

Department of Mechanical Engineering

➤ List of Major Equipment/Facilities:

Name of the Laboratory	Major Equipment/ Facilities
Fluid Mechanics & Machinery	<ol style="list-style-type: none"> 1.Uniflow Oil power Hydraulic trainer kit 2. Kaplan Turbine Test Rig, ALMECH, with rope brake Dynameters, and glass tubes. 3.Pelton Wheel Turbine Test Rig. 4.Francis Turbine Test Rig. 5.Centrifugal Pump Test Rig. 6.Gear pump Test Rig. 7.MultiStage Centrifugal Pump Test Rig. 8.Reciprocating Pump Test rig. 9.Setup of Measuring metacentric height. 10. Setup of Performance of Bernoulli's Theorem. 11.Setup of Venturimeter. 12.Setup of Measuring Reynolds No. 13.Setup of Pipe Flow Measurement. 14.Setup of Hydraulic Ram
I.C. Engines & Automobile Engineering	<ol style="list-style-type: none"> 1.Computerized Engine Indicator with Engine test setup 2.Ruston Model 4ydak Diesel Generating Set developing 40 KVA at NTP condition with control panel 3.Cut Section Model of the Car 4. MEXA-324GB, Horiba Automotive CO/HC Exhaust Gas Analyser with standard Accessories to operate on 230 v. 50Hz 5. Multi cylinder Petrol Engine Test Rig with Hydraulic Dynameters 6. Automobile systems / components 7. Diesel Engine with Mech. Test Rig.5HP, 4 stroke, 1500 rpm.300 mm.Dia, Rope break arrangement - 1 No. 8. Air Compressor Test Rig, 2 stage; suitable for 7 kg, 7.5 HP motor - 1 No 9. Bosch - filter paper darkening type smoke meter for measurement of smoke density. 10. Centrifugal blower test rig. 11. Spark plug cleaning and testing device.
Refrigeration & Air Conditioning	<ol style="list-style-type: none"> 1.Experimental Test Rig of Mini Ice plant (capacity 50 kg. Per day) 2. Test Rig of Vapour Compression System- 3.Thermohygrograph 4.Gas Charging Unit with Vacuum Pump set

	<ul style="list-style-type: none"> 5. Anemometer 6. Digital Barometer 7. Test Rig of Air Conditioning System. 8. Electrolux Refrigerator.
Nonconventional Energy Sources	<ul style="list-style-type: none"> Solar Water Heater system using Flat plate Collector. Sunshine Recorder Pyranometer & Potentiometer for recording Biomass Gasifier. Solar Photovoltaic Demo Model.
Heat Transfer	<ul style="list-style-type: none"> 1. Heat transfer through Composite Wall 2. Emmissivity measurement apparatus 3. Heat transfer in natural convection 4. Thermal conductivity of insulating powder 5. Stefan-Boltzmann apparatus 6. Heat transfer in forced convection 7. Critical heat flux apparatus 8. Thermal conductivity of liquid 9. Standard Fortin's barometer 10. Parallel flow/counter flow heat exchanger 11. Heat transfer from pin fin 12. Thermal conductivity of metal rod
Mechanical Measurement & Control	<ul style="list-style-type: none"> 1. Instrumentation Tutor Part A for Linear & Angular displacement measurement by using LVDT, capacitive pick up and potentiometric devices 2. Instrumentation Tutor Part B for Temperature Measurement 3. Instrumentation Tutor Part C for Speed Measurement by using photoelectric pick up and magnetic pick up transducers 4. Instrumentation Tutor Part D for Force Measurement using strain gauges 5. Dead Weight Pressure Gauge Tester 6. Digital Stroboscope Tachometer 7. Optical Radiation Pyrometer 8. PC based analog & digital motor control training system 9. Flow measurement using optical transducer 10. Pneumatic Servo System 11. Liquid Level Measurement System
Metrology	<ul style="list-style-type: none"> 1. ISOMET Tool Maker-Microscope small 2. Floating Carriage Machine 3. Electrical Comparator 4. Profile Projector

