

DEPARTMENT OF MECHANICAL ENGINEERING

Details Of The Departmental Laboratories



**Rajiv Gandhi University of Knowledge Technologies.
Basar**

Mechanical Engineering Department Laboratories List

SL.No	Subject Code	Name of the Lab
1	19ME1202	Engineering Workshop.
2	19ME1203	Fuels & Lubricants Laboratory
3	19ME2701	Strength of Materials Laboratory
4	19ME2702	Materials Engineering Laboratory
5	19ME2801	Fluid Mechanics & Hydraulic Machinery Laboratory
6	19ME2802	Metrology and Instrumentation Laboratory
7	19ME2803	Manufacturing Process Laboratory
8	19ME3701	Applied Thermodynamics Laboratory
9	19ME3702	Theory of Machines Laboratory
10	19ME3703	Computer Aided Machine Drawing Practice
11	19ME3801	Heat Transfer Laboratory
12	19ME3802	CAD Laboratory
13	19ME4701	Automation in Manufacturing Lab

Individual Lab Experiments List For All The Laboratories

1. Engineering Workshop.

Subject Code: 19ME1202

List of Experiments:

SL.No	EXPERIMENTS
Fitting Trade.	
1.	Step Fitting
2.	V- Fitting.
House Wiring	
3.	Series & Parallel Connections
4.	Staircase wiring
5.	Godown wiring
ARC- Welding	
6.	Welding Bead formation Practice,
7	Butt joint.
8	Lap joint.
Foundry	
9	Mold preparation for Single piece pattern
10	Mold preparation for Split piece pattern
Machining	
11	Plain & Facing Turning,
12	Step Turning
13	Taper Turning
14	Plastic molding – Demo
15	WIRE EDM, CNC, 3D Printer – Demo

2. Fuels & Lubricants Laboratory

Subject Code: 19ME1203

SL.No	EXPERIMENTS
1	To Find the Flash and Fire point of Diesel by Digital PenskyMartene's Flash Point Apparatus.
2	To Find the Flash and Fire point of Diesel by Digital ABEL Flash Point Apparatus.
3	To Find the Flash and Fire point of Diesel Manual digital Flash & fire point apparatus.
4	To Find the Viscosity of oil by Redwood Viscometer no.1
5	To Find the Viscosity of oil fluid by Say bolt viscometer
6	To Find the Viscosity of oil by Engler Viscometer Apparatus.
7	To find the Calorific Value of the Solid & Liquid Fuels by Bomb Calorimeter
8	To find the Calorific Value of the Gaseous fuels by Junker's gas Calorimeter
9	To determine the amount of carbon residue left after evaporation and pyrolysis of an oil by Carbon residue Conradson apparatus (Single test)
10	To determination of the highest temperature at which haziness in oil is observed (cloud point) or the lowest temperature at which movement of the oil is observed (pour point) of petroleum product. By Cloud & Pour point- apparatus.
11	Distillation Apparatus
12	Standard Penetrometer

3.Strength of Materials Laboratory

Subject Code: 19ME2701

List of the Experiments

SL.No	EXPERIMENTS
1.	Torsion test on a specimen of ductile material.
2.	Impact test- Izod Tests.
3.	Impact test - Charpy Impact
4.	Compression tests on helical spring.
5.	Form ability test on Erich Sen's Cupping Test.
6.	Vickers'sHardness test.
7.	Rockwell's Hardness test.
8.	Brinell's Hardness test.
9.	Bending test on Cantilever beam of steel or timber.
10.	Bending test on simply supported beam.
11.	Verification of Maxwell's Reciprocal theorem on beams.
12.	Fatigue Test.
13.	Uni-axial Tension test on a specimen of Ductile Material on UTM
14.	Compression Test on UTM
15.	Double & Single Shear Test on UTM
16.	Bending on a specimen of Ductile Material on UTM.

