Bachelor of Technology -Aerospace 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)

- ✓ PSO 1: Possess skills in design, development and testing of structures and systems for aerospace vehicles.
- ✓ PSO 2: Become professionally competent to take up real time projects through aerospace industries.
- ✓ PSO 3: Pursue research in multidisciplinary areas.

Course Outcomes (COs)

2017 – 2021 Batch

Semester	Course Code	Course Name	Course Outcomes (COs)
I	17BS1MA01	Applied Engineering Mathematics-I	CO1: Determine the power series expansion of the function with the help of mean value theorems. CO2: Analyze the multivariable function for extreme values CO3: Apply multiple integrals to find area, surface area and volume CO4: Employ the method of reduction formulae to find surface area and volumes of evolution CO5: Solve first and higher order ordinary differential equations CO6: Model a physical phenomenon into a mathematical equation
	17BSCPY02	Applied Physics	CO1: Understand the role of physics in Engineering field CO2: Analyze the applications of physics for engineering problems CO3: Demonstrate the problem-solving ability to identify the solutions CO4: Construct the quantum model to explain the behavior of a system at microscopic level CO5: Apply the properties of lasers to improve the optical fiber communication
	17BSCPY02L	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
	17ESCCV03	Basics of Civil Engineering	CO1: Knowledge of different fields of Civil Engineering, Building Materials and Planning of a Building CO2: Comprehend Resultant of Concurrent and Non-Concurrent Force Systems, Support Reactions, Concept of Centroid and Moment of Inertia CO3: Compute Resultant Forces, Centroid of Plane Figures, Moment of Inertia
	17ESCME04	Basics of Mechanical	CO1: Describe working of steam turgines, impulse and reaction turbines

		Engineering	CO2: Demonstrate knowledge on machine tools and basic manufacturing processes CO3: Explain working of two stroke and Four stroke IC engine CO4:Discuss on the basics of refridgeration and airconditioning systems CO5: Discuss on the orking Principles of power transmitting elements.and related actuators CO6: Demonstrate knowledge on basics of manufacturing processes and machine tools
	17ESCME05	Engineering Graphics	CO1: Indicate the basic entities and perspective of a technical drawing as per the BIS standards CO2: Construct the projection of points in various angles of projections manually and with SolidEdge CO3: Construct the projection of lines and planes in first angle projection manually and with SolidEdge CO4:Construct the projection of solids in first angle projection manually and with SolidEdge CO5: Construct the projection of solids in isometric perspective manually and with SolidEdge CO6: Generate orthographic and isometric views through CAD software
	17ESCME41L	Worskshop Practice	CO1: Demonstrate knowledge on the basics of casting, forming, machining, Joining processes CO2: Discuss on the concepts and programming related to CNC machines CO3: Demonstrate skill on fitting with square joint and V joint CO4: Demonstrate skill on carpentry works with dove tail joint and lap joint CO5: Demonstrate skill on carpentry works with dove butt joint. lap joint and T joint CO6:Perform casting of simple components
	17HSSC06	Sociology and Elements of Indian History for Engineers	CO1: Understand the fundamental concepts of Sociology and History CO2: Apply the sociological concepts with new technologies for overall growth CO3: Analyze the theoretical concepts and to reflect on them in contemporary social life CO4: Evaluate the knowledge of social change into developments of the society

