SAULT COLLEGE
of Applied Arts and Technology
Sault Ste. Marie

COURSE OUTLINE

AIRFRAMES AND ENGINES

AVT 110-6

revised June, 1981

AIRFRAMES AND ENGINES

AVT 110-6

TEXT:

From the Ground Up -- A. F. MacDonald

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

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GENERAL OBJECTIVES:

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

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Topic	Periods	Topic Description	Reference
1,2,3,4	1	Airframe Design Airframe Construction Control of Maintenance Design & Construction of Reciprocating Aeroengines	FGU-Airframe FGU-Aero Engines
5,6,7,8	1	Principals, system, parts and Carburation Reciprocating Aero Engines Airframe Electrical Systems Aero Engine Electrical Systems	FGU-Aero Engines
TEST	1	MID TERM EXAM	
9	1	Jet Propulsion (Film) Jet Propulsion discussion	FGU-Aero Engines
10	1	Engine Instruments	FGU-Aero Engines
11,12	1	The Aero Engine Propeller Aero Engine Operation	FGU-Aero Engines
13	1	Review and Discussion Questions from the Commercial Primer	Shewring Primer
TEST	1	FINAL AIRFRAME AND ENGINES EXAMINATION	
TEST	1	MOT COMMERCIAL PILOTS WRITTEN EXAMINATION	

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SPECIFIC OBJECTIVES:

1. Airframe Design

The student is required as a thorough review to know:

a) parts of an airplane and airframe nomenclature
b) the type of material and corrosion
c) load and stress nomenclature
d) loads, stresses and strains with reference to airframe design
e) the types of stresses

2. Airframe Construction

The student is required as a thorough review to know:

a) airframe construction nomenclature
b) the types of construction - fuselage - wing - empennage
c) landing gear - fixed undercarriage
- retractable undercarrage
- tricycle versus tail dragger
d) the types of shock absorption
e) control systems - cable, torque tubes, push pull rods
f) control trims

3. Control of Maintenance

The student is required to know:

a) the purpose and conditions as applicable to flight testing
b) trouble shooting, yaw and roll
c) requirements for logbooks and the division of areas
d) MOT inspection requirements

4. Design and Construction of Reciprocating Aero Engines

The student is required as a thorough review to know:

a) power plants as related to operations and care
b) the reference to power in terms of work, heat and energy
c) the reference to horsepower indicated and brake
d) the construction and parts of an engine
e) the types of aero engines in use today - Radial - Inline - Horizontally opposed along with the advantages and disadvantages.

5. Principles, Systems and Parts of Reciprocating Aero Engines

The student is required as a thorough review, to know:

a) the principles of the two and four stroke reciprocating engine
b) the cooling systems
c) the lubricating systems and requirement of oil
d) the fuel system, gravity, pumps, injection, tanks, detonation and preignition
e) the methods of supercharging and turbocharging

6. Carburation of Reciprocating Aero Engines

The student is required as a thorough review to know:

a) the purpose of carburetor
b) the theory and operation of the basic carburetor
c) the mixture control manual and automatic
d) the reason for carburetor icing and recognition
e) the methods of presenting carburetor icing

7. Airframe Electrical Systems

The student is required as a thorough review to know:

a) the following parts of an aircraft electrical system and identify:
   i) battery
   ii) generator
   iii) voltage regulator
   iv) bus bar
   v) circuit breaker
   vi) ammeter
   vii) voltmeter
   viii) generator warning lights
   ix) bonding
b) by item, describe the function and reason of each part mentioned in "a"

NOTE: i) It is expected that a more precice and extensive knowledge be apparent for the requirement of the second semester
ii) Note a typical modern light aircraft electrical schematic is to be shown and explained during this presentation.

8. Reciprocating Aero Engine Electrical System

The student is required as a thorough review to know:

a) the relation and difference between airframe and aero engine electrical systems
b) the principle of the magneto as applicable to the aero engine ignition system
c) the parts of a magneto including primary and secondary circuits
d) the parts associated with the primary and secondary circuit
e) the purpose of dual ignition
f) the requirement for shielding

9. Jet Propulsion

The student is required to know:

a) basic principles of jet propulsion
b) types of jet engines
   i) Ram Jet
   ii) Turbo Jet
   iii) Turbo Fan
   iv) By-Pass Engine
   v) Turboshaft and Turboprop
   vi) Afterburner

10. Engine Instruments

The student is required to know:

a) instrument markings
b) oil pressure and temperature gauges
c) the cylinder head temperature gauge
d) outside temperature gauge
e) tachometer
f) manifold pressure gauge

11. The Aero Engine Propeller

The student is required as a thorough review to know:

a) purpose of the propeller
b) the relation of the propeller to airfoil efficiency
c) the definitions associated with pitch

NOTE: This is also covered in theory of flight

12. Aeroengine Operation

The student is required as a thorough review to know:

a) handling procedure
b) starting procedure
c) safety precautions
d) taxiing procedure

NOTE: The practical aspect of this lecture will be covered in the MOT "Flight Instructors Guide"