



ASYS 245 - Aircraft Systems I

Course Description:

Aircraft Systems I introduces basic aerodynamics as it pertains to fixed wing aircraft, beginning with the control, stability and performance of aircraft in flight. The learner will design and build a section of wing and test their work in a wind tunnel defining the effects of lift and drag. The principles of hydraulic fluid and the characteristics of aviation fuels required for aircraft operations are also explored, along with the basics of aircraft landing gear design and aircraft door and window systems.

3 credits

Time Guidelines:

The standard instructional time for this course is 90 hours.

Effective Term:

Fall 2016/2017

Accrediting Body/Professional Designation(s):

Cross-referenced to Transport Canada (TC) Curriculum and Topic Guides (CAR 566 Appendix C).

Course Assessment:

Quizzes	25%
Assignments	15%
Exam	60%
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Total:	100%

Aviation Programs Accreditation Compliance: The learner will be issued a "Statement of Aviation Programs Accreditation Compliance" if he/she achieved a mark of 70% or higher in all courses and met all attendance requirements.

Overall attendance for the program must be 95% or above to qualify for applicable experience credit as awarded by the Canadian Council for Aviation and Aerospace (CCAA) and Transport Canada (TC).

Learners should also refer to the School of Transportation Program Guideline - Aircraft Maintenance Engineers Technology for additional course attendance requirements.

SAIT Policies and Procedures:

For information on the SAIT Grading Scale, please visit policy AC 3.1.1 Grading Progression Procedure: [http://www.sait.ca/Documents/About SAIT/Policies and Procedures/Academic Student/pdf/AC.3.1.1 Grading and Progression Procedure.pdf](http://www.sait.ca/Documents/About%20SAIT/Policies%20and%20Procedures/Academic%20Student/pdf/AC.3.1.1%20Grading%20and%20Progression%20Procedure.pdf)

For information on SAIT Academic Policies, please visit: <http://www.sait.ca/about-sait/policies-and-procedures/academic-student.php>

Required Course Publication(s):

Jeppesen Sanderson Inc. (2011). *A & P Technician General Textbook*. Englewood, Colorado: Jeppesen Sanderson Inc. ISBN: 9780884875598

Optional Reference Publication(s):

Course Learning Outcome(s):

1. Locate aircraft maintenance information using the ATA Standard Numbering System. (TC: 1.5)

Objectives:

- 1.1 Identify the need for a standard numbering system.
- 1.2 Explain how the ATA Standard Numbering System is organized.
- 1.3 Review the ATA numbers used for different aircraft systems.

2. Examine the forces acting on an aircraft in flight. (TC: 6.1.1)

Objectives:

- 2.1 Describe atmospheric composition.
- 2.2 Explain air pressure, temperature and density.
- 2.3 Relate air pressure, temperature and density to changes in altitude.
- 2.4 Apply gas law formulas.
- 2.5 Describe a standard day.
- 2.6 Describe airfoils.
- 2.7 Explain factors that affect lift and drag.
- 2.8 Describe aspect ratio.
- 2.9 Explain basic wing and tail design.

3. Demonstrate the effects of lift and drag on an airfoil. (TC: 6.1.1)

Objectives:

- 3.1 Fabricate an airfoil.
- 3.2 Perform wind tunnel tests on an airfoil.
- 3.3 Compare airfoil performance results.
- 3.4 Prepare airfoil results reports.

4. Explain the control of an aircraft around its three rotational axes. (TC: 6.1.1; 6.1.2; 6.3.1)

Objectives:

- 4.1 Describe rotational axes.
- 4.2 Describe the movement of an aircraft around its rotational axes.
- 4.3 Define stability as it pertains to aircraft.
- 4.4 Describe factors affecting aircraft stability around rotational axes.

5. Examine the functions of various flight controls used on aircraft. (TC: 6.1.1; 6.1.2; 6.3.1)

Objectives:

- 5.1 Identify the major sections of an aircraft.
- 5.2 Identify aircraft primary, secondary and auxiliary flight control surfaces.
- 5.3 Describe the function of primary, secondary and auxiliary flight control surfaces.

5.4 Relate the movement of flight control surfaces to the aircraft attitude in-flight.

5.5 Describe lift augmentation systems.

6. Explain the performance characteristics of an aircraft during various phases of flight. (TC: 6.1.1)

Objectives:

6.1 Describe the various phases of flight.

6.2 Relate angle of attack to airfoil stall.

6.3 Define the speed of sound.

6.4 Define Mach number and critical Mach.

6.5 Describe subsonic, hypersonic and supersonic flight.

6.6 Discuss shock waves and sonic booms.

7. Explain the characteristics of hydraulic fluids and hydraulic systems. (TC: 4.2; 14.1; 14.2; 14.3; 14.4)

Objectives:

7.1 Discuss fluid dynamics.

7.2 Identify the physical properties of different types of aircraft hydraulic fluid.

7.3 Describe handling precautions of aircraft hydraulic fluids.

7.4 Identify compatibility issues of aircraft hydraulic fluids.

7.5 Describe the operation of a basic aircraft hydraulic system.

7.6 Describe the function of the major components typically used in a hydraulic system.

7.7 Calculate forces generated by aircraft hydraulic system components.

8. Explain the properties and applications of the various types of aviation fuels. (TC: 19.1; 19.2; 19.3)

Objectives:

8.1 Define fuel.

8.2 Associate the different types of aviation fuel with their applications.

8.3 Discuss refining and chemical composition of aviation fuel.

8.4 Describe handling precautions of aviation fuels.

8.5 Describe the operation of a basic fuel system.

8.6 Describe the function of the major components typically used in a fuel system.

8.7 Describe refuelling and defuelling procedures.

9. Compare different types of aircraft landing gear designs. (TC: 7.1; 17.2; 17.3; 22.3.13)

Objectives:

9.1 Discuss aircraft landing gear types and arrangements.

9.2 Relate aircraft landing gear designs to aerodynamic drag.

9.3 Discuss aircraft steering and shock absorption.

10. Explain the functions of various types of aircraft doors and door subsystems.

Objectives:

10.1 Discuss the various types of aircraft doors and door designs.

10.2 Describe the function of various aircraft doors.

10.3 Describe door functions in emergency situations.

10.4 Discuss door warning systems.

10.5 Discuss aircraft doors and door subsystems maintenance.

11. Relate operation, inspection and maintenance functions of aircraft windows. (TC: 10.1; 10.2; 10.3; 10.4)

Objectives:

11.1 Discuss the various types of aircraft windows.

11.2 Discuss the operation of aircraft windows.

11.3 Discuss the cleaning, inspection and approved repairs of aircraft windows.

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