GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Accredited by NAAC with B+ Grade, An ISO 9001: 2015 Certified Institution
Affiliated to V.T.U., Belagavi, Approved by AICTE, New Delhi.

DEPARTMENT OF AERONAUTICAL ENGINEERING

Lab Infrastructure

Mechanical Measurement and Metrology Lab

This lab is associated with the science of mechanical measurements and metrology and also deals with mechanical instruments and equipments which include all theoretical and practical aspects of measurements. The scope of this lab is measurement in building, aerospace, auto motives, testing and validation methods in various industries. It is also helpful for calibration, sensors and legal metrology. The lab is essential for the socio-economic development of a country and is concerned with providing accurate measurements which impact our economic, health, safety and general well-being.

Machine Shop

The machine shop is equipped with centre lathe, radial drilling machines, shapers, milling machines, surface grinding machines .These machines help the students to prepare the lathe models, milling and shaping models. In this lab the students will do the projects by using the machine shop tools and machines under the guides of staff and instructors. By gaining knowledge of these labs, students can start their own mechanical industries like fabrication of components and also encouraging them to become entrepreneurs.

Computer Aided Aircraft Drawing Lab.

Aircraft drawing is a pictorial representation of aircraft or aircraft components or the part of a product which provides outline/inline detail of a product including how it is going to manufacture with certain rules. The aircraft symbols, tolerances, bill of material, dimensions etc are notified in that drawing. This drawing is the way of communication between you and the worker/designer/customer/manufacturer/engineer to get the desirable outcome in an efficient way. For creating the machine drawing, the students can use the different modelling software like CATIA, SOLID work, UG etc.

Material Testing Lab

The Aeronautical department is well equipped & technically organized Laboratory for the Material testing and metallurgy Laboratory. Testing of materials for their mechanical properties forms an integral part of this lab. In this lab the students conduct experiments on Universal testing machine, various hardness testing machines, Wear, Impact, fatigue and Torsion testing machines.

Fluid Mechanics and Energy Lab

In this laboratory flow behaviour and characteristics, fluid strength and analysis (practice) tools are introduced. The aim of the observation include identification of forces generated when fluid flow occurs over a solid object, indication of the energy & momentum equations, viscosity measurement and engineering correlations. Intricate flow phenomena such as separations and transition to turbulence are demonstrated. Empirical setups such as fluid flow through a tube, fluid flow over a flat, inclined and curved plates, wind tunnel, and viscometer are made available to the students. The lab experiments utilize U-tube manometer and inclined manometer. The areas of research include flow imaging, control, jets, micro-scale transport, and interfacial fluid dynamics.

Aerodynamics Lab

Aerodynamics is the way objects move through air. The rules of aerodynamics explain how an airplane is able to fly. Anything that moves through air is affected by aerodynamics, from a rocket blasting off, to a kite flying. Since they are surrounded by air, even performance characteristics of automobiles come under aerodynamics. The effect of the moving air on different kinds of streamlined objects is studied in our Aerodynamics lab through wind tunnels. WIND TUNNEL is a facility for creating a uniform wind of known value in a duct where fluid flow phenomena can be investigated. This facility can be used for testing required models.

Aircraft Propulsion Lab

An aircraft propulsion system generally consists of an aircraft engine and some means to generate thrust, such as a propeller or a propulsive nozzle. Aircraft Propulsion Lab provides a readable, up-to-date survey of aircraft and rocket propulsion systems.

It includes experiments on Study of an aircraft piston engine. Study of an aircraft jet engine (Includes study of assembly of sub systems, various components, their functions and operating principles), Study of forced convective heat transfer over a flat plate, Cascade testing of a model of axial compressor blade row, Study of performance of a propeller, Determination of heat of combustion of aviation fuel. Study of free jet, Measurement of burning velocity of premixed flame. Fuel-injection characteristics, Measurement of nozzle flow.

Aircraft Structures Lab

Aircraft Structures is a study of various aircraft components which is made up of an airframe, specifically fuselage, booms, nacelles, cowlings, fairings, airfoil surfaces, and landing gear. There are also accessories and controls that go with these structures. It includes experiments on Deflection of a Simply Supported Beam. Verification of Maxwell's Reciprocal Theorem. Determination of Young's Modulus using strain gages. Poisson Ratio Determination, Buckling load of slender Eccentric Columns and Construction of South well Plot, Shear Failure Analysis Bolted and Riveted Joints ,Bending Modulus of sandwich Beam, Verification of Superposition Theorem, Determination of fundamental frequency of a cantilever beam and harmonics. Frequency spectrum analysis for a cantilever beam

Simulation Lab

Simulation lab provides facilities which can be used for simulation of algorithms used in avionics equipment's. It includes experiments on Investigation of Falling sphere with viscous drag, Frequency response for a spring-mass system; Simulation of simple servo-mechanism feedback system, Digital simulation of Analog Computations, Simulate a bomb drop from an aircraft on a moving tank for pure –pursuit motion, Simulation of an Air Speed Indicator to read air speeds for the pressures read from a Pitot-static tube, with compressibility corrections. Simulation of a runaway. Simulation of a point take-off from a runaway.

Design modelling and Analysis Lab

The Design Modelling and Analysis Lab provides facilities which can be used for basic designs aircraft components. It includes the Modeling and Analysis for Velocity Vectors and Pressures Distributions, Incompressible and Inviscid Flow over a Symmetric and Cambered Aerofoil Geometry, Convergent Divergent Nozzle and Analysis of Flow for Adiabatic Conditions, Structural Modeling of Sandwich Beam of Rectangular Cross-Section and Analysis for Stresses, Structural Modeling of a Three Dimensional

Wing. Structural Modeling and Stress Analysis of a Fuselage Bulk Head. Structural Modeling and Stress Analysis of a Simply Supported Rectangular Plate Uniformly Compressed in one Direction. Structural Modeling and Stress Analysis of a Simply Supported Rectangular Plate Uniformly Compressed in one Direction with a Cut Out in Center.

GRIT: UAV Lab

The Unmanned Aerial Vehicles Laboratory (UAV Laboratory) at the department of Aeronautical Engineering is developed to establish a state-of-the-art research infrastructure to support outstanding research and education in the advancement and application of this Unmanned Technology. The UAV laboratory aims in nurturing young talents by bringing in multi-rotor & fixed wing UAV development and real-world flight testing experiences at the undergraduate and postgraduate level courses as well as working on societal-application based research projects. The UAV Laboratory encompasses work spaces with basic infrastructure for the fabrication of small UAVs, UAV system integration and laboratory as well as field tests.