CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A), HYDERABAD - 500 075

LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department:**Civil Engineering**

S. No.	Name of the Laboratory / Workshop	Details
1	**Environmental Engineering Lab (Dr. Bharath Kumar)**	**List of Major Equipment / Facilities**
		1) UV Visible Double beam Spectrometer
		2) Orbital Shaking incubator
		3) Vertical Auto Clave
		4) Lab centrifuge
		5) Hotplate magnetic stirrer.
		6) Turbidity meter
		7) Bench top EC / TDS Meter
		8) Portable Dissolved Oxygen meter
		9) Online Air Quality Monitor
		10) Muffle furnace
		11) Portable Colorimeter
		12) BOD Incubator
		13) Combined Air Sampler
		14) COD reactor
		15) Hot Air Oven
		List of Experimental Setup in each Laboratory
		1) Turbidity meter
		2) PM Combined Sampler
2	**Solid Mechanics Lab (Sri T. Vasudeva Rao)**	**List of Major Equipment / Facilities :**
		1) Mechanical Universal testing machine (UTM-100T)
		2) Digital Universal Testing machine (UTM-1000kN)
		3) Impact Testing machine
		4) Vickers hardness testing machine
		5) Brinells hardness testing machine
		6) Rockwell hardness testing machine
		List of Experimental Setup :
		1) Loading frame
		2) **Beams**: a) Simply supported b) Cantilever c) continuous and d) propped Cantilever
		3) Laminated spring
		4) Helical spring
3	**Transportation Engineering (Sri G. Viswanath)**	**List of Major Equipment / Facilities**:
		1) Ductility testing Machine
		2) Aggregate crushing value test
		3) Los Angeles abrasion test

S. No.	Name of the Laboratory / Workshop	Details
		4) Marshall stability test equipment
		5) Dorry Abrasion Testing Machine
		6) California Bearing Ratio Test
		7) Benkelman Beam
		List of Experimental Setup in each Laboratory:
		1) Penetration test
		2) Ductility test
		3) Softening point test
		4) Specific gravity test
		5) Viscosity test
		6) Flash and fire point test
		7) Aggregate shape test (flakiness & elongation)
		8) Water Absorption test
4	**Fluid Mechanics, Hydraulics and Hydraulic Machines Laboratory (Sri. E. Maheshwar Reddy)**	**List of Major Equipment / Facilities**
		1) Pelton Wheel Turbine
		2) Francis Turbine
		3) Kaplan Turbine
		4) Measurement of Viscosity Apparatus
		5) Stability of Floating Body
		6) Hydrodynamic forces on Flat/Curved Surface
		7) Centrifugal Pump
		8) Reciprocating Pump
		9) Tilting flume
		10) Venturimeter and Orifice meter
		11) Mouth Piece and Orifice
		12) Notch Apparatus
		13) Impact of free jet
		14) Major Losses and Minor Losses in pipes
		15) Bernoulli's Principle Setup
		List of Experimental Setup in each Laboratory:
		1) Mouth Piece Apparatus
		2) Orifice Apparatus
		3) Notch Apparatus
		4) Venturimeter and Orificemeter Apparatus
		5) Major Losses and Minor Losses Apparatus
		6) Major Losses and Minor Losses Apparatus
		7) Bernoulli's Theorem Apparatus
		8) Impact of free jet Apparatus
		9) Reynolds Experimental Apparatus
		10) Hemispherical tank
		11) Curved channel
		12) Venturi flume Apparatus
		13) Hydraulic Jump Apparatus
		14) Measurement of Viscosity Apparatus
		15) Stability of Floating Body Apparatus
		16) Hydrodynamic forces on Flat/Curved Surface
		17) Gear Pump

S. No.	Name of the Laboratory / Workshop	Details
		18) Self-Priming Pump
		19) Pelton Wheel Turbine
		20) Francis Turbine
		21) Kaplan Turbine
		22) Centrifugal Pump
		23) Reciprocating Pump
		24) Tilting flume apparatus (Open Flow Channel)
5	**Surveying Lab (Sri. Ramanarayana Sankriti)**	**List of Major Equipment / Facilities:**
		1) Differential global positioning system (DGPS) /global positioning system
		2) Total station instruments
		3) Batteries for Pentax Total Station
		4) Theodolite
		5) Auto level
		6) Dumpy level
		7) Plane table
		List of Experimental Setup in each Laboratory:
		1) Ranging, running perpendicular lines and types of offsets by using chain, tape, cross staff.
		2) Prismatic compass for measuring the area of a given land by using compass traverse.
		3) Plane table survey - Radiation and intersection methods.
		4) Levelling - Fly levelling using Auto level.
		5) Development of L.S. and C.S after obtaining levels by using Auto levels.
		6) Developing contour maps.
		7) Measurement of horizontal angles using theodolite.
		8) Total station operations.
		9) Traversing by Total station.
		10) Setting of simple curve with the help of Total Station.
		11) Study of GPS operations.
		12) Establishing control points using GPS.
		13) Demonstration of Remote Sensing Data processing software
6	**Concrete Laboratory (Dr. Arshad Hussain Choudhurry)**	**List of Major Equipment / Facilities:**
		1) PUNDIT LAB Ultrasonic testing instrument (PROSEQ)
		2) Vicat apparatus
		3) Half-cell potential meter
		4) Weighing balance 10 kg (1gm)
		5) Vibrating Machine
		6) Pan / slab vibrator
		7) Proving ring
		8) Laboratory Concrete Mixture
		9) 3000 kN Digital Compression Testing machine
		10) Concrete Permeability Apparatus
		11) Ultrasonic Pulse Velocity Apparatus(UPV)

S. No.	Name of the Laboratory / Workshop	Details
		12) Vibrating Table (2m)
		13) Concrete mixer, pan type.
		14) Hot Air oven.
		15) Resipod (sulphate resistivity meter)
		16) Digital R.C.P.T. 6 cell
		17) Core Cutting Machine.
		18) Accelerated Curing Tank.
		19) Concrete Permeability Test Apparatus
		20) Rebound hammer
		21) Shake table
		List of Experimental setup:
		1) Specific gravity testing for cement / coarse aggregate/fine aggregate
		2) Compacting factor
		3) Test set-up for self compaction concrete
		4) Test set – up for impact testing of concrete
		5) Heat of hydration test for cement
		6) Compressometer for stress/ strain for concrete
		7) Concrete Permeability Test
		8) Bulk density testing for coarse / fine aggregate
7	**Advanced Structural Engineering Lab** **(Dr. Arshad Hussain Choudhurry)**	**List of Major Equipment / Facilities:**
		1) Reaction frame with servo-controlled hydraulic Jack (500 kN)
		2) LVDT (200 mm capacity; LC = 0.1 mm)
		List of Experimental setup:
		1) Reaction frame for finding deflections
8	**Geo Technical Engg. Lab (Dr.Angshuman Das)**	**List of Major Equipment/Facilities:**
		1) Triaxial Shear test apparatus- Digital Load Frame Triaxial cell pneumatic control panel air compressors
		2) Proving Ring 2kN & 5kN
		3) Hot air oven digital 45x45x45-250∘ CM-inner S.S.chamber
		4) Precision Electronic balance
		5) Electromagnetic Sieve shaker
		6) Universal automatic compactor
		7) Standard Penetration test (SPT) with accessories
		8) Permeability apparatus
		9) Relative density apparatus with complete accessories
		10) Plate load test apparatus
		11) 20 tonnes truss
		12) Hot Air oven (605x605x605) stainless steel
		13) Proctor Compaction apparatus
		14) Auger Outfit (Post Hole Type) with 50mm dia. and 75mm dia
		15) Direct shear apparatus
		16) Vane Shear apparatus
		17) 0-10mm Spring Type LVDT

S. No.	Name of the Laboratory / Workshop	Details
		18) 1200 Kpa Earth Pressure cell
		19) 2 channel Pressure signal Conditioner
		20) Data Acquisition system along with lab view based data acquisition software for load, deflection & strain measurement
		21) 30 kN S Type load cell
		22) load cell signal conditioner
		23) Acrylic soil tank with MS base fabrication charges size 600 x 600 x 600
		24) 2 Channel Strain Conditioner-350 Ohms Quarter Bridges
		List of Experimental Setup:
		1) Triaxial Shear test
		2) Direct shear test
		3) Standard Penetration test (SPT)
		4) Core Cutter with hammers
		5) Liquid limit device with counter and one casagrande grooving tool
		6) Liquid limit cone penetrometer
		7) Sand pouring cylinder (HS:14.10)
		8) Shrinkage limit apparatus
		9) Proctor penetrometer
		10) Specific Gravity Bottles
		11) Pycnometer
9	**Engg. Geology Lab (Smt. Aswari Sultana Begum)**	**List of Major Equipment/Facilities:**
		1) Electrical Resistivity Meter
		2) Rock forming minerals
		3) Physical mineralogy
		4) Minerals of 50 Nos. showing habit minerals
		5) Showing lustre
		6) Minerals speamenta
		7) Minerals specimens from Almirock
		8) Building stones
		9) Building ornamental
		10) Building ornamental stones
		11) Gems & Semi Gems
		12) Museum show specimens
		13) Gems & Semi Gems
		14) Metallic ovens set
		15) Rock specimens
		16) Rock specimens
		17) Rock specimens
		18) Structural Models
		19) Geological Charts
		20) Crystallography Models
		21) Crystal models of lock framing models
		22) Engineering models
		23) Digital DC Resistance Meter with Accessories

S. No.	Name of the Laboratory / Workshop	Details
		24) Geological Maps
		25) Clinometers Compass
		26) Electronic weighing machine
		27) Hot plate
		28) Measuring Cylinder
		List of Experimental Setup in each Laboratory:
		1) Rock forming minerals
		2) Physical mineralogy
		3) Minerals of 50 Nos. showing habit minerals
		4) Showing lustre & col
		5) Minerals speamenta
		6) Minerals specimens from Almirock
		7) Building stones
		8) Building ornamental
		9) Building ornamental stones
		10) Gems & Semi Gems
		11) Museum show specimens
		12) Gems & Semi Gems
		13) Metallic ovens set
		14) Rock specimens
		15) Rock specimens
		16) Rock specimens
		17) Structural Models
		18) Geological Charts
		19) Crystallography Models
		20) Crystal models of lock framing models
		21) Engineering models
		22) Digital DC Resistance Meter with Accessories
		23) Geological Maps
		24) Clinometers Compass
		25) Electronic weighing machine
		26) Hot plate

