

#172'

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

WELDING

Course Title:

Code No . :

HDE-APPRENTICE BASIC

Program:

Semester:

1989 05 19

Date:

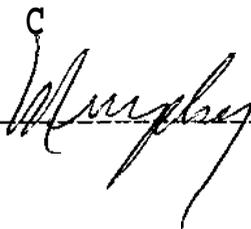
Bob Senechal

Author:

New!

Revision: XX

APPROVED;


Chairperson 


Date **^Wii;**

WELDING

Course Name

Course Number

PHILOSOPHY/GOALS;

This course of study provides students with a basic level of skills in dealing with oxy-acetylene welding equipment. It is intended to provide the student with an understanding of metallurgy as it relates to welding.

METHODS OF ASSESSMENT (GRADING METHOD);

MARKING SYSTEM	2 - Theory Tests	-	30%
	Skill Evaluation	-	60%
A -- 85% +	Attendance/Attitude	-	10%
B -- 75% - 84%			
C -- 60% - 74%	TOTAL	-	100%
D -- 50% - 59%			
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 marking.

TEXTBOOK(S);

I.A.S. and notes.

Students should be given a copy of the course outline.

OBJECTIVES;

The objectives are to develop good welding and cutting skills and non-fusion welding practices.

Also included are simple identification methods used on metals along with a basic introduction to physical metallurgy.

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

SUMMARY - HDE APPRENTICE - BASIC

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
1a	1/2T	Orientation to program.	O.A.W.
b		Introduction and scope: fusion welding, non-fusion welding, cutting, heating.	I.A.S.#1
2a	IL	Assembling and handling of equipment.	Demo/Note
b		Construction and storage of equipment.	
c		Repairs to accessories.	Demo
d	1/2T	Types of oxy-actylene flames and fuel mixtures.	O.A.W. I.A.S.#2
e	1/2T	Welding terms, positions, joints	O.A.W. I.A.S.#3
f		Filler metals and their selection.	Notes
g		Weld faults.	O.A.W. I.A.S.#4
3	8L	Fusion welding practices.	Notes/Demo
4		Non-fusion welding practices.	O.A.W. I.A.S.#5
a	2L	Braze welding.	Notes/Demo
b	IL	Brazing	
c	IL	Soldering	
5	2L	Cutting practices.	O.A.W. I.A.S.#6 Demo
6	1/2L	Distortion of metals.	O.A.W. I.A.S.#7 Demo
7	2L	Basic heat treatment of metals.	O.A.W. I.A.S.#8 Demo
8a	2T	Intoduction to physical metallurgy.	O.A.W. I.A.S.#9
b	1/2L	Identification of metals.	
9	1/2T	Written Test	
TOTAL HRS.	4T, 20L	- 12 WEEKS	

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
1a	1/2T	Orientation to program. - outline of topics to be covered - grading system: A,B,C,D,F. - method of evaluation - testing modes, dates - shop safety and regulations - personal safety - repair of shop equipment	O.A.W. I.A.S.#1
b		Introduction to O.A.W. - Scope: fusion non-fusion culling heating	
2a	IL	Assembling and handling of equipment. - assemble and disassemble hoses, regulators, torches, tips - identify and change "O" rings - adjust goggles, strikers - transport welding cylinders and cart	Notes/Demo
b		Construction of equipment. - study cross-section of cylinders - location of safety devices - identification and marking of cylinders	Notes/Demo
c		Repairs to accessories. - hose splicing, crimping tools, hose diameters	Demo
d	1/2T	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	O.A.W. I.A.S.#2 Notes/Demo

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
2e	1/2T	Welding terms, positions, joints. - 3 types of welds: bead, groove and fillet - explanation of face, root, throat of weld - 5 types of joints: butt, lap, tee, corner, edge - weld positions in respect to fillet welds - explanation of joint penetration and fusion	O.A.W. I.A.S.#3
f		Filler metals and their selection. - RG45, RG60 - tensile strength, ductility - weld soundness in respect to SI content	Notes
g		Weld faults: identification and prevention. - appearance, overlap, undercut. lack of fusion, brittle welds, porosity, excessive convexity, concavity	O.A.W. I.A.S.#4 Notes
3	8L	Fusion welding practices, 16 gauge metal. - beads, no rod and with rod - edge joint without rod - outside corner joint, with rod - butt joint with rod - lap joint with rod	Notes/Demo
4a	2L	Non-fusion welding practices. - braze welding: definition, uses - advantages and disadvantages - braze weld tee-joint (both sides) 2F; 3F	I.A.S.#5 Notes/Demo
b	IL	- brazing, definition; uses - braze tee-joint 16 gauge metal using Allstate #45 (RB45) - safety: fumes, fluxes	
c		Soldering - definition; uses - fluxes - soldering equipment	

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
#	T-THEORY L-LAB		
	1L	- solder steel to steel - solder wire connection	
5	2L	Cutting practices. - manual cutting, with and without guide bar - piercing - bolt cutting - cutability of metals	O.A.W. I.A.S.#6 Demo
6	1/2T	Distortion of metals. - upsetting - heat input - neutral axis - heating for shrink fits	O.A.W. I.A.S.#7 Demo
7	2L	Basic heat treatment for metals. - effect of heat on: grain size and microstructure - forging, hardening, tempering a cold chisel - case hardening	O.A.W. I.A.S.#8 Demo
8a	2T	Introduction to physical metallurgy. - tensile strength - yield strength - ductility - elasticity - toughness - impact strength - factor of safety - allowable stress	O.A.W. I.A.S.#9 Metals and How to Weld Them.
b	1/2L	Identification of metals. - flame test - spark test - appearance, density of carbon steels - L.A.H.S. steels - stainless steels - aluminum, magnesium, white metal - copper based alloys - HR & CR sheet steel	
TOTAL HRS. AT, 20L - 12 WEEKS			