AE-315: Turbo machinery and gas dynamics										
L	**T**	**P**	Credit	Area		**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
3	0/1	2/0	4	DEC		15/25	25/-	20/25	40/50	-

Objectives: This course aims to introduce the student with principles of Turbomachinery, types of turbo devices such as turbines, fans and blowers. This course also offers about the gas dynamics and jet propulsion in engines

AE-315: Turbo machinery and gas dynamics		Contact Hours
Unit-1	Turbomachinery Principles, Energy transfer between fluid and rotor, classification of fluid machinery, dimensionless parameters, specific speed, applications, stage velocity triangles, work and efficiency for compressors and turbines.	**8**
Unit-2	**Centrifugal Fans and Blowers:** Types, stage and design parameters, flow analysis in impeller blades, volute and diffusers, losses, Characteristics curves and selection, fan drives and fan noise.	**6**
Unit-3	**Centrifugal And Axial Flow Compressors:** Construction details, types, impeller flow losses, slip factor, diffuser analysis, losses and performance curves. Stage velocity triangles, enthalpy-entropy diagrams, stage losses and efficiency, work done factor, simple Stage design problems and performance characteristics.	**6**
Unit-4	**Axial And Radial Flow Turbines:** Stage velocity diagrams, reaction stages, losses and coefficients blade design principles, testing and Performance characteristics.	**8**
Unit-5	**Gas Dynamics: -** Continuity Equation, Momentum Equation, Energy Equation, Stagnation Properties; Isentropic Flow with Variable Area, Wave Motion; Flow with Normal Shock Waves, Oblique Shock Waves, Flow in Constant Area Duct with Friction and With Heat Transfer, Measurement of Fluid Properties, Anemometer, Flow Visualization.	**8**
Unit-6	**Jet Propulsion**: -Aircraft Propulsion Theory, Ramjet Engine, Pulsejet Engine; Rocket Propulsion, Liquid Propellant, Solid Propellant, Rocket Propulsion Theory, Rocket Applications, Space Flights.	**6**
	Total	**42**

Reference Books:

1	S.M. Yahya, "Fundamentals of Compressible Flow ", John Wiley and Sons Ltd, 1994, ISBN8122403727
2	P.Hill and C. Peterson, " Mechanics and Thermodynamics of Propulsion ", Pearson Education,2009 ISBN0132465485
3	N.J. Zucrow, "Aircraft and Missile Propulsion, Vol. I & II ", John Wiley , 1958, ISBN 1258694360
4	N.J. Zucrow, "Principles of Jet Propulsion and Gas Turbines ", John Wiley, New York, 1957,
5	H.Cohen, G.E.C.Rogers and Saravanamuttoo, " Gas Turbine Theory ", Longman Group Ltd., 1996, ISBN 0582236320
6	A.H.Shapiro, " Dynamics and Thermodynamics of Compressible Fluid Flow Vol. l ", John Wiley , 1953, ISBN 0471066915
7	V.Ganesan, " Gas Turbines ", Tata Mcgraw Hill Publishing Co., New Delhi, 2010, ISBN 0070681929,
8	G.P.Sutton, " Rocket Propulsion Elements ", John Wiley, 2010, New York, ISBN 0470080248

Course Outcomes

CO1	To study Turbomachinery , fluid machineryand efficiency for compressors and turbines.
CO2	to study centrifugal fans ,blowers and its analysis
CO3	To study Axial And Radial Flow Turbinesand its analysis
CO4	To study centrifugal and axial flow compressors and its analysis
CO5	To study gas dynamics
CO6	To study jet propulsion

CO-PO/PSOMatrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2