Bachelor of Technology
(Aeronautical Engineering)

Program Outcomes (POs)

- **PO**1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO**2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO**3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO**4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO**5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO**6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO**7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO**8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO**9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO**10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO**11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12. Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

- ✓ PSO1: Graduates will possess essential skills in design and engineering analysis of aerospace systems and vehicles.
- ✓ PSO2: Graduates will be able to execute projects in aerospace industries.
- ✓ PSO3: Graduates will be able to carry out research in multidisciplinary areas.

Semester	Course Code	Course Name	Course Outcomes (COs)
1st Semester			
	18BS1MA01	Mathematics-I	CO1: Examine the power series expansion of the function and evaluate indeterminate forms CO2: Employ the method of Eigen values and Eigen vectors to solve system of first order differential equations CO3: Examine surface area and volumes of revolution by using reduction formulae and tracing of curves CO4: Compare the extreme values of the multivariable function and determine potential functions for irrotational force fields CO5: Choose different methods to solve first and higher order linear ordinary differential equations
	18BSCH02	Chemistry	CO1: Recognize the principles of thermodynamics, electrochemistry and their importance in current engineering trends Co2: Outline the fundamentals of Chemistry required to solve engineering problems CO3: Interpret the concept of configuration, basic reactions and synthesis of organic compounds CO4: Employ the ability to apply the concepts of synthesis of organic and nano compounds CO5: Describe the thermodynamic properties, protection of metals and control of pollutions CO6: Summarize the key ecological and physical principles and methods, as well as to apply to solve environmental problems
	18BSCH02L	Chemistry Lab	CO1: Examine the physical principle involved in the various instruments CO2: Explain the principles of the experiments to new application CO3: Experiment different types of titrations in volumetric analysis CO4: Demonstrate skills in performing experiments based on theoretical fundamentals CO5: Employ the basic chemistry laboratory techniques for small/large scale water analysis and purification CO6: Interpret cognitive skills in accordance with current engineering and technology developments
	18ESEE02	Basics of Electrical Engineering	CO1: Recognize and explain basic electric circuits CO2: Identify and paraphrase the basic magnetic circuits CO3: Demonstrate the working principles of transformers

			CO4: Recognize the working principles of rotating electrical machines CO5: Employ the components of low voltage electrical installations
	18ESEE02L	Electrical Engineering Lab	CO1: Illustrate the basic properties of electrical elements, and solve DC circuit analysis problems and DC network theorems CO2: Interpret the fundamental behaviour of AC circuits and solve AC circuit problems CO3: Describe the basic properties of electromagnetic circuit & their application in Electrical machines CO4: Demonstrate experiments and verify the characteristics and losses with respect to given Machines. CO5: Understand and demonstrate load test on Induction motor and DC motors to assess its performance
	18ESME04L	Workshop Practice	CO1: Discuss basic operational features of casting, forming, machining, Joining and advanced manufactruing methods CO2: Demonstrate knowledge on NC machine basics and the use of CNC milling machine CO3: Illustrate usage of power tools CO4: Demonstrate the usage of tools and equipments used in fitting and carpentry. CO5: Illustrate metal casting process CO6: Test welding for butt joint, lap joint and T joint
	18HSS02	Sociology and Elements of Indian History for Engineers	CO1: Outline the fundamental concepts of Sociology and History CO2: Choose the sociological concepts with new technologies for overall growth CO3: Critize the theoretical concepts and to reflect on them in contemporary social life CO4: Examine the knowledge of social change into development of the society CO5: Distinguish the knowledge of sociology of science in engineering domain and in solving the real life problems
2nd Semester			
	18BS2MA01	Mathematics-II	CO1: Employ multiple integrals to find area, surface area and volume CO2: Differentiate line, surface and volume integrals of vector fields CO3: Employ Laplace Transforms to solve ordinary differential equations CO4: Dissect differentiation of complex valued functions to understand its transformations