4. Materials Engineering Laboratory

Subject Code: 19ME2702

List of Experiments:

SL.No	EXPERIMENTS
1	Study of: Metallurgical Microscope, Iron-Iron Carbide diagram, Procedure for specimen preparation
2	Metallographic Study of Low / Medium carbon steel
3	Metallographic Study of Eutectoid steel
4	Metallographic Study of Hyper Eutectoid steel
5	Metallographic Study of Nodular cast iron
6	Metallographic Study of Grey cast iron
7	Metallographic Study of White cast iron
8	Metallographic Study of Brass and Bronze
9	Metallographic Study of microstructure after hardening, normalizing and annealing of steel specimen.
10	Quantitative analysis of Grain Size, ASTM Grain number
11	Quantitative analysis of Volume fraction

5.Fluid Mechanics & Hydraulic Machinery Laboratory

Subject Code: 19ME2801

List of the Experiments:

SL.No	EXPERIMENTS
1.	Measurement of Coefficient of Discharge of given Orifice meter
2.	Measurement of Coefficient of Discharge of given Venturi meter
3.	Measurement of frictional losses in a given pipe
4.	Determination of the performance characteristics of a multistage centrifugal pump
5.	Calibration of Bernoulli's experiment
6.	Calibration of Rotameter
7.	Measurement of velocity of flowing fluid using pitot tube
8.	Determination of the performance characteristics of Pelton Wheel
9.	Determination of the performance characteristics of Francis Turbine
10.	Determination of the performance characteristics of Kaplan Turbine
11.	Impact of jet experiment

6.Metrology and InstrumentationLaboratory

Subject Code: 19ME2802

List of Experiments:

SL.No	EXPERIMENTS
Metrology Lab	
1.	Measurement of Length, Height, Depth and Diameter by Vernier's Caliper, Vernier's Depth Micrometer Screw gauge
2.	Angular Measurement by Bevel Protractor.
3.	Angular Measurement by Sine Bar and Slip gauges.
4.	Study and Applications of Surface Roughness Tester
5.	Study and Applications of Profile Projector
6.	Study and Applications of Tool Maker's Microscope
Instrumentation Lab	
7.	Calibration of Pressure Gauge using Dead Weight Tester (DWT)
8.	Measurement of displacement using Full bridge Strain Gauge circuit
9.	Measurement of displacement using Linear Variable Differential Transformer (LVDT)
10.	Motor speed measurement using Magnetic Pick-Up Sensor, Photo Reflector Sensor, Photo Interruptive Sensor and Hall Effect Sensor
11.	Measurement of Torque Generated by AC (Induction motor) using Force Transducer.
12.	Weight measurement using Load cell
13.	Static Torque Measurement by using load cell.
14.	Measurement of Pressure using Transducer
15.	Strain measurement using strain gauges and cantilever assembly

7.Manufacturing Process Laboratory

Subject Code: 19ME2803

List of experiments:

SL.No	EXPERIMENTS
I. Casting:	
1	Moulding properties like permeability, Green hardness test.
2	Dry tensile & compression strength, Green tensile & compression strength,
3	Moisture measurement. and Sieve analysis.
II. Welding:	
4	Arc welding characteristics
5	Characteristics of MIG welding
6	Demo of TIG and Resistance spot welding
III. Machining:	
7	Preforming of Lathe machine Operations Like Threading, Knurling, and Grooving.
8	Milling of Spur gear
9	Effect of process parameter and machining on shear angle in orthogonal cutting on chip formation in turning
10	Effect of process parameters in turning on cutting forces & temperatures
11	Grinding of single point cutting tool.

8. Applied Thermodynamics Laboratory

Subject Code: 19ME3701

List of experiments:

SL.No	EXPERIMENTS
1.	To determine the Coefficient of Performance, Refrigeration capacity & Compressor work of Vapour Compression Refrigeration cycle with the help of refrigeration circuit under variable load conditions.
2.	To determine the Coefficient of Performance, Refrigeration capacity of Vapour Absorption Refrigeration system.
3.	To compare heat transfer for different heating elements in a cross-flow heat exchanger
4.	To determine the Cooling Effect, Contact Factor & By Pass Factor for Room air conditioning system.
5.	To determine the Pre-Heater output, COP of the Refrigerator, Efficiency of Humidifier Over all COP of Room air conditioning system.
6.	To Determine the Brake Power, Indicated power, Frictional Power, Mechanical Efficiency of a 4 stroke Single cylinder Petrol Engine. Draw the graph for Speed v/s Torque.
7.	To Determine the Fuel Consumption for various load condition, Specific Fuel Consumption, of a 4 stroke Single cylinder Petrol Engine.
8.	To Determine the Brake Power, Indicated power, Frictional Power, Mechanical Efficiency of a 4 stroke Single cylinder Diesel Engine. Draw the graph for Speed v/s Torque.
9.	To Determine the Fuel Consumption for various load condition, Specific Fuel Consumption, of a 4 stroke Single cylinder Diesel Engine.
10.	Study on the characteristics of flame stability and methods to improve stability limits
11.	Determination of flame speed based on the cone method
12.	Determination of the relationship between flame speed and air/fuel ratio flame separation demonstration

