

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

<b>COURSE TITLE:</b>	AIRCRAFT STRUCTURES		
<b>CODE NO. :</b>	ASR103	<b>SEMESTER:</b>	1
<b>PROGRAM:</b>	AIRCRAFT STRUCTURAL REPAIR		
<b>AUTHOR:</b>	STEVE LACHOWSKY		
<b>DATE:</b>	June 2005	<b>PREVIOUS OUTLINE DATED:</b>	June 2004
<b>APPROVED:</b>	_____		_____
		<b>DEAN</b>	<b>DATE</b>
<b>TOTAL CREDITS:</b>	4		
<b>PREREQUISITE(S):</b>			
<b>HOURS: (Total)</b>	72		

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*For additional information, please contact Colin Kirkwood, Dean  
School of Technology, Skilled Trades, Natural Resources & Business  
(705) 759-2554, Ext.2688*

**I. COURSE DESCRIPTION:**

Through the use of textbooks, film and in-class presentations, students will become familiar with the components used to construct both fixed wing and rotary wing aircraft structures. Weight and balance procedures and calculations are studied. Aircraft hardware is presented and discussed with the use of film and assigned textbooks.

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

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

1. Describe aircraft structural components used in the construction of fixed wing and rotary wing aircraft.

Potential Elements of the Performance:

- describe the five stresses acting on an aircraft during flight
- discuss the purpose of an aircraft fuselage
- identify the most common aircraft fuselage designs and their construction
- describe in detail, the semi-monocoque fuselage design
- describe the purpose of all the construction members in a fuselage design
- identify the components used to construct an aircraft wing and their purpose in the construction of the wing
- describe the factors considered in designing an aircraft wing
- discuss wing spar types and construction
- describe “honeycomb” material use in aircraft structures and the advantages
- identify various aircraft nacelles and engine mounts
- describe various types of engine cowlings found on modern aircraft
- identify the structural parts of the tail section of an aircraft
- identify the structural parts of a modern helicopter
- describe the construction of aircraft doors

2. Discuss after repairs and modifications to aircraft structures, new weight and balance figures to derive the new centre of gravity of the aircraft.

Potential Elements of the Performance:

- discuss the reasons for re-weighing of aircraft
- describe the results of improper loading of aircraft
- describe the mandatory times aircraft must be re-weighed and the paperwork involved
- identify the sources from which weight and balance information can be obtained

Potential Elements of the Performance Continued.....

- describe terms used in aircraft weight and balance calculations such as The Datum Line, The Monument, The Arm, Tare Weight, etc.
  - discuss permanent and temporary ballast on aircraft
  - identify when objects have a positive or negative arm when performing calculations
  - describe the procedures used to calculate a weight and balance check given limited information on both conventional and tricycle type undercarriage
  - identify who obtains amended weight and balance information
  - describe where new weight and balance documentation is found in an A.M.O.
3. Identify aircraft hardware codes and part numbers associated with common aircraft bolts, washers and nuts. This section includes the use of aircraft parts manuals and helicoil installation procedures.

Potential Elements of the Performance:

- identify aircraft bolts by their respective head marks
- describe three types of material used to manufacture aircraft bolts
- discuss where specific types of aircraft bolts are used in specific areas of aircraft assembly
- identify both “JO-BOLTS” and Lock Bolts
- describe the various types of aircraft nuts and washers using both letter and number codes
- describe, given a number of aircraft hardware items, the part number associated with the item - i.e. AN9-C-H-17A
- describe how to install Heli Coils
- discuss how to obtain specific hardware using an aircraft parts catalogue and stores requisition form
- discuss the advantages of using JO-BOLTS instead of other aircraft hardware
- identify temperature restrictions on self-locking aircraft nuts
- describe when and where to use lock washers
- discuss the purpose of cotter pins

**III. TOPICS:**

1. Basic A/C Structures and Components
2. Weight & Balance Calculations
3. Aircraft Hardware

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

A/C 65-15A A&P Mechanics Airframe Handbook  
 A/C 65-9A A&P Mechanics General Handbook  
 Standard Aviation Maintenance Handbook  
 Teacher Handbooks  
 Aircraft Sheet Metal  
 Canadian Aviation Regulations (CAR's)

**V. EVALUATION PROCESS/GRADING SYSTEM:**

Three tests: Test#6 Aircraft Structures (50% of final grade)  
 Test#7 Aircraft Weight & Balance Control (25% of final grade)  
 Test#8 Aircraft Hardware (25% 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:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 – 89%	4.00
B	70 – 79%	3.00
C	60 - 69%	2.00
D	50 - 59%	1.00
F (Fail)	49% and below	0.00
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 instructor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 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.