Master of Technology
(Aerospace Propulsion Technology)

Program Outcomes (POs)

PO1: An ability to independently carry out research / investigation and development work to solve practical problems.
PO2: An ability to write and present a substantial technical report / document.
PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor.

Program Specific Outcomes (PSO)

PSO1: Graduates will possess skills in design, development and testing of propulsion systems for aerospace vehicles.
PSO2: Graduates will able to carry out research in multidisciplinary areas.

Department of Aerospace Engineering

Course Outcomes (COs)

2018 – 2020 Batch

Semester	Course Code	Course Name	Course Outcomes (COs)
I	18MTADE101	INTRODUCTION TO AEROSPACE VEHICLES	CO1 :To explain characteristics of airfoils, use of wind tunnel, basics if airplane stability, and Helicopters CO2: To identify the materials used for aircraft structure and its structural layout CO3: To explain working principles of different types of airbreathing propulsion systems and propulsion in helicopters CO4: To explain major aircraft systems and aircraft navigational aids CO5: To explain forces on a body in a central force field, rocket propulsion, and typical launch vehicle configurations
	18MTMAE101	MATHEMATICS FOR AEROSPACE ENGINEERS	CO1 : Solve ordinary and partial differential equations using numerical techniques CO2 : Apply principles of matrix algebra to linear transformations. CO3 : Analyze the functions and signals using Fourier series and Fourier transforms CO4 : Apply the concept of Calculus on Complex functions
	18MTAPT101	GAS DYNAMICS	CO1: Derive and interpret the terms in governing equations of 3D compressible flow CO2: Apply normal shock relations to calculate pressure loss in practical situations CO3: Calculate pressure distribution on plane surfaces with compression and expansion corners CO4: Explain method of characteristics applied to determine supersonic nozzle contour CO5: To recommend simple measurements required for calculations of compressible flow through ducted components.

	18MTAPT102	AIRCRAFT PROPULSION	CO1: Describe the performance parameters and Explain the aerodynamics design-aspects of turbomachinery. CO2: Calculate fatigue safety factor and creep life of gas turbine components. CO3: Identify sources of blade excitation and methods of dealing with them. CO4: Explain the requirement and working of sub-systems
	18MTMCC01	ENGLISH FOR RESEARCH PAPER WRITING	CO 1: To craft persuasive, complex, inquiry-driven arguments dealing with engineering and technology CO2: To work strategically with complex information in order to generate and support inquiry by reading, analyzing, and synthesizing a diverse range of data CO3: To compose technical articles for a variety of audiences and contexts, both within and outside the academia CO 4: To practice writing technical articles as a collaborative process and to develop flexible strategies to deal with giving, receiving, interpreting, and incorporating constructive feedback
	18MTASD101L	AERO STRUCTURES LAB	CO1 : To measure the dimensions of various specimen by Vernier Caliper, Dial Gauge that finds applications in all the experiments. CO2 : To enable the students to understand the various theorems and calculations based on Strength of Materials and Aircraft Structures approach.. CO3 : To study the fringe patterns of Stress and Strain using Photoelastic techniques. CO4 : To understand the concepts of Vibrations and Elastic Stability.
	18MTAPT131	AERO ENGINE PERFORMANCE EVALUATION	CO1: Perform analysis of ideal engines CO2: Estimate component performance given the efficiency inputs CO3: Explain basic steps of real engine cycle calculation

			CO4: Explain steps for calculation for turbofan engine performance CO5: Carry out performance analysis of Turbojet and turbofan engines
	18MTADE102	AERODYNAMICS AND FLIGHT MECHANICS	CO1 : Modeling of bodies for aerodynamic analysis. CO2 : Exposure to different airfoils, understating the influence of each of geometric parameter of the airfoil on aerodynamic forces & moments. CO3 : Calculation of aircraft performance with specific reference to different speeds, range & endurance. CO4 : Ability to do flight mechanics calculations.
II	18MTADE201	COMPUTATIONAL FLUID DYNAMICS	CO1 : Derive governing equations for fluid flow. Learn various forms of governing equations and their significance. CO2 :Classify partial differential equations and learn the properties. CO3 :Learn different kinds of discretization methods for partial differential equations. CO4 :Identify the conditions to be satisfied by the numerical scheme, consistency, stability and accuracy. CO5 :Develop computer codes for Computational fluid dynamics.
	18MTAPT201	HEAT TRANSFER AND COMBUSTION	CO1: Demonstrate an understanding of the basic concepts of heat transfer. CO2: Apply the concepts of mass, momentum and energy conservation to heat transfer problems. CO3: Formulate the differential equations and boundary conditions to solve convection problems. CO4: Demonstrate an understanding of the basic concepts of combustion. CO5: Analyze the problems of flame stabilization and combustion instability
	18MTAPT202	DESIGN AND DEVELOPMENT OF AERO-	CO1: Explain the aerodynamics design-aspects of gas turbine modules CO2: Recommend testing procedures of Gas

