RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

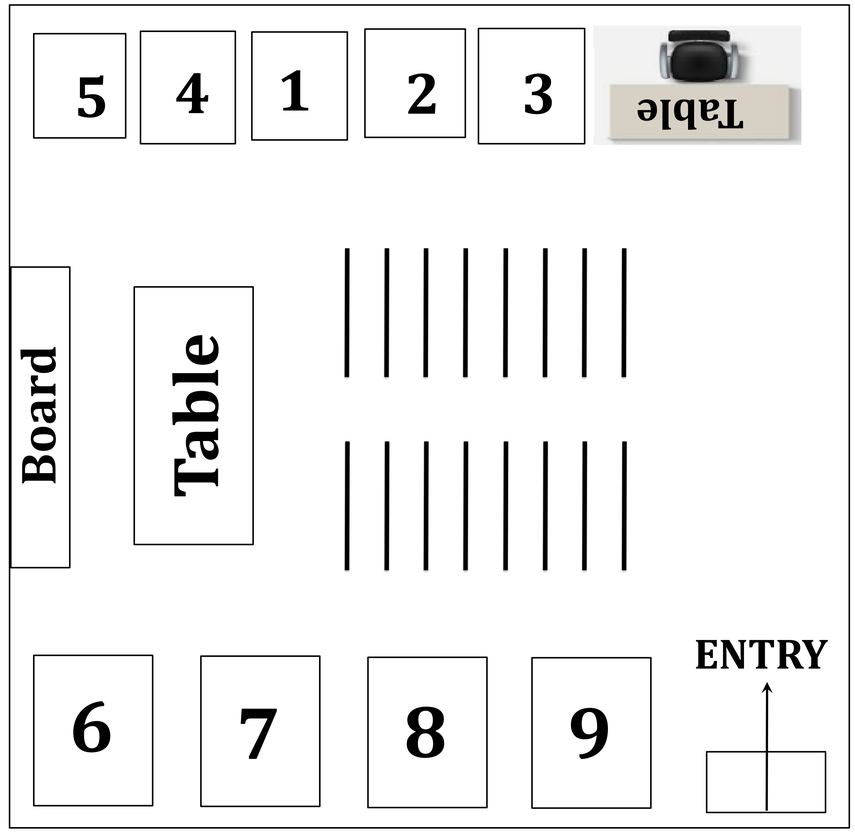
HEATING, VENTILATION, AIR CONDITIONING AND REFRIGERATION LABORATORY

VISION

To create competent technical professionals in Mechanical Engineering with ethical behavior and Environment consciousness.

MISSION

1) To provide contemporary and cutting-edge technical education in Mechanical Engineering.
2) To provide an ambience which nurtures research ideas in futuristic domain of mechanical Engineering.
3) To initiate project based learning and practical exposures in the area of Mechanical Engineering.
4) To direct faculty in research and consultancy advisory roles.
5) To establish strong linkages with well-known national and international technical institutes.
6) To promote the culture of imbibing environmental care and ecofriendly designs.
7) To become a department of aspiration and choice.



LABORATORY OUTCOMES

Learner will be able to…

1) Aware of the roles and ethics of HVAC &R engineers in related industries.
2) Present the impact of professional engineering solutions in societal and environmental contexts.
3) Evaluate performance of HVAC &R systems & Evaluate
4) Develop awareness of the engineering and technological aspects in the HVAC &R industries.
5) Communicate effectively through the preparation of report and practical presentation.
6) Analyze design aspects of HVAC&R in various application.

LIST OF EQUIPMENTS

1) Trial on Refrigeration Test Rig.
2) Trial on Heat Pump Test Rig.
3) Trial on Window A/C Test Rig.
4) Trial on Water Cooling Tower.
5) Trial on Ice Plant Test Rig.
6) Trial on Vapour Absorption System
7) Cut section of Hermetically sealed compressor.
8) Display board of components used in RAC
9) Demo. Model of Refrigeration Test Rig.

INVESTMENTS IN RUPEES:

4,62,065/-

LAB AREA

80.50 m^2

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

AUTOMOBILE & INTERNAL COMBUSTION ENGINE LABORATORY

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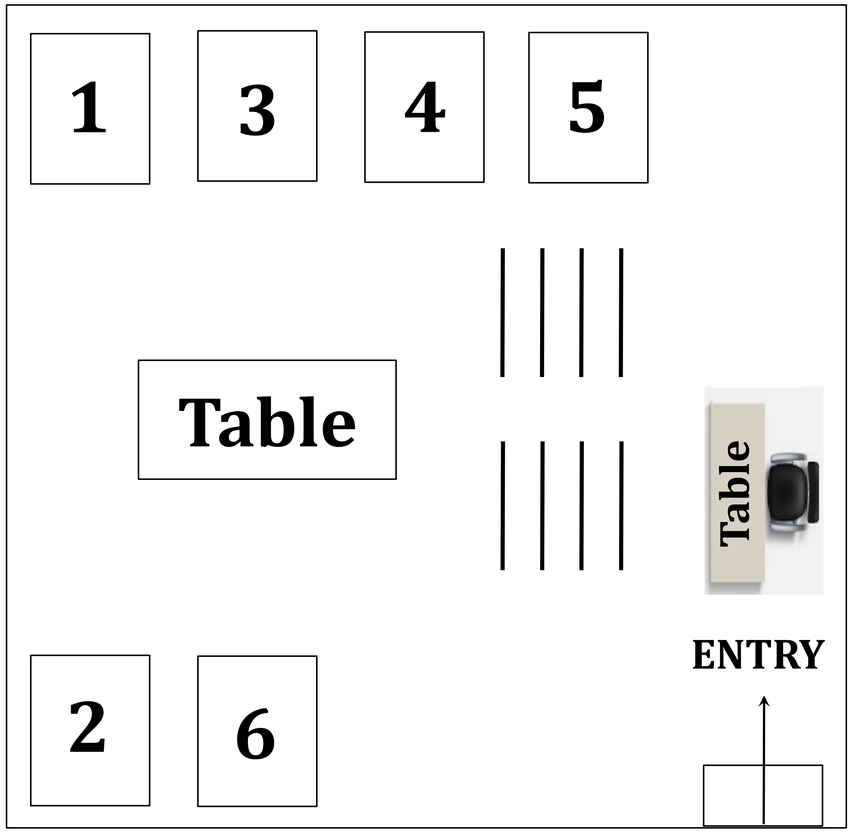


LABORATORY OUTCOMES

Learner will be able to…

1) Explain construction and working of different components of internal combustion engines.
2) Evaluate engine performance and emission characteristics.
3) Represents various components of engine such as carburetor, fuel pump, injector etc.
4) Operate and maintenance of different system of automobile such a steering system, brakes etc.

LIST OF EQUIPMENTS

1. Multi – Cylinder Petrol Engine Test Rig with Hydraulic Dynamometer
2. Single – Cylinder Diesel Engine Test Rig with Rope Brake Dynamometer
3. Two – Cylinder Diesel Engine Test Rig with Electric Dynamometer
4. Single – Cylinder Diesel Engine Test Rig with Electric Dynamometer
5. Exhaust Gas Analyzer
6. Automobile Parts and System

INVESTMENTS IN RUPEES:	LAB AREA
10,49,456/-	**65.55 m^2**

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

THEORY OF MACHINE & MAINTENANCE ENGINEERING LABORATORY

LABORATORY OUTCOMES (TOM)

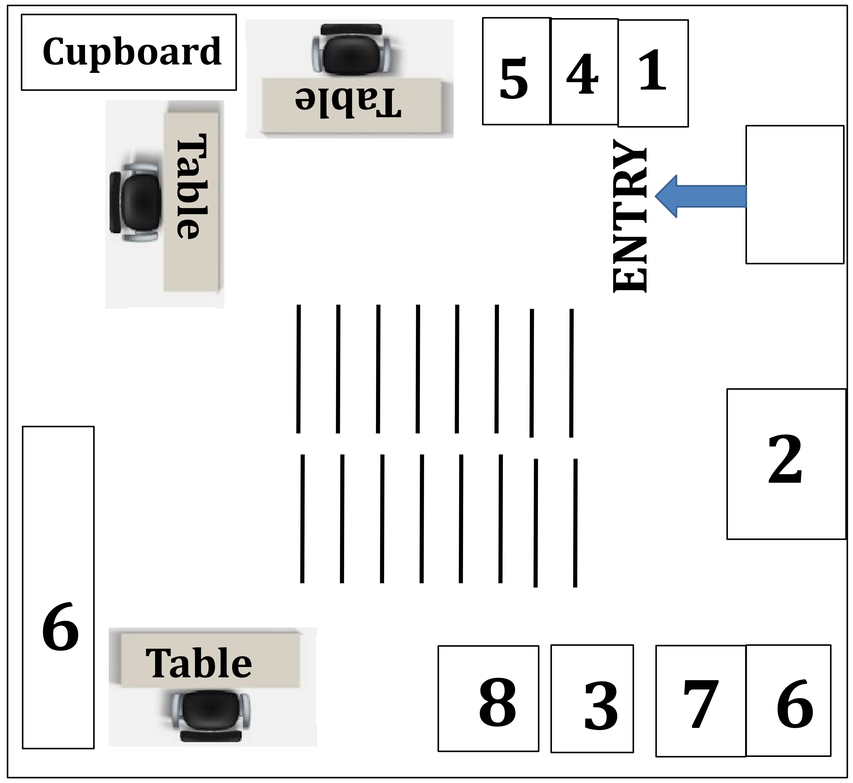
1. Plot and analyze governor characteristics
2. Analyze gyroscopic effect on laboratory model
3. Estimate natural frequency of mechanical systems
4. Analyze vibration response of mechanical systems
5. Determine damping coefficient of a system
6. Balance rotating mass

LABORATORY OUTCOMES (KOM)

1. Draw velocity diagram by instantaneous centre method.
2. Draw velocity and acceleration diagrams for four bar mechanism by relative method.
3. Draw velocity and acceleration diagrams for Slider crank mechanism by relative method
4. Draw Cam profile for the specific follower motion
5. Plot displacement-time, velocity-time, acceleration-time cam profiles
6. Develop and build mechanisms to provide specific motion

LABORATORY OUTCOMES (MAINTENANCE ENGG)

1. Identify different tools used for maintenance.
2. Apply different maintenance strategies.
3. Demonstrate the process of servicing a machine.
4. Identify common faults in Machinery using Vibration Spectrum.
5. Interpret the Vibration Signals for Monitoring and Prognosis.