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: Mechanical Engineering

S. No.	Name of the Laboratory / Workshop	Details
1	RESEARCH LABORATORY	**List of Major Equipment / Facilities**
		i) Nano UTM 25 KN, Lubrication & Friction Tester, Ultrasonic Flaw Detector, Image Analyzer S-W,
		ii) DELL Precession Work Station
		iv) Monocular metallurgical microscope model METZ 56
		v) Hydra 645 3D-Printer With MK450 Extruder
		List of Experimental setup
		Value added lab
2	ADDITIVE MANUFACTURING LAB	**List of Major Equipment / Facilities**
		i) Raise 3D N2 Plus 3D Voume: 305 X 305 X 610 Printer,
		ii) Raise 3D N2 Plus 3DPrinter Volume: 305 X 305 X 610
		iii) Next Engine HD 3D Scanner
		iv) Flash Forge Inventor 3D Printers, Build Volume: 230 X 150 X 160 mm3
		v) Form Labs SLA Base 3D Printer. Build Volume: 145 X 145 X 175 mm3
		vi) Markforged Onyxpro 3D Printer. Build Volume: 320 X 132 X 154 mm3
		vii) G3D Plexi 3D printer, Vo.235x235x250, dual extruders
		List of Experimental Setup in each Laboratory
		Value added lab
3	APPLIED THERMO DYNAMICS LAB	**List of Major Equipment / Facilities**
		i) TD 4/4 A Engine test rig with hydraulic dynamometer (Imported)(30 KW at 4000 RPM)(Tec Equipments,UK)
		ii)VCR petrol Engine
		iii) 4 Stroke Multicylinder petrol engine
		iv) Bajaj 2 stroke petrol engine
		v) Four stroke single cylinder diesel engine with electrical dynamometer
		vi) Two -stage Reciprocating Air compressor
		vii) Single cylinder four stroke with CRDI engine (Dual fuel mode) with CNG system and accessories

		List of Experimental Setup in each Laboratory
		1. Valve timing diagram and Port diagram. 2. Performance characteristics of a multi-cylinder petrol engine. 3. Morse test on multi cylinder petrol engine. 4. Performance test on a variable compression ratio petrol engine. 5. Performance test on single cylinder diesel engine 6. Heat balance test on single cylinder diesel engine. 7. Volumetric efficiency, isothermal efficiency of multi -stage reciprocating air compressor. 8. 4S Single Cylinder 3.68 DE, with computer interface 9. Kirloskar 5 HP Diesel engine with computer interfacing 10. Multicylinder 4-Stroke Diesel engine
4	CAD/CAM LAB	**List of Major Equipment / Facilities**
		i) Vertical Machining Centre (Denford,U.K), MASTER CAM 5.5 ii) V.M.C TRIAC, MTAB XL-TURN iii) SOLID WORKS-18 iv) DIGIMAT ACADEMIC RESEARCH SOFTWARE
		List of Experimental Setup in each Laboratory
		1. Part modeling of various machine components 2. Format of drawing sheet, title block, Generating and editing drawings 3. 4 Assembly modeling of Stuffing Box 4. 5 Assembly modeling of Screw Jack 5. 6 Assembly modeling of Crosshead 6. Production drawing of components and indicating tolerances on size and geometrical form, Position; Indicate Surface finish, surface treatments if any and writing process sheet for anyone component 7. 8 Contouring on CNC Milling Machine. 8. Rectangular & Circular Pocketing on CNC Milling Machine 9. 10 Step Turning and Taper Turning on CNC Lathe Machine 10. Multiple Turning on CNC Lathe Machine 11. Design a product and Manufacture / generate CNC Machining tool path for its components
5	CENTRAL WORKSHOPS	**List of Major Equipment / Facilities**
		i) Surface plate (Granite)1000 x 1000mm, ii) Power saw machine, Mortising machine RPM 1440 HP3, Tenanting iii) Sand testing equipment iv) BOSCH tool kit v) GI sheet cutting machine vi) Stir Casting Machine

		List of Experimental Setup in each Laboratory **Carpentry** 1. plane the given wooden piece to required size 2. lap joint on the given wooden piece according to the given dimensions. 3. a dove tail-joint on the given wooden piece according to the given dimensions. **Exercises in Tin Smithy** 1. make a rectangular box from the given sheet metal with base and top open. Solder the corners. 2. make a scoop. 3. make a pamphlet box. **Exercises in Fitting** 1. make a perfect rectangular MS flat and to do parallel cuts using Hacksaw 2. make male and female fitting using MSflats-Assembly1 3. make male and female fitting using MSflats-Assembly2 Exercises in **House Wiring** 1. Wiring of one light point controlled by one single pole switch, a three pin socket controlled by a single pole switch, and wiring of one buzzer controlled by a bell push 2. Wiring of two light points connected in series and controlled by single pole switch. Verify the above circuit with different bulbs. Wiring of two light points connected in parallel from two single pole switches and a three pin socket 3. Stair case wiring-wiring of one light point controlled from two different places independently using two 2- way switches **Casting:** 1. Moulding sand testing: GCS, GSS, DCS and DSS 2. Moulding sand testing: Permeability and shatter index. 3. Finding out the GFN and Moisture content for a given sand sample. 4. Melting and Pouring of Aluminum.
6	DYNAMICS & VIBRATION LAB	**List of Major Equipment / Facilities** i) Gyroscope, ii) Governors, Cam profile, static and dynamic balancing, Whirling of shafts etc iii) Universal Vibration Apparatus iv) Impact Hammer v) Handheld Shaker vi) Smart Shaker

		List of Experimental Setup in each Laboratory 1. Plot the follower displacement vs angle of rotation curves for different cam follower pairs. 2. Gyroscopic effect on a rotating disc. 3. Determination of the frequency of torsional vibrations. 4. Static and Dynamic balancing in a rotating mass system. 5. Effect of varying mass on the centre of sleeve in Porter governor. 6. Effect of varying the initial spring compression in Hartnell governor. 7. Undamped torsional vibrations of double rotor system. 8. Longitudinal vibrations of helical coiled spring. 9. Uundamped forced vibration of spring mass system. 10. Force damped vibration of spring mass system. 11. Critical speed of the given shaft with the given end conditions (Whirling of Shafts). 12. Frequency response of spring mass system with damping. 13. Eequivalent link parameters and centre of mass of connecting rod theoretically and validate the result by experiment by choosing suitable methods and devices.
7	ENGINEERING GRAPHICS LAB	**List of Major Equipment / Facilities** i) HP Pro 3330 MT Desktop systems-138 Nos, ii) 20 KVA Online UPS with 1/2 hour backup, iii) 10KV online UPI Techsel Make **List of Experimental Setup in each Laboratory** 1.Introduction to CAD package: Settings, draw, modify tools, dimensioning and documentation 2. Construction of Conic Sections by General method 3. Orthographic projection: Principles, conventions, Projection of points 4. Projection of straight lines: Simple position, inclined to one plane 5. Projection of straight lines inclined to both the planes (without traces and mid-point) 6. Projection of planes: Perpendicular planes 7. Projection of planes: Oblique planes 8. Projection of solids: Simple position 9. Projection of solids: Inclined to one plane 10. Sections of solids: Prism, pyramid in simple position 11. Sections of solids: Cone and cylinder in simple position 12. Isometric projections and views 13. Conversion of isometric views to orthographic projections and vice versa.
8	HEAT TRANSFER LAB	**List of Major Equipment / Facilities** i) Emissivity measurement apparatus, ii) Parallel flow & counter flow heat exchanger, iii) Pin fin apparatus

		List of Experimental Setup in each Laboratory 1. Thermal conductivity of composite wall. 2. Convective heat transfer coefficient under Natural and Forced convection phenomena using pin-fin apparatus. 3. Emissivity of a given plate. 4. Stefan-Boltzmann constant. 5. Heat transfer coefficient in parallel and counter flow heat exchanger. 6. Cross flow heat exchanger
9	MACHINE TOOLS ENGINEERING LAB	**List of Major Equipment / Facilities** i) GNM2-Lathe-04, ii) Tiger-Lathe-04, iii)MK(Mysore Kirloskar) Lathe-04, iv)GEDEE WEILER Lathe-02, v)Universal milling machine, vi)HMT Lathe with force measurement interfaced to the system vii)PSG Lathe-02, viii) Lathe Tool Dynamometer ix)Drill Tool Dynamometer x)Milling Tool Dynamometer
		List of Experimental Setup in each Laboratory 1. Facing and plain turning operations on lathe. 2. Step turning and knurling on lathe machine. 3. Taper turning on lathe. 4. Drilling and boring on lathe. 5. Thread cutting on lathe 6. Influence of process parameters on MRR in turning operation. 7. Grinding of single point cutting tool. 8. Gear cutting using (a) Plain Indexing. (b) Compound indexing using universal dividing head. 9. Measurement of cutting forces during machining on lathe machine and milling machine. 10. shear angle experimentally in turning operation. 11. Grinding flat surfaces using surface grinding machine and measurement of surface finish. 12. Process parameters of electro discharge machining (EDM). 13. Design utility component, prepare process sheet for the manufacturing of the same and produce the component in the lab.
10	METAL FORMING LAB	**List of Major Equipment / Facilities** i) Dies ii) Shearing machine, iii) Power operated hydraulic press 25 T, iv) Hydraulic press Capacity – 50 Tons iv) Semi-Hydraulic Pipe Bending v) Spinning Machine

		List of Experimental Setup in each Laboratory 1. Evaluation of Formability of a given sheet material using Erichsen cupping test. 2. Progressive die design and manufacturing of washer components using the same on a fly press (capacity 6 Tons) and estimation of forces. 3. Compound die design and manufacturing of washer components using the same on double body fly press (capacity 8 Tons) and estimation of forces. 4. Combination die design and manufacturing of cylindrical cups using the same on a hydraulic power press (capacity 50 Tons) and estimation of drawing force. 5. Study of extrusion dies and demonstration of extruding lead material
11	MATERIAL SCIENCE AND METALLURGY LAB	**List of Major Equipment / Facilities** i) Metzer – M (Metz – 56) inclined monocular metallurgical microscope (5No's) ii) Metzer – M (Metz – 57) binocular metallurgical microscope (1 No) iii) Master double disk polisher iv) Inverted Binocular Microscope with Camera, v) Rockwell hardness tester , Salt Bath Furnace, Microscopes vi) PC based image analysis system include color ccd camera framer gabber card and full image analyser software
		List of Experimental Setup in each Laboratory 1.Study of: Metallurgical Microscope, Allotropes of Iron, Iron-Iron carbide diagram, Procedure for specimen preparation. 2. Observations for the following specimens - i) Low carbon steels, ii) Medium carbon steels, iii) Eutectoid steels, iv) High Carbon steels, v) Stainless steels, vi) Case carburized, vii)HSS, viii) White cast iron, ix) Gray cast iron, x) alleable iron, xi) Spheroidal iron, xii) Al–Si alloy and determination of grain size using Image Analyzer. 3. Preparations of the following specimens : i) á " â Brass, ii) Normalised steel iii) Medium carbon steel iv) Nodular cast iron v) Grey cast iron. 4.Heat Treatment Processes i) Annealing ii) Normalizing iii) Hardening.

