

LOCALLY DEVELOPED COURSE OUTLINE

Aviation-Flight (2019)15-3

Aviation-Flight (2019)25-3

Aviation-Flight (2019)35-3

Submitted By:

Chinook's Edge School Division No. 73

Submitted On:

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Course Basic Information

<u>Outline Number</u>	<u>Hours</u>	<u>Start Date</u>	<u>End Date</u>	<u>Development Type</u>	<u>Proposal Type</u>	<u>Grades</u>
15-3	62.50	09/01/2019	08/31/2023	Acquired	Authorization	G10
25-3	62.50	09/01/2019	08/31/2023	Acquired	Authorization	G10
35-3	62.50	09/01/2019	08/31/2023	Acquired	Authorization	G10

Course Description

The Aviation - Flight 15, 25, 35 courses aim to expose students to the relevant skills, training, and knowledge in order to explore the world of airplane operation. The Aviation - Flight courses' focal points are:

- Transport Canada standards of pilot knowledge

- A practical element where students will operate an aircraft in a simulated environment such as a flight simulator or a computer outfitted with flight peripherals such as pedals, a flight yoke, and simulation software.

The Aviation - Flight courses will also expose students to the lifestyle and requirements of a career pilot, this will include mapping the post-secondary pathway to achieving that goal. The navigation portion of the course will require specialized navigation tools such as E6B flight computer or a similar tool, Canadian navigational charts, navigation rulers, and a Douglas protractor.

The Aviation - Flight courses seek to inspire and motivate students toward a career in aviation with a focus relevant to course materials to support educational goals by applying skills from Math, Physics, and Earth Sciences.

The Aviation - Flight courses will provide the opportunity to develop the skills necessary to succeed in aviation. Students will be prepared for future careers in the aviation field by developing a transitional plan to post-secondary programs that includes entrance requirements. Students may access Transport Canada exams and upon successful completion will have met the criteria for the “ground school” portion of pilot training.

Course Prerequisites

15: pre-requisite | none

25: pre-requisite | Aviation - Flight 15

35: pre-requisite | Aviation - Flight 25

Sequence Introduction (formerly: Philosophy)

Calgary and Edmonton are both major metropolitan centers and have become international transportation hubs with international airports. Additionally, there are many regional and municipal airports and hangars across the province that serve smaller cities, industry and hobby pilots. These airports provide a variety of employment opportunities in the aerospace sector, including aircraft operation.

The *Aviation - Flight* course (and aerospace education) is designed with the understanding that students should:

- Be exposed to the aircraft operations sector as a possible career path;
- Be trained in the theoretical background of aircraft operations and be exposed to Transport Canada standards to best prepare themselves for a potential career as a pilot;
- Experience an environment that is reflective of the on-the-ground reality of people working in the aircraft operations industry;
- Explore possible post-secondary options for further training and career development in this industry;
- Recognize and appreciate the enormous impact that aviation and space have on our lives;
- Research and be aware of vocational and career possibilities related to the aviation and space industry;
- Recognize and appreciate the potential of aviation and aerospace to serve humankind and to improve both our daily lives and our growing society.

The *Aviation - Flight* courses are based on expectations equivalent to Transport Canada and as such, students will work with real-world curricula from which they may identify an apply career and life skills through their learning. Students

will gain knowledge, understanding and skills through their experiences in this course. Aviation and will be required to think critically, conceptualize and apply the knowledge they gain.

Student Need (formerly: Rationale)

According to the Government of Alberta, “Alberta has a strong foothold in aerospace and defence. The industry contributes \$1.3 billion in revenue annually to the provincial economy, is home to 170 aerospace and aviation companies and employs over 6,000 highly skilled Albertans.” (2017) Pilots account for 2400 of those Albertan jobs and as of 2019 are in high demand (ALIS). The aim of this program is to provide students with an exploratory option in high school where they can prepare for the requirements of an aircraft operation career path.

