B. E. AERONAUTICAL ENGINEERING

COURSE OUTCOMES

U23HST11 COMMUNICATIVE ENGLISH

CO1 : Remember appropriate words in a situational conversation.
CO2 : Gain understanding of basic grammatical structures and use them in right context.
CO3 : Read and infer the denotative and connotative meanings of technical texts.
CO4 : Write Dialogue, Letter and paragraphs on various topics.
CO5 : Make the students prepare effective notes for main sources available.
CO6 : Enhance them to give operational talk.

U23MAT12 MATRICES AND CALCULUS

CO1 : Use the matrix algebra methods for solving practical problems.
CO2 : Use both the limit definition and rules of differentiation to differentiate functions.
CO3: Apply differential calculus tools in solving various application problems.
CO4: Able to use differential calculus ideas on several variable functions.
CO5: Apply multiple integral ideas in solving areas, volumes and other practical problems.
CO6: Solve the ordinary differential equations using different techniques for that model engineering problems.

U23PHT13 PHYSICS FOR ENGINEERS AND TECHNOLOGISTS

CO1 : Differentiate the elastic and plastic nature of the materials.
CO2 : Know the experimental techniques in both production and applications of ultrasonic waves.
CO3: Gain knowledge in the basics of quantum mechanics concepts.
CO4: Develop new devices based on LASER source.
CO5: Understand the advantages of optical fiber than metal wire.
CO6: Demonstrate the some useful experiments based on optical fibre

U23CYT14 CHEMISTRY FOR ENGINEERING & TECHNOLOGY

CO1 : Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
CO2 : Apply the basic knowledge of Corrosion and various electrodes.
CO3: Know the economically and new methods of synthesis nano materials.
CO4: Apply the knowledge of phase rule and composites for material selection requirements.
CO5: Understand the concepts ofsuitable fuels for engineering processes and applications.
CO6: Have the knowledgeof different forms of energy resources and apply them for suitable applicationsin energy sectors.

U23GET16 ENGINEERING GRAPHICS

CO1 : Identify the significance of graphics in engineering applications.
CO2 : Project straight lines inclined to both principal planes and determine true lengths and inclinations.
CO3: Apply orthographic projection techniques to project solids.
CO4: Apply the principles of development to prisms, pyramids, cylinders, and cones.
CO5: Combine two solid objects in simple vertical positions using isometric projection.
CO6: Utilize the isometric scale effectively.

U23BSP11 PHYSICS AND CHEMISTRY LABORATORY

CO1 : Understand the functioning of various physics laboratory equipment.
CO2 : Observe and tabulate experimental data.
CO3: Solve problems individually and collaboratively.
CO4: Analyse the quality of water samples with respect to their acidity, alkalinity
CO5: Determine the amount of hardness in the water
CO6: Analyse quantitatively the impurities in solution by electro analytical techniques

U23HSP12 ENGLISH LABORATORY

CO1 : Identify and comprehend complex academic texts.
CO2 : Interpret accurately and fluently in formal and informal communicative contexts.
CO3: Demonstrate their opinions effectively in both oral and written medium of Communication.
CO4: Plan travelogue and construct paragraphs on various aspects.
CO5: Develop journal reading skills and small talk.
CO6: Utilizing technical terms and making power point presentations.

U23GEP14 ENGINEERING PRACTICES LABORATORY

CO1 : Draw pipe line plan; lay and connect various pipe fittings used in common household plumbingwork; Saw; plan; make joints in wood materials used in common household wood work.
CO2 : Wire various electrical joints in common household electrical wire work.
CO3: Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common Household equipments; Make a tray out of metal sheet using sheet metal work.
CO4: Solder and test simple electronic circuits; Assemble and test simple electronic components onPCB.
CO5: Apply fundamental engineering principles to analyze and solve real-world problems.
CO6: Demonstrate proficiency in using engineering tools and equipment.

U23HST21 PROFESSIONAL COMMUNICATION

CO1 : Compare and contrast products and ideas in technical texts.
CO2 : Identify cause and effects in events, industrial processes through technical texts.
CO3 : Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.
CO4 : Motivate students to write reports and winning job applications.
CO5 : Recall and comprehend different discourses and genres of texts.
CO6 : Making the students to become virtuous presenters.

U23MAT22 STATISTICS AND NUMERICAL METHODS

CO1 : Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO2 : Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO3: Solve the algebraic and transcendental equations.
CO4: Understand the knowledge of numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO5: Solve the ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
CO6: Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

U23GET15 PROBLEM SOLVING AND PYTHON PROGRAMMING

CO1 : Develop algorithmic solutions to simple computational problems.
CO2 : Develop and execute simple Python programs
CO3: Write simple Python programs using conditionals and looping for solving problems.
CO4: Decompose a Python program into functions
CO5: Represent compound data using Python lists, tuples, dictionaries etc
CO6: Read and write data from/to files in Python programs.