12	METROLOGY & INSTRUMENTATION LAB	**List of Major Equipment / Facilities** i) Tool makers microscope, Measuring project M.P. 320 magnifications ii) Zeiss Measuring Optical Projector MP-320 iii) DAK Strain Gauge Starter kit iv) Taylor Hobson Talysurf Surface Roughness Tester S-100 Series v) Optical/Profile Projector 400TE, Computerized Measuring System With 2D Software **List of Experimental Setup in each Laboratory** 1. Measurement with inside, outside and depth micrometers. 2. Measurement with height gauges, height masters. 3. Measurement of linear and angular dimensions with Tool maker's microscope – diameter of thin wire and single point cutting tool angle. 4. Measurement with dial indicator and its calibration. 5. Measurement of angles with sine bar and clinometers. 6. Measurement of roundness errors with bench centers. 7. Measurement of flatness errors of a surface plate with precision spirit level. 8. Measurement with optical profile projector. 9. Design of plugand snap gauges for a given component. 10. Surface roughness measurement by Taylor Hobson -Talysurf. 11. Measurement of gear tooth thickness by gear tooth vernier. 12. Displacement measurement with LVDT. 13. Analyze, assess, measure and document all Measuring attributes of a selected component by using appropriate methods and devices.
13	WELDING LAB	**List of Major Equipment / Facilities** i) Welding Generator 300 Amps, ii) Welding transformer air cooled (Advani), iii) MIG Welding(including CO2 Gas cylinder) iv) Welding Rectifier Throlex (401)(TLG) v) TIG Welding attachment model(ADOR TLG 25/30) vi) Submerged arc welding machine **List of Experimental Setup in each Laboratory** **Welding:** 1. Comparison of the bead geometry with DCSP, DCRP and A.C. 2. Spot of welding of MS Sheets. 3. Plotting cooling curve in TIG welding process. 4. Finding out deposition efficiency in SAW Process. 5. Weld bead geometry formed in MIG welding.
14	COMPUTATIONAL FLUID LAB	**List of Major Equipment / Facilities** i) HP Z220 Workstation Consisting Of Ram-8GB, HDD-1TB, Graphic Card-1GB, ii) LRD Monitor-18.5"-25 Nos, iii) Altair Hyper WorksV-12 -2 users iv) ANSYS

		List of Experimental Setup in each Laboratory 1.Laminar Flow over Flat plate 2. Laminar Pipe Flow 3. Steady Flow past a Cylinder 4. Unsteady Flow past a Cylinder 5. Two Dimensional Steady Free Convection 6. Forced Convection for pipe cross section 7. Study of Hot & Cold Fluid Mix 8. Flow analysis of Aerofoil. 9. Study of compressible flow through a nozzle 10. Partially premixed combustion analysis 11. Supersonic flow over a wedge 12. Study of flow over wind turbine blade/flow through bifurcation artery
15	THERMAL ENGINEERING LAB	**List of Major Equipment / Facilities** i) Solar Thermal Training System ii) Solar Concentrator Training System iii) Wind-PV Hybrid Training System iv) Air conditioning Test Rig i) Refrigeration Tutor v) Axial Flow fan v) Centrifugal Blower Test rig vi) Nozzle pressure distribution apparatus vii) Air conditioning Tutor viii) Subsonic Wind Tunnel
		List of Experimental Setup in each Laboratory 1. Thermal conductivity of metal rod. 2. Critical heat flux for copper wire in water. 3. Convective heat transfer coefficient for condensation and boiling equipment. 4. pressure distribution for convergent and divergent nozzle 5. overall efficiency of axial flow fan 6. overall efficiency of centrifugal blower 7. COP of refrigerating tutor 8. COP of air conditioning tutor 9. Evaluate the effectiveness of cross flow heat exchanger. 10. pressure distribution for a cylinder 11. pressure distribution for an aerofoil. 12. lift and drag coefficient for different contours 13. wind tunnel performance by using the modeling and simulation 14. Heat pipe demonstration 15. Coefficient of thermal expansion -Measurement of solids, liquids and gases 16. Thermal capacity of solids 17. Determination of Isentropic coefficient of air-Clement Desormes Method

16	HEXAGON LAB	**List of Major Equipment / Facilities** i) HP 3330 DESKTOP , 15 Nos ii) CESAR-II,PV Lite, Tank, GT Strudl **List of Experimental Setup in each Laboratory** Value added lab
17	ROBOTICS AND DRONES LAB	**List of Major Equipment / Facilities** 1 Arduino UNO 2 12V 1A DC Power Supply Adapter 3 USB 2.0 printer cable 4 DC Motor in micro servo body 5 Stepper motor 6 Stepper motor board 7 Ultrasonic distance sensor 8 L298N motor drive 9 Geared DC motor 10 Single shaft BO motor (60 rpm) 11 Rotary encoder 12 IR infrared obstacle avoidance sensor 13 170 points breadboard 14 840 points breadboard 15 Metal film resistor and LED kit 16 LIPO Rechargable battery 17 A2212/13T Brushless motor 18 Electronic speed controller (30A ESC) 19 Pixwhak drone controller full kit 20 Digital Multi Servo Tester ESC CCPM 21 "FS-i6S Remote Control 2.4G 10CH AFHDS with FS-IA10B Receiver and Mobile Holder" 22 10x4.5 inch-1045/1045R CW CCW Propeller Pair 23 "ADEPT Digital Anemometer Wind-Speed Gauge Meter" 24 Stemedu TFmini-S lidar range finder sensor module 25 Jumper wires 26 iMax B6AC Smart Balance Charger 80W 26 "Quadcopter Drone Combo with Pixhawk Kit for beginner " 27 S550 Hexacopter Combo Kit 28 Stand-alone Drone kit with pixhawk4 30 Transparent plastic boxes 31 Multi purpose mini screw driver kit

		List of Experimental Setup in each Laboratory 1. Assembling of robot mechanical components, mounting of motors, sensors, electronic circuits to the chassis. 2. Connecting to electronic circuitry: motor drivers, incremental encoders proximity sensors, micro controller, 3. Different types of batteries, selection of suitable battery for application, safety precaution. 4. Introduction to Linux Command Line Interface: basic file and directory management and other useful commands 5. Controlling robot using Python: i) Move robot using Python code, ii) Make robot move in patterns using Python 6. Robot programming with Sensor inputs:i) Read sensor data using Python, ii) Visualize sensor data using Python, iii) Code robot to avoid obstacles by using sensor data 7. Open CV: i) Create an Image and display an image; ii) Read and change pixel values; iii) Create colored shapes and save image; iv) Extract the RGB values of a pixel; v) Reading and Writing Videos 8. Open CV: i) Extraction of Regions of Interest; ii) Extraction of RGB values of a pixel 9. Coding robot to work with colors, follow colored objects, identifying shape of the object-oriented 10. Projects: i)Making a line follower robot using a Camera; ii) Writing code for a complex function 11. Assembly of a drone

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: EEE

S. No.	Name of the Laboratory	Details
1	BASIC ELECTRICAL ENGINEERING LAB	**List of Major Equipment / Facilities**
		i. 3kw MG SET DC COMPOUND Generator
		ii. 3kw MG SET DC COMPOUND Generator
		iii. 3kva Alternator MG Set
		iv. 3kw DC Compound Motor
		v. 3 kw DC Series Motor
		vi. 3kw DC Shunt Motor
		vii. 3 HP 3 P HASE Induction Motor
		viii. Single Phase Energy Meter
		ix. Motor- Generator set
		x. CRO Demonstration Kit
		xi. 100 MHz DSO
		xii. Cut-Out Section of Synchronous Machine
		xiii. CRO
		xiv. Regulated power supply
		xv. Cut-Out Section of Induction Motor
		xvi. Cut-Out Section of DC Machine
		xvii. Transient/Steady State response Kit
		xviii. Rectifier
		xix. Single Phase Transformer 210/110v
		List of Experimental Setup in each Laboratory
		i. Verification of KCL and KVL.
		ii. Verification of Thevenin's theorem
		iii. Verification of Norton's theorem
		iv. Determination of parameters of a choke or coil by Wattmeter Method
		v. Charging and discharging of Capacitor
		vi. Power factor improvement of single-phase AC System.
		vii. Active and Reactive Power measurement of a single-phase system using 3-Ammeter method and 3-Voltmeter method
		viii. Measurement of three phase power in a balanced system
		ix. Calibration of single-phase energy meter
		x. Verification of Turns/voltage ratio of single-phase Transformer
		xi. Open Circuit and Short Circuit tests on a given single phase Transformer
		xii. Load test on DC Shunt motor
		xiii. Speed control of DC Shunt motor

		xiv. Demonstration of cut-out section of machines like DC machine, Induction machine etc.
		xv. Demonstration of Measuring Instruments and Electrical Lab components.
		xvi. Demonstration of Low Tension Switchgear Equipment/Components
2	**ELECTRICALMACHINES-II LAB**	**List of Major Equipment / Facilities**
		i)1.Dc series motor set with loading 2.DC starter
		ii)1.Dc shunt motor set with loading arrangement 2.Dc starter
		iii)1.Dc compound motor set with loading 2.Dc starter
		iv) 3 Phase Squirrel Cage Induction Motor
		v) STAR DELTA starter
		vi) 3 phase slip ring motor 3.7KW,415V,7.5Amp
		vii) Resistance Starter for the Slip ring Induction Motor
		viii)1 Phase induction motor 1.1KW/1.5HP,230V
		ix) **M-G set** 1. DC motor 5.2 kw 2. alternator 7.5KVA
		x)**M-G set** 1.DC motor 5.2 kw 2.alternator 7.5KVA
		xi)**M-G set** 1.DC Motor (3.7KW,220V,18.6Amps) 2.DC Series Generator (3.5KW,220V,15.9Amps)
		xii)**M-G set** 1.DC Motor (3.5KW,220V,21Amps) 2.DC Shunt Generator (3.5KW,220V,15.9Amps)
		xiii)**M-G set** 1.DC Motor (3.5KW,220V,21Amps) 2.DC shunt Generator (3.5KW,220V,15.9Amps)
		xiv)3phase synchronous motor (3.5 KVA, 440-415V)
		xv) transformer 1 phase(230/110V)
		xvi)Scott connected transformer 3 phase (440V, 3Φ, &230V, 2Φ)
		xvii) 1.Dc shunt motor set with loading arrangement 2.Dc starter
		xviii) Rectifier
		xix) 1phase Loading Rheostat
		xx) 3phase Choke Coil (Inductive load)
		xxi) Potential Transformers
		xxii) 3phase AUTO Transformer
		xxiii) Phase Shifting Transformer
		xxiv) transformer 3 phase
		xxv) 3phase Loading Rheostat