Computer Centre and Computer Aided Manufacturing	<ol style="list-style-type: none"> 1.MTAB-Denford model XL Turn CNC slant Bed lathe 2. H/W: 21 computers (P-III) 43 computers (P-IV) 3. S/W: MasterCAM 9.1 CNC Simulator WITNESS Simulation Software 10 Nos CATIA,SOLID WORKS,ANSYS 4. Articulated Robot 5. Automated Guided Vehicle 6.Robotic Work cell (Model) 7.Server Wipro Net Power-01 8 LCD Projector -01 9 LapTop -01
Theory of Machine & Machine Design	<ol style="list-style-type: none"> 1. Cam analysis machine 2.Generation Involutes Profile By Rack Cutter 3.Interference /Undercutting of Gears Demo. Model. 4.Vibration Lab. Set-up. 5.Motorized Gyroscope. 6.Whirling Shaft Apparatus. 7.Static and Dynamic Balancing Set-up. 8.Design of Screw Jack. 9.Hartnell Governor Model.
Metallurgy	<ol style="list-style-type: none"> 1.Inverted type metallurgical microscope (Trinocular) 2. Single Disc Polishing Machine 3. Double Disc Polishing Machine 4. Specimen Moulding Die Set 5. Muffle Furnace 6. Trinocular Metallurgical Microscope with Display screen
Tool Engineering	<ol style="list-style-type: none"> 1.Lathe Tool Dynamometer 2.Drill Tool Dynamometer 3.Erichson Cupping Tester 4.Milling Fixture (Telco Ltd.) 5.Inspection Fixture 6.Drilling Jig (Telco Ltd.) 7.Press Working Die for End Plate 8.Various Cutting Tools For Demonstration

➤ **List of Experimental Setups (Subject wise) :**

1) Name of the Laboratory: I.C. Engines & Automobile Engineering

NAME OF SUBJECT : Energy Conversion-I

Study setups available:

Various models of Boiler, Boiler mountings and accessories.

List of the experiments performed.

1. Study of water tube(Babcock Wilcox) boiler
2. Study of fire tube (Lancashire) boiler
3. study of locomotive boiler
4. Study of Cochran Boiler
5. Study of Boiler mountings
6. Study of condensers.
7. Study of Boiler accessories
8. Study of Steam power plant/ Visit to steam power plant.
9. Study of condensate and air extraction pump.

NAME OF SUBJECT : : Energy Conversion-II

Experimental / Study setups available:

1. Single cylinder diesel engine test rig
2. Multy cylinder petrol engine test rig
3. Single cylinder petrol engine test rig
4. Single cylinder petrol engine test rig with engine analyzer.
5. Two stage reciprocating compressor test rig
6. Centrifugal blower test rig

List of the experiments performed

1. Trial on Single cylinder diesel engine.
2. Trial on Single cylinder diesel engine for evaluation of the heat balance sheet
3. Trial on multy cylinder petrol engine/ morse test
4. Trial on Two stage reciprocating compressor
5. Trial on Centrifugal blower.
6. Study of Carburetors.
7. Study of Gas turbines.
8. Study of Window air conditioning system.

9. Study / performance trial on vapor compression refrigeration system.

NAME OF SUBJECT :IC Engines
Experimental / Study setups available

1. Spark Plug cleaning and testing device.
2. NDIR exhaust gas analyzer.
3. Nisalko- Bosch smoke meter.
4. Cut section model of the car.
5. various models of the automotive subsystem.

List of the experiments performed

1. Disassembly of 2- stroke engine
2. Study of solex & SU carburetor.
3. Study of braking system.
4. study and fault finding of ignition system.
5. Cleaning and testing of spark plug.

2) Name of the Laboratory: Fluid Mechanics & Machinery

NAME OF SUBJECT :Fluid Power-I
Experimental / Study setups available:

- 1.Experimental setting set up of Bernoulli theorem testing.
- 2.Experimental set up of Bernoulli's theorem testing
- 3.Experimental set up of Venturimeter
- 4.Experimental set up Reynolds number
5. Experimental set up Coefficient of friction for a pipe
6. Experimental set up of Head loss due to sudden enlargement
7. Experimental set up of Losses in bend
8. Experimental set up of Losses in elbows

List of the experiments performed.

- 1.Study of Manometers
- 2.Measurement of fluid pressure by manometer
- 3.Determination of metacentric height
- 4.Verification of Bernoulli's theorem
- 5.Flow measurement by venturimeter
- 6.Study of venturimeter
- 7.Determination of Reynolds number (critical Re)
- 8.Determination of coefficient of friction for pipes

- 9.Determination of head loss due to sudden enlargement
- 10.Determination of losses in bends.
- 11.Determination of losses in elbows.

NAME OF SUBJECT :FLUID POWERII

Experimental / Study setups available:

- 1.Pelton wheel turbine test rig
- 2.Francis turbine test rig
- 3.Kaplan turbine test rig
- 4.Centrifugal pump test rig
- 5.Reciprocating pump test rig
- 6.Gear pump test rig
- 7.Jet pump test rig
8. Multistage centrifugal pump test rig
- 9.Experimental set up of Metacentric height.

