LABORATORIES

- **Strength of Materials Lab**
- **Heat & Mass Transfer Lab**
- **Heat Engine Lab**
- **Engineering Mechanics Lab**
- **Turbo Machinery Lab**
- **IC Engine Lab**
- **Refrigeration & AC Lab**
- **Dynamics Lab**
- **Metrology Lab**
- **Automobile Engineering Lab**
- **CAD-CAM Lab**
- **Computer Lab**
- **Workshop**

STRENGTH OF MATERIALS LAB

Properties of the materials are very important in the process of designing the durable components / machines / structures etc. These properties include mechanical properties, thermal properties, electrical properties, optical properties or magnetic properties or deterioration properties. Mechanical engineers are mainly concerned with the mechanical properties like strength, ductility, hardness, brittleness, toughness, creep, fatigue strength of the materials. These properties play an important role for the structures and components that are intended to sustain various type of loads under the given service conditions. Different applications need specific mechanical properties. Strength of Materials Laboratory offers facilities for testing building materials for their strength, behavior and suitability for various applications. The objective of the strength of materials lab is to demonstrate the basic principles in the area of strength and mechanics of materials and structural analysis to the undergraduate students through a series of experiments. In this lab the experiments are performed to measure the properties of the materials such as impact strength, tensile strength, compressive strength, hardness, ductility etc. This laboratory provides the know-how of the mechanical properties of the materials through various experiments on testing machines and equipments.

The various equipments available in the lab are :-

- Universal testing Machine.
- Torsion testing machine
- Brinell hardness testing machine
- Rockwell hardness testing machine
- Impact testing machine

HEAT & MASS TRANSFER LAB

The expected outcome of Heat & Mass Transfer lab is that the students will be able to practically relate to concepts discussed in the Heat & Mass Transfer course. to conduct various experiments to determine thermal conductivity and heat, transfer coefficient in various materials. to select appropriate materials & designs for improving effectiveness of heat transfer. to conduct performance tests and thereby improve effectiveness of heat exchangers. to conduct performance tests and thereby improve effectiveness of refrigeration and air conditioning.

HEAT ENGINE LAB

This lab throws light upon various types of boilers, their working and features .Students study different types of boilers like Cochran Boiler, Lancashire boiler, Babcock and Wilcox boiler, Stirling boiler and locomotive boilers etc. Apart from that, basic knowledge about engine, their types- two stroke and four stroke CI and SI engines, their working and differences is also imparted in this lab, which lays the solid foundation of mechanical engineering.

ENGINEERING MECHANICS LAB

Engineering mechanics lab involves the study of constructional details, working ,theoretical calculations and applications of machines that are used by engineers in field operations supplemented by practical know-how and visualisation.

Some of the apparatus to be studied in the engineering mechanics lab are :-

- Force Polygon Apparatus
- Inclined Plane Apparatus
- Jib Crane Apparatus
- Simple Wheel and Axle Apparatus

- Worm and Wheel Apparatus
- Differential Wheel and Axle Apparatus
- Bell Crank Lever Apparatus
- Parallel Forces Apparatus

TURBO MACHINERY LAB

The Turbo machinery Laboratory conducts basic and applied research into important problems of reliability and performance of turbo machinery — rotating machinery that extracts or adds energy to fluids.

IC ENGINE LAB

The main focus of the I.C. Engines Laboratory is in the following areas:

- Performance improvement and emission control of I.C engines
- Engine instrumentation and control
- Engine design modifications
- Simulation of I.C engine processes
- Mathematical modeling of air flow, fuel sprays, combustion, emission formation and transport processes in I.C engines.

The lab harbours Fiat Engine, Kirloskar diesel engine, Austin petrol engine, Campbell diesel engine etc. to help the students study about their theory, working and necessary calculations involved.

REFRIGERATION & AC LAB

RAC lab is utilized to conduct undergraduate practical's for the subject Refrigeration and Air Conditioning. The lab is well equipped with the experimental setups, models and charts as required in the curriculum. Maintenance is also carried out in the lab.

Equipments

1. Experimental Test Rig of Mini Ice plant (Capacity 50 kg. per day).
2. Test Rig of Vapour Compression System.
3. Thermo hygrograph.
4. Gas Charging Unit with Vacuum Pump set.
5. Anemometer.
6. Digital Barometer.
7. Test Rig of Air Conditioning System.
8. Electrolux Refrigerator.