		List of Experimental Setup in each Laboratory
		i)Three-phase T/F (Scott connection)
		ii)Single –phase Induction motor
		iii)Speed Control of 3 phase Induction motor V/F Control method
		iv)No –load test of slip ring induction motor
		v)No –load test, blocked rotor test on 3 –phase squirrel cage Induction motor
		vi)Power factor improvement of induction motor using capacitors
		vii)Voltage regulation of alternator by 1)Synchronous impedance method 2)Ampere –turn method.
		viii) Voltage regulation of Alternator by Zero Power factor method
		ix) Synchronization of three phase Alternator to bus bar using dark lamp method
		x) V and invested V curves of synchronous motor
3	**ELECTRICAL MACHINES-I LAB**	**List of Major Equipment / Facilities**
		i)3kw MG SET DC COMPOUND Generator
		ii) 3kw MG SET DC SHUNT Generator
		iii) 3kva Alternator MG Set
		iv) 3kw DC SHUNT Motor
		v) 3 kw DC Series Motor.
		vi) 3kw DC Shunt Motor.
		vii) 3 HP 3 P HASE Induction Motor.
		viii) 1phase Transformer.
		ix) 3kw MG SET DC SHUNT Generator.
		x) 3phase AUTO Transformer .
		xi) Rectifiers.
		xii) Loading rheostat.
		List of Experimental Setup in each Laboratory
		i) OCC and load characteristics of separately excited DC generator.
		ii) OCC and load characteristics of DC shunt generator.
		iii) Swinburne's test on DC shunt machine .
		iv)Brake test on DC series motor
		v) Hopkinson's test on two identical dc shunt machines.
		vi) Separation of stray losses of DC shunt machine.
		vii) Load test on single phase transformers.
		viii) Sumpner's test on two identical single-phase transformers.
		ix) Study of three-phase transformer connections.
		x) Load characteristics of DC compound generator.
4	**CONTROL SYSTEM LAB**	**List of Major Equipment / Facilities**
		i. D.C servomotor kit
		ii. A.C servomotor kit
		iii. Frequency response of compensating network
		iv. Synchro Transmitter and Receiver
		v. Stabilizer 10 KVA
		vi. Stabilizer 10 KVA
		List of Experimental Setup in each Laboratory
		i) characteristics of D.C servomotor

		ii)D.C servomotor A.C servomotor
		iii) D.C servomotor synchro pair
		iv) Temperature ON/OFF control system
		v)D.C position control system
		vi) Step response of second order system
		vii) characteristics Magnetic amplifier
		viii)Lead & lag compensating networks
		ix)Linear system simulator
		x)Step angle measurement for Stepper motor
5	**ANALOG ELECTRONICS CIRCUITS LAB**	**List of Major Equipment / Facilities**
		i)CROs 30MHz -04nos
		ii) DSOs 50MHz-06 nos
		iii) Function Generators 10MHz- 10 Nos
		iv) Regulated Power Supply- 10
		List of Experimental Setup in each Laboratory
		i)V-I characteristics of (Silicon) diode
		ii) Zener diode characteristics and its application as a voltage regulator.
		iii) Half Wave and Full Wave rectifier with and without filters
		iv) Characteristics of BJT and MOSFET
		v) Design of biasing circuits for BJT
		vi) Design of biasing circuits for MOSFET
		vii) Frequency response of common emitter BJT Amplifier
		viii) Measurement of OP-Amp parameter
		ix) Design of integrator and differentiator using OP-Amp
		x)Design of active filters
		xi) Generation of Triangle and square Waveforms using OP-Amp
		xii) Design of Clampers using OP-Amp.
		xiii)Design of Clippers using OP-Amp
		xiv) Analysis of hysteric comparator using Schmitt Trigger
		xv)Design of 555 Timer in Astable Mode
6	**DIGITAL ELECTRONICS LAB**	**List of Major Equipment / Facilities**
		i. Digital IC Trainer- 15Nos
		ii. Analog to Digital converter- 6 Nos
		iii. Digital to Analog converter-6 Nos
		iv. CROs 30 MHz- 3 Nos
		v. 2:1,4:1 Mux using gates- 6Nos
		vi. 1:8 De-mux & Decoder using 74138 IC
		vii. SISO and SIPO using IC 7474
		viii. PISO and PIPO using IC 7474
		ix. Ring and Jonson counter using IC 7476
		List of Experimental Setup in each Laboratory
		i) Verify (a) Demorgan's Theorem for 2 variables.
		ii) The sum-of product and product-of-sum expressions using gates.
		iii) Design and implement (a) Full Adder using basic logic gates. (b) Full subtractor using basic logic gates

		iv) Design and implement 4-bit Parallel Adder/ subtractor using IC 7483.
		v) Design and Implementation of 4-bit Magnitude Comparator using IC 7485.
		vi) Realize (a) 4:1 Multiplexer using gates. (b) 3-variable function using IC 74151(8:1MUX).
		vii) Realize 1:8 Demux and 3:8 Decoder using IC74138.
		viii) Realize the following flip-flops using NAND Gates. (a) Clocked SR Flip-Flop (b) JK Flip-Flop
		ix) Realize the following shift registers using IC7474 (a) SISO (b) SIPO (c) PISO (d) PIPO.
		x) Realize the Ring Counter and Johnson Counter using IC7476.
		xi) . Realize the Mod-N Counter using IC7490.
		xii) Design of synchronous counters using flip-flops.
		xiii) Design of Asynchronous counters using flip-flops.
7	**POWER SYSTEM LAB (UG)**	**List of Major Equipment / Facilities**
		i) Three phase transmission line
		ii) Numerical differential relay kit
		iii) Static differential relay kit
		iv) Buchholz relay test kit
		v) Static over current relay kit
		vi) Oil testing kit
		vii) 3 phase Auto transformer
		List of Experimental Setup in each Laboratory
		i) Determination of regulation & efficiency of 3-Phasetransmission lines.
		ii) IDMT characteristics of Over-current relay.
		iii) Determination of A, B, C, D constants of 1-Phasetransmissionline.
		iv) Sequence impedance of 3-PhaseAlternators by fault Analysis.(LG,LL & LLL)
		v) Determination of positive, negative and zero-sequence impedance of 3 – Phase transformers.
		vi) Determination of Synchronous machine reactance and Time constant from 3-Phase S.C test.
		vii) Determination of dielectric strength of Transformer oil and Megger.
		viii) Characteristics of Static Over current Relays.
		ix) Measurement of capacitance of 3-corecables.
		x) Determination of positive, negative and zero-sequence impedance of 3 phase Alternator.
		xi) Determination of Voltage distribution and String efficiency of string of Insulators.
		xii) Study of Series-shunt compensation of a long transmission line.
8	**CIRCUITS AND MEASUREMENTS LAB**	**List of Major Equipment / Facilities**
		i. Phase Shifting Transformer (AE)
		ii. Epstein square Bridge (Zaran)
		iii. Oscilloscopes
		iv. Anderson's Bridge (OSAW)
		v. Maxwell's Inductance Bridge (OSAW)

		vi. Loading Rheostats
		vii. Transformers
		viii. Voltmeters
		ix. Solar PV Emulator
		x. DC Potential
		xi. Kelvins double bridge
		xii. Digital Strain gauge & LVDT
		List of Experimental Setup in each Laboratory
		i. Frequency response of RLC series circuit.
		ii. Frequency response of RLC Parallel circuit
		iii. Verification of Maximum power transfer theorem.
		iv. Determination of Z, Y, ABCD & h parameters of two-port network
		v. Measurement of unknown resistance using Kelvin's double bridge..
		vi. Measurement of unknown Inductance using Maxwell's bridge and validating with LCR meter
		vii. Measurement of unknown inductance using Anderson's bridge and validating with LCR meter
		viii. Measurement of iron losses using Epstein's square bridge.
		ix. Measurement of strain using strain gauge.
		x. Measurement of Displacement using LVDT
		xi. Measurement of unknown voltage using D.C Crompton's potentiometer
9	**ELECTRICAL SIMULATION LAB-I (UG)**	**List of Major Equipment / Facilities**
		i. HP Make Intel core I3 processor HDD 320GB Ram 2GB @ 3.2Ghz
		ii. Dell Make Intel core I5 processor HDD 1 TB Ram 8GB @ 3.2Ghz
		iii. Matlab- 2024b Campus wide license
		iv. 10KVA UPS (CYBER)
		List of Experimental Setup in each Laboratory
		i. Verification of Basic Theorems 2.Timeresponse of R, L, C circuits.
		ii. Determination of power angle diagram for Salient and Non-salient pole synchronous machine.
		iii. Time Domain Analysis of LTI Systems
		iv. Effect of PID Controllers
		v. Stability Analysis of Unity Feedback Control Systems
		vi. Computation of line parameters
		vii. Modeling of Transmission Lines
		viii. Load Flow Studies.
		ix. Fault Analysis.
		x. Transient stability studies
		xi. Economic load dispatch
		xii. Load Frequency control of single-area and two-area systems
		xiii. Determination of Load Flows using ANNs
		xiv. Economic Load Dispatch using Genetic Algorithm

10	**POWER ELECTRONICS LAB (UG)**	**List of Major Equipment / Facilities**
		i. Clamp on Power meter
		ii. Digital Oscilloscopes
		iii. SCR Modules
		iv. 3-Phase Half & Full Controlled Bridge Rectifier
		v. 1-Phase Bridge Inverters
		vi. 1-Phase AC Voltage Controller
		vii. Dual Converter
		viii. Buck-Boost Chopper
		ix. Two Quadrant DC Drive
		x. Closed Loop Control of DC Drive
		xi. Speed Control of 3-phase Wound Rotor Induction Motor
		xii. 1-phase Half Controlled Bridge Converter
		xiii. 3-phase Mc-Murray Bed-Ford Inverter
		xiv. 3-phase IGBT based Inverter
		xv. 1-phase IGBT based inverter
		xvi. Current Commutated Chopper
		xvii. Voltage Commutated Chopper
		xviii. 1-ph Cyclo-Converter
		List of Experimental Setup in each Laboratory
		i) Study of static characteristics of S.C.R. and to measure latching & holding currents.
		ii) Study the characteristics of BJT, MOSFET and IGBT.
		iii) R, RC and UJT triggering circuits for SCR.
		iv) Study of forced commutation techniques of SCR.
		v) Single-phase half-controlled bridge rectifier with R and RL loads.
		vi) Single-phase fully controlled converter with R, RL & RLE loads and freewheeling diode.
		vii) Three-phase half-controlled bridge rectifier with R and RL loads.
		viii) Three-phase fully controlled bridge rectifier with R and RL loads.
		ix) DC voltage control using Buck and Boost choppers.
		x) Voltage and Current commutated choppers with R&RL loads.
		xi) Single-phase step down Cyclo-converter with Rand RL loads.
		xii) Single-phase A.C voltage controller with R and RL loads.
		xiii) Half and Full bridge inverters with R&RL loads.
11	**MICRO CONTROLLER & IT'S APPLICATIONS LAB**	**List of Major Equipment / Facilities**
		i. 8086 Micro Processor Trainer Kits
		ii. DAC Interface Card, combined ADC/DAC Interface Card, Traffic Signal Controller, Keyboard and Display Interfacing Cards
		iii. SMPS 8086 Kits
		iv. 8051 Micro Controller Trainer Kits with LCD Display, 64KB memory, 32KB EPROM 8255 port along with PC Compatible Keyboards.