			CO5: Dissect integrals of complex valued functions to understand its evaluation process
	18BSPH02	Physics	CO1: Outline the role of physics in the field of Engineering CO2: Illustrate the applications of physics for Engineering problems CO3: Demonstrate the problem-solving ability to identify the solutions CO4: Examine the quantum model to explain the behavior of a system at microscopic level CO5: Solve the crystal structure to identify the lattice parameters CO6: Employ the fundamentals of photonics to improve the optical fiber communication
	18BSPH02L	Physics Lab	CO1: Demonstrate the working knowledge of optical, electrical and electronics experiments CO2: Illustrate the procedure to conduct the experiments and correlate their results CO3: Compare moduli of elasticity of given materials CO4: Interpret the diffraction of light to determine the wavelength of incident laser CO5: Examine the Fermi energy of a conductor and semiconductor CO6: Construct simple circuits to verify I-V characteristics of a diode, Stefan's constant, Planck's constant, Dielectric constant and frequency response of resonance circuit
	18HSS01	English	CO1: Paraphrase the writing skills with proper understanding of grammar and syntax CO2: Demonstrate their public speaking skills with correct pronunciation and practicing situational conversations CO3: Employ Coherent Content and use a variety of accurate sentence structure CO4: Illustrate their listening comprehension skills by practicing active listening CO5: Interpret academic vocabulary orally and in writing; summarize and paraphrase information in a text
	18HSS01L	English Lab	CO1: Employ computer aided multimedia instructions and language acquisition CO2: Demonstrate practical knowledge on communication skills CO3: Examine nuances of English speech sounds, words accent, intonation and rhythm CO4: Develop the vocabulary of English and competency for business

			English CO5: Interpret the classroom lectures and practice the exercise proactively through interactive activities
	18ESCS01	Problem Solving through Programming	CO1: Understand the components of computing systems and programming concepts CO2: Develop algorithms and flowchart for mathematical and scientific problems CO3: Exhibits the knowledge of programming basics with C program structure CO4: Develop modular programs using decision and control structures CO5: Demonstrate the usage of Pointers, arrays, strings and functions CO6: Implement programs to solve real world problems using programming feature
	18ESCS01L	Problem Solving through Programming Lab	CO1: Formulate the algorithms for mathematical & computational problems CO2: Translate given algorithms to a working and correct program CO3: Demonstrate programming development tool, compiling, debugging, linking and executing a program CO4: Exhibit programming knowledge by using appropriate construct to solve a given problem CO5: Design to logical formulations to solve mathematical & computational CO6: Develop effectively the required programming components that efficiently solve computing problems in real world
	18ESME01	Engineering Graphics	CO1: Familiarize with the fundamentals and standards of engineering graphics CO2: Draw the orthographic projections of points, lines and plane surfaces CO3: Sketch the sectional views of simple solids and extend its lateral surfaces CO4: Visualize and to project isometric views of simple solids. CO5: Prepare and interpret the drawings of buildings CO6: Demonstrate orthographic and isometric views through CAD software
3rd Semester			
	18HSS03	Economics for Engineers	**CO 1.** To identify and explain economic concepts and theories related to the behaviour of economic agents, markets, industry and firm

			structures, legal institutions, social norms, and government policies. **CO 2.** To demonstrate an awareness of the role in the global economics environment. **CO 3.** To analyse business and managerial economic decisions **CO 4.** To evaluate the consequences of economic activities and institutions for individual and social welfare **CO 5.** To demonstrate an awareness of socio-economic policies of the central bank and central government **CO 6.** To evaluate current economic scenarios
	18AN32	Engineering Materials and Manufacturing Processes	**CO 1.** Illustrate basics of materials, its properties and potential applications in Aircraft and Aerospace. **CO 2.** Completely understand of casting and special casting processes and to application in industries **CO 3.** Demonstrate sheet metal fabrication relating to aircraft and space craft applications **CO 4.** Exposure to welding processes preferably used in aircraft and space craft applications **CO 5.** Plan for manufacturing simple components used in aircraft applications by forging and rolling operations **CO 6.** Outline the requirements for drawing and extrusion processes with respect to fabrication of different components like hollow and solid cross sections
	18AS33	Fluid Mechanics	**CO 1.** Identify the fluid characteristics and behavior and demonstrate the application to problems in fluid properties. **CO 2.** Explain and apply the concepts and problems in fluid statics. **CO 3.** Use of the laws of motion to solve and examine the fluid motion. **CO 4.** Use of scale effects in moving fluid to simplify problems. Employ the simplified viscous flow solutions to fluid flow. **CO 5.** Explain the basic terminologies and use the modeling concepts to solve problems. **CO 6.** Explain the effect of boundary layer to fluid flows and compute boundary layer parameters.
	18AS34	Introduction to Aerospace Vehicles and Systems	**CO 1.** Describe the fundamentals of airplane and helicopters along with its operating principle. **CO 2.** Explain the operating principle of power plants in aviation

