

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



Sault College

**Course Outline**

Course Title Introduction to Welding

Course Code PIP0500

Program Introduction to Plumber and Steamfitter Trades

Author Dennis Clement-Socchia

Date August 2002 Previous Outline Dated N / A

Approved \_\_\_\_\_  
DEAN DATE

Total Credits

Prerequisites Grade 10 English and Mathematics

Hours / Week 3

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**Pat Gibbons, Dean**

*School of Continuing Education, Corporate Training, Apprenticeship and Trades  
(705) 759-2554, Ext 656*

- I. **COURSE DESCRIPTION:** This curriculum that has been designed to provide students with an introduction to the theoretical knowledge and hands on skill related to the safe use and operation of OFG cutting and SMAW welding 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

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- perform specified procedures for flame ignition and adjustment
- perform specified procedures for cleaning and shutting down their individual workstation.

**3. *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
- use a standard hand operated cutting torch to produce square cuts and bevel cuts in mild steel.
- understand potential for changes to base metal strength, ductility and hardness resulting from flame cutting and / or heating operations

**4. *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

**5. *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
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- 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

**6. *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

**7. *Demonstrate 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

**Course Name****Code No****III. TOPICS:**

1. Personal and Shop Safety
2. Cylinder Construction and Safe Operation
3. Flame Cutting & Heating Practices
4. Arc Welding Practices
5. 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. FINAL GRADE DETERMINATION:**

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

<b>Factor</b>		<b>Weight</b>
Shop Assignments and Tests	=	50%
Theory Tests	=	40%
Employment Readiness	=	10%

The minimum passing grade for MET100 shall be 60%.

Course grades are then assigned by means of the following breakdown:

<b>Grade</b>	<b>Definition</b>
A+	95 – 100%
A	86 – 94%
B	76 – 85%
C	60 – 75%
R (Repeat)	59% or below

**VI. SPECIAL NEEDS**

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1. Special Needs: If you are a student with special needs (e.g. physical limitations, visual impairment, hearing impairment, 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 post secondary 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 Registrars 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.