

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY  
SAULT STE. MARIE, ON

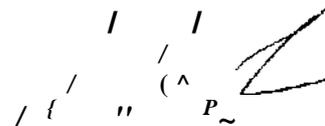
COURSE TITLE: WELDING

CODE NO: HED 800 SEMESTER: N/A

PROGRAM: H.D.E. APPRENTICE - PHASE H

AUTHOR: DENNIS SOCCHIA

DATE: Jan 95 PREVIOUS OUTLINE DATED : Aug 94

APPROVED :  DEAN  -K. / <K / °? TjDATE

**WELDING**

**HED800**

**COURSE NAME**

**CODE NO**

**TOTAL CREDITS**            N/A      

**PREREQUISITE(S)** : Successful completion of both 'Common Core' and Phase *T* Levels of in-school apprenticeship training.

**L PHILOSOPHY / GOALS** : To provide students with a basic level of knowledge and skill in dealing with common arc welding equipment, safe work practices and procedures. Secondly, to introduce a variety of techniques for welding in the flat, and out-of-flat positions using F1, F2, F3 and F4 electrodes.

**H. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):**

Upon successful completion of this course the student will:

- 1) Adjust and operate shielded metal arc welding equipment according to specified job requirements.
- 2) Perform basic repairs to welding cables, electrode holders, helmets and ground clamps.
- 3) Perform arc welding operations in a safe, well organized manner.
- 4) Produce fillet and simulated groove welds having sufficient quality to pass a typical visual and/or destructive test.
- 5) Identify and state the reasons for typical weld defects and/or discontinuities.

**m. TOPICS TO BE COVERED.**

**Approximate Time  
Frames**

- 1) Course Introduction and Orientation.
- 2) Welder Safety.
- 3) Electrode Selection and Amperage Setting.  
Flat / Horizontal Welding Exercises on 16ga, 1/8 and 3/16 material.  
(\*\*\* Shop Assignment \*\*\*)
- 4) Basic Repairs to Common SMAW Equipment.  
Horizontal / Vertical Welding Exercises on 16ga, 1/8 and 3/16 material.  
(\*\*\* Shop Assignment \*\*\*)
- 5) Identify Common Weld Defects and/or Discontinuities.  
(\*\*\* Shop Assignment \*\*\*)

**16 Hours**

#### IV. LEARNING ACTIVITIES/ REQUIRED RESOURCES

##### Topic/Unit - #1. Coarse Introduction and Orientation

##### Learning Activities:

- 1.1 > A lecture presentation of the following major course documents:
- a) course outline
  - b) course guidelines
  - c) course marking system including attendance requirements.

##### Resources:

- > printed handouts, overheads, chalkboard notes

##### Topic/Unit - #2. Welder Safety

##### Learning Activities:

- 2.1 > A lecture presentation with shop demonstration of the following:
- a) A/C, D/C and combination metal arc welding machines and controls.
  - b) Ventilation system including the location of all on / off switches, fans and intake louvers.
  - c) Typical set-up for approved welding area or booth.
  - d) Fire alarm procedures and escape routes.
- 2.2 > A second lecture presentation with shop demonstration of the following:
- a) Eye, hand, face and clothing protection
  - b) Fire protection
  - c) Welding fume hazards
  - d) Cut and burn hazards
  - e) Electric shock prevention
  - f) Vehicle electronic protection from stray or wandering current.

##### Resources:

- > Instructional Aid Sheets, Typical Welding Shop Equipment, Welding Shop

**Topic / Unit: - # 3 Electrode Selection and Amperage Setting**

**Learning Activities:**

- 3.1 > A lecture presentation with shop presentation of electrode specifications including:
  - a) AWS / CSA numbering systems
  - b) Current type and polarity requirements.
  
- 3.2 > A lecture presentation with shop demonstration of electrode selection including:
  - a) welding position
  - b) penetration characteristics
  - c) base metal type (ie low alloy, stainless, cast iron, mild steel) thickness and method of edge preparation preparation.
  - d) condition of base metals prior to welding.
  
- 3.3 > A shop demonstration with student practice of the following basic skills:
  - a) striking the arc (scratch or tap methods )
  - b) typical padding operations
  - c) single and multi-pass fillet welds.

**Resources:**

- > Instructional Aid Sheets, Typical Welding Shop Equipment, Welding Shop

**Topic / Unit: - # 4. Basic Repairs to Common SMAW Equipment**

**Learning Activities:**

- 4.1 > A shop demonstration with student participation of basic repairs to welding cables, electrode holders, helmets and ground clamps.
  
- 4.2 > A shop demonstration with student practice of the following basic skills:
  - a) striking the arc (scratch or tap methods)
  - b) typical padding operations
  - c) single and multi-pass groove welds.

**Resources:**

- > Instructional Aid Sheets, Typical Welding Shop Equipment, Welding Shop

Topic / Unit: - # 5. **Identify Common Weld Faults and/or** Discontinuities.

Learning Activities:

- 5.1 > A shop demonstration with student participation of common weld faults and causes to include the following major items:
  - a) general classes of weld faults
  - b) identification of dimensional faults
  - c) identification of structural discontinuities.
  - d) arc blow
  
- 5.2 > A shop lecture of describing corrective measures for common weld faults.
  
- 5.3 > A shop demonstration with student practice of the following basic skills:
  - a) striking the arc ( scratch or tap methods )
  - b) typical padding operations
  - c) single and multi-pass fillet and groove welds.

Resources:

- > Instructional Aid Sheets, Typical Welding Shop Equipment, Welding Shop

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

**General Assessment**

A = 85 - 100%

B = 75 - 84%

C = 60 - 74%

D - 50 - 59%

F= 0- 49%

**Final Mark\***

Shop Assignments

Attendance (\*\*See Attached)

Ongoing Safety Evaluation (\*\*See Attached)

Total = 100%

**V. PRIOR LEARNING ASSESSMENT:**

**Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:**

1. The successful challenge of all three HED 800 'Shop (Welding) Assignments' plus the demonstrated ability to:
  - a) follow standard safe work practices,
  - b) adjust and operate shielded metal arc welding equipment according to specified job requirements.

— **OR** —

2. Written proof of at least five (3) years of competent trade experience involving the actual welding of structural steel, heavy equipment **OR OTHER SIMILAR WORK.**

**VI. REQUIRED STUDENT RESOURCES :**

C.S.A. Approved (High Cut) Safety Work Boots

C.S.A. Approved Safety (Impact Resistant) Glasses

Work Wear

Notebook, Paper, Pen or Pencil

**VII. SPECIAL NOTES:**

Students with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities etc...) 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 students.

\* Student evaluations concerning the \*Final Mark\* are further affected by the conditions set forth in the printed handout 'Guidelines for Related Welding\*. Be sure to obtain a copy from your instructor.

Special guidelines for attendance and ongoing safety evaluations are included in the above paper.