U23PHT23 APPLIED MATERIAL SCIENCE

CO1 : Know basics of crystallography and its importance for varied materials properties.
CO2 : Familiarize with theories of electrical and thermal conduction is solids, basic quantummechanics, and energy bands.
CO3: Gain knowledge on the magnetic and superconductor properties of materials and theirapplications.
CO4: Acquire knowledge on basics of semiconductor physics and its applications in various devices.
CO5: Get knowledge on newly developed materials in micro and nano scale.
CO6: Understand the different structures of CNT in Nano range

U23EET26 BASIC ELECTRICAL AND DIGITAL ENGINEERING

CO1: Compute the electric circuit parameters for simple problems
CO2: Explain the working principle of electrical machines
CO3: Explain the applications of electrical machines
CO4: Analyze the characteristics of analog electronic devices
CO5: Explain the basic concepts of digital electronics
CO6: Explain the basic concepts of 8085 microprocessor

U23EEP25 BASIC ELECTRICAL AND DIGITAL ENGINEERING LABORATORY

CO1 : Use experimental methods to verify the Ohm‘s Laws.
CO2 : Use experimental methods to verify the Kirchhoff‘s Laws.
CO3: Analyze experimentally the load characteristics of electrical machines.
CO4: Analyze the characteristics of basic electronic devices.
CO5: Analyze the behavior of digital devices.
CO6: Use microprocessor kit to verify the arithmetic operations

U23HSP22 COMMUNICATION LABORATORY

CO1 : Distinguish their technical competency through language skill.
CO2 : Predict context effectively in-group discussions held in a formal / semi-formal discussions.
CO3: Understanding candidates‘ key characteristics.
CO4: Finding personality traits by sharing and comparing thoughts and ability.
CO5: Understanding the value of ethics.(rules and regulations).
CO6: Construct emails and effective job applications**.**

U23GEP13 PROBLEM SOLVING AND PYTHON PROGRAMMING LAB

CO1 : Develop algorithmic solutions to simple computational problems
CO2 : Develop and execute simple Python programs.
CO3: Implement programs in Python using conditionals and loops for solving problems.
CO4: Deploy functions to decompose a Python program.
CO5: Process compound data using Python data structures.
CO6: Utilize Python packages in developing software applications.

U23MAT31 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

CO1 : Understand how to solve the given standard partial differential equations.

CO2 : Able to solve various types of partial differential equations.

CO3: Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.

CO4: Appreciate the physical significance of Fourier series techniques in solving One and two dimensional heat flow problems and one dimensional wave equations.

CO5: Understand the mathematical principles on transforms would provide them the ability to formulate and solve some of the physical problems of engineering.

CO6: Use the method of Laplace Transform to solve initial value problem for Linear differential equations with constant coefficients.

U23AET32 AERO ENGINEERING THERMODYNAMICS

CO1 : Relate laws of thermodynamics to jet engine components.

CO2 : Understands principle operation of piston engine and jet engines.

CO3: Identify efficient cycle of air and jet engines.

CO4: Illustrate condition of working medium.

CO5: Recognize and calculate heat transfer in complex systems involving several heat transfer mechanisms.

CO6: Analyse and solve the problems related to flow and non-flow process

U23AET32 SOLID MECHANICS

CO1 : Clear understanding of mechanical behaviour of materials.

CO2 : Knowledge of different structural members and load types.

CO3: Design members under axial loading.

CO4: Design member under torsion loading.

CO5: Calculate beams deflections

CO6: To gain knowledge in how stresses are developed and distributed internally

U23MET32 FLUID MECHANICS AND MACHINERY

CO1: Understand the properties and behaviour in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics

CO2 : Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. Also, to understand the concept of boundary layer and its thickness on the flat solid surface.

CO3: Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies

CO4: Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps

CO5: Explain the working principles of various turbines and design the various types of turbines.

CO6: Determine the fluid pressure and use various devices for measuring fluid pressure

U23AET34 ELEMENTS OF AERONAUTICAL ENGINEERING

CO1 : Illustrate the history of aircraft & developments over the years

CO2 : Ability to identify the types & classifications of components and control systems

CO3: Explain the basic concepts of flight & Physical properties of Atmosphere

CO4: Identify the types of fuselage and constructions.