Scope and Sequence (formerly: Learner Outcomes)

In the Aviation-Flight 15, 25 and 35 courses, students will be introduced to key concepts, processes and models to foster greater depth toward analyzing, assessing and demonstrating governing connections in aviation. In the study of Aviation-Flight, students will explore the appropriate skills and competencies necessary for simulated flight operation and the relative benefits associated with career opportunities. Students will develop an analytical and reflective approach toward growth and development, particularly in the context of aviation safety. Throughout the course sequence, students will enhance their communicative, active observational and documentation skills of various aviation procedures. The Aviation - Flight courses promote the development of engaged and critical thinkers by allowing students to strive for an authentic personal experience augmented by a unique continuum of learning opportunities that responds to individual student needs.

Outcomes for Guiding Questions, 1-4 are drawn from the Transport Canada documentation for pilot training and are based on the progression of studying the standards and requirements to obtain a private pilot's licence at the 15-level, a commercial pilot's licence at the 25-level and an Instrument flying certification at the 35-level.

Guiding Questions (formerly: General Outcomes)

- 1 What are the laws and procedures governing aviation?**
- 2 How do concepts of navigation and radio aids influence operation of an aeroplane?**
- 3 How does meteorology affect the operation of an aeroplane in flight?**
- 4 How does General Aeronautical Knowledge inform the practice of operating an aircraft?**
- 5 What are the skills and procedures required for the safe operation of an aeroplane in simulated flight?**
- 6 What are post-secondary and career opportunities in aviation?**

Learning Outcomes (formerly: Specific Outcomes)

1 What are the laws and procedures governing aviation?	15-3 25-3 35-3
1.1 List general provisions and requirements for a private pilot's licence including record keeping and documentation practices	X
1.2 Recognize identification and registration standards for aircraft	X
1.3 Identify and list aerodrome and airport standards including Markers and markings; Wind direction indicators; Lighting; Prohibitions; Fire prevention	X
1.4 Identify requirements for personnel licensing and training for a private pilot's license including medical requirements	X
1.5 Recognize general operation and flight rules including: Airspace structure, classification and use; General aircraft operating procedures; Emergency requirements; Flight preparation, plans and itineraries; Pre-flight fuel requirements; Operation at or in the vicinity of an aerodrome; Visual flight rules; Radio communications; Emergency communications and security; General aircraft documentation; Aircraft equipment requirements; Aircraft maintenance requirements; Keeping technical records	X
1.6 Define Transportation Safety Board of Canada reporting protocols	X
1.7 Demonstrate air traffic services and procedures.	X
1.8 Define commercial aircraft operational and emergency equipment requirements including Requirements for power driven aircraft; Survival equipment for flights over land and water including life preservers and flotation devices	X

<p>1.9 Define the differences in regulations between a private and commercial pilot in General provisions required to document and operate a commercial aircraft; Defining the laws regarding registration and identification of commercial aircraft; Identifying requirements regarding licensing and training including requirements for a commercial pilot's license and differences between that and a private pilot's licence; Describing the difference in airspace classification and the differences in regulations for operating in that airspace; Identifying commercial pilot regulations around crew fitness, icing regulations, and procedures and regulations for cruising altitudes; Defining commercial aircraft operational and emergency equipment requirements including requirements for power driven aircraft and survival equipment for flights over land and water including life preservers and flotation devices; Requirements for filing a flight itinerary and arrival plan for a commercial aircraft; Regulations for operating a commercial aircraft in the vicinity of an aerodrome; Being able to describe Visual Flight Rules; ADIZ emergency communications</p>	<p>X</p>
<p>1.10 Describe and define special flight operations including Special aviation events; Parachuting; Private operator passenger operation; Aircraft requirements for commercial operation</p>	<p>X</p>
<p>1.11 Describe and define commercial air service regulations including Flight time limits and rest periods; Aerial work operations; Air taxi operations; Aircraft maintenance requirements</p>	<p>X</p>
<p>1.12 Define requirements for the Instrument Rating - Aeroplane IFR including licensing and training requirements</p>	<p>X</p>
<p>1.13 Describe and define general operating and flight rules for Instrument Rating - Aeroplane IFR including Airspace structures, classification and use; Operating and flight rules; Operational and emergency equipment regulations; Flight preparation, plans and itineraries; Operation in the vicinity of an aerodrome; Instrument flight rules; Radio communications; Aircraft requirements; Air traffic services; Canadian airspace; Route and flight planning; Departure procedures; En route procedures; Holding procedures; Approach procedures; Canadian air pilot definitions; Emergencies</p>	<p>X</p>

