

SAULT COLLEGE of APPLIED ARTS and TECHNOLOGY
SAULT STE MARIE, ON



Sault College
Course Outline

Course Title WELDING
Program IRONWORKER - ADVANCED
Course Code IRN804 **Semester** N/A
Author Dennis Clément-Socchia
Date Feb 2002 **Previous Outline Dated** Dec 1998

Approved _____
Dean Date

Total Credits N / A

Prerequisites Successful completion of WELDING for the Intermediate Ironworker level of training or its equivalent.

Length of Course 8 Weeks

Total Credit Hours 40

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For additional information, please contact

Rick Wing, Dean

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I. COURSE DESCRIPTION: A curriculum that has been designed to provide a combination of theoretical knowledge and practical (hands on) skill in the safe use and operation of typical Gas Metal Arc / Flux Core Arc welding equipment. The ultimate objective is to develop the clients welding skill to the point where s/he can pass the pre-qualified CWB plate test in the specified position.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE

Upon successful completion of this course, clients will have been given the opportunity to :

- 1. *Communicate clearly and correctly, in the written form as well as demonstrate by means of practical shop assignments, a sound working knowledge of both personal and shop safety.***

Potential Elements of Performance:

- identify proper work boots, gloves and eye protection
- identify recommended fabrics and materials for personal protective clothing
- identify and select proper shades of welding lense
- identify, select and adjust welding helmets for proper fit and vision
- locate and identify shop lighting and ventilation switches
- locate and identify emergency exits
- understand procedures for evacuation of shop areas in the case of emergencies

- 2. *Demonstrate the ability to set up and operate a typical GMAW / FCAW workstation .***

Potential Elements of Performance:

- identify proper eye, hand and face protection
- identify proper footwear and clothing
- identify potential fire, fume and explosion hazards associated to either the Gas Metal Arc or the Flux Core Arc welding process
- briefly describe the differences between a constant current and a constant voltage welding machine
- explain why a constant voltage machine is used for the GMAW process
- identify electrode types, sizes and AWS specification
- identify various shielding gases and their potential use(s)
- perform a routine inspection of assigned workstations to determine the condition of wire feeder, cables, torch body, hoses and regulators
- report / correct deficiencies prior to the commencement of work

- describe procedures for setting shielding gas flow rate, voltage, wire feed speed and visible (electrode) stick-out distance.
- describe techniques for arc ignition, setting gun angle and travel speeds
- produce trial weld beads to identify possible defects and verify initial settings

3. *Demonstrate the ability to perform GMAW procedures as well as identify and correct weld defects .*

Potential Elements of Performance:

- produce fillet and groove welds on both thin gauge and thick metals
- perform adjustments to voltage and wire feed speed in accordance with the demands of base metal thickness and joint design
- change / replace rolls of electrode wire
- perform in-service adjustments to wire drive rolls, contact tip and nozzle

4. *Demonstrate the level of skill required to pass a pre-qualified CWB plate test assembly in the specified position.*

Potential Elements of Performance:

- prepare test plate assemblies as per W47.1 specifications relating to:
 - o thickness, width and length dimensions
 - o root opening
 - o bevel angle
 - o number and location of bend test coupons
 - o S – class vs. T – class qualification
- weld the test plate assemblies as per W47.1 specifications relating to:
 - o number and location of stop / restarts
 - o weld bead sequence
 - o dimensions of completed weld
 - o acceptable vs. unacceptable visual defects
- prepare bend test coupons as per W47.1 specifications relating to:
 - o minimum coupon width
 - o minimum coupon thickness
 - o shape of flame cut edges and corners
 - o acceptable vs. unacceptable dimensions for test defects
- understand W47.1 specifications relating to:
 - o period of welder qualification
 - o conditions of welder qualification
 - o qualified welding process
 - o qualified welding process.

5. Demonstrate the ability to read and interpret welding symbols beyond a basic level of comprehension.

Potential Elements of Performance:

- recognize and interpret groove weld symbols and dimensions relating to the:
 - o type of groove specified
 - o groove angle and root opening
 - o depth of preparation vs. depth of penetration
 - o use of back welds vs. backing welds
 - o use of backing bars
- recognize and interpret fillet weld symbols and dimensions relating to the
 - o leg size and length
 - o continuous vs. intermittent
 - o unequal leg size
 - o fillet and groove weld combinations
- recognize and interpret supplemental weld symbols related to
 - o field weld and weld all around
 - o welding process
 - o required electrode(s)
 - o base metal(s) use
 - o GTSM

6. Demonstrate their willingness to assume the responsibilities of employment.

Potential Elements of Performance:

- be present for all scheduled classes
- provide a satisfactory reason for having to leave class early
- provide a reasonable excuse for being absent from class
- provide a written statement explaining the reason(s) for being absent on the day of a scheduled test or assignment due date
- demonstrate behaviour that does not interfere with or obstruct the over-all learning environment
- actively participate in all course assignments and projects
- operate any and all lab / shop equipment according to guidelines prescribed by the College or course Professor
- wear personal protective equipment at all times while in the shop
- return all equipment and practice materials to their designated place upon completion of work
- remove all scrap, welding rods etc., and thoroughly clean their individual work stations
- assist in the cleaning and shutting down of the general shop area.

III. TOPICS

Clients may expect the following list of topics to be covered during this course of instruction.

1. Personal and Shop Safety
2. Set up and Operation of a GMAW / FCAW workstation
3. GMA / FCA Practices and Procedures
4. CWB Test Plate Procedures
3. Welding Symbols
5. Employment Readiness

IV REQUIRED STUDENT RESOURCES / TEXT and MATERIALS

CSA Approved (Impact Resistant) Safety Glasses
CSA Approved (8 inch High Cut) Safety Work Boots
CSA Approved (Gauntlet Type) Welding Gloves
Appropriate Work Wear (see Welding Shop Guidelines)
Pocket Note-pad (for Shop Demonstrations and Discussion)
Text: Principles of Industrial Welding

V. FINAL GRADE DETERMINATION

The final course grade will be determined by means of the following list of weighted factors:

Factor	Weight
Shop Assignments and Tests	30%
CWB Test	25%
Theory Test(s)	35%
Employment Readiness	10%

VI. GRADING SYSTEM

The following system of grades will be used for Apprenticeship Training.

Grade	Definition
A+	95 - 100 %
A	85 - 94 %
B	75 - 84 %
C	60 - 74 %
D	50 - 59 %
F	0 - 49 %

VI. SPECIAL NEEDS

1. **Special Needs:** If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.
2. **Retention of course outlines:** It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.
3. **Plagiarism:** Students should refer to the definition of academic dishonesty in their Student Rights and Responsibilities manual. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.
4. **Course outline amendments:** The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.
5. Substitute course information is available in the Registrar's office.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will only be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.