LIST OF EQUIPMENTS

1) Motorized Gyroscope
2) VIB LAB model
3) Whirling of shaft
4) Static & Dynamic Balancing Apparatus
5) Motorized Governor Apparatus
6) Models of various mechanisms
7) Fatigue Testing Machine
8) Machinery Fault Diagnostic Setup
9) VIBit Sensors & Router

INVESTMENTS IN RUPEES:	LAB AREA
355377/-	63.00 m^2

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

WORKSHOP

OUTCOMES

Learner will be able to…

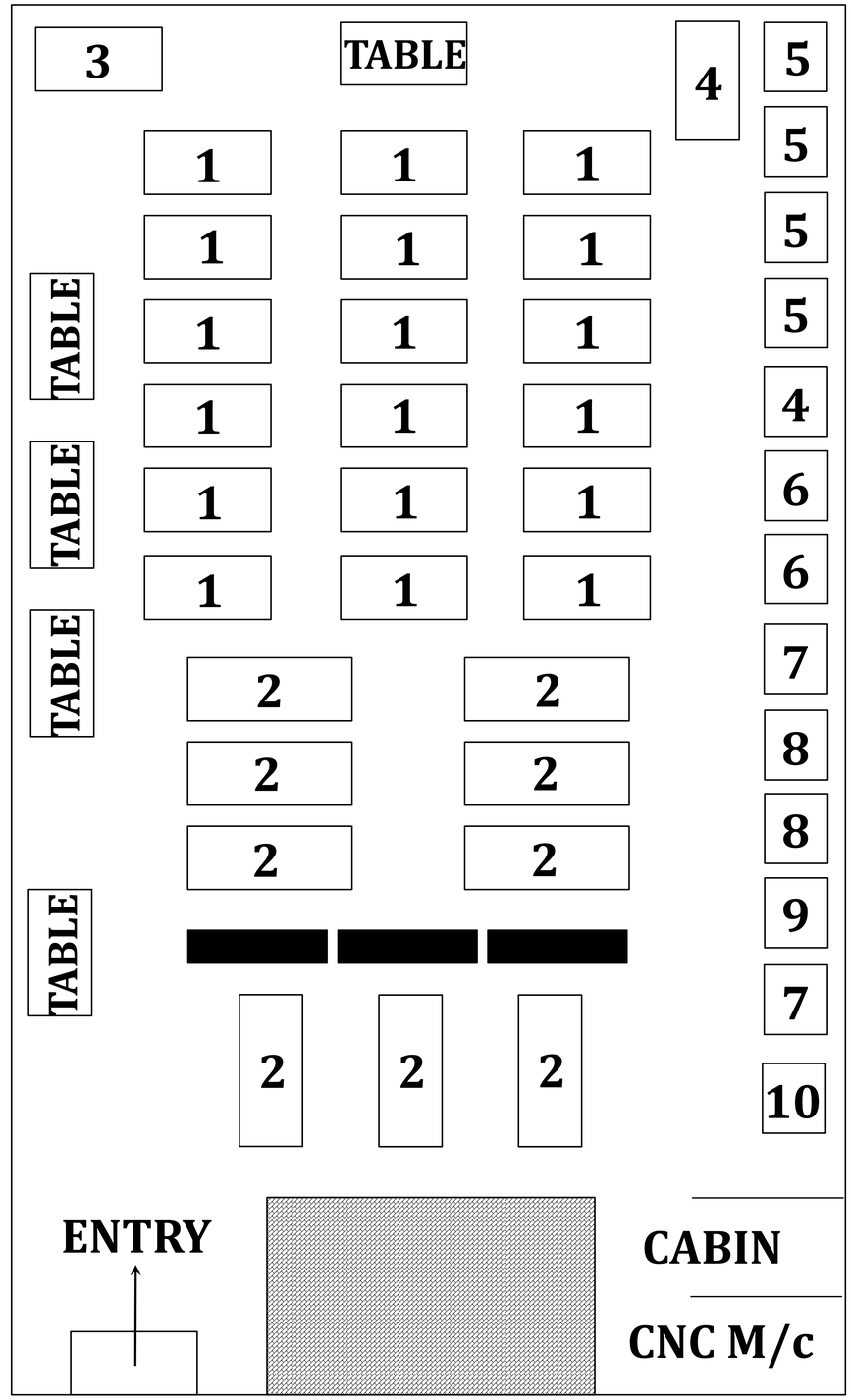
1)Develop the necessary skill require to use different fitting tools.
2)Develop the necessary skill require to use different carpentry tools.
3)Develop the necessary skill require to use different sheet metal & brazing tools.
4)Know the specifications, controls and safety measures related to machines and machining operations.
5)Use the machines for making various engineering jobs.
6)Perform various machining operations
7)Perform Tool Grinding
8)Perform welding operations

INVESTMENT IN INR

NAME OF SHOP	COST
MACHINE SHOP	1746013
FITTING SHOP	153135
CARPENTRY	81183
WELDING SHOP	113823
SMITHY SHOP	64063
SHEET METAL SHOP	12066
TOTAL	**2170283**