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2 How do concepts of navigation and radio aids influence operation of an aeroplane?	15-3 25-3 35-3
2.1 Define aviation specific vocabulary including Meridian; Prime Meridian; Longitude; Equator; Latitude; Rhumb Line/Great Circle; Variation; Isogonal; Agonic Line; Deviation; Track; Heading, Airspeed; Ground Speed; Air Position; Ground Position; Bearing; Wind Velocity; Drift	X
2.2 Interpret and use aviation maps and charts including Characteristics of projections; VTA; VNC; Topographical symbols; Elevation and contours; Aeronautical information; Scale and units of measurement; Locating position by latitude and longitude	X
2.3 Demonstrate how to use time and longitude including The 24-hour system; Time zones; Conversion of UTS to local and vice versa	X
2.4 Demonstrate pilot navigation techniques including Use of aeronautical charts; Measurement of track and distance; Map reading; Setting heading-visual angle of departure; Check points and pin-points; Ground speed checks and ETA revisions; Track made good; Determined drift by 10-degree lines; 1 in 60 rule; Visual alteration method of correcting to track; Diversion to alternate; Return to departure point; Low level navigation; Deduced reckoning; In-flight log and mental calculations; Procedures when lost; Air and ground position; Variation/deviation; True track/magnetic track; True/magnetic compass headings; Indicated/calibrated airspeed; True airspeed/groundspeed; Compass errors; Radio communications	X
2.5 Demonstrate the use of navigation computers to determine Heading and true airspeed; True track and ground speed; Magnetic heading and magnetic track	X
2.6 Demonstrate pre-flight preparation techniques including Factors affecting choice of route; Map preparation; Meteorological information; Selection of checkpoints; Flight log forms; Documents to be carried in aircraft	X
2.7 Demonstrate correct use of an aircraft radio	X
2.8 Demonstrate the basic use of VHF Omnidirection range VOR	X
2.9 Demonstrate the basic use of an automatic direction finder ADF	X

2.10 Demonstrate the use of global navigation satellite system GNSS/GPS	X
2.11 Demonstrate the use of other radio aids including Transponders; Emergency Locator Transmitter ELT; VHF Direction Finding DF assistance; Airport Surveillance Radar ASR	X
2.12 Interpret and use navigation maps and charts including Navigation aids; En route low altitude charts	X
2.13 Demonstrate how to use time and longitude including Morning and evening twilight charts	X
2.14 Demonstrate pilot navigation techniques including: Use of position lines to obtain a fix; Double track error method to regain track; Sum of opening and closing angles to destination	X
2.15 Demonstrate the use of navigation computers to determine Applying the wind; Pressure/density of true altitudes; Indicated/calibrated /true airspeed; Time/ground speed/distance; Fuel consumption and conversions; Climbs/descents	X
2.16 Demonstrate pre-flight preparation techniques including: NOTAM; Fuel requirements; Weight and balance; Use of Canada flight supplement; Flight plans/itineraries; Aircraft serviceability	X
2.17 Identify the operational limitations of aircraft radios	X
2.18 Demonstrate advanced understanding of VHF Omnidirection range VOR including: Serviceability check; Interpretation/orientation/homing; Intercepting predetermined radials and tracking; Position lines and fixes	X
2.19 Demonstrate advanced understanding of an automatic direction finder ADF including Serviceability check; Intercepting predetermined tracks and tracking; Position lines and fixes; Relative bearings/conversion to magnetic/true bearings	X
2.20 Demonstrate the use of other radio aids including Distance measuring equipment	X
2.21 Demonstrate understanding of advanced instrumentation, navigation and radio aids as they pertain to IFR flying including Pitot static system; Pitot static instruments; Gyroscopic systems and instruments; Magnetic compass; VOR; ADF; ILS; GNSS; Transponder; Other systems	X