		v. ARM7 (LPC2148) Microcontroller Trainer Kits 512K Internal Flash Memory and 32+8K RAM with power supply with various interface section on the same board. stepper motor, DC motor,
		vi. 8051 Micro Controller Trainer Kits with LCD Display, 64KB memory, 32KB EPROM 8255 port along with PC Compatible Keyboards.
		List of Experimental Setup in each Laboratory
		i. Simple 8051 Microcontroller Assembly Language Programs under Different Addressing Modes
		ii. 8051 Microcontroller Assembly Language Programming using Arithmetic and Logical Instructions
		iii. 8051 Microcontroller Interfacing Applications using LED (Without using SFRs and with SFRs)
		iv. Generation of Waveform using DAC by Interfacing it with 8051 Microcontroller
		v. Stepper Motor Interfacing
		vi. Simple Assembly Language Programs using ARM7 Instruction Set
		vii. Interfacing Applications using LEDs with ARM7 Microcontroller
		viii. Buzzer and Relay Interfacing with ARM7 Microcontroller
		ix. Generation of Waveforms using Internal DAC of ARM7 Microcontroller
		x. DC Motor Interfacing with ARM7 Microcontroller
		xi. Simple Assembly Language Programs using ARM7 Instruction Set
		xii. Interfacing Applications using LEDs with ARM7 Microcontroller
12	**Electrical Drives Lab (ED)**	**List of Major Equipment / Facilities**
		i. Speed control of dc drive using Thyristor controlled rectifier
		ii. Speed control of dc drive using dc-dc chopper
		iii. Four quadrant operation of dc-dc drives
		iv. Closed loop speed control of dc motor using PID controller
		v. Speed control of single phase induction motor using v/f triac control
		vi. Speed control of three phase induction motor using v/f triac control
		vii. Speed control of three phase induction motor using ac-ac converter
		viii. Regenerative dynamic braking operation of ac drive
		List of Experimental Setup in each Laboratory
		i. Speed control of DC drive using Thyristor controlled rectifier.
		ii. Speed control of DC drive using DC-DC Chopper.
		iii. Four-Quadrant Operation of DC drive.
		iv. Closed loop speed control of DC motor using PID controller.
		v. Speed control of Three-Phase Induction Motor using V/f control.
		vi. Regenerative/Dynamic braking operation for AC drive.

		vii. Simulation of Speed control of DC Motor using BJT-H bridge.
		viii. Simulation of Regenerative/ Dynamic breaking operation of DC motor.
		ix. Simulation of Step/ Ramp speed response of DC motor.
		x. Simulation of VSI-fed 3-PhaseInduction Motor drive.
13	**IoT Lab**	**List of Major Equipment / Facilities**
		i. Arduino UNO boards
		ii. Raspberry pi boards
		iii. 7 Inch LCD Touch ScreenDisplay for Raspberry pi
		iv. ESP8266 Node MCU boards
		v. ESP32 with CAM boards
		vi. HC-05 Bluetooth boards
		vii. Sensor Modules
		i. Characteristics of p-n junction diode, Zener diode and Light Emitting Diode (LED) using Arduino IDE
		ii. Design of half wave rectifier using Arduino /Raspberry Pi
		iii. Temperature measurement using Arduino /Raspberry Pi
		iv. Distance measurement using Arduino /Raspberry Pi
		v. Stopwatch control using Arduino / Raspberry Pi
		vi. Traffic Light Controller using Arduino /Raspberry Pi
		vii. Dark Sensing LED using Arduino/Raspberry Pi
		viii. Design of digital dc voltmeter and ammeter using Arduino /Raspberry Pi
		ix. Design of digital ac voltmeter and ammeter using Arduino / Raspberry Pi
		x. Measurement of power and energy using Arduino / Raspberry Pi.
		xi. Speed control of dc motor using Arduino / Raspberry Pi
		xii. Interfacing of motor using relay with Arduino /Raspberry Pi and write a program to turn ON motor when push button is pressed
		xiii. Interfacing of Bluetooth with Arduino /Raspberry Pi and write a program to send sensor data to smartphone using Bluetooth
		xiv. Uploading of temperature and humidity data from Arduino/Raspberry Pi to thing speak cloud
		xv. Retrieval of temperature and humidity data from thing speak cloud to Arduino/Raspberry Pi
14	**POWER SYSTEMS LAB (PG)**	**List of Major Equipment / Facilities**
		i. Rectifier for Power Systems
		ii. Distribution Panel
		iii. Micro controller-based percentage differential relay
		iv. Solar PV Emulator
		v. Solar PV training & Research System
		vi. M.G.Set
		vii. Radial and Ring Main distribution system trainer kit
		viii. Measurement of power angle of 3phase alternator
		List of Experimental Setup in each Laboratory

		i. Measurement of positive, negative and Zero sequence reactance of synchronous machine.
		ii. Measurement of Positive, negative & Zero Sequence Reactance of 3-ph Transformer.
		iii. Determination of Regulation and efficiency of a 3-ph Transmission line.
		iv. Determination of ABCD Constants of a 3-ph Transmission line.
		v. Characteristics of a Static over Current Relay.
		vi. Deferential Protection of 1-ph Transformer
		vii. IV-PV Characteristics with series and parallel Combination of Modules.
		viii. Study of OVER Voltage and Under Voltage Relay.
		ix. Study of Microprocessor Based inverse Current Relay Characteristics
		x. Single PV module I-V and P-V characteristics with radiation and temperature changing effect
15	**Power Electronics Lab (PG)**	**List of Major Equipment / Facilities**
		i. 3-ph Step-Down Cyclo Converter, 3-ph controlled Rectifier, 1-ph Dual converter
		ii. 3-ph Controlled Rectifier
		iii. 3-ph Voltage Controller, MOSFET Based ZVS, ZCS, Buck converter, 1-ph & 3-ph Matrix converter, Design of Fly-back converter
		iv. Speed Control of slip ring induction motor using Stodic Kramer Drive
		v. 3-ph drive V/F Vector controller
		List of Experimental Setup in each Laboratory
		i. Three-phase half controlled and full controlled bridge rectifiers with R and RL loads.
		ii. Analysis of chopper circuit
		iii. Analysis of single-phase series-resonant inverter
		iv. Three-phase Mc-Murray Bed-Ford inverter with Rand RL loads
		v. Three-phase IGBT inverter with R & RL loads.
		vi. Closed-loop control of permanent magnet DC drive
		vii. Three-phase step down cyclo-converter with Rand RL loads
		viii. Static rotor resistance control of slip-ring induction motor.
		ix. Operation of two quadrant dc drive.
		x. Speed control of SRIM using static Kramer's system

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: ECE

S. No.	Name of the Laboratory / Workshop	Details
1	Computer Centre	**List of Major Equipment / Facilities**
		i. National instruments LabVIEW Software (TEQIP)
		ii. Custom Bundle: NI LabVIEW Academy Hardware Bundle:
		iii. Computers
		iv. Custom Bundle NI La View Academy Hardware Bundle of Advanced Simulation Lab Including following items
		v. HSN/SAC Code: 90329000, NI myDAQ- Student kit with LabView & Multisim student edition, part.no. 781327-01
		vi. 90328910, NI myRIO-1900 for student purchase only including WIFI and MSP Connect, part.no 782693-01
		vii. 90329000, NI Starter Accessory kit, part.no 783068-01
		viii. 90329000, Ni myRIO Kits: Mechatronics kit, 7830 69-01
		ix. 90329000, NI my RIO Kit, Starter kits: Embedded kit part.no.783070-01
		x. IoT Universal Kit – 12 No's
		xi. Beagle Bone Black Kits-12nos
		List of Experimental Setup in each Laboratory
		i. Using NI –LabVIEW software, signal conditioning circuits, combination, sequential circuits and filter design experiments can be performed
		ii. Analog and digital modulation schemes experiments can be performed using MyRIO Kits
		iii. Data acquisition from various sensors and voltage sweep generation experiment can be performed using MYDAQ
		iv. IoT Universal Kits can be used for IoT Applications of 33 Sensors on board.
		v. Beagle Bone Black Kits can be used for IoT Applications of 35 Sensors on board. It can be integrated with IoT Universal Kit.
2	CN - Lab	**List of Major Equipment / Facilities**
		i. Computers
		ii. NetSim Academic Version v13.0
		List of Experimental Setup in each Laboratory
		i. All experiments are software related
3	Communication Lab	**List of Major Equipment / Facilities**
		i. CROs-dual channel
		ii. Spectrum Analyzer with Accessories
		iii. Data communication trainer (2 units)
		iv. Optical Fiber training system
		v. CRO 4 channel
		vi. Dual wave length fiber optic source and detector module
		vii. Fiber optic passive component module

		viii. Computer
		ix. Understanding CDMA-DSSS Communication system with BER
		x. 2G/3G GSM Mobile trainer
		xi. CROs-dual channel
		List of Experimental Setup in each Laboratory
		i. Hardware kits are available to conduct analog and digital communication experiments
4	**Microwave Lab**	**List of Major Equipment / Facilities**
		i. Antenna fabrication kit
		ii. Thermistor Mount
		iii. Computer IBM
		iv. Microwave power meter
		v. Computer (Dell i5)
		List of Experimental Setup in each Laboratory
		i. Microwave Bench - 8No.s
		ii. Antenna training system -01 No
5	**LDIC LAB**	**List of Major Equipment / Facilities**
		i. IC Tester –Linear & Digital
		List of Experimental Setup in each Laboratory:
		i. IC trainer kits are available to conduct linear and Digital IC experiments
6	**ED/Analog Circuits Lab**	**List of Major Equipment / Facilities**
		i. 1.5 MHz-225 MHz AM/FM Generator
7	**SP/ EDA Lab**	**List of Major Equipment / Facilities**
		i. Computers
		ii. MATLAB Campus wide unlimited toolboxes Renewed
		iii. HDL software
		iv. Trainer Kits
		v. DSP Starter Kits
		vi. DSP Kits
		List of Experimental Setup in each Laboratory
		i. PC installed with MATLAB and connected to DSP kit
8	**ES & VSLID Lab**	**List of Major Equipment / Facilities**
		i. Computers
		ii. Cadence Software
		iii. Atlys Spartan 6 FPGA Boards
		iv. Zed Boards (Zynq-7000 EPP Development kit)-10
		v. CADANCETOOLS-FE &BE Bundle
		List of Experimental Setup in each Laboratory
		i. PC installed with keil and Flash Magic and also connected to the ALS/EVBRD/ARM7T7 Evaluation board
		ii. PC installed with MATLAB and connected to TMS320C6748 DSP kit
9	**Microcontrollers Lab**	**List of Major Equipment / Facilities**
		i) Embedded 8051 mc kits and Interfacing modules
		ii) ARM7 Trainer Kits (LPC2148) and Interfacing modules
		iii) ARM cortex M3/M4Development boards with on board interface modules & sensors
		iv) Wind River VX Works (software)
		v).Proteus VSM Simulation Softwar .2user
		List of Experimental Setup in each Laboratory