	Course Code	Course Name	Course Outcomes
II	17BS2MA01	Applied Engineering Mathematics-II	CO1: Apply double and triple integrals to find surface area and volume of solids CO2: Employ differentiation on vector point functions CO3: Analyze line, surface and volume integrals using vector point functions CO4: Apply Laplace Transforms to solve ordinary differential equations CO5: Analyze the solution of system of linear differential equations using Eigen value and Eigen vectors CO6: Test for consistency and solve system of linear equations
	17BSCCH02	Applied Chemistry	CO1: Have knowledge of basics of Nanomaterials and their application CO2: Understand the concepts of Fuels, corrosion and their importance in the engineering CO3: Ability to understand different types of pollutions and analysis of pollutants CO4: Interpret the replacement of conventional materials by polymers for domestic and industrial applications CO5: Have a knowledge of electrochemistry and Ability to analyze & design of energy storage devices
	17BSCCH02L	Chemistry Lab	CO1: Analyse the physical principle involved in the various instruments CO2: Relate the principles of the experiments to new application CO3: Perform different types of titrations in volumetric analysis CO4: Exhibit skills in performing experiments based on theoretical fundamentals CO5: Study and apply basic chemistry laboratory techniques for small/large scale water analysis and purification CO6: Improve cognitive skills in accordance with current engineering and technology developments
	17ESCEC03	Basics of Electronics Engineering	CO1: Explain the fundamentals and concepts of semiconductor devices and its application's CO2: Demonstrate knowledge on the basic structure and operation of transistor with different configurations for various applications CO3: Explain the basics of Communication System with transmission medium and modulation schemes CO4: Examine different analog & digital circuits
	17ESCEE04	Basics of Electrical Engineeing	CO1: Understand the basic laws used in electrical circuits, both DC & AC, Electrical Power Generation. CO2: Analyze the working of electrical machines. CO3: Distinguish between conventional and non conventional sources and their applications.
	17ESCEE34L	Electrical and	CO1: Analysis of Resistive Circuits and Solution of

		Electronics Lab	resistive circuits with independent sources CO2: Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits CO3: Analysis of DC Circuits and practical demonstration of Kirchoff's laws
	17ESCCS05	Problem Solving thorugh 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
	17ESCCS05L	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
	17HSS07	Communicative English	CO1: Explore new ideas in areas like presentations, group discussions and conversations CO2: Transform their pronunciation of English with basic understanding of phonetics CO3: Express fluently in flawless English with proper understanding of grammar and syntax CO4: Develop command in their language which would build their confidence CO5: Identify the salient features of literary texts to produce creative thinking and imaginative writing
III	17BS3MA01	Applied Engineering Mathematics III	**CO1:** Apply Fourier series, Fourier Transform to the functions and Z transform to find solution of difference equations. **CO2:** Analyze the data by fitting linear and non-linear equations using least square method **CO3:** Apply numerical technique to solve algebraic, transcendental, integral problems and ordinary

			differential equations. **CO4:** Determine the solution of wave, heat equation and boundary value problems
	17HSSC08	Economics for Engineers	**CO1:** 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. **CO2:** Demonstrate an awareness of the role in the global economics environment **CO3:** Analyse business and managerial economic decisions **CO4:** Evaluate the consequences of economic activities and institutions for individual and social welfare. **CO5:** Demonstrate an awareness of socio-economic policies of the central banks and central governments **CO6:** Understand the impact of current and historical economic policies in the Indian scenario
	17AE33	Fluid Mechanics	**CO1:** Basic understanding of fluid and its properties **CO2:** To impart the basics of fluid statics and Aerostatics and their applications **CO3:** To explain the basic laws of fluid motion and their simplified form to solve fluid flow problems **CO4:** To introduce the concept of dimensional analysis and its application **CO5:** To introduce the concept of viscous flow through pipes and plates **CO6:** To impart basic knowledge of boundary layer concepts methods
	17AE34	Thermodynamics	**CO1:** Understand the concepts such as conservation of mass, conservation of energy, work interaction, heat transfer and first law of thermodynamics **CO2:** Apply the concept of First law and analyze related problems **CO3:** Apply the concept of second law to design simple systems and analyze related problems **CO4:** Analyze the performance of gas and vapor power cycles and identify methods to improve thermodynamic performance **CO5:** Demonstrate the importance of phase change diagrams of various pure substances **CO6:** Understand the fundamentals of fluid machinery in thermal aspects
	17AE35	Engineering Mechanics	**CO1:** Select appropriate materials for aerospace structures **CO2:** Understand how to design various aircraft structural components **CO3:** Identify the design criteria for maximum stresses and/or maximum displacements **CO4:** Use appropriate stress-strain relations for

