SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

WELDING

MET721-3

PLUMBING APPRENTICE - INTERMEDIATE

1987 07 09

GUNTER THOM

New XX Revision:

Chairperson

87

- **Course Name** **Course Number**

ifr PHILOSOPHY/GOALS ;

This course is intended to provide basic instruction in the safe use of arc welding equipment.

METHODS OF ASSESSMENT (GRADING METHOD):

MARKING SYSTEM

A - 85 +
B - 75% - 84%
C - 60% - 74%
D - 50% - 59%
F - Repeat

1 Theory Test	30%
Skill Evaluation	60%
Attendance/Attitude -	10%
TOTAL	100%

Instructors should provide marks in percentages. 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.

t TEXTBOOK(S)

I.A.S. and notes*
Students should be given a copy of the course outline

OBJECTIVES:

The objectives are to provide the student with a basic knowledge of arc welding equipment, how to use it safely, and how to make fillet welds in the flat and horizontal positions.

The instructor must ensure that those apprentices who had been excused from taking the Basic course do learn the essentials of the material previously covered.

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

TOPIC NO.	PERIODS T-THEORY L-LAB	TOPIC DESCRIPTION	REFERENCE
la		Introduction to program. Scope of SMAW.	
b	1/2T	Personal and shop safety.	SMAW I.A.S.#1
		Maintenance of shop and accessories	
2a	1/2T	Types of welding machines.	SMAW
b		Current adjustments.	I.A.S.#2 Demo
3	1/2T	Electrical principles.	SMAW I.A.S.#3
4	21L	Welding practices.	SMAW I.A.S.#4 Demo
	1/2T	Selection of filler metals.	SMAW I.A.S.#5
		Welding terms and definitions.	SMAW I.A.S.#6
	1/2T	Weld faults.	SMAW I.A.S.I7
8	1/2T	Written test	
TOTAL HRS.	3T, 21L	- 8 WEEKS	

TOPIC NO.	PERIODS T-THEORY L-LAB	TOPIC DESCRIPTION	REFERENCE
la	1/2T	Introduction to program. - objectives of course - assessment	
		Scope of arc welding. - manual, semi-automatic, automatic processes	
		Personal and shop safety. - clothing, gloves, helmet, lenses - electrical hazards - importance of electrical connections	SMAW I.A.S.#1
		Maintenance of shop and accessories. - care of booth, positioners, table - clean-up - care of holder, helmets, gloves - electrode use and storage - material use and storage	
2a		Types of welding machines. - transformer - transformer/rectifier - generator - cost, maintenance of machines	SMAW I.A.S.#2 Demo
	1/2T	- advantages and disadvantages Current adjustments. - coarse and fine adjustments - standard and remote - current and polarity - concept of polaxity	
	1/2T	- quick disconnect couplers Electrical principles. - copy the face plate of a welding machine; input, output, phase - definition of ampere, volt, ohm, duty cycle, OCV	SMAW I.A.S.#3

TOPIC NO,	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
	21L	Welding practices. - beads: 1/8 E6011; AC 1/8 E6013; AC 3/32 E7024; AC 1/8 E7018; DC+; AC - weaves (Pad): 1/4 plate 3^{H} X 6" 1/8 E6011 1 plate 1/8 E7024 1/8 E7018 1 plate; both sides - fillet welds: IF; 1/4" plate i) - Rootpass 1/8 E6011 Remainder 5/31 E6011 ii) - Rootpass 1/8 E6010 Remainder 5/31 E6010 iii) - Rootpass 1/8 E7024 Remainder 1/8 E7024 iv) - Rootpass 1/8 E7018 Remainder 1/8E7018 v) - 2F; 3F, 4F, single pass and multipass welds for more advanced students	SMAW **I.A.S.I4**
	1/2T	Selection of filler metals. - AWS; CSA classification - imperial and metric sizes - operating characteristics of E6010$_{f}$ E6011, E6013, E7024, E7018 - mechanical properties of above (5) rods	SMAW I.A.S.#5

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
	T-THEORY L-LAB		
		Welding terms and definitions. - fillet weld terms - groove weld terms - layers and passes - weld sizes, shapes - types of welds and joints	SMAW I.A.S.#6
	1/2T	Weld faults. - overlap, undercut - lack of fusion and penetration - porosity, external and internal - underbead cracking - arc blow	SMAW I.A.S.#7
8	1/2T	Written test.	

TOTAL HRS. 3T, 21L - 8 WEEKS

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