		i. Interfacing applications using LEDs, Switches, Relays, Buzzer, ADC, DAC, Sensors, LCD, 7-segment display, DC and Stepper motors with 8051 Microcontroller for BE Students
		ii. Applications on on-chip ADC, DAC and PWM modules of LPC2148 and Interfacing applications using LEDs, Switches, Relays, Buzzer and DC Motor with LPC2148 for BE Students
		iii. Applications on on-chip PLL module, Timers, PWM, UART, ADC and Interfacing applications using LED, RGB LED, Sensors with ARM cortex M3/M4Development boards for ME(ES&VLSID) Students
		iv. RTOS Timer programming, Task function programming, Multitasking, Scheduling, IPC using VxWorks for ME (ES&VLSID) Students
		v. Proteus software allows simulation of microcontroller-based circuits by designing schematics, uploading HEX files, running simulations, and analyzing outputs using virtual instruments.
10	**NCRC Lab**	**List of Major Equipment / Facilities**
		i. Computers
		ii. High Performance Electromagnetic Simulation Software, iii. MATLAB
		iv. ADSP -21479 EZ board v. Evaluation Board
		vi. IRNSS-SPS-GPS Receiver (S.No.18000)
		vii. IRNSS-GPS-SBAS Receiver (S.No 18700)
		viii. RF FieldFox Analyzer
		ix. IRNSS/GPS/SBAS Receivers
		x. Laptops 8GB RAM
		xi. POLAR S5 INOSPHERE MONITORING GNSS RECEVER
		List of Experimental Setup in each Laboratory
		i. Navigational Experimental setups are available to carryout various projects
11	**Projects Lab**	**List of Major Equipment / Facilities**
		i. Computers
		List of Experimental Setup in each Laboratory:
		i. Experimental setups are available to carry out software Programs and projects
12	**Basic Electronics Lab**	**List of Major Equipment / Facilities: Nil**
		List of Experimental Setup in each Laboratory:
		i. Analog Digital Circuit development platform
13	**EMS Lab**	**List of Major Equipment / Facilities: NIL**
		List of Experimental Setup in each Laboratory:
		i. Experimental setups are available to conduct all the experiments as per the curriculum
14	**EWN Lab**	**List of Major Equipment / Facilities: NIL**
		List of Experimental Setup in each Laboratory:
		i. Experimental setups are available to conduct all the experiments as per the curriculum

15	**GREEN OPTO NANO ENERGY LAB: G-1 LAB**	**List of Major Equipment / Facilities:** i. Solar Simulator, ii. Electrochemical Workstation, iii. Chemical Vapour Depositor, iv. UV-VIS Spectrometer, v. Spin Coater, vi. High Power Computing
		List of Experimental Setup in each Laboratory: **i.** Solar cells and Fuels and Nano materials Synthesis Experimental setups are available to carryout various projects

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: CSE

S. No.	Name of the Laboratory / Workshop	Details
1	LAB-I	**List of Major Equipment / Facilities**
		i. Dell Vostro 3020 SFF/17-13700/16 GB DDR4 RAM /512gb SSD/ Intel UHD Graphics, Wi-Fi, Bluetooth, windows 11Pro, Dell 20" Monitor-D2020H, Keyboard and mouse (No:30)
		ii. 30 KVA UPS Online with ½ hour backup Sharing with lab2 & lab3**(No:01)**
		iii. 3.5 Ton Cassette AC **(No:02)**
		iv. Cisco SG-300, 48-port Manageable switch **(No:01)**
		v. HP Laser jet 1020 Plus **(No:01)**
		vi. 6-U Communication rack **(No:01)**
		vii. LCD Projector with Screen **(No:01)**
		List of Experimental Setup in each Laboratory
		i. Jupiter notebook
		ii. Dev C++

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: CSE

S. No.	Name of the Laboratory / Workshop	Details
1	LAB-II	**List of Major Equipment / Facilities**
		i. HP Pro-Desk 400-G2MT Desktop Intel Core i7/4770 Processor, 8 GB RAM, 1 TB HDD, 18.5" LED Monitor, Keyboard and mouse **(No:26)** HP Pro 3330 MT, Intel core i3-2130 CPU @ 3.4GHz, 4 GB RAM, 512 GB HDD, 21'' TFT Monitor, Keyboard and mouse **(No:01)** Dell Vostro Desktop 3020 SFF, 13th Gen Intel(R) Core(TM) i7-13700, 2.10GHZ, 16GB DDR4 RAM, 512GB SSD, Intel UHD Graphics, Wi-Fi, Bluetooth, Windows-11 pro, Dell 20" Monitor - D2020H, Keyboard & Mouse **(No:03)**
		ii. 30 KVA UPS Online with ½ hour backup Sharing with lab1 & lab3 **(No:01)**
		iii. 3.5 Ton Cassette AC **(No:02)**
		iv. Cisco SG-300, 48-port Manageable switch **(No:01)**
		v. HP Laser jet 1020 Plus **(No:01)**
		vi. 6-U Communication rack **(No:01)**
		vii. LCD Projector with Screen **(No:01)**
		List of Experimental Setup in each Laboratory
		SQL Developer, Linux OS, Java, Python

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Name of the Department: CSE

S. No.	Name of the Laboratory / Workshop	Details
3	LAB - III	**List of Major Equipment / Facilities**
		i. HP 400-G2MT Desktop Intel Core i5/4570 Processor 8 GB RAM, 1 TB HDD, 18.5" LED Monitor Keyboard and mouse **(No: 30)**
		ii. Dell Vostro Desktop 3020 SFF, 13th Gen Intel(R) Core(TM) i7-13700 2.10 GHz, 16 GB DDR4 RAM , 512GB SSD, Intel UHD Graphics, Wi-fi, Bluetooth Windows 11 Pro, Dell 20" Monitor-D2020H Keyboard and mouse (**No: 01**)
		iii. 30 KVA UPS Online with ½ hour backup Sharing withlab1 & lab2 **(No:01)**
		iv. 3.5 Ton Cassette AC **(No:02)**
		v. Cisco SG-300, 48-Port Manageable Switch **(No:01)**
		vi. HP Laser jet 1020 Plus **(No:01)**
		vii. 6-U Communication rack **(No:01)**
		viii. LCD Projector with Screen **(No:01)**
		List of Experimental Setup in each Laboratory
		i. Ubuntu 20, Windows 10/11, GCC, JDK, Python3.
		ii. SQL Developer, PHP, MySQL, Apache

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Name of the Department: CSE

S. No.	Name of the Laboratory / Workshop	Details
1	LAB - IV	**List of Major Equipment / Facilities**
		i. Dell OptiPlex 3060 Core i7 Processor, 32 GB Ram, 1TB HDD, 20" LCD Monitor, Keyboard, Mouse **(No:30)**
		ii. HP Intel Core i7, 16 GB RAM, 1 TB HDD, 18.5" LED iii. Monitor, Keyboard and Monitor. **(No:10)**
		iv. 30 KVA UPS Online with ½ hour backup Sharing withlab5 & lab6 **(No:01)**
		v. 3.5 Ton Cassette AC **(No:2)**
		vi. 24 Port CISCO Manageable Switch **(No:01)**
		vii. 24 Port D-Link Switch **(No:01)**
		viii. HP Laser 1020Plus **(No:01)**
		ix. 6 U Wall Mounted Rack **(No:01)**
		x. LCD Projector with Screen **(No:01)**
		List of Experimental Setup in each Laboratory
		i. Ubuntu 20.1, jupyter notebook,
		ii. Anaconda python, Dev C++, Visual Studio

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Name of the Department: CSE

S. No.	Name of the Laboratory / Workshop	Details
5	LAB - V	**List of Major Equipment / Facilities**
		HP 280GB Desktop Systems i7-11700, 16GB RAM, 512 SSD, 19.5" Monitor, Keyboard, Mouse. **(12 Nos.)**
		HP 400GB Desktop Systems Core-i5-10500, 16GB RAM, 1 TB HDD, 20" Monitor, Keyboard, Mouse. **(12 Nos.)**
		DELL 12th Gen Intel Core i3-12100X8, 8 GB RAM, 256 HDD, LED Monitor, Keyboard, Mouse. **(10 Nos.)**
		HP 3330 Desktop, Intel Core i7, 8GB RAM, 1 TB HDD, 18.5" LED Keyboard and Monitor, Graphic Card. **(05 Nos.)**
		30 KVA UPS Online with ½ hour backup Sharing with CSE Lab-4 and CSE Lab-6 **(No:01)**
		Split Air Conditioners **(No:02)**
		24 Port 10/100 Mbps D-link switches **(No:02)**
		HP Laser jet 1020 Plus **(No:01)**
		6 U Wall Mounted Rack**(No:01)**
		LCD Projector with Screen **(No:01)**
		List of Experimental Setup in each Laboratory
		Python, Anaconda Navigator, StarUML, Umbrello, draw.io, NetBeans,VSCode, Node JS, Express JS, React JS, MongoDB
		Windows 11, Ubuntu 20

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Name of the Department: CSE

S. No.	Name of the Laboratory / Workshop	Details
1	LAB-VI	**List of Major Equipment / Facilities**
		i. HP 3330 Desktop, Intel Core i7, 8 GB RAM, 1 TBHDD, 18.5" LED Monitor, Keyboard and Mouse, **(No:29) <Mouse missed for two systems>**
		ii. Dell OptiPlex 3050 MT Intel Core i7-7700- 7th gen processor, 16 GB RAM, 1 TB HDD, 18.5 LED Monitor,Keyboard and Mouse **(No:07)**
		iii. 30 KVA UPS Online with ½ hour backup Sharing withlab4 & lab5 **(No:01)**
		iv. Window Air Conditioners **(No:02)**
		v. 24 Port 10/100 Mbps D-link switches **(No:02)**
		vi. HP Laser jet 1020 Plus **(No:01)**
		vii. 6 U Wall Mounted Rack **(No:1)**
		viii. LCD Projector with Screen **(No:01)**
		List of Experimental Setup in each Laboratory
		i. jupyter notebook, Cisco packet Tracker, Solidity, Remix IDE
		ii. C++, Java, Kali linex , pfSence, Metasplote table

