COURSE OUTLINE: AVT364 - AERODYNAMICS

Prepared: Ryan London
Approved: Greg Farish, Dean, Aviation

Course Code: Title	AVT364: AERODYNAMICS
Program Number: Name	4061: AVIATION TECHNOLOGY
Department:	AVIATION TECHNOLOGY
Academic Year:	2024-2025
Course Description:	The course integrates scientific principles with a practical operational approach tailored for pilots. Topics include Newton`s basic equations of motion, the three forces (lift, drag, and weight) acting on a glider, and the four forces acting on a powered airplane. Given that aerodynamics encompasses both the motion of the object and the reaction of the air, the course will also cover the fundamental properties of gases and how these properties change throughout the atmosphere. Additionally, the course will address high-speed aerodynamics, including compressibility effects, shock waves, and the behaviour of airflow at transonic and supersonic speeds.
Total Credits:	3
Hours/Week:	3
Total Hours:	45
Prerequisites:	AVT375
Corequisites:	There are no co-requisites for this course.
This course is a pre-requisite for:	AVT370
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4061 - AVIATION TECHNOLOGY** VLO 1 Aviation Technology - Flight
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.

	EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 70%, B A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Evaluation Considerations: Students will be assessed by a combination of attendance and deportment, quizzes, tests, a final exam and a cumulative project. Weighting of each will be as follows: 30% for quizzes, 30% for all tests prior to the final exam, 30% for the final exam and 10% for the cumulative project. A minimum mark of 70% (B) is required to pass the course. Dates of tests will be announced at least 1 week in advance. Quizzes will be given without prior notice. Students may request a deferment of a test for compassionate reasons. Compassionate Grounds for deferment will include but not be limited to death of an immediate family member, personal illness, or recent diagnosis of a serious illness of a family member. Make-up evaluations will not be permitted without prior notice regardless of the circumstances. Attendance: Attendance is mandatory for courses which appear on the student`s formal Ground School Record required by Transport Canada. To be excused from class due to illness or other unforeseen circumstance, students must inform their instructor/professor prior to the start of class. A make-up class may be required. Unexcused absences will result in 2% deduction from the final mark for each occurrence. Arriving for class late will result in a 1% deduction from the final mark for each occurrence. Classroom Conduct: A classroom code of conduct can be found in the Sault College Student Code of Conduct policy, on the Sault College Website. This along with the list of Unacceptable Behaviours in the Sault College Aviation`s SOPs must be adhered to. Violations of the dress code will result in a Letter of Warning (LOW). Refer to the Sault College Aviation Standard Operating Procedures (SOPs) manual, Section 10, for dress code policies. Student Support and Students at Risk: Student support services are provided through Sault College`s Student Services department. All students are encouraged to use these services to enhance their learning experience. Services like peer tutoring provides support from Aviation students in years ahead, who have demonstrated success in the program. If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services to offer even more assistance with options for

success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
Understand the importance Newton`s Laws of Motion and how these laws apply to aircraft motion.	Students will be adept at explaining and applying these laws to aircraft motion, particularly in relation to the four primary forces acting on a powered aircraft: lift, drag, thrust, and weight. Through analysis and problem-solving exercises, students will learn to relate Newton`s Laws directly to these forces, discerning their interplay and impact on aircraft behavior in various flight scenarios.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
Examine the working parts of an aircraft and understand their place and part in the improvement and design of overall aircraft aerodynamics.	Upon completion of this course, students will possess a comprehensive understanding of the components comprising an aircraft and their respective roles in enhancing and shaping overall aircraft aerodynamics. Learning objectives include the ability to analyze and assess the function of each part within the context of aircraft design, performance, and aerodynamic efficiency. Students will gain insights into how individual components contribute to the optimization of aerodynamic performance, enabling them to critically evaluate aircraft designs and identify areas for improvement
Course Outcome 3	**Learning Objectives for Course Outcome 3**
Explore the atmospheric characteristics on Earth and comprehend its effect in the design and capabilities of aircraft.	Learning objectives encompass the ability to analyze and interpret the various atmospheric phenomena that impact flight, including temperature, pressure and humidity. Students will gain insights into how these atmospheric factors affect aircraft performance, range, fuel efficiency, and safety
Course Outcome 4	**Learning Objectives for Course Outcome 4**
Calculate mach number, examine the problems of transonic airflow and the design of supersonic aircraft.	Applying equations required for Mach number calculations and understanding the significance of Mach numbers in determining aircraft performance and aerodynamic behavior. Additionally, students will develop a comprehensive understanding of the complexities associated with transonic airflow, including shock waves, boundary layer effects, and compressibility issues.
Course Outcome 5	**Learning Objectives for Course Outcome 5**
Understand the concepts surrounding gliders and explore the three forces acting upon it.	Learning objectives include mastering the fundamental concepts of aerodynamics as they pertain to glider flight, including the generation of lift and the reduction of drag. Students will also develop the skills necessary to apply these principles to analyze and optimize glider performance in various flight conditions.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Cumulative Project	10%
Final Exam	30%

	Midterm Exam	30%
	Quizzes	30%
Date:	June 27, 2024	
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.	