

Computer Aided Design Lab

Computer Aided Design (CAD) uses specialist software to create two and three dimensional images and animations of projects both in manufacturing and for use in advertising and technical manuals. CAD can convey many types of information, including dimensions, types of material, and tolerances and is essential in offering solutions to both engineering and manufacturing problems. By producing photorealistic animations and videos, it can simulate how a design will actually function in the real world.

Significant Equipment's and software available: CAD Laboratory is well equipped with high speed computers and mechanical software's

Major equipments are:

1. Lenovo Think Center Desktop (30 Computers)
2. Auto-CAD
3. Unigraphics NX advance software package
4. Pro/E Wildfire 5.0 software package
5. Creo-Parametric 3.0
6. CNC Machine.

Faculty In charge:

Dr Lakshman Sondhi



AutoCad



CNC Machine

Finite Element Analysis Lab

Significant Equipment's and software available

Widely popular among the engineering community, the finite element method (FEM) is a numerical technique used to perform finite element analysis of any given physical phenomenon. It has simple, compact, and results-oriented features that are appealing to engineers.

Equipment and Software Details:

1. Computer Systems
2. Ansys Software

Experiment to be performed

1. Structural Analysis
2. Thermal Analysis
3. Fluent/CFD/CFX Analysis
4. Modal/Frequency Analysis

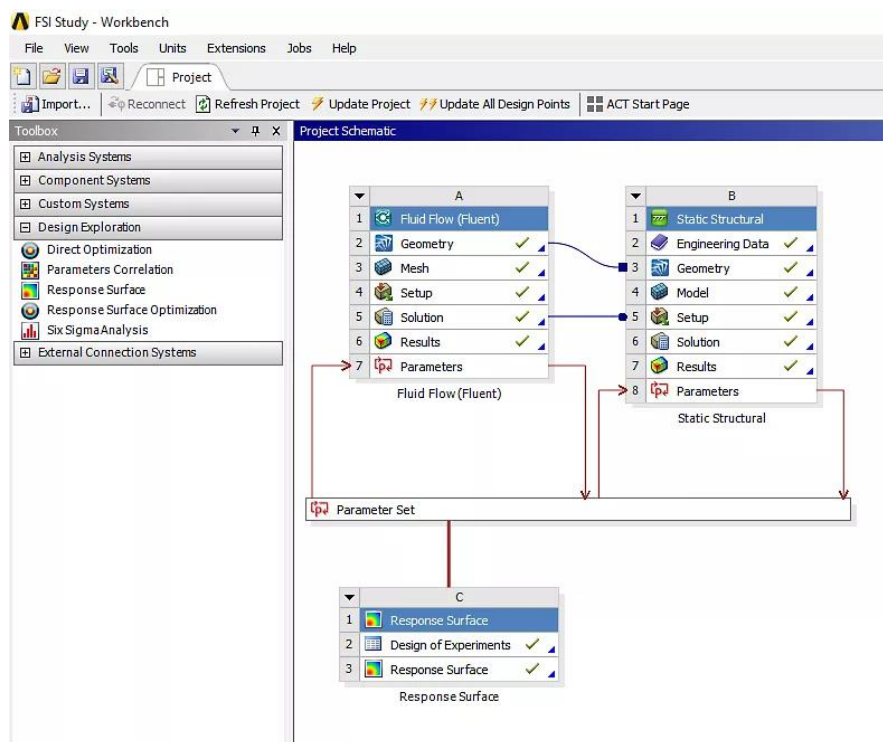


