

LOCALLY DEVELOPED COURSE OUTLINE

# Aviation 35-3

Submitted By:  
Chinook's Edge School Division No. 73

Submitted On:  
Jan. 27, 2015

# **Board Motion**

Motion Conclusion

Motion Date

Motion Number

Motions

## Course Basic Information

<b>Course Name</b>	Aviation 35
<b>Credit Number</b>	3
<b>Hours of Instruction</b>	75.00 hrs
<b>Implementation Dates</b>	9/1/2015 - 8/31/2019
<b>Proposal Type</b>	Authorization
<b>Development Type</b>	Developed
<b>Designed Grade Level</b>	Grade 10 Grade 11 Grade 12
<b>Acknowledgment</b>	This is a dual credit course developed in partnership with Skywings Aviation and Red Deer College

<p><b>Course Description</b></p>	<p>Aviation 35 has been designed to be used as part of a dual credit partnership with Skywings Aviation, Red Deer College and Chinook's Edge School division.</p> <p>The goals of Aviation 35 are:</p> <ul style="list-style-type: none"> <li>· To inspire and motivate students toward a career in aviation.</li> <li>· To give focus to relevant course material to reach educational goals (i.e. apply skills from Math, Physics, and Earth Sciences).</li> <li>· To provide the opportunity to develop the skills necessary to succeed in aviation. Students will be better prepared to enter the aviation field and post-secondary programs by developing a transition plan that includes all entrance requirements, and prepare students for further careers in the aviation field. Students who successfully complete the Transport Canada exams will have met the criteria for the 'ground school' portion of pilot training.</li> </ul>
<p><b>Course Prerequisite</b></p>	

# Philosophy

Aerospace education is based on the belief that everyone - our students and the public at large - should:

- Understand and appreciate the enormous impact that aviation and space have on our lives;
- Understand and be aware of the many vocational and career possibilities related to the aviation and space industry; and,
- Understand and appreciate the potential of aviation and space to serve mankind and to improve our daily lives and our growing society. **Inspiring Education:**

Aviation 35 is based on expectations equivalent to Transport Canada. 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 experience at Skywings Aviation and will be required to think critically, conceptualize and apply the knowledge they gain.

# Rationale

Aviation is part of a dual credit program in partnership with Skywings Aviation, Red Deer College and Chinook's Edge School division.

The goals of Aviation 35 are:

- To inspire and motivate students toward a career in aviation;
- To give focus to relevant course material to reach educational goals (i.e. apply skills from Math, Physics, and Earth Sciences);
- To provide the opportunity to develop the skills necessary to succeed in aviation. Students will be better prepared to enter the aviation field and post-secondary programs by developing a transition plan that includes all entrance requirements, and prepare students for further careers in the aviation field. Students who successfully complete the Transport Canada exams will have met the criteria for the 'ground school' portion of pilot training.

# Learner Outcomes

Aviation 35 is a dual credit course in partnership with Skywings Aviation, Red Deer College and Chinook's Edge School Division. This specific outcomes have been aligned with Transport Canada's courses which will prepare students for their Radio Operator's License and Transport Canada's Private Pilot Written Examination (ground school).

The specific outcomes within Aviation 35 are organized into five overarching themes from which students will acquire basic knowledge and apply their learning in real life contexts. The five themes include:

1. Air Law and Procedures
2. Aeronautics
3. Navigation and Communication
4. Meteorology
5. Air Law and Procedures

# **General Outcomes**

- 1 Students will understand and appreciate the laws and procedures governing aviation.**
- 2 Students will understand and apply the technical principles of Aeronautics as well as the human factors on aviation.**
- 3 Students will understand and apply the principles of Navigation & Communication.**
- 4 Students will understand and apply Meteorological principles to real life Aviation situations.**