CO5: Distinguish the types of Engines and explain the principles of Rocket

CO6: Understand the basic aircraft systems

U23GET41 ENVIRONMENTAL SCIENCES AND ENGINEERING

CO1 : To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.

CO2 : To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.

CO3: To identify and apply the understanding of renewable and non-renewable resources
and contribute to the sustainable measures to preserve them for future generations

CO4: To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.

CO5: To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

CO6: To explain the integrated themes and biodiversity, natural resources, pollution control and waste management

U23AEP31 THERMODYNAMICS AND STRENGTH OF MATERIALS LAB

CO1 : Test and quantify the mechanical properties of Engineering Materials

CO2 : Acquire knowledge on bending properties of beams.

CO3: Estimate the performance of heat exchangers.

CO4: Apply principles of convective heat transfer characteristics to practical systems.

CO5: Acquire Knowledge on ignition aspects of fuels and thermal properties of fuels.

CO6: Ability to characteristic materials

U23AEP32 FLUID MECHANICS AND MACHINERY LABORATORY

CO1 : Operate fluid flow equipment and instrumentation.

CO2 : Analyze data using fluid mechanics principles and experimentation methods.

CO3: Determine the coefficient of discharge for various flow measurement devices.

CO4: Calculate flow characteristics such as Reynolds number, friction factor from laboratory measurements.

CO5: Analyze the performance characteristics of hydraulic pumps.

CO6: Analyze the performance characteristics of hydraulic turbines

U23MAT41 MULTIVARIABLE CALCULUS AND COMPLEX ANALYSIS

CO1 : Calculate grad, div, curl in Cartesian and gauss, stokes and greens theorems.

CO2 : Express analytic functions, conformal mapping and bilinear transformation.

CO3: Use the concepts of integration to complex functions in certain regions derive various Series

CO4: Use the effective mathematical tools for the solutions of difference equations by using Z transform techniques for discrete time systems terms.

CO5: Derive the centre and circle of curvature in solving various application problems.

CO6: Calculate evolutes and envelopes of normals by using cartesian co-ordinates.

U23AET41 LOW SPEED AERODYNAMICS

CO1 : Apply the basics physics for low-speed flows

CO2 : Apply the concept of 2D, inviscid incompressible flows in low-speed aerodynamics.

CO3: Solve lift generation problems using aerofoil theories.

CO4: Make use of lifting line theory for solving flow properties.

CO5: Solve the boundary layer equations for a steady, two-dimensional incompressible flow

CO6: Solve the properties of turbulent flow.

U23AET42 AIR BREATHING PROPULSION

CO1: Apply ideal and actual cycle analysis of a gas turbine engine to relate thrust and fuel consumption.

CO2: Acquire knowledge on the operation of subsonic, supersonic inlets and their operating characteristics.

CO3: Explain the nozzle performance of the engine

CO4: Illustrate the combustion process and fuels used on combustion.

CO5: Understanding the workings of multistage compressor or turbine, and use velocity triangles.

CO6: Understand the working and performance characteristics of the turbines.

U23AET43 AIRCRAFT STRUCTURES-I

CO1: Explain the method to analyse the linear static analysis of determinate and indeterminate aircraft structural components

CO2 : Apply the energy methods to determine the reactions of structure

CO3: Analyse the column structure with different end condition.

CO4: Design the component using different theories of failure.

CO5: Create a structure to carry the given load by considering effect of induced stresses

CO6: understanding on the linear static analysis of determinate and indeterminate aircraft structural components

U23AET44 MECHANICS OF MACHINES

CO1 : Design the linkages and the cam mechanisms for specified output motions.

CO2 : Determine the gear parameters of toothed gearing and speeds of gear trains in various applications.

CO3: Evaluate the frictional torque in screw threads, clutches, brakes and belt drives.

CO4: Determine the forces on members of mechanisms during static and dynamic equilibrium conditions.

CO5: Determine the balancing masses on rotating machineries and the natural frequencies of free and forced vibratory systems

CO6: Understand the importance of balancing and vibration

U23AET45 AIRCRAFT SYSTEMS AND INSTRUMENTS

CO1 : Demonstrate the ability to design a various system using pneumatic and hydraulic components.

CO2 : Keep abreast knowledge on various flight control system and its recent advancements.

CO3: Demonstrate the fundamental understanding of the operation of engine auxiliary systems.

CO4: To understand the various cabin comfort system used in aircraft modern display systems.

CO5: Describe the principle behind the operation of various vital parameter displays and its uses in effective conduct of the flight.

CO6: Describe the inspection procedure and troubleshooting on aircraft

U23AEP41 AERODYNAMICS LABORATORY

CO1 : Calibrate both low speed and high speed experimental facilities.