List of the experiments performed.

- 1.To conduct a trial on Pelton wheel turbine
- 2.To conduct a trial on Francis turbine
- 3.To conduct a trial on Kaplan turbine
- 4.To conduct a trial on Centrifugal pump.
- 5.To study a Reciprocating pump
- 6.Study of Gear pump
- 7.Study of Multistage centrifugal pump
- 8.Study of Jet pump.

3) Name of the Laboratory : Refrigeration & Air Conditioning

Experimental / Study setups available:

1. Vapour compression Tutor
2. Altech Refrigeration test rig
3. Mini Air-conditioning tutor
4. Electrolux Refrigerator
5. Experimental Ice-plant Test rig.
6. Gas charging unit.
7. Window Air Conditioner
8. Cut section Model of Hermetic Compressor
9. Thermo Hydrograph

List of the experiments performed

1. Trial on vapour compression system
2. Trial on Air-conditioning system
3. Study of Electrolux system
4. Study of Window Air-conditioner

5. Testing and charging of Refrigeration system
6. Study of water cooler
7. Study of various Refrigeration and Air-conditioning controls

4) Name of the Laboratory: Tool Engineering

Experimental / Study setups available:

1. Measurement of Forces in orthogonal cutting by dynamometer
2. Measurement of Axial Force & torque in Drilling using Dynamometer
3. Measurement of Drawability by Erikson Cupping Test.
4. Study of Design Features of Various Jigs & fixtures.

List of the experiments performed

1. Drawing & design of single point cutting tools.
2. Measurement of Forces in orthogonal cutting by Dynamometer
3. Selection of proper Grade of Tool Material from Catalogues.
4. Drawing & design of Form Tools.
5. Drawing & design of Broach
6. Design & Drawing of Drill.
7. Measurement of Axial Force & Torque in Drilling using Dynamometer
8. Design & drawing of Milling Cutter
9. Study of Geometry of Reamers.
10. Study of Geometry of gear cutting tool.
11. Study of Geometry of Taps & Dies.
12. Measurement of Drawability by Erichson Cupping Test.
13. Design & drawing of Press tool.
14. Study of Design Features of Various Jigs & Fixstures.
15. Design & drawing of Jigs.
16. Design & Drawing of Fixtures.
17. Preparation of Process Picture Sheet.

5)Name of the Laboratory :Heat Transfer

Experimental / Study setups available :

1. Thermal conductivity of Insulating Power
2. Thermal conductivity of Metal rod.
3. Thermal conductivity of liquid.
4. Heat Transfer through composite wall.
5. Emissivity measurement apparatus.
6. Stefan-Boltzmann apparatus
7. Heat Transfer in Natural Convection.
8. Heat Transfer in forced convection
9. Heat Transfer from a Pin fin.
10. Parallel flow/counter flow heat exchanger
11. Critical Heat Flux apparatus.

List of the experiments performed

- 1.To determine thermal conducting of insulating powder.
- 2.To determine thermal conducting of metal rod.
- 3.To determine thermal conducting of liquid
- 4.To study heat transfer through composite wall.
- 5.To determine emissivity of test plate.
- 6.To determine the Stefan – Boltzmann constant.
- 7.To determine heat transfer coefficient in natural convection.
- 8.To determine transfer coefficient in forced convection.
- 9.To study heat transfer from a pin fin.
- 10.To study performance of parallel flow and counter flow heat exchangers.
- 11.To study the pool boiling phenomenon up to critical heat flux point.

6) Name of the Laboratory :Metallurgy Lab

Experimental / Study setups available :

1. Metallurgical microscopes (03) & standard metallurgical specimen set. on which at least six study experiments can be performed.
2. Specimen mounting press.
3. Set up consisting of belt grinder, polishing machine & metallurgical microscope used for preparation of metal specimen.

List of the experiments performed

1. Study of metallurgical microscope.
2. Preparation of specimen for micro-examination.
3. Mounting of specimen for micro-examination.
4. Study of microstructures of annealed & normalized plain carbon steels.
5. Study of microstructures of cast irons.
6. Study of microstructures of brasses.
7. Study of microstructures of bronzes.
8. Study of microstructures of hardened & tempered steel.
9. To study Fe-C Equilibrium diagram & Allotropic forms of Fe.
10. To study effect of carbon content on mechanical properties, microstructure & uses of plain carbon steels.
11. To study various heat treatment processes for steels.