## Specific Learner Outcomes

<b>1 Students will understand and appreciate the laws and procedures governing aviation.</b>	35-3
1.1 Students will identify markers and markings at an aerodrome.	X
1.2 Students will list requirements for a private pilot license.	X
1.3 Students will compare and contrast the different types of airspace.	X
1.4 Students will identify, understand and appreciate the General Operating and Flight Rules. (starting and ground running of aircraft engines; aircraft icing; right-of-way; cruising altitudes and cruising flight levels).	X
1.5 Students will list emergency and operational requirements for power-driven aircraft.	X
1.6 Students will demonstrate the ability to plan and change a flight plan.	X
1.7 Students will understand the pre-flight fuel requirements.	X
1.8 Students will investigate operations at or in the vicinity of an aerodrome. (VFR and IFR aircraft operations at uncontrolled aerodromes; Frequency (MF) Area; general MF reporting requirements; MF reporting procedures before entering maneuvering area; MF reporting procedures on departure; MF reporting procedures on arrival; MF reporting procedures when flying continuous circuits; reporting procedures when flying through an MF area).	X
1.9 Students will identify and appreciate the privileges and limitations for visual flight rules. ( minimum visual meteorological conditions for VFR flight in controlled airspace; minimum visual meteorological conditions for VFR flight in uncontrolled airspace; VFR over-the-top; special VFR flight).	X
1.10 Students will demonstrate procedures for a two-way radio communication failure in VFR flight.	X
1.11 Students will understand and appreciate Aircraft Equipment Requirements for power-driven aircraft (day VFR, safety belts and restraints system)	X

<p>1.12 Students will understand and appreciate Air Traffic Services and Procedures.( air traffic and advisory services; flight service stations / flight information centers; demonstrate proper communications procedures; employ clock position system in terms of radar service and communication; demonstrate operations in: controlled airport / aerodrome; uncontrolled airport / aerodrome; uncontrolled airports / aerodromes with VFR / IFR traffic mix; describe operations on intersecting runways, including LAHSO).</p>	<p>X</p>
<p>1.13 Students will identify and deduce wind direction from a wind direction indicator.</p>	<p>X</p>
<p>1.14 Students will understand the privileges of a private pilot license.</p>	<p>X</p>
<p>1.15 Students will understand and apply General Operating and Flight Rules. (air law to over-flight of built up areas; air law to take-offs, approaches, and landings within built-up areas of cities and towns; minimum altitudes and distances; demonstrate collision avoidance; list prohibited areas and flight conditions for aerobatic maneuvers; air traffic control instructions and clearances; altimeter setting and operating procedures in the altimeter-setting region; altimeter setting and operating procedures in the standard pressure region).</p>	<p>X</p>
<p>1.16 Students will understand Operational and Emergency Equipment Requirements ( need for life preservers and personal floatation devices; circumstances to carry life rafts and water survival equipment).</p>	<p>X</p>
<p>1.17 Students will identify the requirements in filing an arrival report.</p>	<p>X</p>
<p>1.18 Students will recognize the procedures for oxygen use; transponder and automatic pressure altitude reporting equipment; ELT activation and understand the procedure for reporting an aviation occurrence; protection of the occurrence site.</p>	<p>X</p>
<p>1.19 Students will understand and demonstrate operations in Air Traffic Services and Procedures. ( need for wake turbulence separation; demonstrate operations in: controlled airport / aerodrome; uncontrolled airport / aerodrome; uncontrolled airports / aerodromes with VFR / IFR mix; define Mandatory Frequency (MF); describe operations on intersecting runways, including LAHSO; demonstrate procedures for the prevention of runway incursion).</p>	<p>X</p>

<p><b>2 Students will understand and apply the technical principles of Aeronautics as well as the human factors on aviation.</b></p>	<p>35-3</p>
<p>2.1 Students will understand and appreciate General Flight Operations (role of general aviation; differentiate between general, commercial, and military aviation; relate runway numbering to runway direction; predict wheel-barrowing; predict hydro-planing; discuss taxiing; describe the effects of wind / wind shear; describe side-slips; interpolate from performance charts: take-off charts, cross-wind charts, cruise charts, landing charts; identify effects of aircraft critical surface contamination; discuss aircraft performance related to: effects of density altitude and humidity, ground effect, effects of change of weight or centre of gravity (C of G); define best angle of climb (<math>V_x</math>); define best rate of climb (<math>V_y</math>); define maneuvering speed (<math>V_a</math>); identify slow flight; recognize and predict stalls; differentiate between indicated and true stalling speed; effect of altitude on stall speed; spins; spirals).</p>	<p>X</p>
<p>2.2 Students will calculate weight and balance; identify centre of gravity; interpolate C of G limits; contrast normal and utility category.</p>	<p>X</p>
<p>2.3 Students will demonstrate an apply their understanding of Wake Turbulence in real life situations (causes and effects of wake turbulence; predict wake turbulence; outline procedures for avoidance of wake turbulence).</p>	<p>X</p>
<p>2.4 Students will understand and appreciate Search and Rescue (SAR) practices.</p>	<p>X</p>
<p>2.5 Students will understand and appreciate Aircraft Critical Surface Contamination ( clean aircraft concept; frozen contaminants; cold soaking phenomenon; perform pre-takeoff inspection).</p>	<p>X</p>
<p>2.6 Students will understand the General Theory of Flight ( aircraft structure; explain how airplanes fly; list the forces acting on an airplane; explain the purpose of the flight controls of an aircraft; explain rotary wing aircraft controls; explain lift; explain drag; identify induced and parasite types; graph and discuss the relationship of lift and drag to angle of attack; list the forces acting on an aircraft during maneuvers).</p>	<p>X</p>