			variety of 1D and 2D aircraft structures **CO5:** Apply suitable integration methods for computation of slopes and deflections **CO6:** Solve the problems on energy theorems
	17AE32L	Measurements & Instrumentation Lab	**CO1:** Determine bearing using magnetic compass to understand the use of navigational instruments **CO2:** Measure temperature using Thermocouple and RTD. **CO3:** Analyze the signal characteristics using oscilloscope. **CO4:** Determine the target's speed using RADAR equipment. **CO5:** Design and measure Load and Displacement using Strain gauge and Potentiometer respectively. **CO6:** Measure Pressure using MEMS pressure sensor.
	17AE33L	Fluid Mechanics Lab	**CO1:** To teach and Calibration of flow measuring devices **CO2:** Identify and obtain the values of fluid properties and relationship between them and understand the principles of continuity, momentum, and energy as applied to fluid motions. **CO3:** To impart knowledge in measuring pressure, discharge and velocity of fluid flow **CO4:** To compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows **CO5:** Correlate various flow measuring devices such as Venturimeter, orifice meter and notches etc **CO6:** The ability to communicate in written reports and oral presentation.
IV	17BS4AE01	Engineering Mathematics for Aerospace Engineers	**CO1:** Apply the concept of probability to understand random variables and its distributions **CO2:** Analyze Sampling theory and test hypothesis on engineering application problems **CO3:** Analyze Joint probability distributions and Morkov chains **CO4:** Discuss the complex transformations and integrations of complex valued functions **CO5:** Apply calculus of variations to find the extremal of a functional
	17AE42	Aerospace Vehicles & Systems	**CO1:** Summarize the basics of aircraft and the origins of aircraft designs **CO2:** Identify the different components of an aircraft **CO3:** Interpret the different characteristics of an aircraft's performance based on aircraft construction **CO4:** Classify the systems which are used in the aerospace environment **CO5:** Differentiate between the different types aircraft

			components such structures, powerplants, materials, etc. **CO6:** Explain the basics of space dynamics and rocket propulsion
	17AE43	Machine Drawing	**CO1:** Identify the national and international standards pertaining to machine drawing. **CO2:** Apply the knowledge on illustrating sectional views and orthographic views. **CO3:** Apply limits and tolerances to assemblies and choose appropriate fits. **CO4:** Understand and apply the basics of threads, rivets and fasteners **CO5:** Recognize machining and surface finish symbols. **CO6:** Illustrate various machine components through drawings.
	17AE44	AERODYNAMICS-I	**CO1:** Understand the basic physics behind the governing equations and elementary flow characteristics to solve the flow field problems. **CO2:** Understand the flow behavior of different flows and by superimposing them determine force acting on cylinder. **CO3:** Apply Conformal and Kutta Joukowski transformations for transforming the forces acting on cylinder to an airfoil. **CO4:** Apply thin airfoil and finite wing theory for predicting forces and moments acting on aircraft. **CO5:** Apply Prandtl's lifting line equations for calculating lift and moment coefficient on simple airfoils. **CO6:** Understand the basic concept of boundary layer flows.
	17AE46	Engineering Materials and Manufacturing Processes	**CO1:** Understand basics of materials, its properties and potential applications in different industry sectors **CO2:** Compare the different materials and fabrication processes **CO3:** Explain the process, equipment and tools used and understanding the process controlling parameters. **CO4:** Design and fabricate simple parts and systems through different techniques **CO5:** Understand basic sheet metal processes for simple parts fabrication **CO6:** Understanding basics of polymers and elastomers and its applications
	17AE45L	AEROSPACE STRUCTURES LAB	**CO1:** Differentiate between statically determinate and indeterminate structures. **CO2:** Apply equations of equilibrium to structures and compute the reactions. **CO3:** Determine various unknowns based on Statics

			through many theorems and concepts. **CO4:** Analyze and draw the influence lines for reactions. **CO5:** Determine stresses and strains by fringe patterns. **CO6:** Assess critical loads and mode shapes.
	17AE46L	MACHINE SHOP AND PRECISION ENGINEERING LAB	**CO1:** Understand the given drawing and to prepare process plan for the given component **CO2:** Select of proper tools and work materials and Process planning **CO3:** Select of cutting parameters for different machining processes **CO4:** Use instruments to measure the dimensions and features on the finished component and to check accuracy and surface finish **CO5:** Understanding the cutting forces generated during metal cutting operations in orthogonal cutting **CO6:** Understanding the cutting forces generated during drilling operation
V	17AE51	PROPULSION-I	**CO1:** Explain the basic aerothermodynamic principles of aircraft engine components. **CO2:** Interpret various performance parameters of aircraft engines. **CO3:** Can solve the basic laws of thermodynamics to engines. **CO4:** To analyze and interpret the basic correlations necessary for design of engines. **CO5:** To analyze performance characteristics required for engine selection. **CO6:** Recommend selection of propulsion systems for aircraft application.
	17AE54	INTRODUCTION TO SPACE TECHNOLOGY	**CO1:** Apply the physical laws for the spacecraft orbital movement. **CO2:** Understand the solar systems and space environment. **CO3:** Apply the basic principles of rocketry and propulsion for the space craft **CO4:** Apply the stability and spacecraft system design considerations. **CO5:** Apply the remote sensing and navigation techniques to satellites systems **CO6:** Understand the spacecraft communication technologies
	17AE55	Heat and Mass Transfer	**CO1:** Apply the principle of energy conservation and Fourier's law to solve one-dimensional heat conduction problems. **CO2:** Analyze both steady and unsteady one-dimensional heat conduction problems. **CO3:** Apply numerical methods to solve one-

