

Sault College  
of Applied Arts and Technology  
sault ste. marie

Course Outline

NAVIGATION  
AVT 110-6

NAVIGATION

AVT 110-6

TEXT:

|  |   |
|--|---|
| From the Ground Up                               | A.F. MacDonald                                      |
| Aeronautical Information Publication             | M.O.T.  |
| Flying Training Manual                           | M.O.T.  |
| Notams and Information Circulars                 | M.O.T.  |
| IFR Supplement GPH 205                           | M.O.T.  |
| Low Altitude Enroute GPH 206                     | Canada - Dept. of                                   |
| Charts - Aeronautical Edition<br>scale 1:500,000 | Energy, Mines and Resources<br>Aeronautical Edition |
| - WAC<br>scale 1:1,000,000                       | Directorste of Map Production                       |
| Navigation Booklet                               | Sault College                                       |

STUDY AND REFERENCE GUIDE:

Sault College Curriculum Directives  
Ministry of Transport Study and Reference Guide for Commercial  
Pilots Licence  
Shewring Canadian Commercial Pilot Written Examination Primer

NAVIGATION

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GENERAL OBJECTIVES:

To teach in theory and in practise Aviation Technology, with emphasis on study toward the Commercial Pilots Licence Standard, as required by the Ministry of Transport.

NAVIGATION

AVT 110-6

| Topic Number | Suggested Periods | Topic Description   | Reference                           |
|--------------|-------------------|---|-------------------------------------|
| 1            | 2                 | Review of Definition<br>Form of the Earth<br>Time (mean and apparent)<br>Direction True and Magnetic    | FGU-Air Navigation<br>S.C. Precise  |
| 2            | 1                 | Earth's Magnetism<br>Compass errors<br>Airspeed and Altitude Indicators                                 | FGU-Air Navigation                  |
| 3            | 1                 | Maps and Charts<br>Types of Charts  | FGU-Air Navigation<br>S.C. Precise  |
| 4            | 1                 | The Triangle of Velocities  | FGU-Air Navigation<br>S.C. Precise  |
| Test         | 1                 | Variation on Deviation  |                                     |
| 5            | 3                 | CR3 Computer for Commercial<br>Navigation<br>Problem Work Sheet Aircraft Information Manual<br>Mid Term | CR Computer                         |
| 6            | 4                 | Weight and Balance of Commercial<br>Navigation  | FGU-Air Navigation                  |
| Test         | 1                 | Weight and Balance  | S.C. Precise                        |
| 7            | 3                 | ASTRO COMPASS AND PRACTICAL<br>USAGE  | FGU-Air Navigation                  |
| 8            | 3                 | Aircraft Performance Charts   | FGU-Air navigation<br>S.C. Handouts |
| Test         | 1                 | Navigation 2  |                                     |
| 9            | 3                 | Radius of Action and Critical<br>Point  | FGU-Air Navigation                  |
| Test         | 1                 | Navigation 3  |                                     |
| 10           | 2                 | Cross Country Using LE Charts<br>and Interpretation of LE Charts  | IFR Supplement<br>LE charts         |
| Test         | 1                 | Navigation 4, Part I  |                                     |
| Test         | 1                 | Navigation 4, Part II   |                                     |

NAVIGATION  
-011 TVA

| Topic Number | Suggested Periods | Topic Description  | Reference          |
|--------------|-------------------|--|--------------------|
| 11           | 6                 | Shewring Commercial Primer   | Shewring<br>Primer |
|              |                   | Navigation Exercise 1,2 and 3<br>Radio Navigation Exercise 1 and 2 |                    |
| Test         | 1                 | Final Navigation Exam  |                    |
| Test         | 1                 | MOT Commercial Pilots Written Examination                          |                    |

## NAVIGATION

AVT 110-6

### SPECIFIC OBJECTIVES:

1. Definition, form of the Earth, Time, Direction True/Magnetic and the Earth's Magnetism.

The student is required as a thorough review, to know

- a) definitions
- b) The Earth's shape specifics of latitude/longitude
- c) The arc of Time, time zones local and Greenwich
- d) The Compass rose and measurement of distance and track angle on Aeronautic Charts.
- e) The term Heading Track, Bearing and associated problems.
- f) The reference to lines on a short relating to a great circle, small circle and rhumb line
- g) The location of magnetic North and the North Pole and associated Magnetic meridian and the vector resolution
- h) The reference to variation, isogonal agonic and the Residual magnetic error deviation and deviation card.

