

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Welding

CODE NO. : MET700 / MET 712 **SEMESTER:** N/A

PROGRAM: TRUCK COACH TECHNICIAN - PHASE 1
HEAVY EQUIPMENT TECHNICIAN - PHASE 1

AUTHOR: Dennis Clement-Socchia

DATE: Jan 2004 **PREVIOUS OUTLINE DATED:** Jan 2002

APPROVED:

	_____	_____
	DEAN	DATE

TOTAL CREDITS: N/A

PREREQUISITE(S): Successful completion of WELDING for the Motive Power
Common Core Level of training or its equivalent

HOURS/WEEK: 2

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*For additional information, please contact Colin Kirkwood, Dean
School of Technology, Skilled Trades & Natural Resources*

(705) 759-2554, Ext. 688

- I. **COURSE DESCRIPTION:** A two part curriculum that begins with a review of the theoretical knowledge and practical (hands on) skill related to the safe use and operation of typical Oxy-acetylene welding equipment. The second part is devoted to the Gas Metal Arc Welding process and its related equipment.

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 and in writing, a sound working knowledge of both personal and shop safety.***

Potential Elements of the Performance:

- identify proper work boots, gloves and eye protection
- identify recommended fabrics and materials for personal protective clothing
- identify and select proper shades of welding lenses
- identify, select and adjust welding helmets for proper fit and vision
- locate and identify shop lighting and ventilation switches
- locate and identify emergency exits
- understand procedures for evacuation of shop areas in the case of emergencies

2. ***Demonstrate how to safely set up and operate a typical Oxy-acetylene workstation.***

Potential Elements of the Performance:

- perform a routine inspection of assigned workstations to determine the condition of torch body, hoses, regulators and tips
- report / correct deficiencies before the commencement of work
- understand the differences in construction between a balanced pressure torch and an injector torch
- pressurize and purge regulators, hoses, torch body and tip
- explain the dangers associated to the hazards of backfire and flashback
- explain the correct safe response to backfire and flashback
- identify correct vs. unsafe flame ignition procedures
- adjust the oxyacetylene flame to produce flames designated as carburising, neutral and oxidizing
- describe procedures for the shutting down of the torch, regulators and assigned work station.

3. ***Demonstrate the ability to perform typical fusion and braze welding operations procedures as well as identify and correct weld defects .***

Potential Elements of the Performance:

- describe potential fire, fume and explosion hazards associated to the fusion and / or braze welding of metals
- identify proper fusion welding techniques
- make fillet and groove fusion welds on thin gauge metal c/w filler rod
- identify proper braze welding techniques
- make fillet and groove braze welds on thin gauge metal c/w filler rod
- adjust pressure settings and flame size(s) appropriate to the requirements of each joint type and welding process

4. ***Demonstrate the ability to set up and operate a typical GMAW workstation .***

Potential Elements of the Performance:

- identify proper eye, hand and face protection
- identify proper footwear and clothing
- identify potential fire, fume and explosion hazards associated to the Gas Metal 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
- produce trial weld beads to identify possible defects and verify initial settings

5. ***Demonstrate the ability to perform GMAW procedures as well as identify and correct weld defects .***

Potential Elements of the Performance:

- produce fillet and groove welds on both thin gauge and thick metals
- perform adjustments to voltage and wire feed speed in accordance with the demands of base metal thickness and joint design
- perform in-service adjustments to wire drive rolls, contact tip and nozzle

III. TOPICS:

1. Personal and Shop Safety
2. Set up and Operation of a typical Oxyacetylene workstation
3. Fusion and Braze Welding Procedures
4. Set up and Operation of a typical GMAW workstation
5. GMAW Practices and Procedures

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- CSA Approved (Impact Resistant) Safety Glasses
- CSA 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 and Discussion)
- Text: Principles of Industrial Welding

V. EVALUATION PROCESS/GRADING SYSTEM:

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

<i>Factor</i>	<i>Weight</i>
Shop Assignments and Tests	65%
Theory Test(s)	35%

The following grades will be assigned to students:

Grade	Definition	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
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 instructor and/or the Special Needs office. Visit Room E1204 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.

Re-writes are NOT ALLOWED for the final theory test

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.