			industry **CO 3.** Identify the structural components of aircraft and describe the materials used in the field of aviation. **CO 4.** Classify different types of airplane Hydraulic, Pneumatic, Fuel, Electrical & Communication systems and Flight Control Systems **CO 5.** Classify the landing gear components and describe about Flight envelope. **CO 6.** Describe the basics of space dynamics and rocket propulsion.
	18AS35	Engineering Mechanics	**CO 1.** Identify the physical phenomena & understand the importance of mechanical properties of rigid and deformable bodies in aircraft structures. **CO 2.** Apply the stress – strain relations for variety of aircraft structures subjected to various loading conditions **CO 3.** Analyze beams for effect of shear and bending for design of beams. **CO 4.** Analyze the shafts and beams including deflection as design criteria for structural members. **CO 5.** Estimate the design factors for shafts and springs for the given data. **CO 6.** Apply energy theorems for structural analysis.
	18AN32L	Machine Shop and Precision Engineering Lab	**CO 1.** A knowledge to understand the industry lay-out and to draft a layout. **CO 2.** Awareness about the do's and don'ts in the industrial environment. **CO 3.** Expertise to perform various precision measurement techniques **CO 4.** Aptitude to perform various operations using lath **CO 5.** Skill to perform various other manufacturing processes such as milling, shaping, drilling etc., **CO 6.** A knowledge for selecting a machining process and proper tools appropriate for the work material or the requirement
	18AS33L	Fluid Mechanics Lab	**CO 1.** Measure pressure using Vernier Calipers for finding coefficient of discharge for V-Notch **CO 2.** Measure pressure using U-tube Manometer for different flow measuring devices.

			CO 3. Compare the coefficient of discharge between Orifice meter, Nozzle meter and venturimeter to find the accurate flow meter. **CO 4.** Calculate head loss due to friction in turbulent flow **CO 5.** Compare the minor losses due to change of section, valve, bend or any other interruption **CO 6.** Determine the force exerted by the jet on vanes
4th Semester			
IV	18AS41	Thermal Science	**CO 1.** Explain and demonstrate the concepts of energy and energy interactions. **CO 2.** Identify the assumptions that are to be made for an engineering design. **CO 3.** Apply the laws of thermodynamics to engineering problems. **CO 4.** Decide the feasibility of design using thermodynamics principles with variables. **CO 5.** Develop new ideas to an engineering design satisfying thermodynamics and heat transfer principles. **CO 6.** Identify heat transfer challenges in engineering problems and society
	18AN42	Aerodynamics	**CO 1.** Illustrate the basic physics behind the different types of flow, governing equations. **CO 2.** Use the basic flow models, conformal transformation and thin airfoil models for predicting forces. **CO 3.** Examine the 2D or 3D flow models in aerodynamics for lift and drag computations. **CO 4.** Identify the principles of one dimensional compressible supersonic flow for determining the performance of the nozzle. **CO 5.** Use the normal shock and oblique shock relations for calculating aerodynamic properties for a supersonic flow. **CO 6.** Use the compressible flow equations to estimate the lift and drag coefficient of an airfoil.
	18AN43	Measurements and Instrumentation for Aerospace	**CO 1.** Compare the basic Instruments used in Aircraft. **CO 2.** Distinguish various display devices used in Aircraft. **CO 3.** Explain the principle of operation of Air Data Instruments and Gyroscopic instruments used in Aircraft. **CO 4.** Explain the operation of various engine instruments and pressure instruments used in Aircrafts **CO 5.** Describe the operation of the fuel Instruments used in aircrafts