AREA

NAME OF SHOP	AREA
MACHINE SHOP	144 m^2
FITTING SHOP	88 m^2
CARPENTRY	68 m^2
WELDING SHOP	44 m^2
SMITHY SHOP	44 m^2
SHEET METAL SHOP	30 m^2
TOTAL	**418 m^2**



1 LATHE MACHINE 2 WORK BENCH 3 CUTTING MACHINE 4 SHAPER 5 GRINDING MACHINE 6 MILLING MACHINE 7 DRILLING MACHINE 8 WELDING 9 FURNACE 10 SPOT WELDING

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

WORKSHOP

VISION

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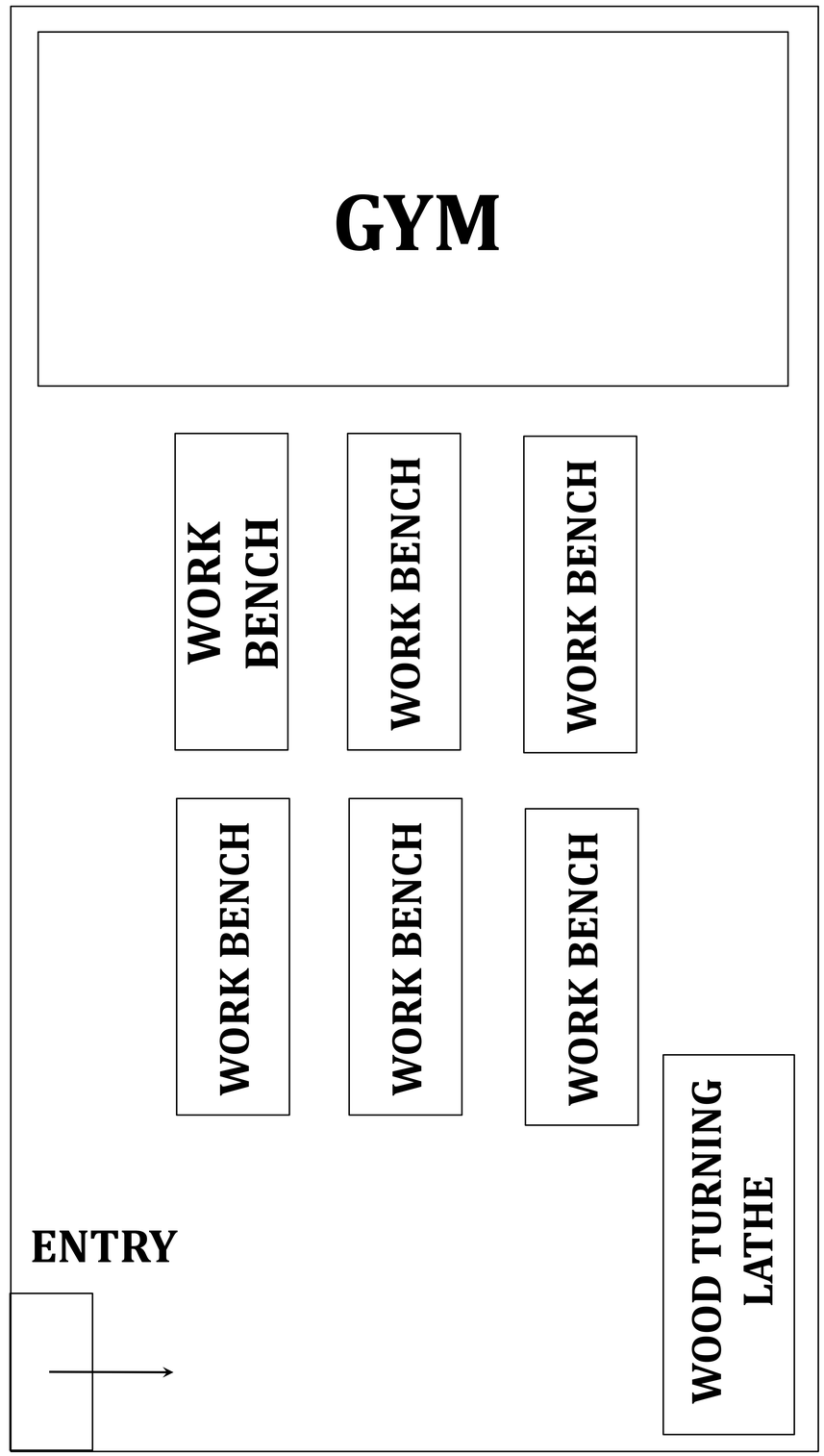

