

SAULT COLLEGE  
of Applied Arts and Technology  
Sault Ste. Marie

COURSE OUTLINE

AERODYNAMICS

AVT 210-7

revised June, 1981

AERODYNAMICS

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TEXTS:

Kermode -- Flight Without Formulae

Davies -- Handling The Big Jets

Pultz -- Flying Instructor Course

AERODYNAMICS  
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GENERAL OBJECTIVES:

Review basic aerodynamics from a different angle and introduce students to more advanced concepts of aerodynamics. In addition, handling procedures, differences and problems will be covered considering an aircraft or the Boeing 747 type, as compared to smaller jet transport aircraft.

NOTE: Topics number 17 to 28, and others if required by course population, will be given by students.

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Topic No.	Periods	Topic Description	Reference
1	1	Aircraft Classification	Flight Without Formula Sections 1-4
2	1	The atmosphere Lift and drag Airspeed and Ground Speed Track and heading Wind tunnels	Flight Without Formula Sections 5-9
3	1	Smoke tunnels Air and water Centre of Pressure Stability and Instability The Wing Section	Flight Without Formula Sections 10-14
4	1	Air flow over a wing section Pressure distribution over a wing Wake turbulence	Flight Without Formula Sections 15 & 16  Film - Caution Wake Turbulence
5	1	The Venturi Tube Why the centre of pressure moves Stalling or burbling Lift and drag again Effects of speed Effects of size Effects of air density Lift drag ratio	Flight Without Formula Sections 17-24
6	1	Analysis of Drag Induced drag	Flight Without Formulae Sections 25 & 26
7	1	Parasite drag Form drag Skin friction The boundary layer Shape or wing section Variable chamber	Flight Without Formula Sections 27-32
8	1	Slots, Slats & Flaps Aspect Ratio Biplanes Summary or lift and drag	Flight Without Formula Sections 33-36
9	1	Straight and level flight The four forces Thrust Jet Propulsion Propeller Propulsion Rocket Propulsion	Flight Without Formula Sections 37-42

Topic No.	Periods	Topic Description	Reference
10	1	An introduction to Jet Engines	NFB Film
11	1	Balance of an aeroplane The Tail Plane Stability Degrees of stability Rolling, Pitching. & Yawing Longitudinal Stability Lateral Stability Directional Stability Directional & Lateral Stability	Flight Without Form Sections 43-51
12	1	Control Longitudinal Control Lateral Control Directional Control Balance Control Control Tabs	Flight Without Form Sections 52-57
13	1	Control at low speeds Control at high speeds	Flight Without Form Sections 58 & 59
14	2	MID SEMESTER EXAMINATIONS	
15	2	Introduction to handling the big jets and glossary of terms	Handling the Big Jet
16	1	Briefing on lecture assignments & allocation of material	Handling the Big Jet
17	1	First order differences	Handling the Big Jets
18	1	Consequences of increased size and weight	Handling the Big Jet
19	1	Flight handling significance of turbine engines	Handling the Big Jet
20	3	Flying Faster	Handling the Big Jet
21	1	Flying Higher	Handling the Big Jet
22	2	Take-off and landing	Handling the Big Jet
23	1	Flight Through Severe Weather	Handling the Big Jet
24	1	The very big jet	Handling the Big Jet
25	1	Asymmetric flight	Handling the Big Jet

Topic No.	Periods	Topic Description	Reference
26	1	Level Flight - The Speed Range Economical Flying Flying at low speeds Stalling Landing Reduction of landing speed Wing Loading	Flight Without Formula Sections 60-66
27	1	STOL & VTOL Gliding Climbing Turning Nose-Diving Taxiing	Flight Without Formula Sections 67-73
28	1	Taking off Aerobatics Flying faults	Flight Without Formula Sections 73,74 & 77
29	2	The propeller	Flight Without Formula Section 75 Flying Instructor Course Pages 61-66
30	2	Torque Gyroscopic action Gyroscopic precession Slipstream Asymmetric thrust Critical engine Multi-engine aeroplane	Flying Instructor Course Pages 67-75 Flight Without Formula Section 76
31	1	Instruments The air speed indicator The altimeter Navigation Instruments Flight instruments	Flight Without Formula Sections 78-82
32	1	High speed flight The speed of sound Mach numbers Flight at transonic speeds Shock waves The shock stall	Flight Without Formula Sections 83-88
33	1	Wave drag Sweep back Vortex generators Wing and body shapes Through the barrier and beyond	Flight Without Formula Sections 89-93

Topic No.	Periods	Topic Description	Reference
34	1	Supersonic flow Supersonic shapes Sonic bangs Other problems of supersonic flight The future	Flight Without Formulae Sections 94-98
35	1	Space	Flight Without Formulae Section 99
36	3	Review	Flight Without Formulae Handling The Big Jets Flying Instructor Course
37	2	FINAL SEMESTER EXAMINATION	