

#169

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

COURSE OUTLINE

Course Title: WELDING
Code No.:
Program: MVM-APPRENTICE BASIC
Semester: AUGUST 1988
Author: GUNTER THOM

New. Revision; XX

APPROVED:

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Chairperson

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Date 7 ' /

WELDING

Course Name

Course Number

PHILOSOPHY/GOALS;

This course of study provides students with a basic level of skills with emphasis placed on O.A. welding, safety and correct procedures.

METHODS OF ASSESSMENT (GRADING METHOD):

MARKING SYSTEM	1 - Theory Test	30
	Skill Evaluation	60
A - 85%+	Attendance/Attitude	10
B - 75% - 84%	TOTAL	100
C - 60% - 74%		
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 basic objective is to develop a student with safe work habits in the use of oxy-acetylene welding and cutting equipment. He will be introduced to non-fusion welding practices and to heat effects on metals.

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

SUMMARY - MVM APPRENTICE - BASIC

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
1a b	1/2T	Oirientation to progiram. Introduction and scope: fusion welding, non-fusion welding, cutting, heating.	O.A.W. I.A.S.#1
2a b c d		Assembling and handling of equipment. Construction and storage of equipment. Repairs to accessories. Types of oxy-actylene flames and fuel mixtures.	Demo/Note Demo O.A.W.
f g		Welding terms, positions, joints Filler metals and their selection. Weld faults.	O.A.W. I.A.S.#3 Notes O.A.W. I.A.S.#4
	5L	Fusion welding practices. Non-fusion welding practices	Notes/Demo O.A.W. I.A.S.#5
a b c	4L 1L 1L	Braze welding. Brazing Soldering	Notes/Demo
	2L	Cutting practices. Distortion of metals.	O.A.W. I.A.S.#6 Demo O.A.W. I.A.S.#7 Demo
	1/2T,1L	Basic heat treatment of metals,	O.A.W. I.A.S.#8 Demo
	1/2T	Written Test	
TOTALS	IT, 15L	- 8 WEEKS	

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
1a	1/2T	<p>Orientation to program.</p> <ul style="list-style-type: none"> - 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 <p>Introduction to O.A.W.</p> <ul style="list-style-type: none"> - Scope: fusion <ul style="list-style-type: none"> non-fusion cutting heating 	<p>O.A.W. I.A.S.#1</p>
2a		<p>Assembling and handling of equipment.</p> <ul style="list-style-type: none"> - assemble and disassemble hoses, regulators, torches, tips - identify and change "O" rings - adjust goggles, strikers - transport welding cylinders and cart <p>Construction of equipment.</p> <ul style="list-style-type: none"> - study cross-section of cylinders - location of safety devices - identification and marking of cylinders <p>Repairs to accessories.</p> <ul style="list-style-type: none"> - hose splicing, crimping tools, hose diameters 	<p>Notes/Demo</p> <p>Notes/Demo</p> <p>Demo</p>
	1/2T	<p>Types of O.A. flames and fuel mixtures.</p> <ul style="list-style-type: none"> - 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 	<p>O.A.W. I.A.S.#2 Notes/Demo</p>

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
2e	1/2T	<p>Welding terms, positions, joints.</p> <ul style="list-style-type: none"> - 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 	0, W. I, S.#3
		<p>Filler metals and their selection.</p> <ul style="list-style-type: none"> - RG45, RG60 - tensile strength, ductility - weld soundness in respect to SI content 	Notes
		<p>Weld faults: identification and prevention.</p> <ul style="list-style-type: none"> - appearance, overlap, undercut. lack of fusion, brittle welds, porosity, excessive convexity, concavity 	O.A.W. I.A.S.#4 Notes
	5L	<p>Fusion welding practices, 16 gauge metal.</p> <ul style="list-style-type: none"> - 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	4L	<p>Non-fusion welding practices.</p> <ul style="list-style-type: none"> - braze welding: definition, uses - advantages and disadvantages - braze weld tee-joint (both sides) 	I.A.S.#5 Notes/Demo
	IL	<p>2F; 3F</p> <ul style="list-style-type: none"> - brazing, definition; uses - braze tee-joint 16 gauge metal using Allstate #45 (RB45) - safety: fumes, fluxes <p>Soldering</p> <ul style="list-style-type: none"> - definition; uses - fluxes - soldering equipment 	

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
	1L	- soldeF steel to steel - soldeiT wi]e connection	
	2L	Cutting practices. - manual cutting, with and without guide bair - piercing - bolt cutting - cutability of metals Distortion of metals. - upsetting - heat input - neutral axis - heating for shrink fits Basic heat treatment for metals, - effect of heat on: grain size and microstructure	O.A.W. I.A.S.#6 Demo O.A.W. I.A.S.#7 Demo O.A.W. I.A.S.#8 Demo
a	2L	- forging, hardening, tempering a cold chisel - case hardening	
b	1/2T	Written test.	