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

FLUID MECHANICS & MACHINERY LABORATORY

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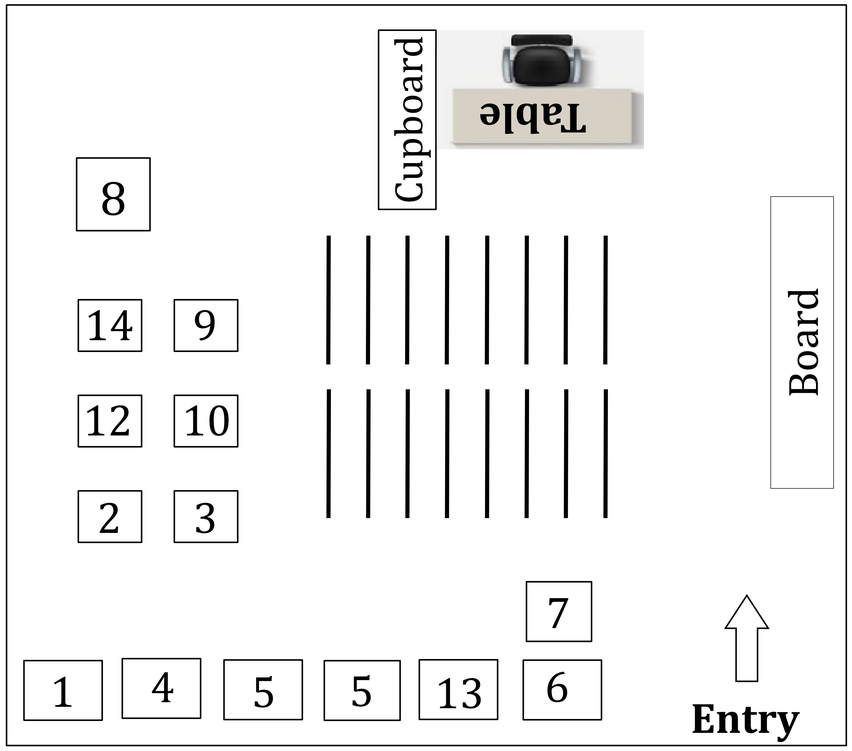
LABORATORY OUTCOMES

Learner will be able to…

1) Conduct a trial on reciprocating compressor / centrifugal compressor.
2) Conduct a trial on impulse turbine and analyze its performance
3) Conduct a trail on reaction turbine and analyze its performance
4) Conduct a trial on centrifugal pump and analyze its performance
5) Conduct a trial on reciprocating pump and analyze its performance
6) Conduct a trial on gear pump

INVESTMENTS IN RUPEES:	LAB AREA
661000 /- INR	**105 m^2**



LIST OF EQUIPMENTS

1) Bernoulli's Theorem Apparatus
2) Reynold's Apparatus
3) Losses in Pipe (Major & Minor Losses)
4) Flow through Orifice & Mouthpeace Apparatus
5) Flow Measurement by Venturimeter & Orifice Meter – 2 No
6) Purge Type Level Indicator
7) Magnetic Flow Indicator
8) Pelton Wheel Turbine Test Rig
9) Centrifugal Pump Test Rig
10) Reciprocating Pump Test Rig
11) Cavitation Test Rig
12) Francis Turbine Test Rig
13) Series & Parallel Pump Test Rig
14) Gear Pump Test Rig

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

MECHANICAL MEASUREMENTS & AUTOMATION AND METROLOGY LABORATORY

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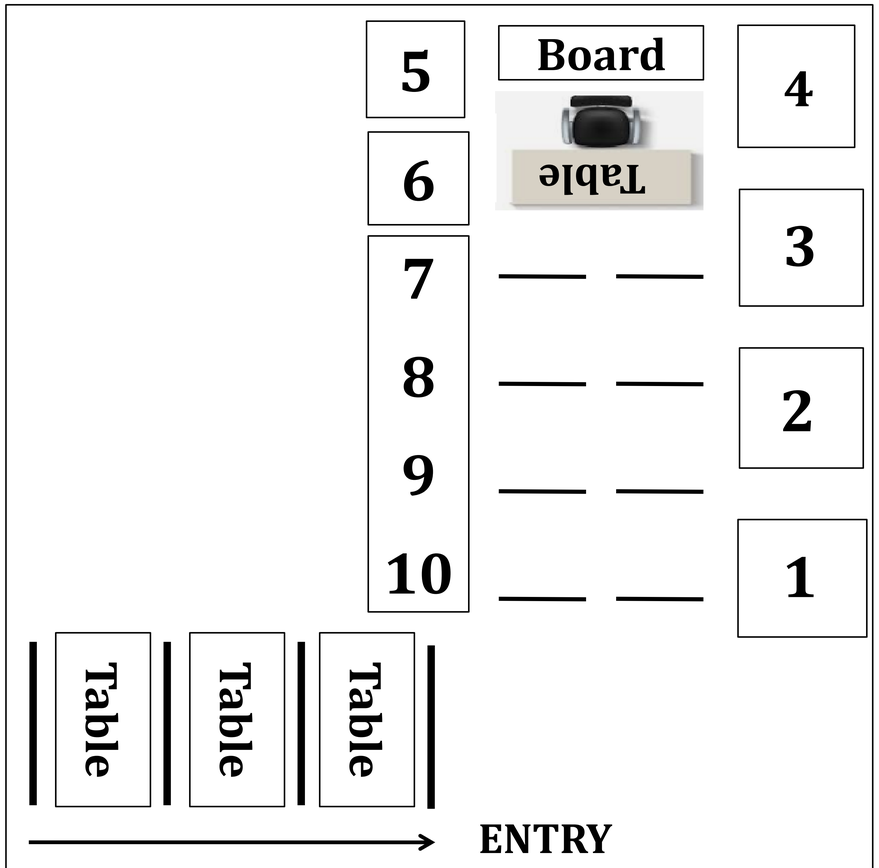


LABORATORY OUTCOMES

Learner will be able to…

1) Apply inspection gauge to check or measure surface parameters.
2) Measure surface parameters using precision measurement tools and equipment.
3) Measure different mechanical parameters by using sensors.
4) Analyze the response of a control systems
5) Demonstrate use of automated controls using pneumatic and hydraulic systems
6) Implement program on PLC system and demonstrate its application.