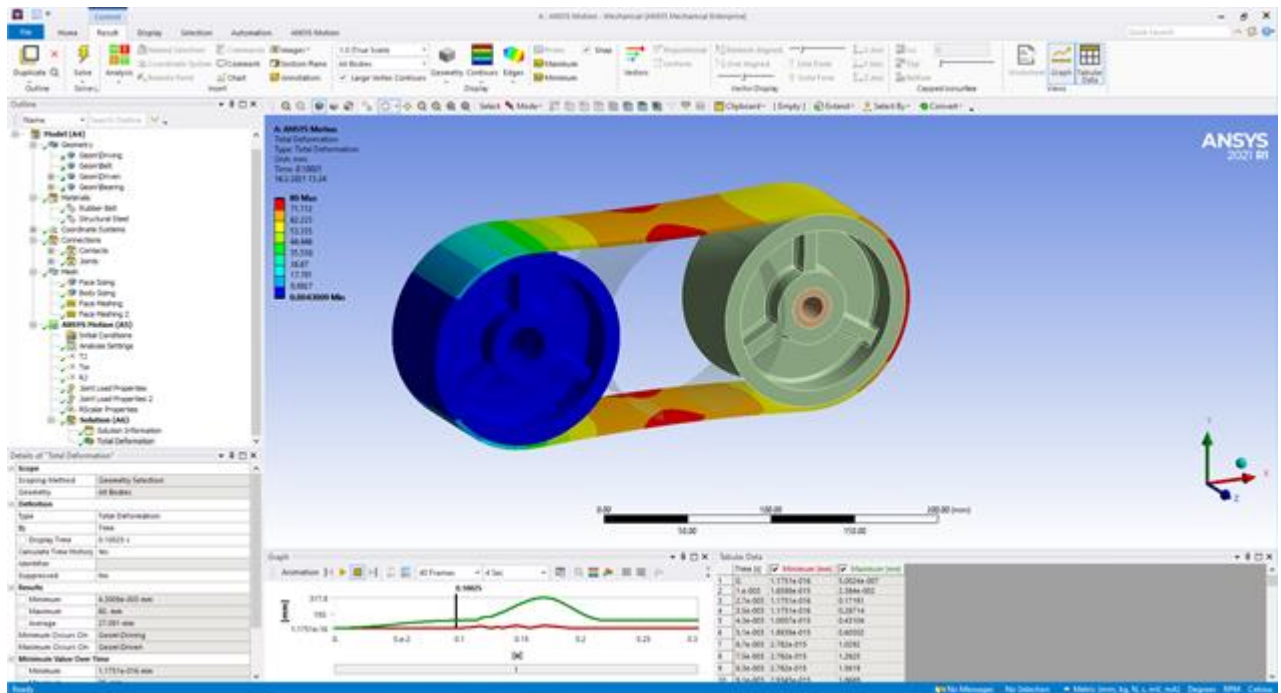


Computer Systems

Faculty In charge:

1. Mr. Vikky Kumhar
Assistant Professor





Anslys Interface

FLUID MECHANICS & MACHINERY Lab

Significant Equipment's available: The Fluid mechanics and machinery laboratory is well equipped with all equipment's and test rigs required for determination of various fluid flow parameters viz. identification of type of flow, determination of discharge coefficients and measurement of flow discharge, determination of friction losses during flow, etc.

Some of the major equipments installed in the laboratory are :

1. Reynold's apparatus
2. Bernoulli's apparatus
3. Pipe friction apparatus
4. Apparatus for losses in pipe fittings
5. Notch tank apparatus
6. Vortex flow apparatus
7. Metacentric height measurement apparatus
8. Venturimeter and Orificemeter test rig
9. Pelton wheel turbine test rig
10. Francis turbine test rig
11. Centrifugal pump test rig
12. Reciprocating pump test rig
13. Jet pump apparatus

Faculty In charge: Prof. Mahesh Dewangan



Reynold's Apparatus



Bernoulli's Apparatus



Pipe friction Apparatus



Apparatus for Losses in pipe fittings



Notch Tank Apparatus



Venturimeter & Orificemeter



Pelton Wheel Test Rig



Francis Turbine Test Rig



Centrifugal Pump Test Rig



Reciprocating Pump Test Rig

Kinematics of Machines Lab

Kinematics of Machines is well equipped with all equipments required for measuring displacement, velocity, acceleration, torque, vibration, balancing mass etc.

Significant Equipment's:

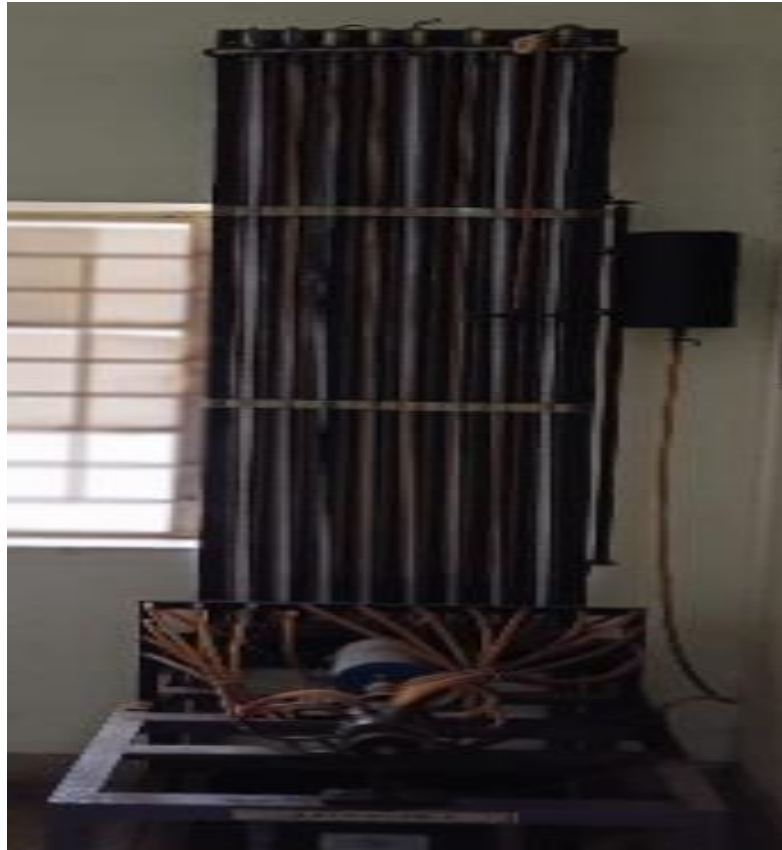
1. Demo model for Coriolis component of acceleration.
2. The journal bearing apparatus.
3. Cam profile analysis apparatus.
4. Universal governor apparatus.
5. Motorized gyroscope apparatus.
6. Dynamic balancing equipment.
7. Force damped vibration of spring and mass system apparatus.
8. Whirling of shaft demo unit.
9. Undamped torsional vibration of single and two rotor system apparatus.
10. Compound pendulum and bi-filler suspension apparatus.
11. Undamped free vibration and mass system apparatus.
12. Damped torsional vibration Apparatus.

Faculty In charge:

- 1 **Mr. Sharad Kumar Chandrakar**



Demo model for coriolis component of acceleration.



The journal bearing apparatus.



Cam profile analysis apparatus



Universal governor apparatus.



Motorized gyroscope apparatus.



Dynamic balancing equipment



Force damped vibration of spring and mass system apparatus.



Whirling of shaft demo unit.



Compound pendulum and bi-filler suspension apparatus.

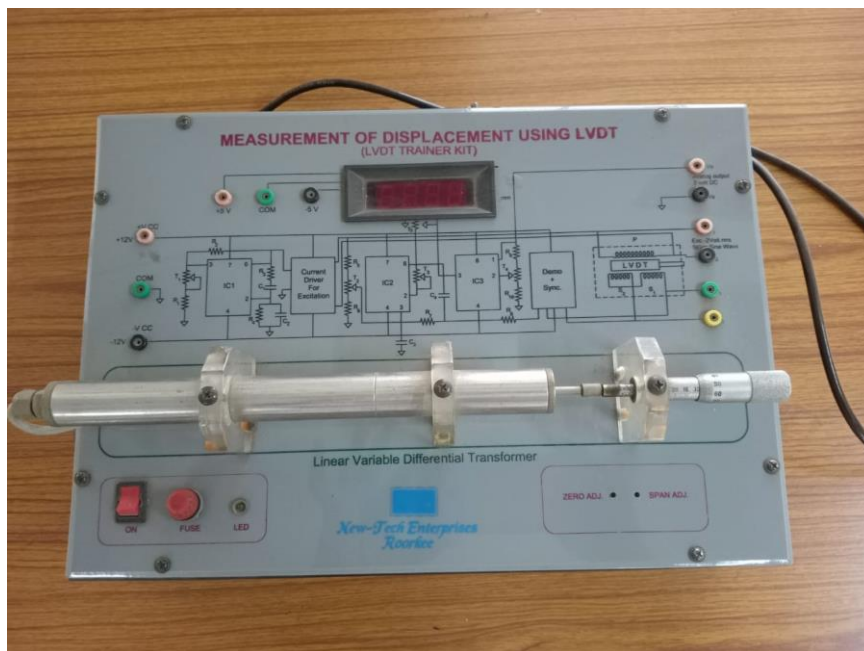
Mechanical Measurement & Metrology Lab

Significant Equipment's: Mechanical Measurement & Metrology is well equipped with all equipments required for measuring displacement, temperature, flow rate, strain, height, depth, diameter, angles etc. Major equipments are:

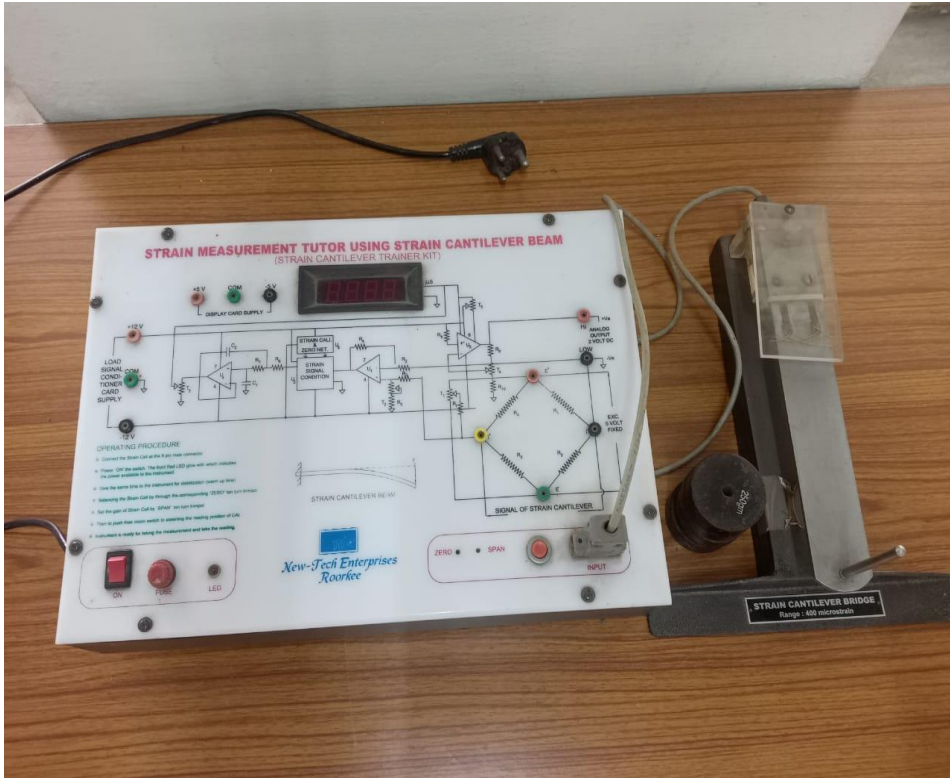
1. Demo model for displacement measurement tutor using LVDT.
2. Demo model for strain measurement tutor using strain cantilever beam.
3. Demo model for temperature measurement tutor using thermocouple
4. Demo model for rotameter trainer module.
5. Demo model for temperature measurement tutor using RTD sensor.
6. Demo model for temperature measurement tutor thermister sensor.
7. Measurement of height by using Vernier Height gauge apparatus.
8. Measurement of length & depth by using Vernier caliper apparatus.
9. Measurement of diameter by using Micrometer apparatus.
10. Measurement of angles by using Bevel Protractor apparatus.
11. Measurement of angles by using sine bar apparatus.

Faculty In charge:

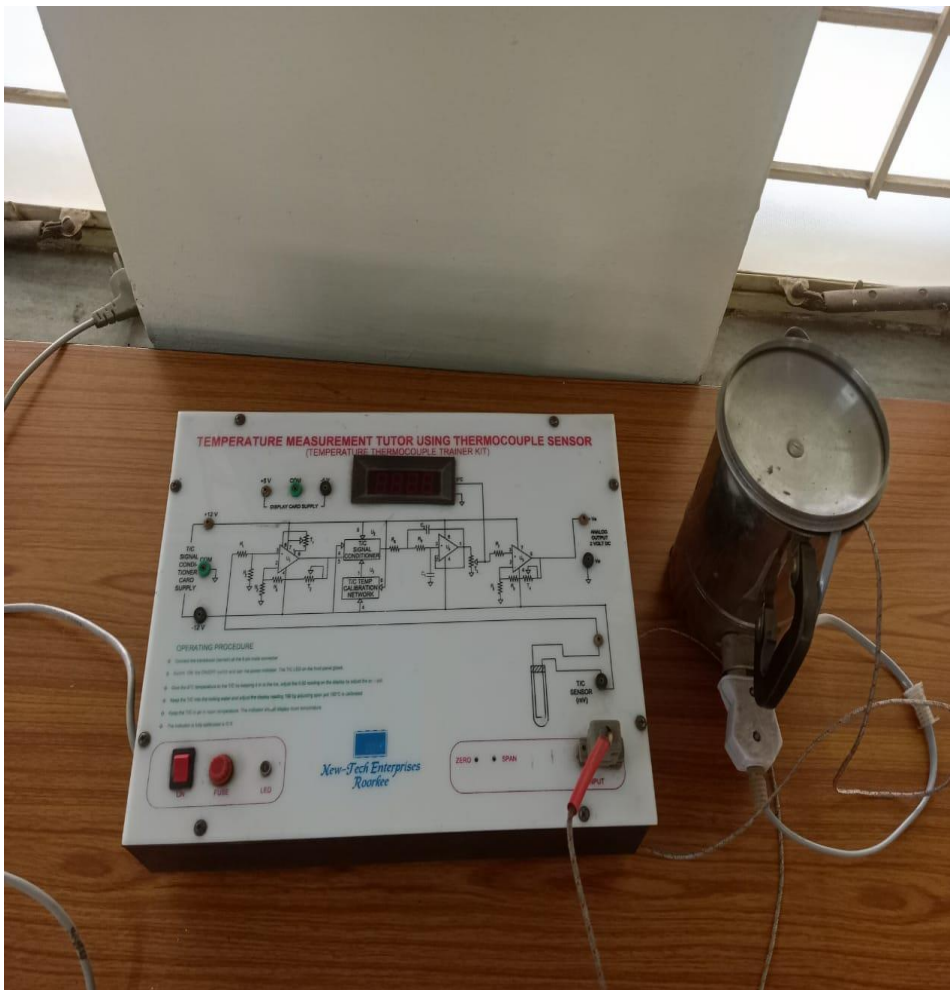
1 Mr. Hari Ram Chandrakar



Demo model for displacement measurement tutor using LVDT.



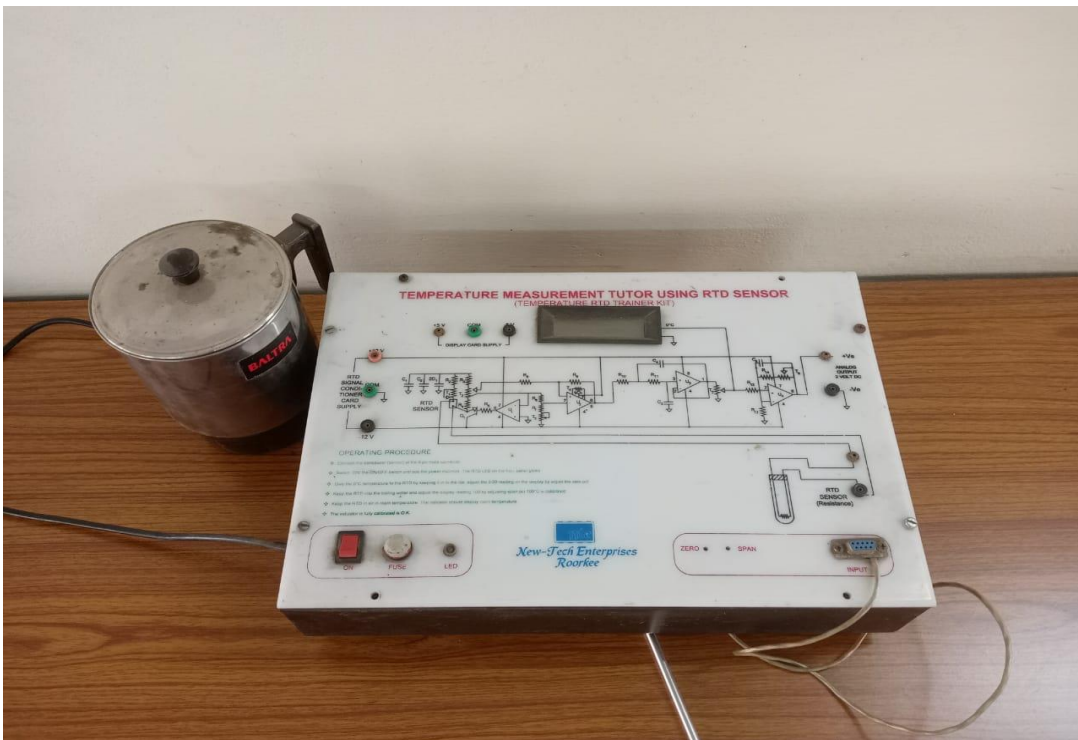
Demo model for strain measurement tutor using strain cantilever beam.



