

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ON**

**COURSE OUTLINE**

**COURSE TITLE:** WELD TESTING and INSPECTION

**CODE NO.:** WLD119 **SEMESTER:** Winter

**PROGRAM:** WELDING and FABRICATING-Techniques  
AVIATION WELDING

**AUTHOR:** D. SOCCHIA

**DATE:** March 1997 **PREVIOUS OUTLINE DATED:** August 1995

**APPROVED:** \_\_\_\_\_ **/i^A**  
DEAN DATE

**TOTAL CREDITS** 1

**PREREQUISITE(S):** WLD103 SMAW Pract & Procd I  
WLD107 Fabrication & Layout I

**LENGTH OF COURSE:** 24 Hours ... comprised of  
18 Classroom/Shop Contact Hours with Professor  
6 Lab Non-Contact Hours

**TOTAL CREDIT HOURS** 24

Weld Testing and Inspection  
**COURSE NAME**

WLD119  
**CODE NO.**

**COURSE DESCRIPTION:** This course will study the requirements of C.S.A. Standards W59.1, W47.1 and ASME Section IX for acceptable and non-acceptable weld profiles, defects and discontinuities. Students will participate in a variety of shop activities designed to show common measuring devices and gauges that are used to ensure that weld samples conform to the acceptance requirements of the above codes and standards. Shop activities will be supported by written reports.

- n. 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) *Demonstrate by means of a written theory test a sound working knowledge of the concepts related to "Basic Mechanical Properties".*

Potential Elements of the Performance:

- name the various mechanical properties that can exist in both plain carbon and low alloy steels at room temperature.
- describe and define a pre-determined list of mechanical properties
- identify and describe general procedures that may be used to determine mechanical properties
- perform independent research into the topic of 'Mechanical Properties' to determine:
  - a) their general units of measurement
  - b) their importance to the field of weld testing and inspection
- describe the general relationship between the mechanical properties of a given base metal to a specified welding electrode

**NOTE:** *This learning outcome will constitute 45% of the course grade*

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

**2) *Demonstrate by means of a written theory test a sound working knowledge of the concepts related to "Weld Profiles, Defects and Discontinuities" as it relates to the field of; "Testing and Inspection".***

Potential Elements of the Performance:

- identify and describe CSA / AWS requirements for material identification
- identify and describe CSA / AWS requirements for base metal cleanliness, edge preparation and joint fit-up prior to welding
- identify and describe CSA / AWS requirements for allowable variations in both joint and completed weld size from the design / detailed size
- prepare welding procedures for groove and fillet welds via computer software
- participate in the preparation and welding of samples
- participate in the process of visually inspecting fillet and / or groove welds in order to determine their conformance to CSA / AWS standards
- participate in the performing of guided bend tests to identify potential defects Resulting from welds that contain unacceptable contours
- participate in the use of the Dye Penetrant process in order to identify the possible existence of hidden weld and / or HAZ cracks

*NOTE: This learning outcome will constitute 45% of the course grade.*

**3. *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
- be in the lab/shop or classroom within 5 minutes of the scheduled starting time
- be present for the taking of attendance
- provide a satisfactory reason to the professor for having to leave class early
- provide a reasonable excuse to the professor 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

*NOTE: This learning outcome will constitute 10% of the course grade*

**m. TOPICS:**

**Note 1:** These topics sometimes overlap several areas of skill development and are not necessarily intended to be explored in isolated learning units or in the order below.

- 1) Understanding the basics of Mechanical Properties
- 2) Understanding the relationship between Base Metal Properties and Electrode Selection
- 3) CSA / AWS requirements for Acceptable and Non-Acceptable Welds
- 4) Employment Readiness

**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  
Module; 'WIC # 16 - Techniques of Visual Inspection'  
Texts: 'The Metal Trades Handbook'  
'Modem Welding'

**V. EVALUATION PROCESS/GRADING SYSTEM**

The evaluation for Learning Outcomes # 1 and # 2 will each consist of '*closed book*' theory test using WLDI 19 course notes and identified resources / texts. They will constitute 90% of the mark for *Weld Testing and Inspection* .

While all tests and assignments are designed to be completed with the specified time limit (or less), students MUST report to the classroom fully prepared. Your professor will supply only the assignment or test instructions.

The evaluation for Learning Outcome # 3 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 total number of points allocated to this outcome.

**Course Grading Scheme**

<b>A+</b>	<b>90 - 100%</b>	Outstanding Achievement
<b>A</b>	<b>80 - 89%</b>	Above Average Achievement
<b>B</b>	<b>70 - 79%</b>	Average Achievement
<b>C</b>	<b>60 - 69%</b>	Satisfactory Achievement
<b>U</b>		Unsatisfactory, only given on the midterm report
<b>S</b>		Satisfactory, only given on the midterm report
<b>R</b>		Repeat, signifies a failing grade
<b>X</b>		A temporary grade that is limited to instances where special circumstances have prevented the student from demonstrating the required elements of performance by the end of the course semester. An 'X' grade must have the Dean's approval and has a maximum time limit of 120 days after which it becomes an 'R' grade.

**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. 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.

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

5. Substitute Course Information is available at the Registrar's Office.

6. 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" .

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**Vn. 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 course in Welding Inspection course having Learning Outcomes and Elements of Performance that are at least 80% compatible with this course outline...

AND

2. The successful challenge of all lab tests identified by this course outline.

<OR>

3. Documented proof of at least three (3) years of competent shop experience involving the testing and inspection of welds which is compatible with Learning Outcomes described in WDL1 19.

AND

4. The successful challenge of all theory tests identified by this course outline.