LIST OF EQUIPMENTS

1) Dead Weight Pressure Gauge
2) Mechatronics Training package with pneumatic trainer
3) Stroboscope
4) Pneumatic Trainer
5) Electronic Comparator
6) Oil Hydraulic Trainer
7) Parkinson's Gear tester
8) Floating Carriage Diameter Measuring Machine
9) Autocollimator
10) Interferometer

INVESTMENTS IN RUPEES

12,03,857/- (MMA) + 11,65,746/- (Metro.) = 2369603/-

GRANT RECEIVED FROM AICTE UNDER MODROB

Rs. 5,30,000 /-

LAB AREA

69.0 m^2

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

PROJECT & E-YANTRA ROBOTICS LABORATORY

LABORATORY OUTCOMES (E-Yantra Robotics Lab)

Learner will be able to…

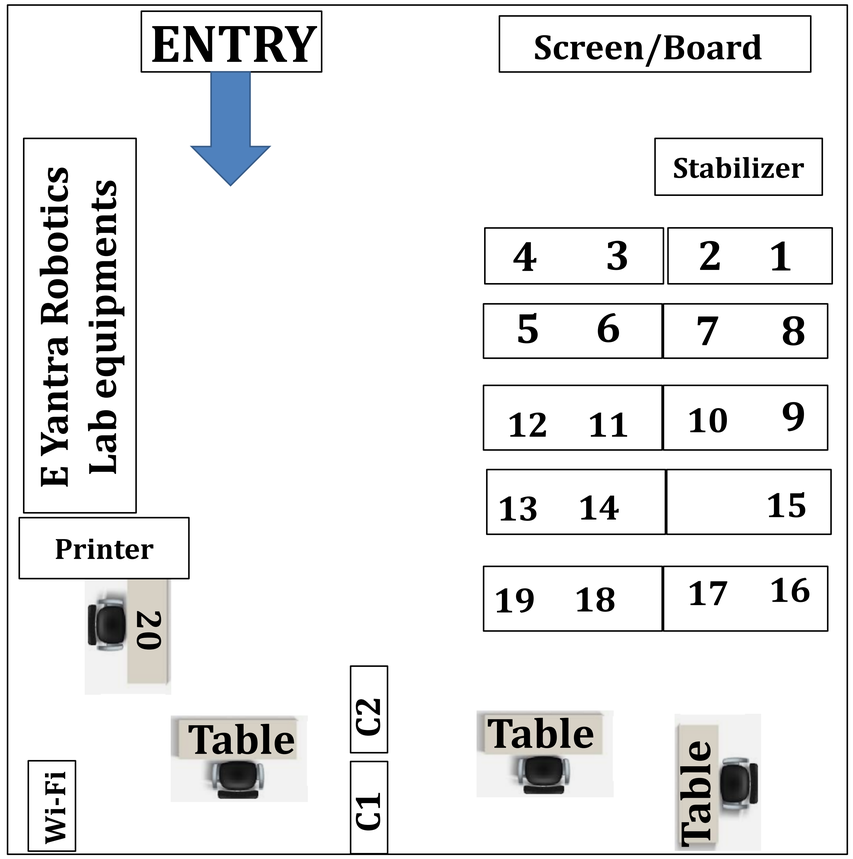
1) Demonstrate the basic functioning of a robot
2) Identify various components of robots
3) Carryout kinematic analysis, workspace analysis, and trajectory planning for a robot
4) Identify suitable sensors/actuators for robot
5) Select an appropriate robot for given industrial inspection and material handling systems.

LABORATORY OUTCOMES (Project Lab)

Learner will be able to…

1) Students will be able to implement solutions for the selected problem by applying technical and professional skills.
2) Students will be able to analyze impact of solutions in societal and environmental context for sustainable development.
3) Students will be able to collaborate best practices along with effective use of modern tools.
4) Students will be able to develop proficiency in oral and written communication with effective leadership and teamwork.
5) Students will be able to gain expertise that helps in building lifelong learning experience.

INVESTMENTS IN RUPPEES:	LAB AREA
11,53,360/-	**64.5m²**



LIST OF EQUIPMENTS

Desktop PC	20 Nos.
Fire Bird V 2560 Robot	05 Nos.
Spark V Robot	05 Nos.
Gripper kit for Spark V	05 Nos.
Robotic arm kit	01 Nos.
Printer	01 Nos.
Wi-Fi	01 Nos.
Stabilizer	01 Nos.