CO2 : Identify variation in flow physics due to geometrical modifications and orientations.

CO3: Estimate the various forces and moments acting on aerodynamics bodies.

CO4: Demonstrates the different aspect flow patterns of the aerodynamic bodies.

CO5: Predict and analyse various forms of drag and their contributions.

CO6: Explain the viscous interaction in Various flows

U23AEP33 AIRCRAFT SYSTEM LABORATORY

CO1: Perform ground handling procedure for aircraft maintenance.
CO2 : Carry out alignment and symmetry of aircraft.
CO3: Check the pressure variation in aircraft systems
CO4: Test the functions of aircraft systems and maintenance of various air frame systems.
CO5: Identify the problems occurrence and rectifications.
CO6: Recognizes performance of brake and torque produce

U23AEP32 PROPULSION LABORATORY

CO1 : Explain the basic fundamental concepts in jet propulsion and hands on experience on jet engine
CO2 : Analysis the performance of the propeller
CO3: Measure the wall pressure of the engine components
CO4: Understand the flame stabilization and Propagation of Pre-mixed Flame
CO5: Get practical exposures on flow visualization techniques pertaining to supersonic flows.
CO6: Demonstrate the fundamental concepts of low speed and high-speed jets and experimental techniques pertain to measurements.

U23AET51 HIGH SPEED AERODYNAMICS

CO1 : Realise the importance of studying the peculiar hypersonic speed flow characteristics pertaining to flight vehicles.
CO2 : Provide knowledge on various surface inclination methods for hypersonic inviscid
CO3: Be provided with the knowledge on thermodynamic state of the gas behind normal shock waves, oblique shock waves and expansion waves.
CO4: Arrive at the approximate solution methods for hypersonic flows.
CO5: Impart knowledge on hypersonic viscous interactions.
CO6: Impart knowledge on the effect on aerodynamic heating on hypersonic vehicles.

U23AET52 AIRCRAFT STRUCTURES – II

CO1 : Perform calculations on unsymmetrical bending.
CO2 : Perform shear flow calculations in open sections.
CO3: Perform shear flow calculations in closed sections.
CO4: Perform buckling calculations in plates.
CO5: Perform stress analysis calculations on wing and fuselage structures.
CO6: Solve complex engineering problems, and interpret the results to validate design decisions and optimize system performance.

U23AET53 SPACE PROPULSION

CO1 : Explain hypersonic propulsion systems and their application to aerospace vehicles.
CO2 : Understand the traditional propulsion concepts, including liquid, solid, hybrid, ion, and thermal rockets.
CO3: Know the applications and principles of solid, liquid, and hybrid rocket propulsion systems.
CO4: Understand the performances of various rocket propulsion systems.
CO5: Apply the concepts of hydrogen systems and unconventional propulsion in rocket.
CO6: Realise the importance of advanced space propulsion concepts.

U23AET54 AIRCRAFT MATERIALS AND PROCESSES

CO1 : Familiarize with the basic casting concepts.
CO2 : Know the various welding processes.
CO3: Use different machining process for component production.
CO4: Familiarize with the various plastic moulding processes
CO5: Understand and carry out simple experiments in CNC machines.
CO6: Have knowledge on the mechanical behaviour of various materials that are used in aircraft and it characteristics.

U23AET55 CONTROL ENGINEERING

CO1 : Understand the importance of mathematical modeling of a system.
CO2 : Demonstrate the concept and needs of feedback control systems and its application.
CO3: Determine the response of different order systems for various step inputs.
CO4: Determine the (absolute) stability of a closed-loop control system.
CO5: Introduce sampled data control system.
CO6: Understand the concept of data system sampling and digital controller.

U23AEP51 STRUCTURES LABORATORY

CO1 : Understand the effects of bending in the aerospace structures.
CO2 : Find the shear centre of the aerospace structures.
CO3: Conduct test on beams for the structural analysis.
CO4: Have familiarity with plate theory and its limitations.
CO5: Present the experimental findings in clear oral and concise report
CO6: Apply finite element methods and analysis tools to simulate and analyze the structural behavior of aerospace components, under various loading conditions, including bending, torsion, and vibration

U23AEP52 CAD LABORATORY

CO1 : Use commercial design software and understand its structure.
CO2 : Design the aircraft and spacecraft components and solve engineering problems.
CO3: Write formal technical report and convey engineering.
CO4: Analyze and evaluate the performance of designed aircraft and spacecraft components using computational fluid dynamics (CFD) and finite element analysis (FEA) tools
CO5: Integrate multidisciplinary design optimization (MDO) techniques to optimize the design of aircraft and spacecraft components for improved performance, efficiency, and cost-effectiveness.
CO6: Apply this knowledge on real life problems and develop suitable solutions