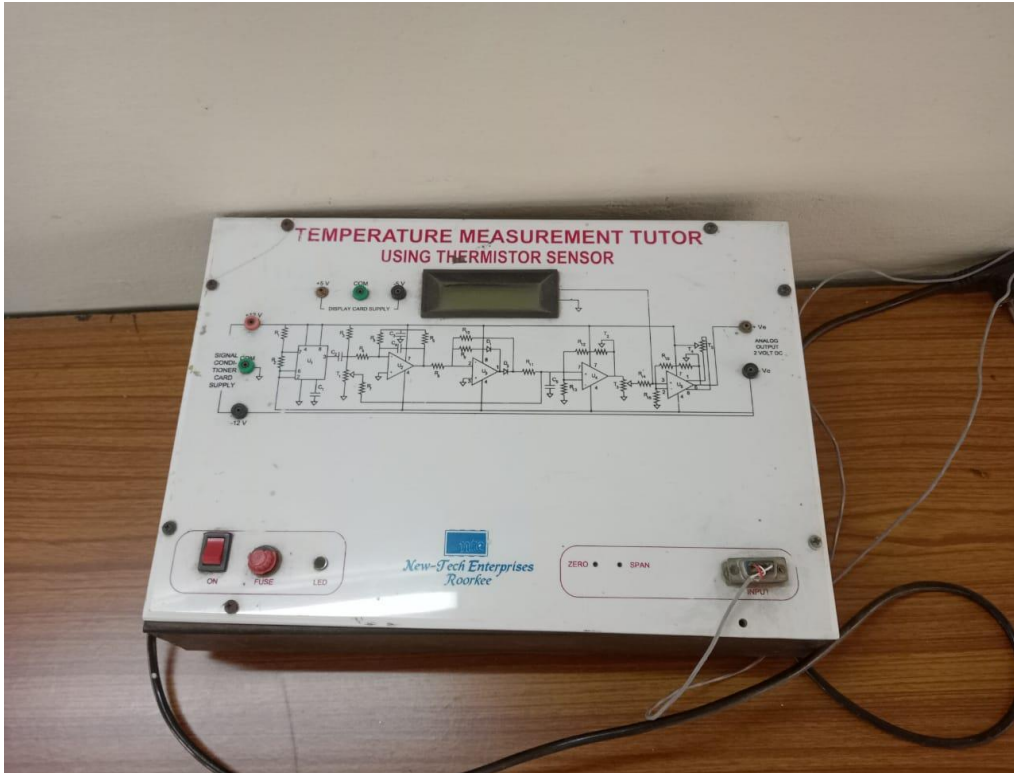
Demo model for temperature measurement tutor using thermocouple



Demo model for rotameter trainer module.



Demo model for temperature measurement tutor using RTD sensor.



Demo model for temperature measurement tutor thermister sensor



Measurement of diameter by using Micrometer apparatus



Measurement of angles by using Bevel Protractor apparatus.



Measurement of angles by using sine bar apparatus.

INTERNAL COMBUSTION ENGINE (ICE) LABORATORY

The laboratory is equipped with number of equipment & experimental setups to study the fundamental & applied aspects of the internal combustion (IC) engines. The laboratory facilitates experimental based performance evaluations of a wide variety of IC engines using a wide variety of fuels including biofuels. It also facilitates evaluation of exhaust smoke and emissions of IC engines. With wide varieties of engines, associated computer assisted equipment, dynamometers the lab caters to the needs of all tiers of students of SSTC, viz. undergraduate, post graduate and research students. With the state-of-the-art equipment, the lab is well equipped to undertake any consultancy work related to IC engines and vehicle performance testing which work on conventional fuels as well as Bio fuels. Available equipment includes:

- Single Cylinder Two Stroke Petrol Engine
- Single cylinder Four stroke Diesel Engine with Hydraulic Dynamometer
- Three Cylinder 4 Stroke petrol engine with computerized data acquisition system
- Single Cylinder 4 Stroke petrol engine with variable compression.
- Double stage Air Compressor Test Rig
- Numerous Cut Section Models
- Working models of fuel injection, lubrication, ignition etc.

Faculty Coordinator : Prof. Shashank Shekhar Mishra

Laboratory Technician : Mr. Satyendra Gupta





Material Testing Lab

Significant Equipment's available

Materials testing helps us to understand and quantify whether a specific material or treatment is suitable for a particular application. With the wide variety of materials and treatments available in the marketplace, testing can help narrow down the choices to the most appropriate selection for the intended use. Several tests have to be performed of various properties of material like tensile, compression, ductility, fatigue failure, torsional, hardenability etc.