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

THERMAL ENGINEERING AND INTERNET OF THINGS BASED LABORATORY

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LABORATORY OUTCOMES (THERMAL ENGINEERING)

1) Estimate thermal conductivity of engineering materials.
2) Evaluate performance parameters of extended surfaces.
3) Analyze heat transfer parameters in various engineering applications

LABORATORY OUTCOMES (INTERNET OF THINGS)

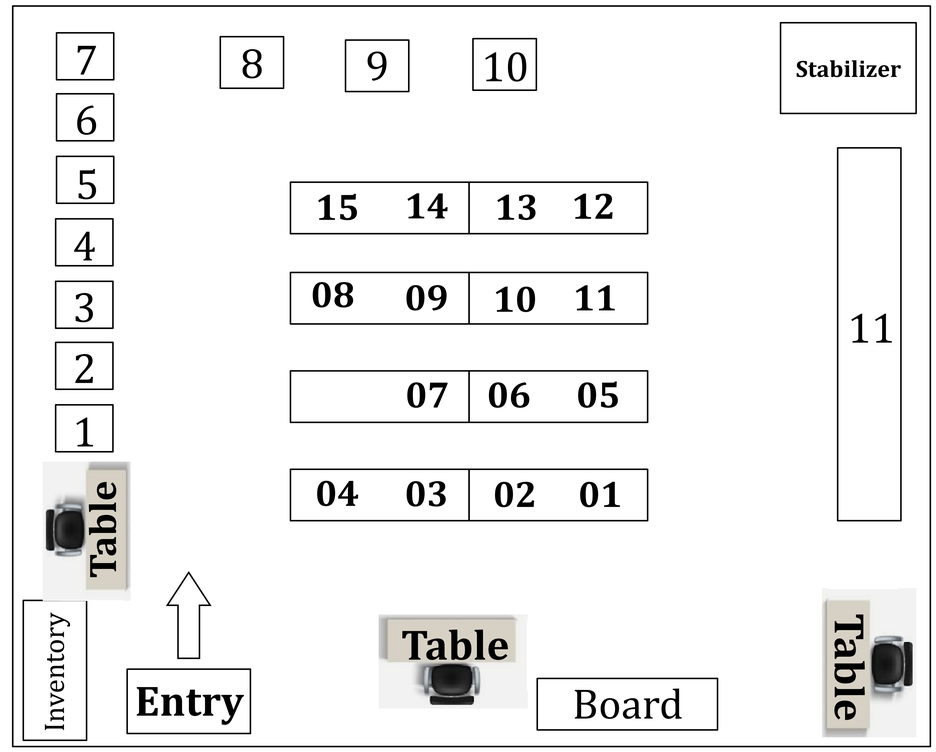
1) Develop simple applications using microcontrollers 8051 and Arduino.
2) Interface simple peripheral devices to a Microcontroller.
3) Use microcontroller based embedded platforms in IoT.
4) Use wireless peripherals for exchange of data.
5) Setup cloud platform and log sensor data.

INVESTMENTS IN RUPPEES

(9,07,814)HT+(11,09,985)IOT=20,17,799/-

LAB AREA:

63.20 m²



LIST OF IOT LAB. EQUIPMENTS & S/W

i)	Desktop PC	15 Nos.
ii)	Arduino UNO Boards	15Nos.
iii)	Arduino Nano Boards	05 Nos.
iv)	Stabilizer	01 Nos.

LIST OF TE LAB. EQUIPMENTS

1) Set up for heat transfer in forced convection
2) Set up for heat transfer in natural convection
3) Set up for effectiveness of pin fin
4) Set up for thermal conductivity of insulating material
5) Set up for emissivity of a surface
6) Set up for thermal conductivity of composite wall
7) Set up for unsteady state heat transfer
8) Set up for condensation in Drop & Film form
9) Set up for Thermal Conductivity of Metal Rod
10) Set up for heat pipe demonstration
11) Models of various types of boilers

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

STRENGTH OF MATERIALS & MATERIAL TECHNOLOGY LABORATORY

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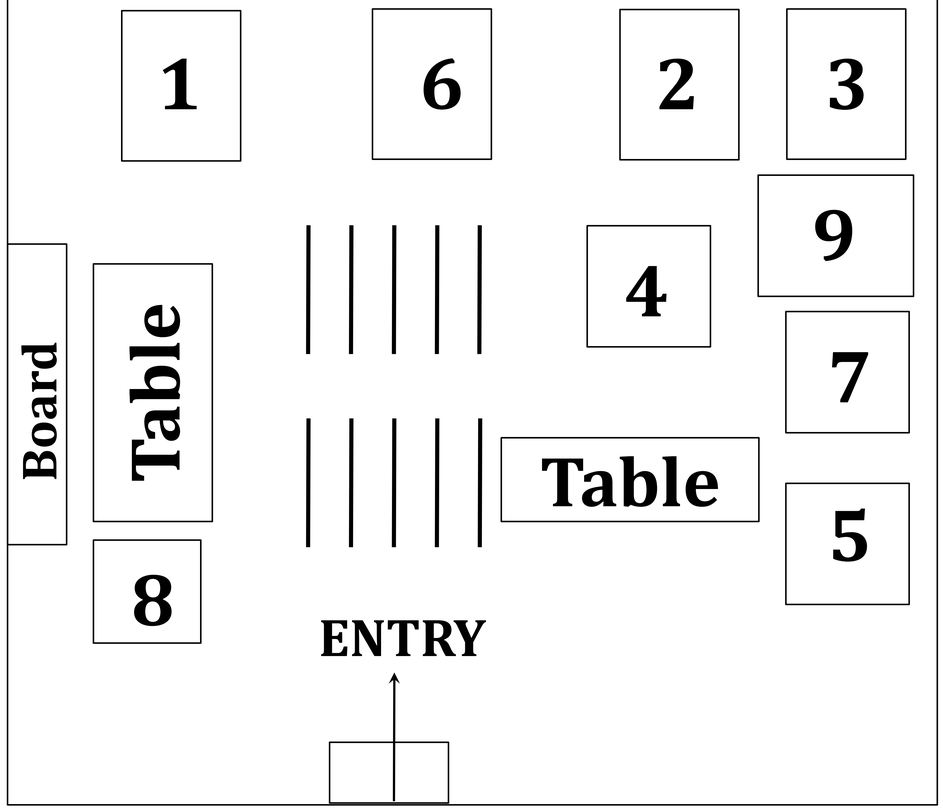