2.22 Describe and define advanced topics in human factors and airmanship as they pertain to IFR flying including Aviation physiology; Aviation psychology; Pilot-equipment/material relationship; Controlled flight into terrain; Threat and error management	X
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3 How does meteorology affect the operation of an aeroplane in flight?	15-3 25-3 35-3
3.1 Describe the following meteorological concepts as they pertain to flying: The earth's atmosphere; Atmospheric pressure; Meteorological aspects of altimetry; Temperature; Moisture; Stability and instability; Clouds; Surface based layers; Turbulence; Wind; Air masses; Fronts; Aircraft icing; Thunderstorms; Hurricanes and tornadoes	X
3.2 Describe meteorological services available to pilots	X
3.3 Describe and use aviation weather reports and aviation forecasts	X
3.4 Describe and use weather maps and prognostic charts	X
3.5 Identify considerations when flying from high to low pressure and temperature areas and vice versa	X
3.6 Define Saturated/dry adiabatic lapse rate; Cloud associated precipitation and turbulence; Fog formation in surface-based layers; Orographic turbulence; Wind shear including types/causes; Wind veer/back; Air mass formation/classification; Front cross sections, cold fronts, warm fronts, TROWAL and upper fronts; Thunderstorm hazards including updrafts, downdrafts, gust fronts/downbursts/microbursts/hail/lightning	X
3.7 Decode aviation weather reports, forecasts, weather maps, and prognostic charts	X
3.8 Define and describe Characteristics of stable/unstable air; Lifting processes; Subsidence/convergence	X
3.9 Define how meteorological phenomena affect IFR flying including Fundamentals of weather; Icing; Turbulence; Thunderstorms	X

3.10 Demonstrate correct reading of Aviation weather reports; Aviation forecasts; Weather maps and prognostic charts; Weather interpretation	X
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4 How does General Aeronautical Knowledge inform the practice of operating an aircraft?	15-3 25-3 35-3
4.1 Describe airframes, engines, and systems including Airframes; Landing gear, flaps and brakes; Engines; Carburation; Fuel Injection; Electrical systems; Lubricating systems and oils; Fuel systems and fuel; Other aircraft systems including oxygen and vacuum	X
4.2 Demonstrate an understanding of the theory of flight including Principles of flight; Forces acting on an airplane; Aerofoils; Propellers; Design of the Wing; Stability; Flight Controls	X
4.3 Demonstrate an understanding of Flight Instruments including Pilot static system; Airspeed indicator; Vertical speed indicator; Altimeter/Encoding altimeter; Magnetic compass; Gyroscope; Heading indicator; Attitude indicator; Turn and bank indicator/turn co-ordinator; Basic instrument flying	X
4.4 Define flight operations principles including General flight operation; Use of performance charts; Aircraft performance; Weight and balance; Wake turbulence; Search and rescue; Aircraft critical surface contamination	X
4.5 Describe human factors that may influence flying including Aviation physiology; The pilot and operating environment; Aviation psychology; Pilot-equipment/material relationship; Interpersonal relations	X
4.6 Describe Turbo charging engines; Effects of density altitude/humidity on engines; Carburetor icing and use of carb heat; Fuel - Types, colour, fuel handling when fueling aircraft, ground/bonding	X
4.7 Describe Relationship of lift and drag to angle of attack; Centre of Pressure of C of P; Centrifugal/centripetal forces; Relative airflow and angle of attack on airfoils; Fixed/Variable pitch propellers; Relationship of load factor to stalling speed	X