Equipment Details:

3. Torsion Testing Machine
4. Universal Testing Machine
5. Impact testing Machine
6. Fatigue Testing Machine
7. Cupping Testing Machine
8. Rockwell Hardness Testing Machine
9. Brinell Hardness Testing Machine

Faculty In charge:

2. **Dr. Ajay Kumar Verma**
Associate Professor



Torsion Testing Machine



Universal Testing Machine



Impact testing Machine



Fatigue Testing Machine



Cupping Testing Machine



Rockwell Hardness Testing Machine



Brinell Hardness Testing Machine

Research Lab

Significant Equipment's and software available

To familiarize students with experimental apparatus, the scientific method, and methods of data analysis so that they will have some idea of the inductive process by which the ideas were originated. To teach how to make careful experimental observations and how to think about and draw conclusions from such data.

The objective of CNC machining is to create a prototype by cutting a block of material into a specific shape. CNC machining boasts both financial and production advantages over manufacturing alternatives like conventional machining and 3D printing. It is more cost-effective, more accurate, and a faster process overall.

The main purpose of 3D printer is to create items with only minimal material used. In industry products are made cheaply with mass production due to techniques such as injection moulding to ensure there is no material wastage.

The Frequency Analyzer (FFT) is an important measurement method in the science of audio and acoustics measurement. It converts a signal into individual spectral components and thereby provides frequency information about the signal.

Finite Element Analysis (FEA) concepts and make familiar with the tools and techniques of the ANSYS software package.

MATLAB allows you to. Implement and test your algorithms easily. Develop the computational codes easily. Debug easily. Use a large database of built-in algorithms.

Equipment and Software Details:

10. Computer Systems
11. CNC Machine
12. 3D Printer
13. Frequency Analyzer
14. Ansys Software
15. MATLAB Software

Experiment to be performed

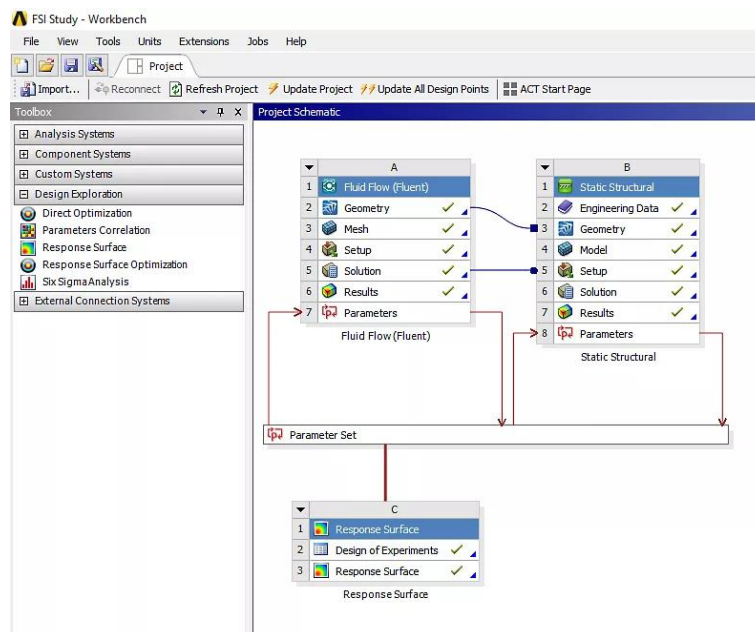
5. Structural Analysis
6. Thermal Analysis
7. Fluent/CFD/CFX Analysis
8. Modal/Frequency Analysis
9. Optimization
10. CNC Work
11. 3D Printing
12. Frequency Analyzing



