

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**COURSE OUTLINE**

**COURSE TITLE:** MECHANICS OF FLIGHT

**CODE NO. :** ASR102 **SEMESTER:** 1

**PROGRAM:** AIRCRAFT STRUCTURAL REPAIR

**AUTHOR:** Larry Canduro

**DATE:** Sept. 2016 **PREVIOUS OUTLINE DATED:** Sept. 2015

**APPROVED:** Colin Kirkwood

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**TOTAL CREDITS:** 3 **DATE**

**PREREQUISITE(S):**

**HOURS: (Total)** 48

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**For additional information, please contact Colin Kirkwood, Vice President,**  
**Academic & Research**  
**(705) 759-2554, Ext. 2492**

**I. COURSE DESCRIPTION:**

This course deals with the various forces acting on an aircraft in flight. Presentations deal with airfoil design, flight control systems, aircraft axis and various terms associated with aircraft controllability and stability for fixed wing and rotary wing aircraft. Various aircraft control systems will be researched by the students.

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

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

1. Discuss and understand how an aircraft maintains flight, forces acting on A/C during flight. Various terms such as wing condition, center of pressure, angle of attack and aircraft stability and maneuverability.

**Potential Elements of the Performance:**

- describe how an aircraft produces lift using Bernoulli's Principle.
  - identify the four forces acting on an aircraft during flight
  - discuss terms such as relative wind, airfoil, wing camber, wing chord, center of pressure and angle of attack
  - describe the three axis of an aircraft and the terminology associated with the aircraft movements about the three axis
  - discuss aircraft stability and the various factors associated and affecting stability
  - describe lateral, longitudinal and vertical stability
  - describe profile and induced drag as they affect aircraft flight
  - discuss flight theory for rotary wing aircraft
2. Research and discuss various aircraft control systems as presented by both instructor and students groups. Rebalancing techniques of control surfaces will be presented.

**Potential Elements of the Performance:**

- identify primary and secondary control systems of a fixed wing aircraft and how they operate
- describe various systems and the components found in the system
- describe the flight control systems for helicopters
- research a complete flight control system using the supplied manufacturers training manuals and parts books
- identify which control system affects aircraft movement or pilot selection

Potential Elements of the Performance Continued...

- present personal assignment to the class pertaining to their system as assigned by the instructor
- discuss the purpose of spoilers, slats, slots and stall strips associated with wing components
- describe the purpose of rebalancing aircraft components after repair using the “static” balancing method

### III. TOPICS:

1. Theory of Flight
2. Flight Control Systems

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

FAA-H-8083-31 Aviation Maintenance Technician Handbook - Airframe  
FAA-H-8083-30 Aviation Maintenance Technician Handbook - General

### V. EVALUATION PROCESS/GRADING SYSTEM:

- (a) Two multiple choice tests – each accounts for 45 percent of the final grade.  
**Test #3** Mechanics of Flight  
**Test #5** Flight Control Systems
- (b) Student presentation for “Flight Control Systems” – accounts for 10 percent of the final grade.

#### Notes:

- 1/ **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.**
- 2/ **All assignments must be completed, and are recorded on file. Failure to complete assignments may be used as criteria toward X-GRADE policy for rewrites in respect of the final grade for ASR102.**

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.	

If a faculty member determines that a student is at risk of not being academically successful, the faculty member may confidentially provide that student's name to Student Services in an effort to help with the student's success. Students wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

**VI. SPECIAL NOTES:**Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

***It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.***

**1/** Course attendance is mandatory. If a student is absent, he/she must have a valid reason – documentation is required.

**2/** Students having missed more than 5 percent of the program through absences, shall not qualify for experience credit from Transport Canada, and will not be granted make-up or re-write options for theory tests and shop projects.

**3/** If a student misses a test, he/she must have a valid reason – documentation is required. In addition, the instructor must be notified prior to the test, or the student will receive a mark of zero, with no make-up option.

**4/** If a student is absent for all of the in-class theory or shop demonstrations for which a test/project is assigned, he/she will not be granted permission to complete the test/project.

**5/** Valid reasons for being absent:

- Illness – supported by doctor's note
- Family death or serious illness – supported by applicable documents

**CELL PHONES / LAPTOPS / ELECTRONIC DEVICES MUST NOT BE USED  
IN THE SHOP OR CLASSROOM**

**VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.