



Department of AERONAUTICAL ENGINEERING



Aerodynamics (R22A2107) COURSE COVERAGE SUMMARY

Prepared by: Dr. Krishna Anand Assistant Professor Department of ANE

COURSE COVERAGE SUMMARY

AERODYNAMICS (R22A2107)

Unit	Topics	Text book	Chapter	Page numbers
No. and	of the		no.in	
Title	Units		Textbook	
1 Basics of	Aerodynamic forces and Moments, Derivation of Lift, Drag and moment Coefficients with pressure	Fundamentals of Aerodynamics,	1	12-40
amics	respect to angle of attack. Flow regimes based on Mach number	J.D., International		
		edition, McGraw Hill		
	Governing equations of flow- Continuity, momentum and Energy equations, Flow regimes based on mach number		2	63-78
2 Inviscid Incompres sible Flow over Airfoil	Governing Equation for incompressible and irrotational flow, Elementary flows and their combinations, Magnus effect, D'Alembert's Paradox, Kutta – Joukowsky theorem.		3	131-166
	kutta condition. Kelvin's circulation theorem & starting vortex, Thin airfoil theory, expressions for calculating the aerodynamic center and Center of pressure.		4	198-217
3 Inviscid Flow over Wings & Panel Methods:	Vortex filament statement of Helmholtz's vortex theorems, Biot - Savart Law, starting, bound & trailing vortices of wings, Prandtl's Lifting line theorem – downwash and induced drag, Elliptic loading & wings of elliptic platforms, expression for induced drag.		5	229-258
4 Applied Aerodyn amics	Lift augmentation and Drag Reduction methods -Flaps, slats, slots, winglets, NACA Airfoils, Circulation control, strakes. Drag augmentation methods – spoilers, Air brakes.	MRCET DIGITAL NOTES of Aerodynamics	4	71-93

	Leading edge root extensions, Large Eddy	https://en.wikipedi		
	Breakup	a.org/wiki/Leading-		
	device, Co-flow jet, Cuffs and vortex generators	edge_extension		
5	Wind tunnel and its Components,	Low Speed	3	61-123
Experim		Wind		
ental	Types of wind tunnels and Model testing in	Tunnel	2	25-58
Aerodyn	wind	Testing,		
amics	tunnels.	Barlow,		
	Pressure, Temperature, Velocity measurements -	J.B.,	4	136-154
	Hotwire and Laser – Doppler anemometer.	Rae,W.H.,		
	Force measurements – Wind tunnel balances.	Pope, A.,	7	234-288
	Flow visualization techniques	Wiley 1999	5	188-216
	schileren and shadowgraph methods	MRCET DIGITAL	5	99-103
		NOTES of		
		Aerodynamics		