			CO 6. Discuss the functioning of flight data recorders and application of instruments.
	18AS44	Data Structures using C	**CO 1.** Understand the concepts of data structure, algorithms and ADT. **CO 2.** Apply linear and non-linear data structures in real world problems. **CO 3.** Demonstrate Tree and Hashing to handle the data efficiently. **CO 4.** Analyze data structures and algorithms to solve real world problems. **CO 5.** Evaluate searching and sorting algorithms. **CO 6.** Design the data representation using graph technique.
	18AN45	CAD Lab using CATIA V5	**CO 1.** Provide skills in modern tools involved for modeling in Industry. **CO 2.** Identify the national and international design standards pertaining to professional drawing. **CO 3.** Apply limits and tolerances to assemblies and choose appropriate fixtures and joints **CO 4.** Recognize location of critical components location in an assembly sketch. **CO 5.** Introduce new design ideas for reducing of size and weight. **CO 6.** Apply the different standards in drafting the designed model.
	18AN42L	Aerodynamics Lab	**CO 1.** Analyze the air flow in a wind tunnel. **CO 2.** Experimentally measure the aerodynamic coefficients of an airfoil. **CO 3.** Measure the aerodynamic forces using wind tunnel balances. **CO 4.** Obtain the boundary layer thickness and velocity profile. **CO 5.** Calculate the wake thickness. **CO 6.** Conduct flow visualization studies.
	18AN43L	Measurements and Instrumentation lab	**CO 1.** Measure bearing angle using magnetic compass to understand the use of navigational instruments. **CO 2.** Measure temperature using thermocouple and designed RTD circuits. **CO 3.** Examine the given signal characteristics using oscilloscope. **CO 4.** Determine the target's speed using RADAR equipment. **CO 5.** Measure load using strain gauge and displacement using potentiometer. **CO 6.** Measure pressure and acceleration using MEMS sensor
5th Semester			
V	18AN51	Aircraft Propulsion	**CO 1.** Explain the basic aerothermodynamic principles of aircraft

			engine components. **CO 2.** Recognize typical engine design components and their characteristics. **CO 3.** Estimate performance parameters of aircraft engines and its components. **CO 4.** Solve, analyze and interpret the basic laws of thermodynamics to engines. **CO 5.** Match performance criterion for selecting engine component. **CO 6.** Recommend selection of propulsion systems for aircraft propulsion
	18AS52	Flight Mechanics I (Performance)	**CO 1.** Understand various aerodynamic characteristics and propulsive efficiencies of piston-propeller and jet engines. **CO 2.** Understand the performance characteristics like cruise, ascent and descent, turning, range and endurance of an aircraft. **CO 3.** Understand aircraft take-off, landing and noise characteristics. **CO 4.** Predict aircraft performance based on aerodynamic properties and engine performance. **CO 5.** Determine aircraft static stability, control and various mission profiles of different types of aircraft. **CO 6.** Understand the concept of aircraft noise and their effects on humans.
	18AN53	Aircraft Structures	**CO 1.** Perform analysis, and interpret results of simple aircraft structural elements in the form of beams and frames. **CO 2.** Analyse stable planar and space trusses . **CO 3.** Demonstrate special aerospace features like unsymmetrical bending, Shear center and shear flow concepts. **CO 4.** Idealize complex aircraft structures for the analysis of determinate problems. **CO 5.** Solve indeterminate problems using energy methods. **CO 6.** Comprehend stability related behavior of column type structures.
	18AN54	Introduction to Helicopters	**CO 1.** Identify the Parts of Helicopters and Explain their functionality **CO 2.** Apply the Momentum theory for Analysis of Helicopter Aerodynamics **CO 3.** Apply the Blade Element theory for Analysis of Helicopter Aerodynamics **CO 4.** Differentiate the Momentum theory and Blade element theory for Analysis of Helicopter Aerodynamics

			CO 5. Calculate the performance parameters in various flight Conditions **CO 6.** Describe helicopter rotor dynamics, sources of helicopter vibrations and means of reduction.
	18AS55	Matlab with Applications	**CO 1.** Solve systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion. **CO 2**.Demonstrate understanding of the concepts of vector space and subspace. **CO 3**.Apply principles of matrix algebra to linear transformations. **CO 4**. Generate plots and export this for use in reports and presentations **CO 5**. Create program scripts and functions using the Matlab development environment **CO 6**. To implement the algorithm using Matlab to solve real world problems
	18AN51L	Propulsion Lab	**CO 1.** To estimate and analyze heat transfer coefficient for forced convection over a flat plate and natural convection over an airfoil. **CO 2.** To calculate the performance of a twin blade propeller. **CO 3.** To measure the pressure and velocity distribution in a convergent nozzle. **CO 4.** To determine the growth rate of a free jet by finding the velocity profiles at different locations. **CO 5.** To predict the pressure distribution on the blade surface of a turbine in cascade wind tunnel. **CO 6.** To determine the speed of premixed flame with mass flow rates.
	18AN53L	Aerospace Structures Lab I	**CO 1.** Differentiate between statically determinate and indeterminate structures. **CO 2.** Apply equations of equilibrium to structures and compute the reactions. **CO 3.** Determine various unknowns based on Statics through many theorems and concepts. **CO 4.** Analyze and draw the influence lines for reactions. **CO 5.** Determine stresses and strains by fringe patterns. **CO 6.** Assess critical loads and mode shapes.
6th Semester			
VI	18AN61	Avionics	**CO 1.** Demonstrate the communication principle to aircraft systems. **CO 2.** Compare the different radar systems used in aircraft.