LABORATORY OUTCOMES

Learner will be able to…

1) Prepare metallic samples for studying its microstructure following the appropriate procedure.
2) Identify effects of heat treatment on microstructure of medium carbon steel and hardenability of steel using Jominy end Quench test
3) Perform Fatigue Test and draw S-N curve
4) Perform Tension test to Analyze the stress - strain behavior of materials
5) Measure torsional strength, hardness and impact resistance of the material
6) Perform flexural test with central and three point loading conditions in shaft.

LIST OF EQUIPMENTS

1) Universal Testing machine 40 Tone.
2) Impact Testing machine
3) Universal Hardness Testing machine 187.5Kg/ 200Kg.
4) Torsion Testing machine.
5) Muffle furnace for heat Treatment(1200^0C)
6) Jominy End Quench setup.
7) NDT (Magnetic & Die Penetrating)
8) Metallurgical Microscope.
9) Belt grinding and Disc Polishing

INVESTMENTS IN RUPEES:

$7,14,239_{(SOM)} + 3,04,681_{(MM)} = 10,18,920/-$

LAB AREA:

$83.50 m^2$

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Mechanical Engineering

CAD/CAM/CAE/3D-PRINTING AND R & D LABORATORY

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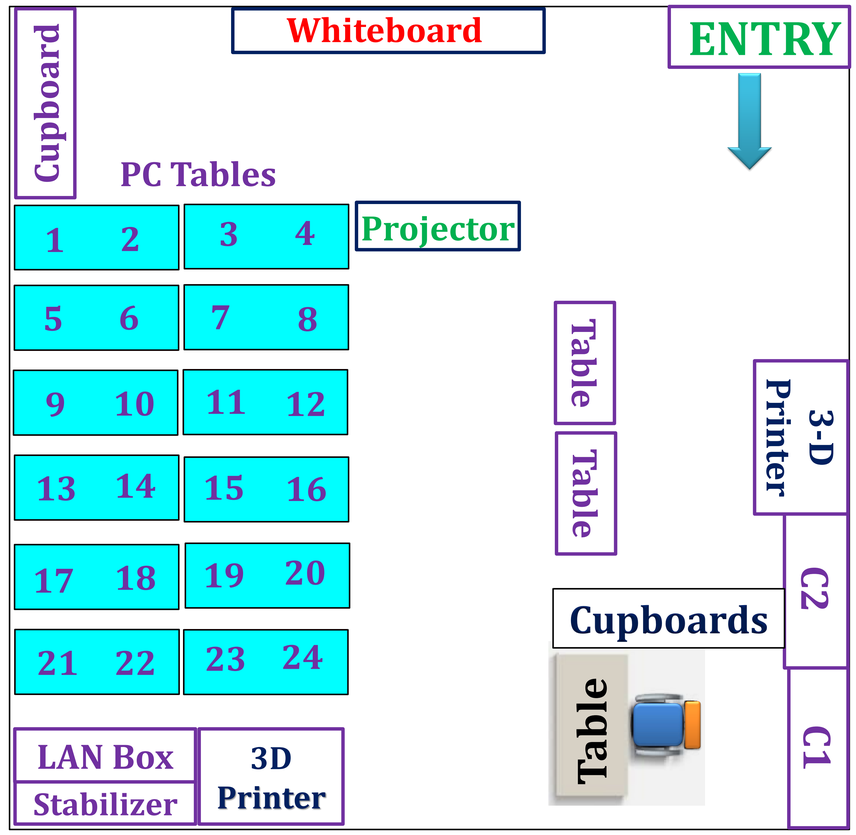
LABORATORY OUTCOMES

Learner will be able to…

1) Develop, execute & Build part programing for any given specific operation.
2) Demonstrate CAM Tool path and prepare NC- G code.
3) Develop & Build 3D model using available biomedical data.
4) Apply the basic finite element formulation techniques to solve engineering problems by using 1D, 2D & 3D dimensional elements.
5) Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system.
6) Use Academic, Open source & commercial CAD/CAM/CAE/AM software, to solve problems related to Mechanical Engineering.
7) Solve/study/R&D related to industrial problems as a mini, major, R &D project.

INVESTMENTS IN RUPPEES:	LAB AREA
34,50,700.26/-	**75.00 m²**



LIST OF S/W & H/W EQUIPMENTS

SN	Name	Qty /Users
1	Turnitin Similarity	2123 Users
2	Ansys Workbench 2023 R2	25 Nodes
3	Autodesk Inventor	50 Users
4	Simplify 3D	1 Users
5	Flashforge FlashPrint	1 Users
6	Desktop PC	24 Nos
7	3D Printer	02 Nos.
8	Laser Printer	02 Nos.
9	Interactive Board	01 Nos.
10	Projector	01 Nos