



Department of AERONAUTICAL ENGINEERING



AIR BREATHING PROPULSION

(R22A2109) COURSE COVERAGE SUMMARY

> Prepared by: B. NAVEENA AssistantProfessor Department of ANE Naveena.aero@mrcet.ac.in

B.TECH II – II SEMESTER - COURSE COVERAGE SUMMARY SUBJECT: AIR BREATHING PROPULSION (R22A2109)

UNIT	TITLE OF THE UNIT	TOPIC OF THE UNIT	NAME OF THE TEXT	CHAPTER	PAGE
			BOOK	NO.	NO.
1	FUNDAMENTALS OF PROPULSION	Aircraft Engine Components - Performance Requirements Thermodynamic Processes Representation by T-s and p-v diagra Pressure ratios, Temperature ratios,Energy transfer, Polytropic and Stage Efficiencies Engine Station Numbering, thrust generation Equation of Thrust for installed and uninstalled cases Factors affecting thrust Role of propulsion in aircraft performance	ms ^{Elements of GasTurbine osနိုင်စွpulsion by Mattingly}	4	213- 237
2	ANATOMY OF JET ENGINE-I	INLETS: Locations, Types of inlets flow field, capture area, flow distortion, drag, and diffuser losses and methods of mitigation operating principle, functions, geometry, operating conditions, NOZZLE: Function, Types, Engine Back-pressure control, Exhaust nozzle Area Ratio, Thrust Vectoring Types; Thrust Reversal, Types of Thrust Reversal Systems Nozzle Coefficients, Gross Thrust coefficien Discharge Coefficient, Velocity coefficient, Angularity coefficient	Elements of GasTurbine Propulsion by Mattingly	10	757- 849`
3	ANATOMY OF JET ENGINE-II	Types, construction, stage, Cascade, blade geometry, velocity triangles, Euler equation, types of flow analysis, diffusion factor, stage loading, Performance Maps, Off-design Performance, Multi- spooling; Axial flow turbines, Velocity diagram analysis, no exit swirl condition, flow losses, causes tangential stresses, repeating stages, Typical blade profiles, turbine performance maps, Blade cooling, materials, Similarities and	Elements of GasTurbine Propulsion by Mattingly	8	383- 404

		differences with compressors, Numericals on turbo-machinery			
4	ANATOMY OF JET ENGINE-III	Essential considerations in Design of Burners, Primary Burners-types, components, schematic diagram, operation; airflow distribution, Flame stability, Ignition and Engine starting,Factorseffecting CombustionChamber Performance, After burners, flame stabilization, fuels-composition and properties	Elements of GasTurbine Propulsion by Mattingly	8	461- 605
5	DESIGN OF GAS TURBINE ENGINE	Aircraft Mission Analysis Engine Selection-Performance andParametric Analysis, Sizing the Engine, , Major Considerations in Engine Components Design SYSTEM MATCHING AND ANALYSIS Component Matching of Gas Turbine Engine, Gas Generator, Component Modeling, Equilibrium Points, Solution of Matching Problem, Dynamic and Transient Response, Matching of Engine and Aircraft.	Elements of GasTurbine Propulsion by Mattingly	9	615- 748