			dimensional and two-dimensional heat conduction problems. **CO4:** Analyze heat exchanger problems and solve heat convection problems. **CO5:** Apply the concepts of radiation heat transfer to solve combined heat transfer problems. **CO6:** Apply the concepts of mass diffusion and convection to solve mass transfer problems
	17AE56	COMPOSITE MATERIALS	**CO1:** Select materials for different aircraft structures under different service conditions. **CO2:** Do composites fabrication for simple parts. **CO3:** Inspect and do NDT of Composite structures. **CO4:** Understand and implement quality concepts in composite fabrication. **CO5:** Understand importance of thermal barrier coatings in engines **CO6:** Understand concepts of high speed aerodynamics, re entry of shuttles, ablative coating technology
VI	17AE61	AEROSPACE DESIGN - I	**CO1:** Apply the basic theory of Aerodynamics, Propulsion and Aero structures to survey the various characteristics of Airplanes and Space vehicles. **CO2:** Apply design levels to compute and estimate geometrical parameters of aircraft components. **CO3:** Analyze the types of loads acting on an aircraft and estimate the weight characteristics. **CO4:** Analyze and estimate Wing loading, Thrust loading and Performance related data for an aircraft. **CO5:** Sketch the detailed layouts of an aircraft and its subsystems. **CO6:** Estimate the performance and stability characteristics of an aircraft.
	17AE62	FLIGHT MECHANICS	**CO1:** Understand the effect of lift and drag on performance and to understand performance characteristics of various aircraft power-plants. **CO2:** Derive the various equation of motions for an aircraft. **CO3:** Determine the neutral point and maneuver point for an aircraft. **CO4:** Understanding the various types of aircraft stability. **CO5:** Understand different control surfaces and their contribution. **CO6:** Demonstrate knowledge of a variety of aerospace flight vehicles.
	17AE63	PROPULSION - II	**CO1:** Apply the basic principles of rocket propulsion to evaluate performance parameters. **CO2:** Apply the principle of energy-conservation to solve nozzle flow problems.

			CO3: Apply the concepts of combustion to design thrust chambers. **CO4:** Design solid and liquid propulsion systems and analyze their performance. **CO5:** Apply the elements of solid and liquid propulsion systems to cryogenic and hybrid propellant rockets. **CO6:** Solve and analyze multi staging problems.
	17AE64	INTRODUCTION TO FINITE ELEMENT METHODS	**CO1:** Idealize various structural components. **CO2:** Apply discretization methods with the help of different element geometries for 1D and 2D structures using relevant shape functions. **CO3:** Solve the problems of Bar, Truss, Beam, Plate and axi-symmetric structures CO4: Get acquainted with the concept of Principle of minimum potential energy and other analytical methods. **CO5:** Acquire the knowledge on Convergence analysis and The P and HP finite element method for problems on thin domains (1D). **CO6:** Acquire the knowledge of post-processing and validation of the analysis results.
	17AE651	Aerospace Control Systems	**CO1:** Understand and develop the open loop and closed loop control systems. **CO2:** Develop mathematical model for different dynamical systems. **CO3:** Analyze stability of dynamical systems based on the classical control theory. **CO4:** Implement controllers and compensators using PID. **CO5:** Formulate solutions using classical control system design methods for solving control problems to meet the desired specifications. **CO6:** Analyze dynamical system using modern control theory i.e. state space analysis and use of MATLAB to solve simple problems.
	17AE662	Operation Research	**CO1:** Understand phases of an Operational research study and formulate linear programming model for real time problems. **CO2:** Apply Graphical method, Simplex algorithm, duality theory and revised simplex algorithm to solve linear programming problems. **CO3:** Design and solve transportation and Assignment Models using quantitative techniques. **CO4:** Apply critical path analysis and programming evaluation production and review techniques for timely project scheduling and completion. **CO5:** Apply Linear programming to concepts of game theory and find solution to zero- sum games. **CO6:** Analyze and solve problems with inter-arrival and service times exponentially distributed using