2. Earth's Magnetism, Compass errors, Airspeed and Altitude Indicators.

The student is required as a thorough review, to know

- a) Terms associated with magnetic lines of force on the earth's surface, including the reference position of Magnetic North, dip variations (agonic and isogonal lines), residual magnetic error deviation and the deviation card.
- b) The construction of the magnetic compass, compass errors and the principles of gyroscopic action.
- c) Pressure measuring instruments, pilot and status pressure; with terms indicated, calibrated, rectified, true and equivalent regarding airspeed; and indicated calibrated pressure, density, true and absolute regarding altitude; computer solution to air-speed and altitude computation.

3. Maps and Charts, types of charts

The student is required as a thorough review to know:

- a) The requirement of maps and charts, types and kinds, scales with reference to great circle and rhumb lines.
- b) The types of charts used in Canada, chart characteristics, symbols and signals, dated chart information, and radio facility charts and supplement usage.

4. The Triangle of Velocities

The student is required as a thorough review to know:

- a) and define Heading Track (course) and wind vector
- b) define vectors true magnetic and compass
- c) speed distance and bearing formula

Jeppesen CR5

5. Computer for Commercial Navigation

The student is required to know:

- a) airspeed and altitude nomenclature
- b) Computer procedure to find airspeeds and altitudes as defined.
- c) Method new and old conversion to TAS
- d) use of circular slide rule in determining multiplication, division proportions and solution of airspeed formula.
- e) affective usage of the wind computing side of the flight computer.
- f) the solution to problems applicable to the CR5 Computer.

6. Weight and Balance for Commercial Navigation

The student is required to know:

- a) Theory nomenclature and definition as applying to aircraft loading and procedures.
- b) Principals of aircraft loading using weight, distance or aiming moments, and fulcrum or Central gravity.

- c) The use of Datum or reference datum line and formula to establish the center of gravity.
- d) The principals of a simple weight and balance problems.
- e) The problems associated with weight and balance of more sophisticated and heavy aircraft.

7. Astro Compass and Practical Use

The student is required to know:

- a) Definition pertaining to Astro navigation
- b) The theory behind navigation and specifically true direction as obtained from an Astro compass.
- c) and use the "Air Almanac" and Department of Transport publication "Finding the Sun's True Bearing" in solving for the true bearing of the Sun, Moon, Planets and Stars.
- d) The practical use of the Astro Compass.
- e) The solution of problems pertaining to the usage of Astro information.
- f) Other methods of obtaining bearing information from the sun

8. Aircraft Performance Charts

The student is required to know:

- a) The purpose of aircraft performance charts.
- b) The specific examples as applicable to aircraft types.
- c) The uses and basic interpolation as applicable to the specific performance of aircraft.
- d) Methods of interpolation
- e) The solution of practical problems.

9. Raduis of Action and Critical Point

The student is required to know:

- a) the theory and rational of Raduis of Action and critical point
- b) the solution of Raduis of Action and Critical Point problems using both the graphic and computer methods.



10. Cross Country Exercise using LE Charts.

The student is required to know:

a) Publication required for IFR Flight

Canada Air Pilot - GPH 200

LE Charts - GPH 206

IFR Supplement - GPH 205

Aeronautical Information Publication TP2300

b) the information available on the Low level Enroute Charts (LE Charts) and be able to apply practically to cross country planning.

c) Complete a cross country flight plan

11. Shewing Commercial Primer

The student is required to know and review navigation exercise and Radis. Navigation exercises and is presented in this primer.

a) Review of navigation exercises 1, 2 and 3

b) Review of Radis navigation exercise 1 and 2.

