

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ON**



**COURSE OUTLINE**

**COURSE TITLE: WELDING**

**CODE NO.: HED700/MVM712 SEMESTER: N/A**

**PROGRAM: HEAVY DUTY EQUIPMENT MECHANIC - Phase 1  
TRUCK / COACH TECHNICIAN - Phase 1**

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**DATE: May 1998 PREVIOUS OUTLINE DATED: August 1997**

**APPROVED**

**DEAN'**

**P DATE**

**TOTAL CREDITS N/A**

**PREREQUISITES): 1. An apprenticeship in one of the Motive Power Trades  
2. The successful completion of the Motive Power 'Common Core'  
level of in-school training.**

**LEI^ - A OF COURSE: 2 Hours / Week for 8 Weeks**

**TOTAL CREDIT HOURS: 16 Hours**

**I. COURSE DESCRIPTION:** A two-part curriculum that begins with a review of the safe use and operation of typical oxyacetylene welding and cutting equipment. The second half is devoted to the Gas Metal Arc Welding process and its related equipment. The course will include shop demonstrations and some practical application of the above equipment in order to reinforce learning.

**H. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**  
(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

**Upon successful completion of this course the student will:**

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

Potential Elements of the Performance:

- identify proper eye, hand, 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
- explain procedures for evacuation of shop areas in case of emergency
- describe procedures for setting up, pressurising, purging and shutting down a portable oxyacetylene station

**2) *Demonstrate and describe a sound working knowledge of how to set up and operate a typical oxyacetylene workstation.***

Potential Elements of the Performance:

- perform a routine inspection of assigned workstations to determine the condition of torch body, hoses, regulators and tips
- correct deficiencies prior to the commencement of work
- understand the differences in construction and operation between a balanced pressure and an injector torch
- pressurise and purge regulators, hoses, torch body and tip
- explain the correct safe response to backfire and flashback
- identify correct versus unsafe flame ignition procedures
- explain the dangers associated to the hazards of backfire and flashback

- adjust the oxyacetylene flame to produce flames designated as carburizing, neutral and oxidising
- describe procedures for the shutting down of the oxyacetylene torch, regulators and assigned workstation

3) *Demonstrate and describe the ability to perform fusion and braze welding operations.*

Potential Elements of the Performance:

- describe potential fire, fume and explosion hazards associated to the fusion welding of metals
- identify proper fusion welding techniques
- perform appropriate pressure settings and flame adjustments for specific fusion welding exercises
- describe potential fire, fume and explosion hazards associated to the braze welding of metals
- identify proper braze welding techniques
- perform appropriate pressure settings and flame adjustments for specific braze welding exercises

4) *Demonstrate and describe a sound working knowledge of how to set up and operate a typical GMAW workstation.*

Potential Elements of the Performance:

- identify proper eye, hand, face protection
- identify proper footwear and clothing
- identify hazards associated with Gas Metal Arc welding
- identify rectifier, generator and inverter power sources
- provide a basic description of their construction, capabilities and differences
- identify electrode types, sizes and specifications
- identify various shielding gases and their potential use
- describe methods for identifying cylinders, hoses, regulators and fittings
- identify physical properties and dangers associated with a typical shielding gas
- perform a routine inspection of assigned workstations to determine the condition of power supply, wire feeder, cables, torch body, hoses and regulators
- correct deficiencies prior to the commencement of work
- explain basic of GMAW joint designs and base metal edge / surface preparation
- describe procedures for cylinder handling

- describe procedures for pressurising and purging with a GMAW shielding gas
- describe procedures for setting 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 beads to identify possible defects and verify initial settings
- re-adjust settings to produce sound welds

5) *Demonstrate and describe the ability to perform GMA Wprocedures and diagnose / correct defects.*

Potential Elements of the Performance:

- describe potential fire, fume and explosion hazards associated to GMAW
- demonstrate proper welding techniques
- perform appropriate adjustments to GMAW equipment specific to the demands of variable welding exercises
- describe and diagnose defective welds
- identify and explain the service requirements of the wire drive rolls, contact tip, gas nozzle and gun liner

6) *Demonstrate a willingness to assume the responsibilities of employment*

Potential Elements of the Performance:

- be present for all scheduled classes
- provide a satisfactory reason for having to leave class early
- provide a reasonable excuse for being absent from class
- provide a written statement to the professor explaining the reason(s) for being absent on an assignment due date or the day of a scheduled test
- demonstrate behaviour that does not interfere with or obstruct the over-all learning environment
- actively participate in all course assignments and projects
- operate any and all lab / shop equipment according to guidelines prescribed by the college and / or course professor
- wear personal protective equipment at all times while in the shop
- return all equipment and unused practice materials to their designated place upon completion of work
- remove all scrap and thoroughly clean individual and / or assigned station

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

C.S.A. Approved (High Cut) Safety Work Boots  
C.S.A. Approved (Impact Resistant) Safety Glasses  
CSA Approved (Gauntlet Type) Welding Gloves  
Appropriate Work Wear  
Notebook c/w Paper  
Text: New Lessons in Arc Welding

**V. EVALUATION PROCESS/GRADING SYSTEM**

Evaluation will consist of an over-all theory test as well as designated lab / shop assignments and / or practical shop tests for which students must demonstrate proficiency in both knowledge and hands on skill.

Failure to complete all designated shop assignments shall result in the loss of the entire 10% allocated to the "Employment Readiness" evaluation.

The over-all *theory test* will represent 35% of the final course mark and will be 'open book' using MVM712 / HED700 course notes and the identified text.

All *practical lab /shop assignments* and *tests* will represent 55% of the mark for the final course mark and must be completed prior to the writing of the said theory test.

The evaluation for *employment readiness* will consist of a day to day recording of the Elements of Performance listed. Each infraction will constitute the loss of one percentage point from the *10 percentage points* allocated to this outcome.

**Course Grading Scheme**

**Final Mark (\*see item s 3 under special Notes)**

<b>A</b>	<b>85 - 100%</b>	<b>Shop Assignments / Tests</b>	<b>55%</b>
<b>B</b>	<b>75 - 84%</b>	<b>Theory Test</b>	<b>35%</b>
<b>C</b>	<b>60 - 74%</b>	<b>Employment Readiness</b>	<b>10%</b>
<b>D</b>	<b>50 - 59%</b>		

TUCK / COACH TECHNICIAN - Phase 1  
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F 0 - 49%

## VI. SPECIAL NOTES:

1. Special Needs

If you are a student with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 491 so that support services can be arranged for you.

2. 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 post-secondary institutions.

3. Student evaluations concerning the **Final Mark** are further affected by the conditions set forth in the printed handout, *Welding Department Guidelines* . Be sure that you receive a copy of these guidelines.

4. Course materials that are discussed and / or explained during any and all lab or shop demonstrations are subject to evaluation. Students are therefore responsible for the content of all lab / shop demonstrations.

5. Your Professor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

6. Substitute Course Information is available at the Registrars Office.

7. Any person caught cheating or substituting another persons work in place of their own for the purpose of grading or evaluation will automatically fail the said assignment or test. College policy\* also dictates that such persons may be subject to immediate dismissal.

\* Students should refer to the definition of academic dishonesty provided in the Sault College Statement of Student Rights and Responsibilities .

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## **VII. 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 completion of an Gas Metal Arc welding course with Learning Outcomes and Elements of Performance that are at least 80% compatible with this course outline ...

AND

2. The successful challenge of the over-all theory test identified by this course outline.

<OR>

3. Documented proof of at least three (3) years of competent trade experience involving both the OFG Welding and GMA Welding processes that is compatible with Learning Outcomes described in HED700...

AND

4. The successful challenge of the over-all theory test identified by this course outline.