4.8 Describe Airspeed indicator errors/malfunctions; Vertical speed indicator errors/malfunctions; Altimeter/encoding altimeter errors/malfunctions; Heading indicator errors/malfunctions; Attitude indicator errors/malfunctions; Turn and bank indicator/turn coordinator errors/malfunctions	X
4.9 Describe Effects of wind and wind shear; Effects of density altitude/humidity; Effects of change of weight or centre of gravity on performance; Use of performance charts including - Take off charts, cross wind charts; Cruise charts; Fuel burn charts, landing charts, CFRI performance tables and charts; Weight and balance concepts including - Locating CG, CG limits, load adjustment, cargo tie-down/passenger loading; ELT (exclude categories); Effects of aircraft critical surface contamination on performance, clean aircraft concept, and pre-takeoff inspection	X
4.10 Describe Hypoxia/hyperventilation; Effects of medications and substance abuse on a pilot; Toxic hazards including carbon monoxide	X

5 What are the skills and procedures required for the safe operation of an aeroplane in simulated flight?	15-3 25-3 35-3
5.1 Apply effective decision making that anticipates problems in advance, make appropriate inquiries and prioritizes tasks	X X X
5.2 Apply situational awareness to actively monitor and detect changes to weather conditions, aircraft systems, instruments and ATC communications	X X X
5.3 Apply effective workload management for eliminating distractions, organizing cockpit resources and recognizing signs of overload in self	X X X
5.4 Operation of Aircraft Systems: Demonstrate practical knowledge of General Aeronautical Knowledge while operating an aircraft in simulated flight	X X
5.5 Taxiing: Demonstrate safe manoeuvring of the aircraft, avoid unnecessary interference with other aircraft and position the aircraft appropriately for wind conditions	X
5.6 Demonstrate safe takeoff and landing procedures in a simple circuit	X

5.7 Forced Landing: Demonstrate safe approach and landing in the event of engine failure	X
5.8 Spiral: Demonstrate recognition of a spiral dive and execute a safe recovery to straight and level flight	X
5.9 Short Field Takeoff: Demonstrate safe takeoff from a short field and clear an obstacle	X
5.10 Precautionary Landing: Demonstrate safe evaluation and landing at an unfamiliar aerodrome or landing	X
5.11 Diversion to an Alternate: Demonstrate a diversion to a suitable alternate destination using mental in-flight planning, dead reckoning, map reading and pilotage	X
5.12 Instrument Flying: Demonstrate safe control of the aeroplane solely by reference to available flight instruments	X
5.13 Demonstrate a variety of flight maneuvers without visual feedback (Instrument flying) techniques including Safe takeoff and landing; Forced landing; Spiral; Short field takeoff; Precautionary landing	X

6 What are post-secondary and career opportunities in aviation?	15-3 25-3 35-3
6.1 Make Connect personal interests, values, resources, prior learning and experiences to future career and post-secondary choices Complete/update a personal inventory; Create a connection between personal inventory and occupational choices	X
6.2 Identify possible life roles related to the skills and content of this course Recognize and then analyze the opportunities and barriers in the immediate environment; Identify potential resources to minimize barriers and maximize opportunities	X
6.3 Create a transitional strategy to accommodate personal changes and build personal values Identify short-term and long-term goals; Identify steps to achieve goals	X

Facilities or Equipment

Facility

No required facilities

Facilities:

Equipment

This course requires access to a simulated flight environment such as a flight simulator or a computer outfitted with flight peripherals such as pedals, a flight yoke, and simulation software.

The navigation portion of the course will require specialized navigation tools such as E6B flight computer or a similar tool, Canadian navigational charts, navigation rulers and a Douglas protractor

This course requires access to a simulated flight environment such as a flight simulator or a computer outfitted with flight peripherals such as pedals, a flight yoke, and simulation software.

The navigation portion of the course will require specialized navigation tools such as E6B flight computer or a similar tool, Canadian navigational charts, navigation rulers and a Douglas protractor

Learning and Teaching Resources

No required resources

Sensitive or Controversial Content

No sensitive or controversial content.

Issue Management Strategy

Health and Safety

No directly related health and safety risks.

Risk Management Strategy

Statement of Overlap with Existing Programs

Provincial Courses with Overlap and/or Similarity

-none

Locally Developed Courses with Overlap and/or Similarity

-none

Student Assessment

Assessment practices in this course follow board policies. This course has no unique assessment requirements.

Course Approval Implementation and Evaluation