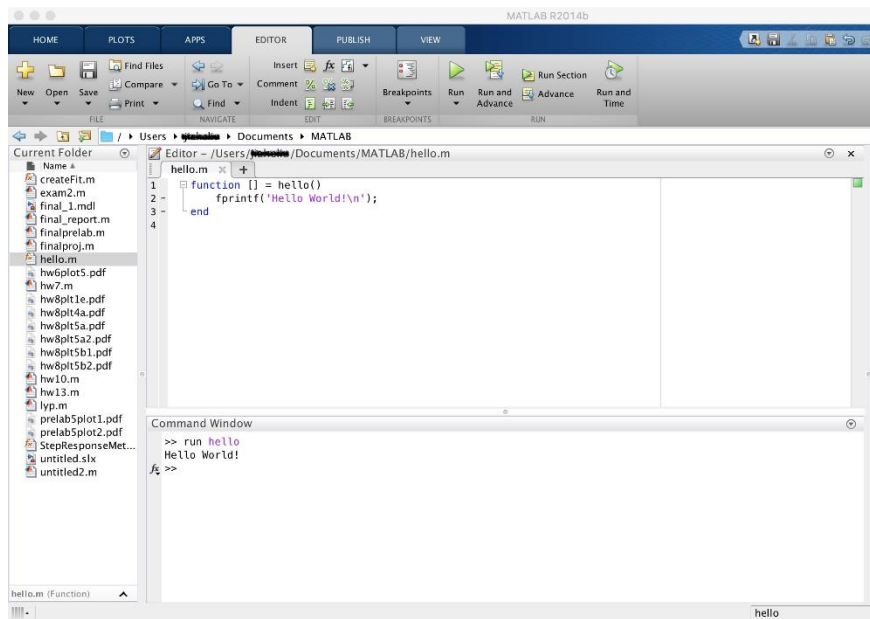
Computer Systems

Faculty In charge:

3. Prof. Vikky Kumhar Assistant Professor



Ansys Interface



MATLAB Interface



CNC Machine



3D Printer Machine



Frequency Analyzer Machine

Robotics Lab

Significant Equipment's and software available

The objective of this laboratory is to provide a practical understanding of Robotics theory concepts on various programming methods, path planning, kinematics and dynamics, grippers, end effectors, and integrated sensors. The goal of robotics is to design machines that can help and assist humans. Robotics integrates fields of mechanical engineering, electrical engineering, information engineering, mechatronics, electronics, bioengineering, computer engineering, control engineering, software engineering, mathematics, etc.

MAKIT – Master is a collection of precision mechanical components which are handy & flexible. These components can be used for building Mechanisms like slider crank, whit worth quick return mechanisms, walking mechanisms and pantograph copying mechanisms and so on. By utilizing these components any body can build verities of machine prototypes & later on it can be transformed in to real working models.

Our comprehensive components has wide verities of Machine elements & there is lot of room for the testing of creative ideas and even one can even draw the coupler curves with the help of pencils and drawing boards provided in the kit. Which will be useful for doing lot of research work regarding the mechanisms and their movements instantaneously.

Equipment and Software Details:

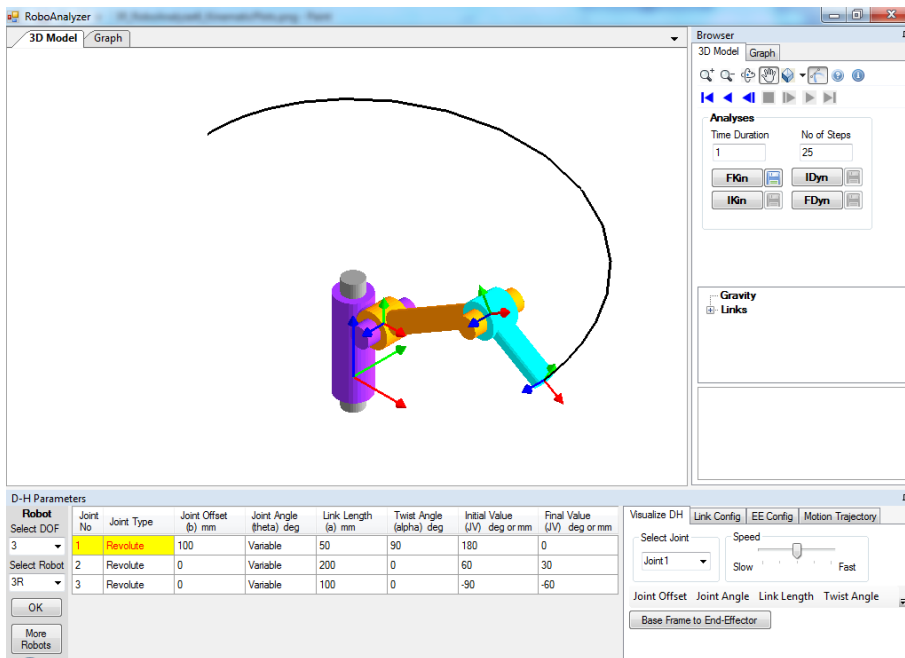
16. Computer Systems
17. Cartesian/ Cylindrical/ Spherical Robot
18. Grippers
19. Robo Analyzer Software
20. MAKIT Tool Kit

Experiment to be performed

13. Demonstration Cartesian/ Cylindrical/ Spherical Robot
14. Analysis of Gripper
15. Robot Path Analysis
16. Kinematic and Dynamic Analysis
17. Forward and Inverse Analysis

Faculty In charge:

Mr. Vikky Kumhar
Assistant Professor



Software Interface



MAKIT tool robotics kit



MAKIT tool model