			CO 3. Explain the different navigation concepts for aircraft . **CO 4.** Compare the navigation systems used in the aircraft. **CO 5.** Apply bus architecture to aircraft communication . **CO 6.** Implement GPS principles to aerospace applications.
	18AN62	Control Systems	**CO 1.** Understand open loop and closed loop control systems, types of control systems. **CO 2.** Develop mathematical model for different dynamical systems. **CO 3.** Analyze stability of dynamical systems based on the classical control theory. **CO 4.** Implement controllers and compensators using PID. **CO 5.** Formulate solutions using classical control system design methods for solving control problems to meet the desired specifications. **CO 6.** Analyze dynamical system using modern control theory i.e., state space analysis and use of MATLAB to solve simple problems.
	18AN63	Composite Materials	**CO 1.** Select materials for different aircraft structures under different service conditions. **CO 2.** Select different types and forms of raw materials used for fabrication and fabrication procedures to make different components and structures **CO 3.** Compare different mechanical properties of polymer matrix and metal matrix composites along with their applications in structures **CO 4.** Use ceramic matrix and carbon matrix composites for aircraft engine and space structures **CO 5.** Elaborate on high speed aerodynamics, thermal barrier coatings and ablative coatings **CO 6.** Describe NDT techniques and inspect composite structure for defect analysis and evaluation
	18AN66L	Aerospace Structures Lab II	**CO 1.** Hands on experience to calibrate and measure the dimensions using various instruments. **CO 2.** Better understanding and verification of the concepts of Strength of Materials and Aircraft **CO 3.** Structures. **CO 4.** Determination of Stresses and Strains by fringe patterns. **CO 5.** Assessment of critical loads and mode shapes. **CO 6.** Get an appreciation of the mechanics of modern fiber reinforced composites and their fabrication. **CO 7.** Evaluation of simple mechanical property testing of standard

			specimens.
	18AS67P	Flight Lab Course	**CO 1.** Understand what an aircraft, glider is with hands on experience **CO 2.** Importance of aircraft CG and its relevance of movement **CO 3.** Calibrate system instrumentation **CO 4.** Experience Flight and Conduction of experiments during flight **CO 5.** Appreciate theory and practice **CO 6.** Appreciate and compare various facilities
	18AS641	Rocket Propulsion	**CO 1.** Apply the basic principles of rocket propulsion to evaluate performance parameters. **CO 2.** Apply the principle of energy-conservation to solve nozzle flow problems. **CO 3.** Apply the concepts of combustion to design thrust chambers. **CO 4.** Design solid and liquid propulsion systems and analyze their performance. **CO 5.** Apply the elements of solid and liquid propulsion systems to cryogenic and hybrid propellant rockets. **CO 6.** Solve and analyze multi staging problems.
	18AS642	Flight Mechanics II (Stability and Control)	**CO 1.** Derive governing equations and linearize them. **CO 2.** Predict steady and quasi-steady aerodynamic derivatives **CO 3.** Derive open loop transfer function for longitudinal and later-directional motion **CO 4.** Study stability characteristics. **CO 5.** Apply various aircraft handling qualities and stability augmentation systems. **CO 6.** To understand control augmentation and its various types.
	18AS651	Introduction to Fracture Mechanics	**CO 1.** Understand fundamentals of fracture through conventional and modern design approaches. **CO 2.** Explain fracture based problems by LEFM Approach (Griffith's and Irwin's approach). **CO 3.** Explain fracture based problems by EPFM approach (CTOD & J-Integral methodology). **CO 4.** Relate and solve a Structure under fatigue loads. **CO 5.** Distinguish and infer on failure mechanisms in composites. **CO 6.** Describe NDT techniques and can justify about their applications.
	18AS652	Introduction to Finite Element Methods	**CO 1.** Ability to idealize various aircraft structural components. **CO 2.** Apply discretization methods systematically to aircraft