			queuing theory
VII	17AEDE731	Aircraft Systems	**CO1:** Identify, formulate and solve aircraft system requirements important to the industry **CO2:** Understand the impact of aerospace systems in a global and societal context **CO3:** Use the techniques, skills and modern engineering tools necessary for engineering practice **CO4:** Integrate aerospace science and engineering topics and their application in aerospace vehicle design **CO5:** Understand professional and ethical responsibility **CO6:** Recognize the need for, and an ability to engage in life-long learning
	17AEDE732	MEMS	**CO1:** Understand the basics of Micro Electro Mechanical Systems(MEMS) and Applications **CO2:** Analyze the scaling laws and its practical use to MEMS **CO3:** Apply the engineering Mechanics concept for the design of sensors **CO4:** Apply the electrostatic and electrical circuit concepts for the design of sensors and actuators **CO5:** Apply the semiconductor and chip design process for the development of pressure sensor **CO6:** Analyze the semiconductor packages for the manufacturing of sensors
	17AEDE741	Aerospace Avionics	**CO1:** Explain the basics of various building blocks of avionics systems. **CO2:** Compare the different radars and digital data bus systems used in aerospace. **CO3:** Classify the navigation instruments and systems for aerospace application. **CO4:** Apply the inertial navigation systems for aerospace control system . **CO5:** Develop the capability of synthesizing and configuring aircraft flight instrumentation system **CO6:** Apply GPS Technology for ground , aerospace and space systems for navigation .
	17AEDE742	Computational Fluid Dynamics & Aerodynamics	**CO1:** Analyze mathematical models for modeling of various flow problems. **CO2:** Classify partial differential equations based on the mathematical and physical properties modeled by them. **CO3:** Analyze and apply finite difference method for fluid flow problems. **CO4:** Analyze and apply finite volume method for fluid flow problems.

		CO5: Analyze and apply time discretization schemes for fluid flow problems.
		CO6: Apply numerical methods to model and solve turbulent flow problems
17AEDE751	Helicopter Aerodynamics & Vibrations	**CO1:** Explain the basic concepts associated with rotary wing aerodynamics. **CO2:** Identify helicopter configurations based on various rotor classifications. **CO3:** Calculate the performance of helicopter in hover, climb, descent, forward flight and autorotation. **CO4:** Describe basic helicopter control mechanisms, sources of helicopter vibrations and means of reduction. **CO5:** Apply the knowledge from Cos 1,2,3 and 4 to study and optimize the rotor configuration **CO6:** Solve and analyze aerodynamics & performance problems of helicopter
17AEDE752	Vibration of Elastic Systems	**CO1:** Understand the importance of vibration for design and development of mechanical systems in general and aerospace vehicles in particular **CO2:** Learn to represent a complex mechanical system by a simple one and determine solution **CO3:** To study vibration of various systems without and with damping. **CO4:** Analyze vibration of multi-degree-of-freedom-discrete systems **CO5:** Analyze vibration of continuous systems **CO6:** Learn the experimental technique to solve complex engineering vibration problems
17AEDE761	Aerospace Design – II	**CO1:** Understand requirements and concept of payload layouts of internal systems weight estimations. **CO2:** Apply aerodynamics to calculate all aerodynamic parameters lift, drag and their derivatives for design. Apply systems and Estimate weight of subsystems. **CO3:** Apply to Design all primary & secondary structures like fuselage, wing, HT/VT, landing gears, control surfaces as per loads. **CO4:** Analyze displacements, strains and stresses using hand calculations and FEM while subjected to allowable, limit and ultimate load. **CO5:** Understand and apply in detail design, create drawings for manufacturing Proto types and testing to validate design. Understand Aerospace Standards and Certifications from DGCA & CEMILAC. **CO6:** Apply CAD, FEM and Understand PLM software tools in manufacturing. Understand Aerospace Manufacturers and OEM Supply chain
17AEDE762	Fracture	**CO1:** Understand fundamentals of fracture through

