

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title; WELDING

Code No.:

Program: HDE APPRENTICE - INTERMEDIATE

Semester:

Date: 1989 05 19

AlWior: Bob Senechal

New; Revision XX

APPROVED:  Chairperson 

WELDING

Course Name

Course Number

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 | 1 Theory Test | - | 30% |
| | Skill Evaluation | - | 60% |
| A - 85+ | Attendance/Attitude | - | 10% |
| B - 75% - 8A% | TOTAL | - | 100% |
| C - 60% - 74% | | | |
| D - 50% - 59% | | | |
| F - Repeat | | | |

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.

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 met due to time constraints.

SUMMARY - HDE APPRENTICE - INTERMEDIATE

| TOPIC NO. | PERIODS | TOPIC DESCRIPTION | REFERENCE |
|-------------------|--------------------|--|--------------------------|
| | T-THEOftY L-LAB | | |
| 1a | | Introduction to program. Scope of SMAW. | |
| b | 1/2T | Personal and shop safety. | SMAW I.A.S.#1 |
| c | | 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 | IIL | Welding practices. | SMAW I.A.S.#4 Demo |
| 5 | 1/2T | Selection of filler metals. | SMAW I.A.S.#5 |
| 6 | | Welding terms and definitions. | SMAW I.A.S.#6 |
| 7 | 1/2T | Weld faults. | SMAW I.A.S.#7 |
| 8 | 1/2T | Written test. | |
| TOTAL HRS. | 3T, IIL | - 7 WEEKS | |

| TOPIC NO. | PERIODS | TOPIC DESCRIPTION | REFERENCE |
|-----------|-------------------|---|--------------------------|
| | T-THEORY L-LAB | | |
| 1a | 1/2T | Introduction to program - objectives of course - assessment Scope of arc welding. - manual, semi-automatic, automatic processes | |
| b | | Personal and shop safety. - clothing, gloves, helmet, lenses - electrical hazards - importance of electrical connections | SMAW I.A.S.#1 |
| c | | 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 - advantages and disadvantages | SMAW I.A.S.#2 Demo |
| b | 1/2T | Current adjustments. - coarse and fine adjustments - standard and remote - current and polarity - concept of polarity - quick disconnect couplers | |
| 3 | 1/2T | 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 | | |
| 4 | IIL | Welding practices. | SMAW |
| a | | - beads: 1/8 E6011; AC 1/8 E6013; AC 3/32 E7024; AC 1/8 E7018; DC+; AC | I.A.S.#4 |
| b | | - weaves (Pad): 3/8 plate 3" X 6" 1/8 E6011 1 plate 1/8 E7024 1/8 E7018 1 plate; both sides | |
| c | | -welding joint: IF; 1/4" plate or 1/8 plate i) - edge joint E6013 - E7018 ii) - lap joint E7018 - E7024 iii) - outside corner E6011 - E7018 iv) - butt joint E6011 - E7018 | |
| d | | v) - 2F; 3F single pass and multipass welds for more advanced students | |
| 5 | 1/2T | Selection of filler metals. - AWS; CSA classification - imperial and metric sizes - operating characteristics of E6011, 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 | | |
| 6 | | 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 |
| 7 | 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, IIL - 7 WEEKS | | | |