate thickness, width and length
 - bevel angle
 - root opening
- describe the acceptance criteria for the size and shape of the completed weld including:
 - number and size of bend test coupons
 - preparation and condition of bend coupons
 - identification of face vs root bend coupons
 - acceptance criteria for possible defects

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- CSA Approved (Impact Resistant) Safety Glasses
- CSA Approved (6 inch High Cut) Safety Work Boots
- CAS Approved (Gauntlet Type) Welding Gloves
- Appropriate Work Wear (see Welding Shop Guidelines)
- Modules: Course Pack MET721

III. TOPICS:

1. Personal and Shop Safety
2. SMAW Practices and Procedures
3. Visual Inspection of Welds
4. Destructive Testing of Weld Samples

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

1. Re-writes are NOT allowed for any written assignment, quiz or test.
2. Repeats are NOT allowed for any shop test
3. Course attendance is mandatory. One percent (1 %) per hour will be deducted from the final course grade for apprentices with more than 4 hours of 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 and Tests	65 %
CWB S-Class Test(s)	35 %
Attendance	-1 % per Unexcused Hour
Shop Clean-up	-1 % per Incident

The following 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.

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 on the portal form part of this course outline.