		Mechanics	conventional and modern design approaches. **CO2:** Explain fracture based problems by LEFM Approach (Griffith's and Irwin's approach). **CO3:** Explain fracture based problems by EPFM approach (CTOD & J-Integral methodology). **CO4:** Relate and solve a Structure under fatigue loads. **CO5:** Distinguish and infer on failure mechanisms in composites. **CO6:** Describe NDT techniques and can justify about their applications.
	17AEOE712	Introduction to Fracture Mechanics	**CO1:** Understand fundamentals of fracture through conventional and modern design approaches. **CO2:** Explain fracture based problems by LEFM Approach (Griffith's and Irwin's approach). **CO3:** Explain fracture based problems by EPFM approach (CTOD & J-Integral methodology). **CO4:** Relate and solve a Structure under fatigue loads. **CO5:** Distinguish and infer on failure mechanisms in composites. **CO6:** Describe NDT techniques and can justify about their applications.
	17AEOE721	Introduction to Aerospace Vehicles & Systems	**CO1:** Understand the fundamentals airplane and helicopters with its principle of operation. **CO2:** Understand the operating principle of power plants used in aircrafts and materials used in the field of aviation. **CO3:** Compare and understand the different types of airplane systems and its components **CO4:** Classify and understand the flight control system, landing gear components and Flight envelope. **CO5:** Able to understand the basics of space dynamics and orbital mechanics **CO6:** Able to understand the operating principles of rockets and Launch vehicles, Missiles and its trajectories
	17AEOE722	Introduction to Micro Electro Mechanical Systems	**CO1:** Understand the basics of Micro Electro Mechanical Systems(MEMS) and Applications **CO2:** Analyze the scaling laws and its practical use to MEMS . **CO3:** Apply the MEMS process for devices processing **CO4:** Understand the polymer MEMS and its application **CO5:** Apply the Semiconductor packaging and testing techniques for MEMS **CO6:** Apply the MEMS for real world applications

VIII	17AEOE811	Engineering Management and Ethics	**CO1:** Comprehend and evaluate the basic principles of the fundamentals of engineering management **CO2:** Identify and apply appropriate management techniques for managing contemporary organizations **CO3:** Demonstrate an understanding of personnel management and motivational theories **CO4:** Distinguish between ethical and non-ethical situations **CO5:** Practice moral judgment in conditions of dilemma **CO6:** Apply risk and safety measures in various engineering fields
	17AEOE812	Non-Destructive Testing And Evaluation	**CO1:** Understand the Importance of Non-Destructive testing **CO2:** Explain the Basic Procedure for Various Non-Destructive techniques **CO3:** Perform the various NDT test such as Ultrasonic and Eddy current methods **CO4:** Describe the properties of radiation used in NDT **CO5:** Explain the Ultrasonics used in NDT **CO6:** Describe the concept of Tomography used for NDE
	17AE821	Operation Management	**CO1:** Summarize organization objectives and functionss and understand, evaluate & apply issues in services & manufacturing operations. **CO2:** Describe trends and developments in operation management and use them for design of operations systems elements & their modifications. **CO3:** Explain the role and importance of planning and scheduling, hierarchy in planning, Strategic planning, business plan, operations strategy **CO4:** Outline strategic and tactical decision making and Apply and carry out techniques of aggregate planning and master scheduling, operational decision making. **CO5:** Apply forecasting tools and carry out capacity planning, disseminate & use data in all concerned functional areas. **CO6:** Explain materials management, Supply chain management, its evolution, objectives, processes and techniques, functions of inventory control, inventory costs and purchase and apply the understanding to manage supply chain elements
	17AEOE822	Basics of Research And Development	**CO1:** Outline the basic concepts of R&D **CO2:** Describe the research process and methodology in R&D **CO3:** Differentiate the types of R&D **CO4:** Explain the research methodology of R&D

			CO5: Summarize the admin and evaluation process of R&D **CO6:** Discuss the future of R&D organizations