7) Name of the Laboratory :Non Conventional Energy Sources

Experimental / Study setups available :

1. Study of Pyranometer & measurement of Global radiation.
2. Study of sunshine Recorder & measurement of sunshine hours.
3. Study & testing of Hot plate colleefor.
4. Study of Solar dryer.
5. Study of continuous Tracffiy mechanism.
6. Study of solar energy storage.

List of the experiments performed

1. Study of Pyrheliometer & measurement of direct Radiation.
2. Study of Pyranometer & measurement of Global & diffuse Radiation.
3. Study of Sunshine recorder & measurement of sunshine hours.
4. Study & Testing of flat plate collectors.
5. study of various concentrating collectors.
6. Study of solar absorption refrigerators system.
7. Study of solar dryer.
8. Study of Wind Mill & trial on it.
9. Study of biogas plant.
10. Study of sterility cycle engine & trial on it.
11. Study of solar still & trial on it.
12. Study of gasifier & trial on it..
13. Study of photovoltaic system & trial on it.

8) Name of the Laboratory :Metrology

Experimental / Study setups available :

1. Floating carriage machine.
2. Tool makers Microscope
3. Flanged gear tooth micrometer
4. Gear tooth vernier caliper
5. Profile projector
6. Various gauges (thickness guage, wire guage etc)
7. Limit gauges
8. Mechanical and electronic comparator
9. Universal bevel protractor
10. Various linear measuring instruments.

List of the experiments performed

1. Measurement of thread
2. Measurement of gear
3. Measurement of flatness, squareness
4. Design of limit guage.
5. Measurement of roundness, concentricity of cylindrical job

6. Inspection of a job using comparators.
7. Angular measurement of given job.
8. Linear measurement of a given job.

**10) Name of the Laboratory :Mechanical Measurement & Control Laboratory
Experimental / Study setups available :**

1. Instrumentation Tutor Part A- Displacement Measurement
2. Instrumentation Tutor Part B- Temperature Measurement
3. Instrumentation Tutor Part C- Speed Measurement
4. Instrumentation Tutor Part D- Force Measurement
5. Dead Weight Pressure Gauge Tester
6. Digital Stroboscope Tachometer
7. Optical Radiation Pyrometer
8. PC based analog & digital motor control training system
9. Flow meter – Flow measurement using optical transducer
10. Pneumatic Servo System
11. Liquid Level Measurement System

List of the experiments performed

1. Liquid level measurement system
2. Calibration of Pressure Gauge on Dead Weight Pressure Gauge Tester.
3. Measurement of Force by using Strain Gauges.
4. Measurement of Speed by using Magnetic Pick-up Tachometer
5. Measurement of Angular Displacement by using Capacitive Pick-up Transducer.
6. Measurement of Speed by using Stroboscope
7. Measurement of Temperature by using Thermocouple, R.T.D. & Thermistor.
8. Measurement of Linear Displacement by using Light Dependent Resistor (L.D.R.)
9. Measurement of Speed by using Photoelectric Pick-up Tachometer
10. Measurement of Linear Displacement by using Linear Variable Differential Transformer (L.V.D.T.)
11. Measurement of Linear Displacement by using Potentiometer
12. Measurement of Temperature by using Radiation Pyrometer
13. Flow measurement.

11) Name of the Laboratory: Theory of Machine & Machine Design

List of Experiments/Study Setups available in the Lab

Theory of Machine -I

1. Cam Analysis Machine.
2. Involute Profile by Rack Cutter.
3. Interference / Undercutting of Gears Demonstration Model.

Study Models –

4. Mechanisms Demonstration Models.

5. Clutches Models.
6. Brakes Models.
7. Cam& Follower Models.

List of the experiments performed

1. Study Of Inversion Of Four Bar Chain Mechanism.
2. Study Of Inversion Of Single Slider Crank Mechanism.
3. Study Of Inversion Of Double Slider Crank Mechanism.
4. Study Of Common Mechanisms.
5. Study Of Velocity Analysis By Relative Velocity Method.
6. Study Of Velocity Analysis By Pole Technique.
7. Study Of Coriolis Acceleration.
8. Study Of Acceleration Analysis By Relative Acceleration Method.
9. Study Of Brakes.
10. Study Of Clutches.
11. Study Of Dynamometers.
12. Study Of Graphical Layout Of Cam Profile.
13. Study Of Gear Terminology & Layout Of Involute Gear Profile.
14. Study Of Gear Trains.
15. Problem In Position Synthesis.
16. Problem In Input/Out Put Co-Ordination.
17. Computer Aided Synthesis Of Four-Bar Mechanism.
18. Study & Analysis Of Steering Mechanism.
19. Mini Project On Links, Mechanisms & Inversions Of Mechanisms.