			components in parts. **CO 3.** Acquire the knowledge of writing FEM codes for structural and thermal analysis software packages. **CO 4.** Perform various types of analysis for aircraft structural components. **CO 5.** Acquire the knowledge of post-processing and validation of the analysis results. **CO 6.** Apply software knowledge to solve practical problem.
7th SEMESTER			
VII	18AS71	Aerospace Design	**CO 1.** Outline the basics of aerodynamics, propulsion and structures for the Preliminary design calculations. **CO 2.** Identify design requirements and compute weight estimation, fuel load estimation. **CO 3.** Compile and Compute Wing loading, Thrust loading, Performance related data and V-n Diagram. **CO 4.** Estimate the stress and design margins for all the primary and secondary structural members. **CO 5.** Estimate the stability characteristics and Design characteristics of the model developed by using software's. **CO 6.** Identify design and manufacturing tolerances followed in the aerospace industry.
	18AS72	Computational Fluid Dynamics	**CO 1.** Analyze mathematical models for modeling of various flow problems. **CO 2.** Classify partial differential equations based on the mathematical and physical properties modeled by them. **CO 3.** Analyze and apply finite difference method for solution of partial differential equations governing fluid flow. **CO 4.** Analyze and apply finite volume method for for solution of partial differential equations governing fluid flow. **CO 5.** Analyze and apply time discretization schemes for fluid flow problems. **CO 6.** Apply numerical methods to solve incompressible and compressible flow problems

	18AS78L	Computational Analysis Lab	**CO 1.** Demonstrate various steps involved in performing the structural analysis of aircraft structural components using MSC Patran, Nastran. **CO 2.** Apply various boundary conditions, material properties and given loading conditions on MSC patran tool. **CO 3.** Become adept at using different meshing techniques on MSC Patran. **CO 4.** Interpret the results of analysis by comparing them with theoretical values. **CO 5.** Use ANSYS Fluent software for analysis of airfoils, nozzle etc. and other aerospace systems/components **CO 6.** Capable of performing different meshes using ANSYS **CO 7.** Obtain aerodynamic performance results and plot contours of physical quantities through post-processing **CO 8.** Perform computational aerodynamic analysis using ANSYS
	18AS731	UAV Systems	**CO 1.** Describe the historical evolution of Unmanned Aerial Vehicles (UAVs), their applications and regulations related to UAVs **CO 2.** Explain the terminology specific to UAVs **CO 3.** Apply the concepts of Aerodynamics, Propulsion, Structures and Systems to UAVs **CO 4.** Analyze basic Fixed Wing and Rotary Wing UAVs design problems **CO 5.** Categorize UAV payloads and sizing based on mission requirements **CO 6.** Analyze Mission Plans for UAVs
	18AS732	Aircraft Systems	**CO 1.** Ability to identify, formulate and solve aircraft system requirements important to the industry; **CO 2.** The broad education necessary to understand the impact of aerospace systems in a global and societal context; **CO 3.** Ability to use the techniques, skills and modern engineering tools necessary for engineering practice; **CO 4.** Competence in the integration of aerospace science and engineering topics and their application in aerospace vehicle design; **CO 5.** An understanding of professional and ethical responsibility; **CO 6.** Recognition of the need for, and an ability to engage in life-long learning.
	18AN741	Air Traffic	**CO 1.** Demonstrate an understanding of the general principles and

		Management	theories of operation of the air traffic control system. **CO 2.** To have brief understanding of Air Traffic Services around the globe. **CO 3.** Demonstrate an understanding of the procedures used in radar and non-radar air traffic control. **CO 4.** Have familiarization with international air traffic control. **CO 5.** Have familiarization with future enhancements to the national airspace system. **CO 6.** Be able to transition into Aviation 192 (Instrument Flight) with a sound grasp of instrument flight procedures.
	18AN742	Vibration of Elastic Systems	**CO 1.** Analyze vibration of multi-degree-of-freedom-discrete systems **CO 2.** Analyze vibration of multi-degree-of-freedom-discrete systems **CO 3.** Analyze vibration of continuous systems **CO 4.** Analyze vibrations of nonlinear systems and random vibrations **CO 5.** Learn the experimental technique to solve complex engineering vibration problems **CO 6.** Apply knowledge of vibration to solve aeroelastic problems