		ENGINE SYSTEMS AND TESTING	turbine engines and components CO3: Explain the functions and requirements of secondary systems. CO4: Describe gas turbine engine from system engineering perspective. CO5: Demonstrate knowledge of basic system integration requirements.
	18MTAPT203L	PROPULSION LAB	CO1: To estimate and analyze heat transfer coefficient for forced convection over a flat plate and natural convection over an airfoil. CO2: To measure the pressure and velocity distribution in a convergent nozzle. CO3: To determine the growth rate of a free jet by finding the velocity profiles at different locations. CO4: To understand and plot starting characteristics of gas turbine engine in IIAEM. CO5: To understand and plot speed characteristics of gas turbine engine in IIAEM CO6: To determine the speed of premixed flame. CO7: To calculate pressure coefficient distribution over compressor blades
	18MTASD221	INTRODUCTION TO AEROELASTICITY	CO1 : Understanding of principles of vibration, elements of a vibrating system, classification of vibration , types of damping , free and forced vibration of undamped and damped single and two degree of freedom systems, principal coordinates, natural frequencies and mode shapes, normal modes, modal analysis etc. CO2 : Understanding of aeroelastic phenomenon and the multidisciplinary interactions involved, historical background, static aeroelastic phenomena like divergence, control effectiveness and reverasal , ability to model them, solution methods , extension to 3-D wings from 2-D airfoil models. CO3 : Understanding of dynamic aeroelastic phenomenon like flutter and ability to model and analyse them using simple two dimensional models and extension to 3-D flutter analysis.

	18MTADE231	VISCOUS FLOWS AND TURBULENCE	CO1 : Apply concepts of boundary layer theory to fluid flow problems. CO2 :Apply statistical description of turbulent flows CO3 : Ability to analyze wall bounded flows, Free shear flows, Turbulent motion scales, velocity spectra. CO4 : Apply turbulence modeling theory
	18MTAPT231	MATERIALS AND PROCESSES FOR PROPULSIVE SYSTEMS	CO1: Describe and suggest recommended materials for aero-engine components CO2: Explain desirable properties of different materials for engine components CO3: Recommend machining and sheet metal forming processes for engine components CO4: Recommend basic manufacturing process of tubular components of made of titanium alloy and composite honeycomb structures CO5: Suggest heat treatment processes of alloys used in engine components
	18MTADE203	BASICS OF HELICOPTERS	CO1: Understand the basic concepts associated with rotary wing aerodynamics. CO2 : Helicopter configurations based on various rotor classifications. CO3 : Aerodynamics & performance of helicopter in Hover, climb, descent, forward flight and autorotation. CO4 : Introduction to helicopter dynamics highlighting the interaction & coupling of aerodynamics and blade motions. CO5 : Basic helicopter controls and mechanism for achieving these controls. CO6 : Overview of static & dynamic stability of helicopter. CO7 : Sources of vibration of helicopter. Isolation and or reduction of vibrations.
III	18MTAE301	RESEARCH METHODOLOGY	CO 1:Apply a range of quantitative and / or qualitative research techniques to business and management problems / issues.

			CO 2:Demonstrate knowledge and understanding of data analysis and interpretation in relation to the research process. CO 3:Conceptualise the research process. CO 4:Assess critically the following methods: literature study, case study, structured surveys, interviews, focus groups, participatory approaches, narrative analysis, scenario methodology and basic statistical methods.
	18MTAE305	INTELLECTUAL PROPERTY RIGHTS	CO1:Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. CO2:Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits
	18MTAPT321	AIRWORTHINESS AND QUALITY CONTROL	CO1: Explain airworthiness requirements at aircraft level, system level, sub-system level and component level CO2: Will be able to support in the certification of aircraft and aircraft systems CO3: Will be able to support quality assurance procedures during manufacturing and testing of aircraft systems
	18MTAPT322	FAILURE AND RISK ANALYSIS OF AERO-PROPULSION SYSTEMS	CO1. Explain the concept of failure and risk analysis with respect to engineering structures. CO2. Explain basic failure analysis methodology. CO3. Explain techniques for failure analysis CO4. Understand failures occurring during component testing and flight testing CO5. Carry out basic failure analysis of engine components
	18MTAEP304	Project work	CO1: Will be able to carry out literature study of a propulsion system design project Co2: Will able to work in an industrial project that

			needs knowledge of aircraft propulsion systems