

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON



COURSE OUTLINE

COURSE TITLE: WELDING

CODE NO.: IRN804 **SEMESTER:** N/A

PROGRAM: IRONWORKER APPRENTICE -Advanced

AUTHOR: D. CLEMENT-SOCCHIA

DATE: Dec 1998 **PREVIOUS OUTLINE DATED:**

APPROVED: rf.O. C^!LAfs/yJ^ f}. MJ /' ^// Y' f
DEAN DATE

TOTAL CREDITS N/A

PREREQUISITE(S): An apprenticeship in the trade of Ironworker plus the successful completion of the Intermediate level of in-school

LENGTH OF COURSE: 5 Hours / Week for 8 Weeks

TOTAL CREDIT HOURS: 40 Hours

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I. COURSE DESCRIPTION: A curriculum that has been designed to provide a combination of theoretical knowledge and practical skill in the safe use and operation of typical Gas Metal Arc / Flux Core Arc welding equipment by means of shop lectures and demonstrations combined with practical application of the above equipment.

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 demonstrate the ability to:

1) *Communicate clearly and correctly in the written form as well as demonstrate by means of practical shop assignments a sound working knowledge of both 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 gas manifold system
- explain procedures for evacuation of shop areas in case of emergency
- identify hazards associated with Gas Metal Arc welding

2) *Communicate clearly and correctly in the written form as well as demonstrate by means of practical shop assignments a sound working knowledge of how to set up and operate a typical GMA W/FCA W workstation.*

Potential Elements of the Performance:

- identify and distinguish between power source and wire feeder
- 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

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**D. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE
(Continued)**

- 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 / FCAW joint designs and base metal edge / surface preparation
- describe procedures for cylinder handling
- describe procedures for pressurizing 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
- identify and explain basic service requirements of the wire drive rolls, contact tip, gas nozzle and gun liner

3) *Communicate clearly and correctly in the written form as well as demonstrate by means of practical shop assignments a sound working knowledge of how to perform GMA W/FCA W procedures and diagnose / correct defects.*

Potential Elements of the Performance:

- identify potential fire, fume and explosion hazards
- demonstrate proper welding techniques
- perform appropriate adjustments to equipment specific to the demands of single and multi-pass groove welds c/w and w/o backing bars
- produce single and multi-pass groove welds c/w and w/o backing bars in the flat and horizontal positions
- describe and diagnose defective welds
- identify acceptance criteria for weld soundness based upon industrial standards
- perform basic visual inspection of completed welds to ensure their adherence to industrial standards for visual acceptance prior to destructive testing
- perform destructive testing on completed welds in order to determine weld soundness

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4. *Demonstrate by means of regular attendance, punctuality, respect for fellow students as well as lab /shop equipment, 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

**n. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE
(Continued)**

- 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
Appropriate Work Wear
Notebook c/w Paper
Two Finger (Gauntlet Type) Welding Gloves
Text: "Principles of Industrial Welding"

V. EVALUATION PROCESS/GRADING SYSTEM

The 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 IRN804 course notes and the identified text.

AW 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 # 3 under Special Notes)	
A	85 - 100%	Shop Assignments	55%
B	75 - 84%	Theory Test	35%
C	60 - 74%	Employment Readiness	10%
D	50 - 59%		
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.

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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 Registrar's Office.
7. Any person caught cheating or substituting another person's 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".

VH. 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 a Gas Metal / Flux Core 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 (2) years of competent trade experience involving the use and operation of GMAW / FCAW equipment that is compatible with Learning Outcomes described in IRN804...

AND

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