

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** WELDING

**CODE NO. :** MSE-716 & MSE-201                      **SEMESTER:** N/A

**PROGRAM:** MARINE & SMALL ENGINES - Level 2

**AUTHOR:** D. Clement-Socchia

**DATE:** Jan 2005              **PREVIOUS OUTLINE DATED:** Jan 2002

**APPROVED:**

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**DEAN**

\_\_\_\_\_  
**DATE**

**TOTAL CREDITS:** 2

**PREREQUISITE(S):** Successful completion of WELDING for the MSE Level 1 or its equivalent.

**HOURS/WEEK:**

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*For additional information, please contact C. Kirkwood, Dean  
School of Technology, Skilled Trades & Natural Resources*

*(705) 759-2554, Ext.688*

- 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 Gas Metal Arc / Shielded Metal Arc welding equipment.
  - Produce acceptable fillet and groove welds on a base metal not greater than one quarter (1/4) inch thick.

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 protection as well as the need to wear it at all times while in the welding shop
- identify proper hand and face protection as well as the need to wear it during any and all cutting, heating or welding operations
- identify proper footwear and clothing
- identify the dangers associated with contact lenses, butane lighters, exposed metal jewelry, long hair and beards
- identify the location of commonly used welding tools, face shields and leather jackets
- identify personal safety equipment that must be supplied by the student
- locate and identify shop lighting and ventilation controls
- locate and identify emergency shop exits
- understand emergency shop evacuation procedures
- locate and identify manifold shut-off valves for the shop gas system

2. ***Demonstrate the ability to set up and operate a typical GMAW Workstation.***

Potential Elements of the 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

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

Potential Elements of the Performance:

- produce fillet and groove welds on base metals not greater than ¼ inch thick
- 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
- identify and troubleshoot the possible cause(s) of common weld defects

4. ***Demonstrate the ability to set up and operate a typical SMAW Workstation.***

Potential Elements of the Performance:

- identify, select and adjust welding helmets and lenses
- identify electrodes according to type, size and AWS / CSA designation
- identify guidelines for electrode selection and application
- identify techniques for adjusting both welding current and polarity
- perform a routine inspection of assigned workstation to determine the condition of welding machine, cables, electrode holders and related equipment
- correct deficiencies prior to the commencement of shop assignments
- identify basic SMAW joint designs
- describe techniques for arc ignition, electrode manipulation and travel speeds
- produce trial weld beads to identify possible defects and verify current settings

5. ***Demonstrate the ability to perform SMAW procedures and identify and correct potential weld defects.***

Potential Elements of the Performance:

- produce fillet and groove welds on base metals not greater than ¼ inch thick
- identify and troubleshoot the possible cause(s) of common weld defects
- identify and explain limited repair and service activities related to electrode cables, holders, welding machines and protective equipment

**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. Set up and Operation of a GMAW / FCAW workstation
5. SMAW Practices and Procedures

**IV. REQUIRED RESOURCES/TEXTS/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)

**V. EVALUATION PROCESS/GRADING SYSTEM:**

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

<b><i>Factor</i></b>	<b><i>Weight</i></b>
Shop Assignments and Tests	75 %
Theory Test(s)	25 %
Total	100 %

The following semester grades will be assigned to students:

<b>Grade</b>	<b><u>Definition</u></b>	<b><i>Grade Point Equivalent</i></b>
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:

### 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 professor and/or the Special Needs office. Visit Room E1101 or call Extension 703 so that support services can be arranged for you.

### 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.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. 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.

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.

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 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.