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Name of the Department: CSE

1	LAB-VII	**List of Major Equipment / Facilities**
		i. Dell OptiPlex 3050 MT Intel Core i7-7700- 7th gen processor, 16 GB RAM, 1 TB HDD, 18.5 LED Monitor,Keyboard, Mouse **(No:36)**
		ii. 30 KVA UPS Online with ½ hour backup Sharing withlab8 & lab9 **(No:01)- Not working**
		iii. Window Air Conditioners **(No:02)- Not working**
		iv. 24 Port 10/100 Mbps D-link switches **(No:02)**
		v. HP Laser jet 1020 Plus **(No:01)**
		vi. 6 U Wall Mounted Rack **(No:1)**
		vii. LCD Projector with Screen **(No:01)**
		List of Experimental Setup in each Laboratory
		i. Ubuntu 20.1
		ii. Visual Studio, IDLE

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Name of the Department: CSE

8	LAB-VIII	**List of Major Equipment / Facilities**	
		i.	Dell OptiPlex 3060 MT - Intel Core i7- 8700 CPU @3.20GHz x 12 Processor, Mesa Intel @UHD Graphics 630, 8 GB RAM, 1 TB HDD, 20 ” LED Monitor, USB Keyboard and USB Optical Mouse **(No:64)**
		ii.	HP ProDesk-400 G7 - Intel Core i5- 10500 CPU @ 3.10GHz x 12 Processor, Mesa Intel @UHD Graphics 630,16 GB RAM, 1 TB HDD, 20 ” LED Monitor, USB Keyboard and USB Optical Mouse **(No:04)**
		iii.	30 KVA UPS Online with ½ hour backup Sharing with lab7 & lab9 **(No:01)**
		iv.	Split Air Conditioners **(No:03)**
		v.	Window Air Conditioners **(No:01) Not Working**
		vi.	HP Laser jet 1020 Plus**(No:01)**
		vii.	24 Port 10/100 Mbps D-link switches **(No:02)**
		viii.	16 Port 10/100 Mbps D-link switches **(No:02)**
		ix.	12 U Wall Mounted Rack **(No:01)**
		x.	6 U Wall Mounted Rack **(No:01)**
		xi.	LCD Projector with Screen **(No:01)**
		List of Experimental Setup in each Laboratory	
		i.	Ubuntu 22.04
		ii.	Code Blocks, IDLE, Visual Studio, Jupiter Notebook, Pycharm, Dev C++, C , vi Editor, R, R Studio, etc...

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Name of the Department: CSE

11	**SERVER ROOM**	HP ProLiantDL 380 Gen 10 Rack Server, Intel Xeon – 5115 (2* 2.5GHz/10-core/85w) Dual Processor kit, HPE 64GB (4x16GB) Dual Rack x 8 RAM DDR4-2666,3*1.5 TB HD 6 G SAS 10k rpm 12G SAS Modular Controller, 1GB 4-port network **(No:01)**
		Vmware Hypervisor-I (Bigbluebutton, Oracle 11g, Digihunt and Diginance Servers): HP ProLiantDL 380 Gen 10 Rack Server, Intel Xeon – 5115 (2.4GHz /10-core/85w) FIo Processor kit, HPE 128GB (8x16GB) Dual Rack x 8DDR4-2666,5x300 GB 6 G SAS 10k rpm 12G SAS Modular Controller, 1GB 4-port network **(No:01)**
		Vmware Hypervisor-II (Digital Library, LMS and LMSdb Servers): HP ProLiant DL 380 G9 Rack Server, Dual E5-2620V3 @2.4 GHz Processors, 2G 440Smart Array Controller, 32 GB RAM, 5*300 GB SAS HDD, DVD RW, 4*1Gigabit Ethernet Cards **(No:01)**
		Vmware Hypervisor-III (Quick Heal Antivirus Servers, ACIC website and pfSense Firewall,) : HP ProLiant DL 380 G9 Rack Server, Dual E5-2620V3 @2.4 GHz Processors, 2G 440 Smart Array Controller,32 GB RAM, 5*300 GB SAS HDD, DVD RW, 4*1Gigabit Ethernet Cards **(No:01)**
		HP Blade Server (Bigbluebutton Server): Intel Xeon E5-2630v4 (2.2GHz/10-core /25MB/ 85W),Dual Processor, 64GB DDR3 RAM, 2.4TB HDD etc., **(No:01)** **HP Blade Server (LMS Server):** Intel(R) Xeon(R) CPU E5-2640 v2 @ 2.00GHz (8 Cores)/25MB/ 85W) Dual Processor, 32GB DDR3RAM, 1.2TB HDD etc., **(No:01)**
		LTSP Thin Client Server: DELL Server Power edge T610 2S Server, IntelQuad Core E5506 xeon processor@2.15 GHz,PERC H700 Raid controller card, 16 GB DDR-2 ECC RAM, 4 MB Cache Memory, 4 x 300 GB SASHDD, DVD RW drive, Integrated Dual BroadcomGigabyte Ethernet card, 19" LCD Monitor. **(No:01)**
		Linux Server DELL Server Power edge 2900 Intel Pentium –IV, 2 x 1.8 Ghz Quad Core xeon processor, PERC 5/I Raid controller card, 4 GB DDR-2 ECC RAM, 2x4 Cache Memory, 2 x 146 GB 15K RPM SAS HDD, DVD Combo drive, Integrated Dual Broadcom Gigabyte Ethernet card, 15" Color Monitor. **(No:01)**

		DHCP Server: DELL Server Power edge 2900 Intel Pentium – IV, 2 x 1.8 Ghz Quad Core xeon processor, PERC 5/I Raid controller card, 4 GB DDR-2 ECC RAM, 2x4 Cache Memory, 2 x 146 GB 15K RPM SASHDD, DVD Combo drive, Integrated Dual Broadcom Gigabyte Ethernet card, 15" Color Monitor **(No:01)**
		Windows 2008 Server (Matlab): DELL Server Poweredge 2900 Intel Pentium –IV, 2 x 1.8 Ghz Quad Core xeon processor, PERC 5/I Raid controller card, 4 GB DDR-2 ECC RAM, 2x4 Cache Memory, 2 x 146 GB 15K RPM SAS HDD, DVD Combo drive, Integrated Dual Broadcom Gigabyte Ethernet card, 15" Color Monitor **(No:01)**
		VMware V-Centre - Dell Optiplex 3050 MT Intel Core i7-7700-7th gen processor, 16 GB RAM, 1 TBHDD, 18.5 LED Monitor **(No:01)**
		LMS (Moodle) HP 400-G Desktop Intel Core i5/4570 Processor, 8 GB RAM, 1 TB HDD, 18.5" LED Monitor,Keyboard and mouse **(No:02)**
		HP 3330 Desktop, Intel Core i7, 8 GB RAM, 1 TBHDD, 18.5" LED Monitor, Keyboard and Monitor, **(No:01)**
		HP Pro 3330 i3 Processor, 4 GB RAM, 500 GB HDD, 20" led monitor, Keyboard, Mouse **(No:05)**
		HP Elite 7100 MT, Intel core i3 550 @ 3.2GHz, 2 GBRAM, 320 GB HDD, 18.5'' TFT Color Monitor, Keyboard and mouse **(No:01)**
		Dell i5, 8GB RAM, 1 TB HDD, 18.5" Monitor, KeyBoard, Mouse **(No:01)**
		HP i5, 8GB RAM, 1 TB HDD, 18.5" Monitor, Key Board, Mouse **(No:01)**
		Laptop Dell Vostro 3560, Core i5 Processor, 8 GBRAM, 1 TB HDD, with DOS. **(No:02)**
		MikroTic Cloud Core Router CCR2116 Series **(No:01)**
		Cisco MX100 Firewall **(No:01)**
		MikroTic Cloud Core Router CCR1009 Series **(No:01)**
		HPE Aruba CX 6200F 24G 4SFP + Switch **(No: 10)**
		28 Port CISCO SG-350 Gigabit Switch **(No:04)**
		Netgate 1537 MAX pfSence + Security Gateway (**No:01**)
		Ubiquite 24 Port 1 Gig Switch (**No:01**)
		HP Lasejet M233dw Printer **(No:01)**
		HP Lasejet MFP M226dw Printer **(No:01)**
		42 U Rack for Switches **(No:01)**
		8 Port KVM Switch **(No:01)**
		Netrack Servers Rack **(No:01)**
		Air conditioner 3.5 Tones **(No:02)**
		10 KVA Online UPS 5 hours Backup Techser make **(No:01)**

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: AI&ML

S. No.	Name of the Laboratory / Workshop	Details
1	**AIML LAB-1** (Principles of Artificial Intelligence / Natural Language Processing / Data and Visual Analytics using AI / Mini Project / Database Management Systems, Capstone Project, Project Part 2)	**List of Major Equipment / Facilities**
		• HP, Intel(R) Core(TM) i5-10500 CPU @ 3.10GHz, 16.0 GB RAM, 1 TB HDD and 20″ LED Monitor, Keyboard and Mouse. **(No: 36)**
		• 10 KVA UPS Online with ½ hour backup: HS11-10 CM Model. **(No: 01)**
		• Window Air Conditioners **(No: 02)**
		• D-Link (10/100 Switch) DES-1024A, 24 Port **(No: 01)**
		• D-Link DES 1016A 10/100 Switch 16Port **(No:01)**
		• 6U Wall Mounted Rack. **(No: 01)**
		• LCD Projector with Screen **(No: 01)**
		List of Experimental Setup in each Laboratory
		• Oracle 11i, Python, Dev C++, Hadoop, OS-Windows, Ubuntu
		• Visual Studio, CISCO-Packet Tracer
2	**AIML LAB-2** (Web Programming / Mathematical Foundations for Data Science and security / Machine Learning / Deep Learning for Computer Vision, Operating Systems/ Unified Modelling Language-Case studies)	**List of Major Equipment / Facilities**
		• HP, Intel(R) Core(TM) i5-10500 CPU @ 3.10GHz, 16.0 GB RAM, 1 TB HDD and 20″ LED Monitor, Keyboard and Mouse. **(No: 36)**
		• 10 KVA UPS Online with ½ hour backup: HS11-10 CM Model. **(No: 01)**
		• D-Link (10/100 Switch) DES-1024A, 24 Port **(No: 01)**
		• Netgear Prosafe (JFS516), 10/100 Switch 16 Port **(No: 01)**
		• HP Laser 108 W Printer **(No: 01)**
		• 6U Wall Mounted Rack. **(No: 01)**
		• LCD Projector with Screen **(No: 01)**
		List of Experimental Setup in each Laboratory
		• Python, Dev C++, R-Studio, MangoDB, NodeJS, ReactJS, OS- Windows, Ubuntu
		• Visual Studio, Umbrella, Tensorflow
3	**AIML LAB-3** (Web Programming / Mathematical Foundations for Data Science and security / Machine Learning / Deep Learning for Computer Vision, Operating Systems)	**List of Major Equipment / Facilities**
		• DELL, Intel(R) Core(TM) i7-13700 CPU @ 2.10GHz, 16.0 GB RAM, 1 TB HDD and 20″ LED Monitor, Keyboard and Mouse. **(No: 36)**
		• 10 KVA UPS Online with ½ hour backup: HS11-10 CM Model. **(No: 01)**
		• Window Air Conditioners **(No: 02)**
		• D-Link (10/100 Switch) DES-1024A, 24 Port **(No: 01)**
		HP Laser 108 W Printer **(No: 01)**
		• 6U Wall Mounted Rack. **(No: 01)**
		• LCD Projector with Screen **(No: 01)**