2.7 Students will discuss relative airflow and angle of attack on aerofoils.	X
2.8 Students will be able to explain the effect of flaps.	X
2.9 Students will be able to identify the relationship of load factor to stalling speed and the impact of structural limitations.	X
2.10 Students will understand the concept of Stability (longitudinal, lateral, and directional ).	X
2.11 Students will apply various measurement systems (Imperial, Metric, Nautical) to Airframes, Engines, and Systems.	X
2.12 Students will understand dual ignition and provide examples of ancillary controls.	X
2.13 Students will understand and appreciate the concept of Carburation (optimum fuel-air mixture; mixture controls; carburetor icing; use of carb heat and its effects on mixture).	X
2.14 Students will understand and appreciate the types and purposes of Lubricating Systems and Oils.	X
2.15 Students will understand and appreciate Fuel System and Fuels (contamination and deterioration; causes and effects of detonation; proper fuel handling procedures).	X
2.16 Students will be able to outline pitot and static system.	X
2.17 Students will provide examples of airspeed indicator errors and identify markings on airspeed indicator.	X
2.18 Students will discuss magnetic dip, turning and acceleration errors and be able to read a compass.	X
2.19 Students will be able to explain the principles of operation of the Heading Indicator and provide examples of errors.	X
2.20 Students will be able to explain the principles of the Altitude Indicator and provide examples of errors.	X
2.21 Students will be able to explain the principles of the Turn and Bank Indicator / Turn Coordinator and compare traditional instruments to electronic instrument displays (CRT).	X
2.22 Students will be able to explain the principles of Human Factors / Aviation Physiology ( hypoxia / hyperventilation, orientation / disorientation (including visual / vestibular illusions), and hearing; vision / visual scanning techniques).	X

2.23 Students will understand and appreciate The Pilot and the Operating Environment ( medications (prescribed and over-the-counter); identify toxic hazards (including carbon monoxide)).	X
2.24 Students will understand and appreciate Aviation Psychology -( identify factors that influence decision-making; maintain situational awareness; give examples of stress; generate ways of managing risk).	X
2.25 Students will describe employment opportunities related to aviation.	

<b>3 Students will understand and apply the principles of Navigation &amp; Communication.</b>	<b>35-3</b>
3.1 Students will understand and apply proper aircraft communication procedures - (understand and use the phonetic alphabet, engage in proper aircraft communication procedures).	X
3.2 Students will interpolate aviation maps in terms of: topographical symbols, elevation and contours (relief), aeronautical information, scale, units of measurement, and locating position by latitude and longitude.	X
3.3 Students will Pilot Navigation - measure track and distance; conduct ground speed checks and ETA revisions; distinguish between variation / deviation; contrast true track / magnetic track; explain diversion to alternate; calculate return to departure point (reciprocal track); explain procedures when lost.	X
3.4 Students will be able to calculate: heading and true airspeed applying the wind; true track and ground speed magnetic heading and magnetic track pressure / density; true altitudes indicated / calibrated; true airspeed time / ground speed; distance fuel consumption; conversions.	X
3.5 Students will recognize and demonstrate Pre-flight Preparation -(recognize factors affecting choice of route; interpret NOTAM; calculate fuel requirements; weight and balance; show use of Canada Flight Supplement).	X
3.6 Students will be able to describe orientation and homing.	X
3.7 Students will understand and appreciate Radio and Radar Aids and their Basic Principles and Use (operate a transponder; describe an emergency locator transmitter (ELT); summarize VHF direction finding).	X

