

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: AIRCRAFT STRUCTURES

CODE NO: ASR103 SEMESTER: I

PROGRAM: AIRCRAFT STRUCTURAL REPAIR TECHNICIAN

AUTHOR: STEVE LACHOWSKY

DATE: FALL 1993 PREVIOUS OUTLINE DATED: FALL 1992

APPROVED: LP Cluzette
Dean, School of Engineering Tech.

94-02-02
Date

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TOTAL CREDIT HOURS: 60 Hours (4 credits)

PREREQUISITE(S):

I. PHILOSOPHY/GOALS:

Through the use of textbooks, film and in-class presentations, student 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. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will:

Describe aircraft structural components used in the construction of fuselages and wings. Discuss after repairs and modifications to aircraft structures, new weight and balance figures to derive the new centre of gravity of the aircraft. Identify aircraft hardware.

III. TOPICS TO BE COVERED:

1. Basic aircraft structures and components.
2. Weight and balance calculations.
3. Aircraft hardware.

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IV. LEARNING ACTIVITIES

1.0 Basic Aircraft Structures and Components

Upon successful completion of this unit the student will be able to:

- 1.1 Describe the five stresses acting on an aircraft during flight.
- 1.2 Discuss the purpose of an aircraft fuselage.
- 1.3 Identify the most common aircraft fuselage designs and their construction.
- 1.4 Describe in detail the semi-monocoque fuselage design.
- 1.5 Describe the purpose of all the construction members in a fuselage design.
- 1.6 Discuss the purpose of "data plates" found on aircraft component.
- 1.7 Identify the two types of wing design.
- 1.8 Identify the components used to construct an aircraft wing and their purpose in the construction of the wing.
- 1.9 Describe the factors considered in designing an aircraft wing.
- 1.10 Discuss wing spar types and construction.
- 1.11 Describe "honeycomb" material use in aircraft structures and the advantages.
- 1.12 Identify various aircraft nacelles and engine mounts.
- 1.13 Describe various types of engine cowlings found on modern aircraft.

REQUIRED RESOURCES

Textbook: AC 65-15A
Chapter I, pg. 1-17

Teacher hand outs.

Textbook: AC65-15A
Chapter I, pg. 14-16

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LEARNING ACTIVITIES

2.0 **Weight and Balance Calculations**

Upon successful completion of this unit the student will be able to:

- 2.1 Discuss the reasons for re-weighing of aircraft.
- 2.2 Describe the results of improper loading of aircraft.
- 2.3 Describe the mandatory times aircraft must be re-weighed and paperwork involved.
- 2.4 Identify the sources from which weight and balance information can be obtained.
- 2.5 Describe terms used in aircraft weight and balance calculations such as The Datum Line, The Moment, The Arm Tare weight, etc.
- 2.6 Discuss Permanent and Temporary ballast on aircraft.
- 2.7 Identify when objects have a positive or negative arm when performing calculations.
- 2.8 Describe the procedures used to calculate a weight and balance given limited information on both, convention and tricycle type undercarriage.
- 2.9 Identify who obtain amended weight and balance information.
- 2.10 Describe where new weight and balance documentation is found in an A.M.O.

REQUIRED RESOURCES

Textbook: A/C 65-9A
Chapter III, pg. 53-70 inclusive.

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LEARNING ACTIVITIES

3.0 Aircraft Hardware

Upon successful completion of this unit the student will be able to:

- 3.1 Identify aircraft bolts by their respective head marks.
- 3.1 Describe three types of material used to manufacture aircraft bolts.
- 3.2 Discuss where specific types of aircraft bolts are used in specific areas of aircraft assembly.
- 3.3 Identify both "JOBOLTS" and Lock Bolts.
- 3.4 Describe the various types of aircraft nuts and washers using both letter and number codes.
- 3.5 Describe, given a number of aircraft hardware items the part number associated with the item, i.e. AN9-C-H-17A.
- 3.6 Describe how to install Heli Coils.
- 3.7 Discuss how to obtain specific hardware using an aircraft parts catalogue, and stores requisition form.
- 3.8 Discuss the advantages of using J0-BOLTS instead of other aircraft hardware.
- 3.9 Identify temperature restrictions on self-locking aircraft nuts.
- 3.10 Describe when and where to use lock washers.
- 3.11 Discuss the purpose of cotter pins.

REQUIRED RESOURCES

Textbook: A/C 65-9A
Chapter IV, pg. 121-135.

Textbook: Standard Aviation
Maintenance Handbook
EA-282-0

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Chapter IV, pg. 121-135

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V. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.)

Written tests (3)

Aircraft Structures - 33 1/3%
Weight and Balance - 33 1/3%
Aircraft Hardware - 33 1/3%
TOTAL - 100%

The grading will be as follows:

A = 90 to 100%
B = 80 to 89%
C = 70 - 79%
I = Incomplete

VI. REQUIRED STUDENT RESOURCES

A & P Airframe and Powerplant Airframe Handbook - A/C65-15A
Standard Aviation Maintenance Handbook - EA-282-0

VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY:

Book Section (title, publisher, edition, date, library call number if applicable - see attached example)

Periodical Section (Magazines, Articles)

Canadian Aircraft Operator

Audiovisual Section (Films, Filmstrips, Transparencies)

AN Hardware
Aircraft Structures as per A/C 65-15A
Weight and Balance as per A/C 65-9A
AN Hardware as per A/C 65-9A

VIII. SPECIAL NOTES

Students with special needs (eg. physical limitation, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

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