SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: Welding

CODE NO. : MET721 **SEMESTER:** N / A

PROGRAM: Plumbing Apprentice (Intermediate)

AUTHOR: Dennis Clement-Socchia

DATE: Mar 2004 **PREVIOUS OUTLINE DATED:** Dec 2001

APPROVED:

_____ _____

DEAN **DATE**

TOTAL CREDITS: 3

PREREQUISITE(S): Successful completion of the 'Plumbing – Basic' level of in-school training or its equivalent.

HOURS/WEEK: 3 Hrs / Week

I. COURSE DESCRIPTION: This curriculum that has been designed to provide apprentices with a sound working knowledge and level of skill in the safe use and operation of typical SMAW welding equipment. It's terminal objective will be to develop within the apprentice the skill required to produce welds capable of passing both visual and destructive testing .

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. ***Demonstrate by means of practical shop assignments a sound working knowledge of both personal and shop safety.***
   Potential Elements of the Performance:
   - identify proper eye, hand, and face protection
   - identify proper footwear and clothing
   - locate and identify shop ventilation devices
   - locate and identify emergency fire exits
   - identify the location of shut-off valves for the shop manifold gas system
   - understand procedures for evacuation of shop areas in case of
   - describe potential fire, fume and explosion hazards associated to the SMAW process

2. ***Demonstrate by means of practical shop assignments a sound working knowledge of how to set up and operate a typical SMAW workstation.***
   Potential Elements of the Performance:
   - identify, select and adjust welding helmets and filter lenses
   - identify electrode according to type, size and AWS / CSA numbering system
   - identify ASME / CSA standards for the storage and handling of electrodes
   - identify techniques for adjusting both welding current and polarity
   - perform a routine inspection of assigned workstations to determine the condition of cables, electrode holder and related equipment
   - correct deficiencies prior to the commencement of work
   - explain basic of SMAW joint designs and base metal edge / surface preparation
   - describe techniques for arc ignition, setting electrode angle and travel speed
   - produce trial beads in the flat and horizontal positions
   - identify possible weld defects and verify initial settings

3. ***Demonstrate by means of practical shop assignments a sound working knowledge of how to troubleshoot / correct defects.***
   Potential Elements of the Performance:
   - perform adjustments to SMAW equipment specific to the demands of single and multi-pass fillet welds and groove welds
   - describe and diagnose common weld defects
   - take corrective action to eliminate the presence of weld defects
   - perform destructive test on fillet welds to determine weld soundness
   - identify and explain ASME and CSA acceptance standards for weld soundness
   - identify and explain limited repair and service to electrode cables, holders, power sources and protective equipment

4. ***Demonstrate by means of practical shop assignments a sound working knowledge of how to pass visual examination and destructive testing of weld samples.***
   Potential Elements of the Performance:
   - describe the physical dimensions of a Vee-Groove test plate assembly including:
     - plate thickness, width and length
     - bevel angle
     - root opening
   - describe the acceptance criteria for the size and shape of the completed weld including:
     - number and size of bend test coupons
     - preparation and condition of bend coupons
     - identification of face vs root bend coupons
     - acceptance criteria for possible defects

III. TOPICS:

1. Personal and Shop Safety
2. SMAW Equipment and Workstation Set-up
3. SMAW Practices and Procedures
4. Visual Inspection of Welds
5. Destructive Testing of SWelds

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- CSA Approved (Impact Resistant) Safety Glasses
- CAS Approved (8 inch High Cut) Safety Work Boots
- CSA Approved (Gauntlet Type) Welding Gloves
- Appropriate Work Wear (see 'Welding Shop Guidelines')
- Pocket Note-pad (for Shop Demonstrations)
- Text 'Principles of Industrial Welding'

V. EVALUATION PROCESS/GRADING SYSTEM:

The final course grade will be calculated using the following list of weighted factors.

Factor	***Value***
Shop Assignments & Tests	70 %
Theory Test	30 %

The following grades will be assigned to students:

Grade	**Definition**	*Grade Point Equivalent*
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00

CR (Credit)	Credit for diploma requirements has been awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

VI. SPECIAL NOTES:

Special Needs:
If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 493 so that support services can be arranged for you.

Retention of Course Outlines:
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:
Students should refer to the definition of "academic dishonesty" in *Student Rights and Responsibilities*. Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:
The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

<*include any other special notes appropriate to your course*>

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.