

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: WELDING

CODE NO. : MSE616 and MSE101 **LEVEL:** 1

PROGRAM: Marine and Small Engines

AUTHOR: Steve Witty

DATE: Aug 2008 **PREVIOUS OUTLINE DATED:** Sept 2007

APPROVED:

“Corey Meunier”
Chair

TOTAL CREDITS: N/A **DATE**

PREREQUISITE(S):

HOURS/WEEK: 2

Copyright ©2008 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 Technology & Skilled Trades
(705) 759-2554, Ext. 2610

I. **COURSE DESCRIPTION:** This curriculum has been designed to provide new and / or inexperienced clients with a combination of theoretical knowledge and basic practical (hands on) skill in the safe use and operation of both OFG and SMAW welding, cutting and heating equipment.

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

**Day
01**

2. ***Identify and describe oxyacetylene cutting and heating equipment and accessories including their construction, operation, assembly and disassembly.***

Potential Elements of the Performance:

- cylinder identification and general construction
- pressure regulators
- manual valves
- manifold systems
- gages, hoses and torch body
- tips used for
 - cutting
 - heating
 - welding
- cutting attachments
- flashback arrestors
- check equipment for safe operating condition

**Day
01**

3. ***Demonstrate and describe the process of Oxyacetylene Flame Cutting and Heating.***

Potential Elements of the Performance:

***Day
02***

***Day
03***

- set up equipment for oxyacetylene cutting
- select tip size and set cutting pressures for a given thickness of metal
- check equipment for safe operation
- pressurize, ignite, adjust and safely operate a cutting torch
- perform typical flame cutting operations to include
 - square cut c/w re-start
 - piercing and making holes
- distort / shape gauge metal by means of heating and cooling
- create a mild steel repair patch

4. ***Demonstrate and describe the process of:***

a) Oxyacetylene Fusion Welding.

b) Oxyacetylene Braze Welding.

Potential Elements of the Performance:

***Day
04***

- set up equipment for oxyacetylene fusion welding
- select tip size and set welding pressures for a given thickness of metal
- pressurize, ignite, adjust and safely operate a welding torch
- check equipment for safe operation
- deposit weld beads on mild steel sheet metal with filler rod
- set up equipment for oxyacetylene braze welding
- select tip size and set welding pressures for a given thickness of metal
- pressurize, ignite, adjust and safely operate a welding torch
- check equipment for safe operation
- deposit brass beads on mild steel sheet metal

5. ***Demonstrate and describe the process of making a welded patch repair by means of the Oxyacetylene Process***

Potential Elements of the Performance:

***Day
05***

- set up equipment for oxyacetylene braze or fusion welding
- select tip size and set welding pressures for a given thickness of metal
- pressurize, ignite, adjust and safely operate a welding torch
- check equipment for safe operation
- tack weld patch repairs to maintain alignment
- braze weld mild steel patch in the flat and horizontal and position

6. ***Demonstrate and describe how to set up and operate a typical SMAW Workstation.***

Potential Elements of the Performance:

**Day
06**

- identify, select and adjust welding helmets and lenses
- identify SMAW electrodes according to type, size, current type, polarity and welding position according to AWS 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

7. ***Demonstrate and describe the process of making a welded patch repair by means of the SMAW Process***

Potential Elements of the Performance:

**Day
07**

- set up equipment for shielded metal arc welding
- check equipment for safe operation
- select electrode size, current and polarity for the given thickness of metal
- tack weld patch repairs to maintain alignment
- weld mild steel patch in the flat and horizontal and position

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. C.S.A. Approved (High Cut) Safety Work Boots
2. C.S.A. Approved Safety Glasses
3. C.S.A Approved Welding Gloves (Gauntlet Type)
4. Appropriate Work Wear – (as per the Welding Department Guidelines)
5. Modules: Course Pack MSE616

III. TOPICS:

1. Personal and Shop Safety
2. Cylinder Construction and Safe Operation / Use
3. Flame Cutting and Heating Equipment and Techniques
4. Fusion and Braze Welding Equipment and Techniques
5. Shielded Metal Arc Welding Equipment and Techniques

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:

Factor	Value
Shop Assignments and Tests	65 %
CWB S-Class Test(s)	35 %
Attendance	-1 % per Unexcused Hour
Shop Clean-up	-1 % per Incident

The following semester grades will be assigned to students:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 – 89%	3.00
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.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

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.