DYNAMICS LAB

The lab is well-equipped and enables students to understand the balancing of machine parts statically and dynamically and also used to understand the dynamic behavior of moving objects. Dynamics of Machinery lab imparts practical knowledge on design and analysis of mechanisms for the specified type of motion in a machine. With the study of rigid motion bodies and forces for the transmission systems, machine kinematics and dynamics can be well understood.
Major Equipment in Dynamics of Machines Lab are**:-**

Static and dynamic balancing machine, Dynamometer, Centrifugal governor (Watt, Porter and Proell governors), Telescopic gyroscope.

Scope :-

- To study inversion of four bar chain.
- To determine moment of inertia of the given object using connecting rod.
- Measure forces due to dynamic imbalance of a rotating shaft.
- To determine the various types of vibration effect on the shaft.

- To determine damping co-efficient of given systems.
- To determine moment of inertia of the given object using Trifler suspension.

METROLOGY LAB

This laboratory exercise also provides practice in making engineering judgments, estimates and assessing the reliability of your measurements, skills which are very important in all engineering disciplines.

This is the laboratory where the student learns to use and calibrate measuring instruments and equipments. Main equipments in which students gain hands on experience are transducers, profile projector, sine bar, floating carriage micrometer, temperature measurement setup, force measurement setup and torque measurement setup.

Objectives:-

- Understand the principle of operation and calibration of an instrument.
- Know different measuring device for a particular application.
- Understanding the concepts of limits, fits and tolerance.
- Understand the various transducers and application of strain gauges.

Scope:-

The course is intended to provide students with general knowledge about mechanical measurements and metrology laboratory techniques for industrial applications and diagnostics.

Ability to identify the different types of simple linear measurement instruments, design, sensitivity and use as a practical application of what they have studied in the lecture. Practice measuring some products dimensions using these instruments.

List of Equipments:-

- Micrometers
- Sine bar
- Different plug gauges
- Setup to measure surface roughness
- Setup and accessories to inspect screw threads using effective diameter method
- Profile projector to inspect gear tooth.
- Experimental setup for measuring force using transducers
- Setup to measure pressure using strain gauges

AUTOMOBILE ENGINEERING LAB

Automobile Engineering is one of the rapid growing stream of Engineering with plenty of scope for design, re-design, modeling, analysis in addition to R&D. The objective of this undergraduate program is to prepare technically competent world class automobile engineers for the industry and academia. The lab is well-equipped and enables students to understand the fundamentals of Automotive Engineering which includes basic structure, body style, power plant and wheel & tyre assembly. Students will undergo practical sessions in various labs such as automobile engineering lab, fuel testing and fluid mechanics lab, service and reconditioning lab, engine testing lab during the program and will get chance to undergo short term training in related industries. Industrial visits and trainings are part of the engineering course, during which students visit / undergo training in companies and

get insight on the internal working environment of the industry. This gives the students much needed exposure to automobile industries and also to get useful information related to the practical aspects of the course which cannot be achieved through class room learning.

CAD-CAM LAB

This lab is to primarily facilitate students to evolve concepts and convert it into a complete product. The process of design, simulation and prototyping takes place in a digitally integrated environment. The facility has been designed and structured to take care of professional certification programs for students, consultancy for industries and to also carry out globally outstanding research.

Objectives :-

- To lay a strong foundation for design analysis.
- To be able to understand and handle design problems in a systematic manner
- To gain practical experience in handling 2D drafting and 3D modeling software systems.
- To be able to apply CAD in real life applications
- To know the applications of various CNC machines.
- To expose the students to modern CNC application machines EDM, EDM wire cut and rapid prototyping

(Use of ANY ONE of these packages such as CATIA, ProE, SOLIDWORKS is recommended)

FE Analysis :-

Using any FEA software packages like ANSYS .

COMPUTER LAB

Computer Graphics I is a study of the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts, 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms.

The goal of Computer Graphics I is to provide a broad exposure to the computer graphics field in order to be prepared for follow-on study.

Outcomes :-

- Students will have an understanding of 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations. They will be able to implement these. Assessed by tests and programming assignments.
- Students will be introduced to algorithms and techniques fundamental to 3D computer graphics and will understand the relationship between the 2D and 3D versions of such algorithms. Students will be able to reason about and apply these algorithms and techniques in new situations. Assessed by tests and programming assignments.

WORKSHOP

Explanation on various engineering tools and equipment, and their use in different fields of engineering is carried out in Basic Workshop lab. The practice helps the students gain fundamental and practical knowledge in the following areas of engineering practices:-

- Fitting
- Welding,
- Foundry and pattern making

- Carpentry
- Study of tools and machineries like lathe,shaper, miiling maching,drilling machine etc.
- Gear Cutting
- CNC Programming