

(647)

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ON**

**COURSE OUTLINE**

COURSE TITLE: WELDING

CODE NO: MET010  
PROGRAM

SEMESTER: 20 WEEK

PROGRAM: MARINE AND SMALL ENGINES

AUTHOR: ASH NELDER

DATE: NOVEMBER 93

PREVIOUS OUTLINE DATED: OCTOBER 89

APPROVED:

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Dean, School of Technical Trades

*93 / ? e c -*  
Date

COURSE NAME: WELDING

CODE NO. MET010

TOTAL CREDIT HOURS: 32

PREREQUISITE(S):

**I. PHILOSOPHY/GOALS:**

This course stresses safe handling of oxy-acetylene welding and cutting equipment. In addition to fusion and non-fusion welding practices, students will learn to set-up and practice welding of small diameter pipe. Introduction to MIG and SMAW processes - **ALU** welding.

**II. STUDENT PERFORMANCE OBJECTIVES:**

Upon successful completion of this course the student will:

The objectives are that the student becomes proficient in cutting and welding. To have an understanding of welding principles as related to these objectives.

The student should realize that all objectives may not necessarily be reached due to time constraints.

The objective of this course is to have the student become proficient in cutting and welding of five basic joints. To have an understanding of the welding principles (theory) of these welding processes upon finishing this course.

**III. TOPICS TO BE COVERED:**

Approximate Time Frames  
(Optional)

- |            |   |                      |
|------------|---|----------------------|
| 1.         | Orientation to program.<br>Introduction to O.A.W.   | 1/2 Time             |
| 2.         | Assembling and handling of equipment.<br>Construction of equipment.<br>Repairs to accessories.<br>Types of oxy-acetylene flames and fuel mixtures.<br>Welding terms, positions, joints.<br>Filler metals and their selection.<br>Weld faults. | 1/2 Time             |
| 3.         | Fusion welding practices of mild steel.   | 6 L                  |
| 4.         | Pipe welding.   | 1/2 T, 9 L           |
| 5.         | Non-fusion welding.   | 4 L                  |
| <b>6.</b>  | <b>Cutting</b>  | <b>3 L</b>           |
| 7.         | Introduction to all welding-brazing.  | 22 L (for following) |
| 8.         | Introduction to MIG welding.  |                      |
| 9.         | Introduction to SMAW.   |                      |
| <b>10.</b> | <b>Written Test</b>   |                      |

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**IV. LEARNING ACTIVITIES**

**REQUIRED RESOURCES**

1. Orientation io Program

**I.A.S. # 1**

Outline of topics to be covered; method of evaluation; testing modes, dates; shop safety and regulations; personal safety; repair of shop equipment.

Introduction to O.A.W.  
Scope: fusion, non-fusion, cutting, heating

2. Assembling and Handling pi Equipment.

Notes/Demo

Assemble and disassemble hoses, regulators, torches, tips; identify and change "o" rings; adjust goggles, strikers; transport welding cylinders and cart.

Construction of equipment; study cross-section of cylinders; location of safety devices; identification and marking of cylinders.

Notes/Demo

Repairs to accessories; hose splicing, crimping tools, hose diameters.

Demo

Types of O.A. flames and fuel mixtures; lighting torches and adjustment; flame type and effect on weld puddle; characteristics and uses of other fuel gases: Mapp, natural gas, propane, air-acetylene; welding and cutting on containers.

I A S . # 2  
Notes/Demo

Welding terms, positions, joints; 3 types of welds: bead, groove, fillet; explanation of face, root, throat of weld; 5 types of joints: butt, lap, tee, corner, edge; weld position in respect to fillet welds; explanation of joint penetration and fusion.

I.A.S. #3

	Filler metals and their selection; RG45, RG60; tensile strength, ductility; weld soundness in respect to SI content.	Notes
	Weld faults: identification and prevention; appearance, overlap, undercut, lack of fusion, brittle welds, porosity, excessive convexity, concavity.	I.A.S. #4 Notes
3.	<b>Fusion welding</b>	
	Fusion welding practices, gauge plate; beads, no rod and with rod; outside corner joint, with joint; butt joint with rod; lap joint with rod.	Demo
4.	Welding of small diameter pipe & (1" dia: sch.40),  ASTM welding procedure.	I.A.S. #5
5.	<b>Non-Fusion Welding <u>Practices</u></b>	I.A.S. #6
	Braze welding: definition, uses; advantages and disadvantages; braze weld tee-joint (both sides); braze tee-joint 16 gauge metal using Allstate #45 (RB45); introduction to basic welding alu - demo.	
6.	<b>Cutting Practices: <u>Scope</u></b>	
	Manual straight line cutting with and without guide bar; bevel cutting, mitre cutting; piercing; cutting of round stock; pipe, structural bar; gouging.	O.A.W. I.A.S. #7
7.	<b>Introduction &amp; <u>MIG</u> Welding</b>	
	Welding practices.	Demo
8.	<b>Introduction to <u>SMAW</u></b>	
	Welding practices.	Demo

**V. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.)**

A - 85% - 100%	1 Theory Test	30%
B - 75% - 84%	Skill Evaluation	60%
C - 60% - 74%	Attendance/Attitude	10%
D - 50% - 59%	TOTAL	100%
F - Repeat		

Instructors should provide marks in percentage. A mark of "D" must be balanced with a "B" (in another subject if necessary) to obtain a passing grade of "C" - average. Instructors should try for a class average of between 70 - 75%.

The instructor will determine which practical exercises will be used for grading.

**VI. REQUIRED STUDENT RESOURCES**

Textbooks

I.A.S. (Instruction Aid Sheets) and notes (Basic Welding for Related Trades). Students should be given a copy of the course outline.

**VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY:**

Book Section (title, publisher, edition, date, library call number if applicable - see attached example)

Periodical Section (Magazines, Articles)

Audiovisual Section (Films, Filmstrips, Transparencies)

**VIII. SPECIAL NOTES**

Students with special needs (eg. physical limitation, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of the students.