SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	WELDING		
CODE NO. :	MET210	**SEMESTER:**	FOUR
PROGRAM:	TRUCK COACH/HED TECHNICIAN		
AUTHOR:	STEVE WITTY/CLIFF MOSS		
DATE:	JAN 2011	**PREVIOUS OUTLINE DATED:**	JAN 2010
APPROVED:			

"Corey Meunier"
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

For additional information, please contact Corey Meunier, Chair
School of Technology & Skilled Trades
(705) 759-2554, Ext. 2610

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 GMAW 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 SMAW 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 SMAW 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 GMAW 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 GMAW 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. R PERSONAL AND SHOP SAFETY
2. FUNCTIONS, CONSTRUCTION AND PRINCIPLE(S) OF OPERATION OF SHIELDED METAL ARC WELDING EQUIPMENT
3. SMAW OPERATIONS IN THE FLAT AND HORIZONTAL POSITION
4. FUNCTIONS, CONSTRUCTION AND PRINCIPLE(S) OF OPERATION OF GAS METAL ARC WELDING EQUIPMENT
5. GMAW 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 (6 inch) Safety Work Boot (CSA Approved)
- Weld Gloves (CSA Approved)
- Modules: Course Pack MET210

V. EVALUATION PROCESS/GRADING SYSTEM:

Part 1 Notes:

1. Re-writes are NOT allowed for any written assignment, quiz or test.
2. Repeats are NOT allowed for any shop test
3. Course attendance is mandatory. One percent (1 %) per hour will be Deducted from the final course grade for apprentices with more than 4 hours of unexcused* absence.

[Any absence without a written, valid reason will be deemed unexcused.]

Valid reasons would include:

- Doctor's note
- Apprenticeship Ministry note
- Family Death or Serious Illness supported by a written note.

Part 2 Final Course Grades:

The final course grade will be determined by means of the following list of weighted factors:

Factor	***Value***
Shop Assignments	65 %
Theory Quiz & Test	35 %
Attendance	-1% per Unexcused Hour
Shop Clean-up	-1% per Incident

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:

Attendance:
Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.