U23AET61 AIRCRAFT STABILITY AND CONTROLS

CO1 : Understand the contribution to static longitudinal stability from various components of the airplane and the requirements of rudder
CO2 : Understand the contribution to directional stability from various components of the airplane and the requirements of rudder.
CO3: Understand the dihedral effect, rolling power and control effectiveness of aileron.
CO4: To get familiarized with the longitudinal, directional and lateral dynamics of the airplane.
CO5: Identify the lateral and longitudinal modes and relate the important physical influences of aircraft properties on these modes.
CO6: Analyze and evaluate the dynamic stability characteristics of an airplane, including the effects of various design parameters and flight conditions on stability modes.

U23AET62 FINITE ELEMENT METHODS

CO1 : Obtain an overall understanding of Finite Element analysis.
CO2 : Perform discrete element analysis.
CO3: Perform continuum element analysis.
CO4: Perform isoparametric element analysis
CO5: Apply FEM methods to typical engineering situations.
CO6: Solve complex engineering problems, and interpret the results to validate design decisions and optimize system performance.

U23AET63 COMPOSITE MATERIALS AND STRUCTURES

CO1 : Understand the mechanics of composite materials.
CO2 : Able to analyse the laminated composites for various loading eases.
CO3: Have knowledge gained in manufacture of composites.
CO4: Able to design and optimize composite structures for specific applications, considering factors such as strength, stiffness, weight, and cost.
CO5: Understand the failure mechanisms and damage tolerance of composite materials.
CO6: Able to predict and analyze their behavior under various loading conditions.

U23GET72 TOTAL QUALITY MANAGEMENT

CO1 : Identify and prioritize quality improvement opportunities.
CO2 : Implement Total Quality Management (TQM) principles.
CO3: Apply statistical process control (SPC) techniques.
CO4: Design and implement quality control plans.
CO5: Conduct quality audits and assessments.
CO6: Analyze and interpret quality data for decision-making

U23AET72 AVIONICS

CO1 : Apply the basics of avionics subsystems architecture.
CO2 : Distinguish between the needs of civil and military avionics systems.
CO3: Acquire knowledge on display technologies.
CO4: Build Digital avionics architecture.
CO5: Design navigation system and ability to design and perform analysis on air data system.
CO6: Integrate and test avionics subsystems, ensuring compliance with safety and regulatory standards, such as those set by FAA or EASA.

U23AET73 COMPUTATIONAL FLUID DYNAMICS

CO1 : Acquire knowledge on the mathematical nature of fluid dynamic equations and to specify boundary conditions.
CO2 : Generate grid by using numerical methods.
CO3: Apply time dependant methods for 1-Dand 2-Dflow problems.
CO4: Acquire knowledge on various flux evaluation schemes and on pressure-velocity coupling procedure.
CO5: Gain insights on performance computing and parallelization of complex codes.
CO6: Analyze and validate computational fluid dynamics (CFD) results for various flow problems, including laminar and turbulent flows, and evaluate the accuracy and reliability of the numerical solutions.

U23AEP71 FLIGHT INTEGRATION LABORATORY

CO1 : Understand digital electronics circuits.

CO2 : Perform Multiplexer/demultiplexer, Encoder/decoder, timer & shift register circuits.

CO3: Use microprocessor in Flight control.

CO4: Perform stability analysis

CO5: Understand the different types of avionics data buses.

CO6: Design and implement avionics systems integration, including the interface between digital electronics, microprocessors, and data buses, to ensure reliable and efficient data communication and control in aircraft systems.

U23AEP72 STRUCTURAL AND FLOW SIMULATION LABORATORY

CO1 : Find out the effect of force and impact of stress on the mechanical components.

CO2 : Calculate the deflection occurring on the mechanical components

CO3: Get a detailed understanding of the thermal stress creation and its mechanism of spreading in mechanical components.

CO4: Gain knowledge regarding the mechanism of heat transfer in mechanical components.

CO5: Find out the vibration effects on mechanical components.

CO6: Design and analyze mechanical components and systems to withstand various types of loading, to ensure safety, reliability, and optimal performance.

U23AEP81 PROJECT WORK

CO1 : Demonstrate a sound technical knowledge of their selected project topic.

CO2 : Undertake problem identification, formulation, and solution

CO3: Design engineering solutions to complex problems utilising systems approach.

CO4: Conduct an engineering project.

CO5: Communicate with engineers and the community at large in written and oral forms.

CO6: Demonstrate the knowledge, skills and attitudes of a professional engine