9.Theory of Machines Laboratory

Subject Code: 19ME3702

Sl.No	Experiment
1.	To find experimentally the Gyroscopic couple on Motorized Gyroscope and compare with applied couple.
2.	To find out critical speed experimentally and to compare the Whirling Speed of a shaft with theoretical values
3.	To determine experimentally, the Moment of Inertia of a Flywheel and Axle compare with the theoretical values.
4.	To calculate the torque on a Planet Carrier and torque on internal gear using epicyclic gear train and holding torque apparatus.
5.	To perform the experiment of Balancing of rotating parts and find the unbalanced couple and forces
6.	To find out experimentally the Corioli's component of acceleration and compare with theoretical values.
7.	Working models of various types of gears-Spur, Helical, cross helical, worm, bevel gear
8.	Working model of a synchromesh gear box.
9.	Working models of various commonly used mechanisms and its inversions
10.	To determine the frequency of undamped free vibration of an equivalent spring mass system.
11.	To determine the frequency of damped force vibration of a spring mass system
12.	Dynamic force analysis of 4 bar mechanism and slider crank mechanism (Analytical Methods)
13.	To evaluate the performance on spring-controlled governors.
14.	To evaluate the performance on gravity-controlled governors
15.	To determine the natural frequency of undamped torsional vibration of a single rotor shaft system.

10. Computer Aided Machine Drawing Practice

Subject Code: 19ME3703

I. Machine Drawing Conventions:

Need for drawing conventions – introduction to IS conventions

- a) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
- b) Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
- c) Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
- d) Title boxes, their size, location and details – common abbreviations & their liberal usage
- e) Types of Drawings – working drawings for machine parts.

II. Drawing of Machine Elements and simple parts

Selection of Views, additional views for the following machine elements and parts with every drawing proportions.

- a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
- b) Keys, cotttered joints and knuckle joint.
- c) Rivetted joints for plates
- d) Shaft coupling, spigot and socket pipe joint.
- e) Journal, pivot and collar and foot step bearings.

III. Assembly Drawings:

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

- a) Engine parts – stuffing boxes, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.
- b) Other machine parts – Screws jacks, Machine Vices Plummer block, Tailstock.
- c) Valves : Steam stop valve, spring loaded safety valve, feed check valve and air cock.

NOTE : First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

11. Heat Transfer Laboratory

Subject Code: 19ME3801

LIST OF EXPERIMENTS

Sl.No	Experiment
1.	To Calculate the Heat Transfer Through Composite Wall.
2.	To Calculate the Heat Transfer in Natural Convection.
3.	To Calculate the Heat Transfer in Forced Convection.
4.	To Calculate the Emissivity of a Test Plate.
5.	To Calculate the Critical heat flux of given metal wire.
6.	To Calculate the thermal Conductivity in Metallic Rod.
7.	To Calculate the thermal Conductivity through Liquids.
8.	To Calculate the LMTD, Heat transfer rate, Overall Heat transfer co-efficient in Shell and Tube Heat Exchanger.

12.CAD Laboratory

Subject Code: 19ME3802

1. AUTOCAD

1.1 Introduction, Draw tools, Modify tools

1.2 Introduction, Dimensions, Text, Layers, Blocks

2. SOLID WORKS:

2.1 Introduction, Sketch tools, Modify tools, Part modeling, Part modification

2.2 Assembly drawing, Cotter joint, Universal joint, Old hams coupling

2.3 Drawing

3. FUSION 360

3.1 Introduction, Sketch tools, Modify tools, Part modeling

3.2 Assembly drawing, Knuckle joint, Piston –connecting rod –crank

3.3 Simulation

4. ANSYS

4.1 Static structural analysis of parts

4.2 Static structural analysis of assembly

13.Automation in Manufacturing Lab

Subject Code: 19ME4701

List of Experiments

Sl.No	Experiment
1.	Machining of Components using CNC Lathe.
2.	Machining of Components using CNC Wire EDM.
3	Manufacturing of simple components using 3D Printer.
4	Palletization of objects using pick and place Robot.
5.	Characteristics of TIG welding.