SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: Welding

CODE NO. : MET210 **SEMESTER:** 04

PROGRAM: Truck Coach / HED Technician

AUTHOR: Dennis Clement-Socchia

DATE: Jan 2008 **PREVIOUS OUTLINE DATED:** Jan 2007

APPROVED:

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CHAIR **DATE**

TOTAL CREDITS: 2

PREREQUISITE(S): Successful completion of Year 1 of the Truck Coach / HED Technician program or its equivalent.

HOURS/WEEK: 2

I. COURSE DESCRIPTION: Part one of this curriculum has been designed to provide clients who have successfully completed year 1 of the Truck Coach / HED Technician program with the opportunity to further develop their skill with the SMAW process. Part two will introduce GMA Welding and provide clients with a sound working knowledge of the process as well as the ability to develop job entry skills.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. ***Demonstrate a sound working knowledge of both personal and shop safety.***

   Potential Elements of the Performance:
   - review proper eye, hand and face protection as well as the need to wear it at all times while in the welding shop
   - review proper footwear and clothing
   - review the dangers associated with contact lenses, butane lighters, exposed metal jewelry, long hair and beards
   - review the location of commonly used welding tools, face shields and leather jackets
   - identify personal safety equipment that must be supplied by the student
   - locate and identify shop lighting and ventilation controls
   - locate and identify emergency shop exits
   - review emergency shop evacuation procedures
   - locate and identify manifold shut-off valves for the shop gas system

2. ***Demonstrate the ability to identify, select and inspect the proper tools and equipment necessary operate a SMA Welding station in a safe manner.***

   Potential Elements of the Performance:
   - identify and select correct shade of filter lens based upon required welding current
   - review procedure(s) to install filter lenses, gaskets, clear lens and retaining spring
   - identify source(s) of high voltage electrical hazards
   - review arc welding cables, holders and ground clamps and inspect same for damage / unsafe condition(s)
   - review open circuit voltage and its danger to the operator
   - perform a routine inspection of assigned workstation to determine the condition of welding machine, cables, electrode holders and related equipment
   - correct deficiencies prior to the commencement of shop assignment

3. ***Demonstrate a sound working knowledge of how to perform SMA Welding operations in the flat, horizontal and vertical up position(s)***

Potential Elements of the Performance:

- make full penetration groove type welds on plate in the flat position based upon CSA W59 workmanship techniques for the E4924 electrode class
- make fillet and groove welds on plate in the horizontal position based upon CSA W59 workmanship techniques for the E4918 electrode class
- perform destructive bend tests on selected weld samples to verify weld soundness.

4. ***Demonstrate the ability to identify, select and inspect the proper tools and equipment necessary operate a GMA Welding station in a safe manner.***

Potential Elements of the Performance:

- identify source(s) of high voltage electrical hazards
- identify potential fire, fume and explosion hazards associated to either the Gas Metal Arc or the Flux Core Arc welding process
- briefly describe the differences between a constant current and a constant voltage welding machine
- explain why a constant voltage machine is used for the GMAW process
- identify electrode types, sizes and AWS specification
- identify various shielding gases and their potential use(s)
- perform a routine inspection of assigned workstations to determine the
- condition of wire feeder, cables, torch body, hoses and regulators
- report / correct deficiencies prior to the commencement of work
- describe procedures for setting shielding gas flow rate, voltage, wire feed speed and visible (electrode) stick-out distance.
- describe techniques for arc ignition, setting gun angle and travel speeds

5. ***Demonstrate a sound working knowledge of how to perform GMA Welding operations in the flat and horizontal positions.***

Potential Elements of the Performance:

- make full penetration groove type welds on ***plate*** in the flat position based upon CSA W59 workmanship techniques for the E49S-6 electrode class
- make full penetration groove type welds on ***10ga metal*** in the flat position based upon CSA W59 workmanship techniques for the E49S-6 electrode class
- make fillet and groove type welds on ***plate*** in the horizontal position based upon CSA W59 workmanship techniques for the E49S-6 electrode class

- make fillet and groove type welds on ***10ga metal*** in the flat position based upon CSA W59 workmanship techniques for the E49S-6 electrode class
- perform destructive bend tests on selected weld samples to verify weld soundness.

III. TOPICS:

1. Personal and Shop Safety
2. Functions, Construction and Principle(s) of Operation of Shielded Metal Arc Welding equipment
3. SMA Welding Operations in the Flat and Horizontal Position
4. Functions, Construction and Principle(s) of Operation of Gas Metal Arc Welding equipment
5. SMA Welding Operations in the Flat and Horizontal Position
6. Weld Testing and Quality Assurance

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Impact Resistant Safety Glasses (CSA Approved)
- High Cut (8 inch) Safety Work Boot (CSA Approved)
- Weld Gloves (CSA Approved)
- Modules: Course Pack MET210

V. EVALUATION PROCESS/GRADING SYSTEM:

- All shop assignments and tests must be completed by the end of the second last week of the course. No shop assignments or tests will be accepted after this date.
- Re-writes for theory tests are not allowed.
- Where a student is absent for a test the student must provide written statement (to the course professor) explaining his / her absence in order to obtain permission to write the said test.
- All tests will be scheduled at the convenience of the course professor.

- The final course grade will be determined by means of the following list of weighted criteria
  - Theory Tests and Quizzes 35%
  - Shop Assignments 65%

The following semester 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 703 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.