<b>4 Students will understand and apply Meteorological principles to real life Aviation situations.</b>	<b>35-3</b>
4.1 Students will identify and understand the concept of Atmospheric Pressure.	X
4.2 Students will understand and apply Meteorological Aspects of Altimetry. (calculate: pressure altitude, density altitude; interpolate altimeter settings; identify considerations when flying from high to low pressure and temperature areas, and vice versa).	X
4.3 Students will understand and appreciate the influence of Temperature on Aviation. ( investigate heating / cooling of the atmosphere: convection, advection, radiation; graph temperature variations with altitude; recognize and define inversions).	X
4.4 Students will be able to define relative humidity and dewpoint.	X
4.5 Students will recognize characteristics of stable / unstable air and compare lifting processes.	X
4.6 Students will be able to identify cloud types and relate associated precipitation and turbulence.	X
4.7 Students will understand and appreciate the effects of turbulence.	X
4.8 Students will understand and appreciate the effect of wind on flight. (interpolate pressure gradient low level winds and variation in surface wind and distinguish between veering and backing; explain topographical effects of wind; identify causes and types of wind shear).	X
4.9 Students will recognize the types of Fronts and their impact on flight.	X
4.10 Students will be able to recognize and compare types of Frontal Weather.	X
4.11 Students will understand the science behind Thunderstorms and recognize the associated hazards. (requirements for development; updrafts, downdrafts, gust fronts, downbursts, microbursts, hail, and lightning).	X
4.12 Students will understand the types of Surface-based layers ( examples of fog formations; identify fog types (including mist)).	X

4.13 Students will be able to understand and decode Aviation Weather Reports (METAR).	X
4.14 Students will be able to understand and decode Aviation Forecasts (recall times issued and period of coverage; decode graphical area forecasts (GFA), terminal area forecasts (TAF), upper winds, temperature forecasts (FD), significant in-flight weather warnings and messages (SIGMET)).	X

## Facilities or Equipment

### Facility

A standard classroom is a suitable place to conduct this course.

**Note:** Beyond the requirement of the *School Act* for a Certified Teacher, the teacher of this course should be highly knowledgeable in this area. Due to the licensing component, the teacher should also have skill and background experience in the area including ongoing professional development related to the course.

92(1) Unless otherwise authorized under this Act, a board shall employ as a teacher only an individual who holds a certificate of qualification as a teacher issued under this Act. (*School Act*, Chapter S-3).

Aviation 35 has a specific requirement for teacher knowledge, experience and professional development due to the certification of successful students. Students may be writing Transport Canada examinations, and the teacher of the course must have the necessary credentials to permit examination following instruction. (Qualifications are determined by Transport Canada, but for information - Private Pilot Instructor Rating is the expected level.)

### Equipment

There is no special equipment that is recommended or required in order for a student to successfully achieve the outcomes in this course.

# Learning Resources

## Resource List

- *Transport Canada* - Study & Performance Guide
- *Thrill of Flight* (Grade 6)

## Others

### **Identification of Controversial or Sensitive Course Content**

There are no such issues.

### **Identification of Safety Components**

This is a classroom-based course with no special safety components.

### **Significant Overlap with Provincial Curriculum**

There is no significant overlap with provincial curricula.



# Assessment

## Aviation Topics

### Weighting for Student Assessment

- Air Law & Procedures **35%**
- Aeronautics **35%**
- Navigation & Communication **10%**
- Meteorology **10%**
- Unspecified **10%** (to be used to increase any of the above areas) Will prepare students for Radio Operator's License.

The following provide some examples of assessments and possible topics:

### **Research Project**

- History and Progression of Canadian Aircraft
- Famous Canadian Aviators
- Cloud Types
- Engine Types
- Instruments **Debate**

Role of Edmonton's Airports

### **Lab Activities (and Reports)**

- Principles of Flight
- Vertigo
- Weight and Balance **Simulations**

Flight Test Exercises (Transport Canada)

### **Case Studies**

General Operating and Flight Rules

### **Presentations**

Map Types

## **Course Evaluation and Monitoring**

The schools' department head and curriculum coordinator will ensure that the course objectives are being met. The teachers within the department will use self-evaluation to ensure that they are meeting the guidelines under which the course was created. This course, as well as other courses, is subject to monitoring from Central Services according to current Board policy.

## **Appendix I**

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