

Sault College of Applied Arts and Technology
Sault Ste Marie, ON



Course Outline

Course Title MET100-3
Program Motive Power Techniques - Heavy Equipment Diesel
Author Dennis Clement-Socchia
Date August 2001 Previous Outline Dated August 1997

Approved _____
DEAN DATE

Total Credits 3

Prerequisites Registration in the Motive Power Techniques
Heavy Equipment Program

Length of Course 16 Weeks Total Credit Hours 32

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I. COURSE DESCRIPTION: A trades curriculum that has been designed to provide students with a combination of theoretical knowledge and hands on skill in relation to the safe use and operation of both OFG / SMA welding, cutting and heating equipment.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE

Upon successful completion of this course, the student will have been given the ability to:

- 1. *Communicate clearly and correctly in the written form as well as demonstrate by means of their participation in shop activities, a sound working knowledge of both personal and shop safety.***

Potential Elements of Performance:

- identify proper eye, hand and face protection
 - identify proper footwear and clothing
 - locate and identify shop ventilation controls
 - locate and identify emergency exits
 - locate and identify manifold shut-off valves for the shop gas system
 - understand emergency shop evacuation procedures
 - describe the physical construction of both acetylene and oxygen cylinders
 - locate and identify the built-in safety devices for both acetylene and oxygen cylinders
 - identify both acetylene and oxygen cylinders, hoses, regulators and fittings
 - identify basic physical properties and dangers associated with the use of acetylene gas
 - identify basic physical properties and dangers associated with the use of oxygen gas
 - describe proper procedures for cylinder handling
 - describe procedures for setting up, pressurizing, purging and shutting down oxyacetylene equipment
- 2. *Demonstrate and describe a sound working knowledge of how to set up and operate a typical oxyacetylene workstation.***

Potential Elements of Performance:

- perform a routine inspection of individual workstation to determine the condition of the torch body, hoses, regulators and tips
- correct workstation deficiencies prior to the commencement of shop assignments
- understand the basic differences in construction and operation between the balanced pressure and injector type torch
- pressurize and purge regulators, hoses, torch body and tips
- explain the dangers associated to the hazards of backfire and flashback
- explain the correct safe response to backfire and flashback
- perform specified procedures for flame ignition and adjustment
- perform specified procedures for cleaning and shutting down their individual workstations

- 3. Demonstrate and describe by means of practical shop assignments and tests a sound working knowledge of how to perform both fusion welding and braze welding operations.**

Potential Elements of Performance:

- describe potential fire, fume and explosion hazards associated with the fusion and / or braze welding of metals
- identify proper fusion and braze welding techniques
- perform appropriate pressure settings and flame adjustments for specific fusion welding and / or braze welding operations
- perform fusion and braze welding operations on mild steel
- determine weld soundness by means of visual and / or destructive testing

- 4. Demonstrate and describe by means of practical shop assignments and tests a sound working knowledge of how to perform flame cutting and heating operations.**

Potential Elements of Performance:

- describe potential fire, fume and explosion hazards associated with the process of flame cutting and / or heating operations
- identify proper flame cutting and heating operations
- select appropriate pressure settings, flame adjustments and torch travel speeds
- flame cut mild steel using manual and / or semi-automatic equipment
- understand potential changes in base metal strength, ductility and hardness resulting from flame cutting and / or heating operations

- 5. Demonstrate and describe by means of practical shop assignments and tests a sound working knowledge of personal and shop safety as related to the SMAW process.**

Potential Elements of Performance:

- identify proper eye, hand and face protection
- identify proper footwear and clothing
- locate / identify shop ventilation controls and emergency exits
- locate / identify manifold shut-off valves for the shop gas system
- locate and identify emergency exits
- understand emergency shop evacuation procedures
- identify hazards associated with the SMAW process

- 6. Demonstrate and describe by means of practical shop assignments and tests a sound working knowledge of how to set up and operate a typical SMAW workstation.**

Potential Elements of Performance:

- identify, select and adjust welding helmets and lenses
- identify electrodes according to type, size and AWS / CSA designation
- identify guidelines for electrode selection and application
- identify techniques for adjusting both welding current and polarity
- 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 assignments
- identify basic SMAW joint designs
- describe techniques for arc ignition, electrode manipulation and travel speeds
- produce trial weld beads to identify possible defects and verify current settings

- 7. Demonstrate and describe by means of practical shop assignments and tests a sound working knowledge of how to perform SMAW procedures and troubleshoot weld defects.**

Potential Elements of Performance:

- adjust SMAW equipment and settings according to the demands of single and multi-pass fillet and groove welds
- deposit single and multi-pass fillet welds on mild steel
- deposit single and multi-pass groove welds on mild steel
- identify and troubleshoot the cause(s) of weld defects
- identify and explain limited repair and service activities related to electrode cables, holders, welding machines and protective equipment

- 8. Demonstrate by means of punctuality, regular attendance and clean-up as well as respect for fellow students a willingness to assume the responsibilities of employment.**

Potential Elements of Performance:

- be present for all classes
- provide a satisfactory reason to the professor for having to leave the class early or being absent from class
- provide a written excuse to the professor explaining the reason(s) for being absent on an assignment due date or on the day of a scheduled test
- demonstrate behavior that does not interfere with or obstruct the over-all learning environment

- actively participate in all assignments and projects
- operate any and all lab / shop equipment according to the procedures and guidelines set forth by the course professor
- wear the prescribed personal safety equipment at all times while in the shop
- return all equipment and unused practice materials to their designated place upon completion of work and / or during shop cleanup
- remove all scrap and thoroughly clean individual workstations
- remain in the shop to assist in the general cleaning and shutting down of the shop upon completion of the scheduled class

III. TOPICS:

1. Personal and Shop Safety
2. Cylinder Construction and Safe Operation
3. Fusion Welding Practices and Safe Work Practices
4. Braze Welding Practices and Safe Work Practices
5. Flame Cutting & Heating Operations and Safe Work Practices
6. Employment Readiness

IV. REQUIRED STUDENT RESOURCES / TEXTS and 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
 Pocket Note-pad for Shop Demonstration and Discussion Content
 Text: Principles of Industrial Welding

V. EVALUATION PROCESS/GRADING SYSTEM:

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	94 – 100%	4.00
A	80 – 93%	3.75
B	70 – 79%	3.00
C	60 – 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	

X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies & Procedures Manual B Deferred Grades and Make-up</i>).
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has not been possible for the faculty member to report grades.

VI. SPECIAL NEEDS

1. 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, 717, or 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 postsecondary institutions.

3. 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.

4. 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.

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

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.