NAME OF SUBJECT :Theory of Machine –II
Experimental / Study setups available :

1. Vibration Lab Set-up
2. Motorized Gyroscope
3. Whirling Shaft Apparatus
4. Static & Dynamic Balancing Set-up

List of the experiments performed

1. Determination of Intertia of Simple Pendulam.
2. Determination of Intertia of compound Pendulam.
3. Determination of Intertia of Irregular Bodies.
4. Experiment on Static Balancing of Rotating Masses.
5. Experiment on Dynamic Balancing of Rotating Masses
6. Determination of Gyroscopic Couple.
7. Determination of Whirling Speed of Shaft.
8. Static & Dynamic Force Analysis of Four Bar Mechanism
9. Experiment on Free & Damped Vibration of System With one degree of freedom.
10. Experiment on Free Damped Tensional Vibration.

11. Study of Universal Joint.
12. Study of Vehicle Dynamics
13. Mini Project on Study of Machines & Three Motions.

NAME OF SUBJECT : Machine Design –I

Experimental / Study setups available

1. Design of screw jack.

List of the experiments performed

1. Design of Screw Jack
2. Design of Cotter Joint
3. Design of Knuckle Joint
4. Design of Bolts or Rivets for Eccentrically Loaded Brackets.
5. Design of Helical Spring Acting As A Buffer or Leaf Spring.
6. Design of Pipe joint with Gasket Inserted between Flanges.
7. Design of Axially loaded Non-Symmetrical welded section.

Machine Design -II

Experimental / Study setups available

1. Hartnell governor model

List of the experiments performed

1. Design of Shaft
2. Design of Coupling
3. Design of Flywheel for Punching Machine / Otto Engine
4. Design of Hydrodynamic journal bearing
5. Design of Flat Belt Drive
6. Computer Aided Design & Selection of Roller Chain Drive
7. Design of Vee Belt Drive
8. Computer Aided Design & Selection of Wire Rope
9. Design of Spur Gear
10. Design of Brakes
11. Design of Clutches
12. Design of I.C. Engine Parts
13. Design of Hartnell Governor.

12) Name of the Laboratory: Computer Centre and Computer Aided Manufacturing
NAME OF SUBJECT :Elective I - Mechatronics

Experimental / Study setups available :

1. PC based analog and digital DC motor control set-up.
2. Hydraulic Trainer
3. PC based tutor

List of the experiments performed

1. Study of automatic photocopying machine.
2. Study and demonstration of the working of analog to digital converter.
3. To examine the working of double acting cylinder with recalculating mid-position Direction control valve.
4. To examine the hydraulic motor operation.
5. Study the working of different Pneumatic circuits
6. Study the working of different Hydraulic circuits.
7. Study and demonstration of direct digital control..

NAME OF SUBJECT :Automation Engineering

Experimental / Study setups available :

1. CNC Trainer
2. Articulated Robot
3. Robot workcell
4. AGV
5. PC based softwares

List of the experiments performed

1. Preparation of manual part program for CNC turing operation
2. Preparation of manual part program for point to point control system (Drilling operation)
3. Study of APT language using examples
4. Simulation of machining on CNC machine using simulation software
5. Study of Automated Inspection and Testing methods
6. Study of Group Technology and classification and coding of given part.
7. Study of Computer Aided Process Plan and Retrieval of process plan of the component.
8. Study of configuration and working of articulated robot
9. Study of construction and working of robot workcell.
10. Study of line balancing of manual flow lines

13) Name of the Laboratory: Computer Aided Design Lab
NAME OF SUBJECT :Computer Software Application-I

List of the experiments performed

1. Computer Aided drafting of Basic Geometrical Shapes.
2. Editing of 2D Geometry
3. 3D Modeling
4. Simple Auto Lisp Programs
5. Creation of script and DFX from design problem.
6. Creation of blocks and external reference.

NAME OF SUBJECT :Computer Software Application-II

List of the experiments performed

1. Study of Expert System and application of Expert System shell.
2. Creation and manipulation of Database Scheme for banking enterprise using DDL and DML commands.
3. Creating and manipulation of Database for inventory control system of ABC Ltd.
4. Creating a table of Bill of Material from inventory control system.
5. Study of Simulation packages.