

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** METALLURGY AND HEAT TREATING  
PROCESSES

**CODE NO. :** ASR111 **SEMESTER:** 2

**PROGRAM:** AIRCRAFT STRUCTURAL REPAIR

**AUTHOR:** STEVE LACHOWSKY

**DATE:** Jan. **PREVIOUS OUTLINE DATED:** Jan.  
2005 2004

**APPROVED:**

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**DEAN**

\_\_\_\_\_  
**DATE**

**TOTAL CREDITS:** 2

**PREREQUISITE(S):**

**HOURS/WEEK:** 2

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*For additional information, please contact Colin, Kirkwood, Dean  
School of Technology, Skilled Trades & Natural Resources  
(705) 759-2554, Ext. 688*

**COURSE DESCRIPTION:****I.**

Basic metallurgy and heat treating processes will be discussed as it pertains to aircraft metals. Various procedures used to increase hardness and durability will be researched. Testing using specialized equipment will be explained.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1. Understand the heat-treating processes used to heat-treat ferrous and nonferrous metals and to discuss and identify all terminology used in each heat treating process.

**Potential Elements of the Performance:**

- describe how aluminum is produced
  - identify the major alloy in a sheet of aluminum by the part number stamped on the sheet
  - discuss various terms associated with the heat treatment process of aluminum
  - describe why we heat treat aluminum and the changes that occur in the metal
  - discuss the characteristics associated with magnesium
  - discuss heat treatment of ferrous metals and the various methods used in the heat treatment of ferrous metals
  - describe the purpose of having “Alclad” on aluminum
  - identify with the use of charts, the temperature that specific metals are heat treated at
  - describe, using charts, the precipitation heat treatment procedures to be used to heat treat aluminum
  - identify the “soaking” temperature of various alloyed metals
  - discuss heat treatment of 2024T3 rivets
2. Discuss and identify various hardness testing methods performed on ferrous and non-ferrous metals.

**Potential Elements of the Performance:**

- identify the procedures used to operate both the Brinell and Rockwell hardness testers

- describe how to identify the hardness of aluminum using the Barcol tester
- discuss, using charts, the ultimate and shearing strength of various types of alloyed aluminum

### III. TOPICS:

1. Heat Treatment of Metals
2. Hardness Testing

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

A/C 65-9A

Teacher Handouts

### V. EVALUATION PROCESS/GRADING SYSTEM:

One Written Test (Test #24) – accounts for 100% of Final Grade.

**Note: Students in the Aircraft Structural Repair Program require a minimum of seventy (70) percent in a course to obtain a passing grade. This equates to a “B” grade.**

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

<b>Grade</b>	<b><u>Definition</u></b>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a	

	student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

## VI. SPECIAL NOTES:

### 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 professor and/or the Special Needs office. Visit Room E1101 or call Extension 493 so that support services can be arranged for you.

### 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.

### 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.

### 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.

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

COURSE NOTE: All assignments must be completed. Failure to complete assignments will result in removal of 10% from the test associated with the assignment.

**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.