		List of Experimental Setup in each Laboratory
		• R-Studio, Python, Dev C++, Hadoop, OS-Windows, Ubuntu
		• Visual Studio, Anaconda Navigator
4	**AIML LAB-4** (Web Programming / Mathematical Foundations for Data Science and security / Machine Learning / Deep Learning for Computer Vision, Operating Systems)	**List of Major Equipment / Facilities**
		• DELL, Intel(R) Core(TM) i7-13700 CPU @ 2.10GHz, 16.0 GB RAM, 1 TB HDD and 20″ LED Monitor, Keyboard and Mouse. **(No: 36)**
		• 10 KVA UPS Online with ½ hour backup: HS11-10 CM Model. **(No: 01)**
		• D-Link (10/100 Switch) DES-1024A, 24 Port **(No: 01)**
		• Netgear Prosafe (JFS516), 10/100 Switch 16 Port **(No: 01)**
		• 6U Wall Mounted Rack. **(No: 01)**
		• LCD Projector with Screen **(No: 01)**
		List of Experimental Setup in each Laboratory
		• R-Studio, Python, Dev C++, Hadoop, OS-Windows, Ubuntu
		• Visual Studio, Anaconda Navigator

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: Computer Engineering and Technology

S. No.	Name of the Laboratory / Workshop	Details
1	Lab –I (Internet of Things Lab)	**List of Major Equipment / Facilities**
		i. Dell Optiplex 3060 MT Intel Core i7 processor, 16 GB RAM, 1 TB HDD, 20" LED Monitor, Keyboard, Mouse **(No: 25)**
		ii. Dell Intel core i5, 8 GB RAM, 1 TB HDD, 20'' LED Monitor, Keyboard and mouse **(No: 01)**
		iii. HP Pro Desk 400 G7 MT, Intel Core i5-10500 CPU@3.10 GHz x64-based processor, Intel @HD Graphics 4600, 16 GB RAM, 1 TB HDD, 20'' LED Monitor, Keyboard and Mouse **(No: 10)**
		iv. 30 KVA UPS Online with ½ hour backup. **(No: 01)**
		v. 24 Port 10/100 Mbps D-link switches **(No: 02)**
		vi. 6U Wall Mounted Rack-1 **(No: 01)**
		vii. LCD Projector with Screen-1 **(No: 01)**
		List of Experimental Setup in each Laboratory
		i. Ubuntu 22.04, Java, Oracle, Python, Dev C++
		ii. Android Studio, Visual Studio
2	Lab-II (Cyber Security Lab)	**List of Major Equipment / Facilities**
		i. HP, Intel(R) Core(TM) i5-10500 CPU @ 3.10GHz, 16.0 GB RAM, 1 TB HDD and 20″ LED Monitor, Keyboard and Mouse. **(No: 36)**
		ii. 10 KVA UPS Online with ½ hour backup: HS11-10 CM Model. **(No: 01)**
		iii. Window Air Conditioners **(No: 02)**
		iv. D-Link (10/100 Switch) DES-1024A, 24 Port **(No: 01)**
		v. CISCO Switch (SG300-28) 28 Port **(No: 01)**
		vi. HP Laser Jet 1020 plus Printer **(No: 01)**
		vii. 6U Wall Mounted Rack. **(No: 01)**
		viii. LCD Projector with Screen **(No: 01)**
		List of Experimental Setup in each Laboratory
		i. SQL Developer, MongoDB, MAT Lab
		ii. Visual Studio, Python, Dev C++

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: Information Technology

S. No.	Name of the Laboratory / Workshop	Details
1	**IT LAB-1 (ES&IOT,DS)**	**List of Major Equipment / Facilities**
		i) Dell Optiplex 3060, i7, 8 GB RAM, 1TB HDD, 20" Monitor - **28** Nos, ii) HP i7, 8GB RAM, 1TB HDD- **01**Nos, iii) HP 400 G7 - i5 - **04**Nos, iv) Dell i7 - **04**Nos etc
		v) **Raspberry Pi3 kits** - 20 no.with different sensors. (smoke, Gas, Soil Moisture, Rain, Pressure, Temperature, ultrasonic sensor) **(No: 20)**
		vi) **Embedded 8051** Microcontroller 89E516RD (Flash Programmable Development Board (URD4)) **(No: 15)**
		vii) LCD Projector
		viiii) Two Air conditioners
		ix) 30 KVA Cyber UPS with batteries
		x) Network Switch: 24 Port switch with batteries
		xi) HP Laser Jet Printer (**No:01**)
		List of Experimental Setup in each Laboratory
		i) Softwares: Keil Compiler, SST FlashFlex 5,
		ii) Raspbian OS
		iii) Open Source Eclipse IDE
2	**IT LAB-2** (JPEF, DAA,OS)	**List of Major Equipment / Facilities**
		i) Dell OptiPlex 3060, i7, 8 GB RAM, 1TB HDD/20" Monitor- **27** Nos, ii) HP i7, 8GB RAM, 1TB HDD- **01**Nos , iii) HP 400 G7 - i5 - **03**Nos, iv) Dell i7 - **04**Nos, v) Dell 3060 i5 - **1**No etc
		vi) LCD Projector
		vii) Two Air conditioners
		viii) Network Switch: 24 Port switch with batteries
		List of Experimental Setup in each Laboratory
		i) Softwares: Keil Compiler, SST FlashFlex 5
		ii) Raspbian OS
		iii) Sql Developer for DBMS Lab.

3	**IT LAB-3** **(DL,SE,PROJECTS LAB)**	**List of Major Equipment / Facilities**
		i) Dell Optiplex 3060, Core i7, 8 GB RAM, 1TB HDD, 20" Monitor, W10, 3YW-**23** Nos, ii) Dell Optiplex 3050 i7-**01**Nos, iii) HP 400 G2 - i7 - **01**Nos, iv) Hp 3330 i7 - **03**Nos, v) Dell Vostro i7 - **3No**, vi) Hp 400 G7 i5-**04**Nos, vii) Dell 3060 i5-**01**Nos etc
		viii) HP Laser Jet Printer (**No:01**)
		ix) LCD Projector
		x) Two Air conditioners
		xi) Network Switch: 24 Port switch with batteries
		List of Experimental Setup in each Laboratory
		i)Open Source Eclipse IDE
4	**IT LAB-4** **(FSD,NS,FBCT)**	**List of Major Equipment / Facilities**
		i)Dell Optiplex 3050, Core i7, 8 GB RAM, 1TB HDD, 20" Monitor, W10, 3YW-**20** Nos, ii) Dell Optiplex 3060 i7-**04**Nos, iii) Dell Optiplex 3060 i5-**02**Nos, iv) HP 400 G2 - i7 - **02**Nos, v) HP 3330 i7-**01**, vi) HP 400g7-**04**, vii) Dell Vostro i7 - **4**Nos, viii) HP Server-**01**Nos, ix) Dell Server-**01**Nos etc
		x) LCD Projector
		xi) Two Air conditioners
		xii) Network Switch: 24 Port switch with batteries
		xiii) UPS – 10 KVA
		List of Experimental Setup in each Laboratory
		i) Open Source Software (Anaconda Navigator/Python)
5	**IT LAB-5** (DBMS, BDA,BML)	**List of Major Equipment / Facilities**
		i) Dell Optiplex 3050, Intel Core i7, 16 GB RAM, 1TB HDD, 20" Monitor-**24**No's, ii) HP 400G7 i5-**10**Nos, iii) Dell Vostro i7 - **4**Nos etc
		iv) LCD Projector
		v) Two Air conditioners
		vi) Network Switch: 24 Port switch with batteries
		vii) UPS – 10 KVA
		List of Experimental Setup in each Laboratory
		i) Open Source Linux / Ubuntu Operating System Software
		ii) Open Source Eclipse IDE

6	**IT LAB-6 (AI & R)**	**List of Major Equipment / Facilities**
		i)HP 400G7 i5 - **32**Nos, ii) HP 3330 i7 -**03**Nos, iii) HP 400G2 - **03**Nos etc
		iv) HP Laser Jet Printer (**No:01**)
		v) LCD Projector
		vi) two Air conditioners
		vii) Network Switch: 24 Port switch with batteries
		vii) UPS – 10 KVA
		List of Experimental Setup in each Laboratory
		i)Open Source Software(Anaconda Navigator/Python)
7.	**LAB7 (1st Year Lab)**	**List of Major Equipment / Facilities** HP i7,8 Gb Ram,1TB HDD,Monitor,Keyboard,Mouse(02) HP i7,2 Gb Ram,1TB HDD,Monitor,Keyboard,Mouse(02) HP i5,8 Gb Ram,1TB HDD,Monitor,Keyboard,Mouse(22) HP i5,8 Gb Ram,500 GB HDD ,Monitor,Keyboard,Mouse(02) HP i5,8 Gb Ram,320 GB HDD,Monitor,Keyboard,Mouse(01) HP i5,8 Gb Ram,160 GB HDD,Monitor,Keyboard,Mouse(01) HP i5,8 Gb Ram,120 GB HDD,Monitor,Keyboard,Mouse(01) HP i5,4 Gb Ram,1 TB HDD,Monitor,Keyboard,Mouse(03) HP i3,4 Gb Ram,500 GB HDD,Monitor,Keyboard,Mouse(10) HP i3,2 Gb Ram,500 GB HDD,Monitor,Keyboard,Mouse(02) HP i3,2 Gb Ram,320 GB HDD,Monitor,Keyboard,Mouse(14)
		Projector Installed - 1 No New AC’s Installed - 3 No Computer Tables Installed - 60 No’s

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: Artificial Intelligence & Data Science

S. No.	Name of the Laboratory / Workshop	Details
1	AI&DS LAB-1	**List of Major Equipment / Facilities**
		1. **HP Pro 400 G7 Desktop, Core i5 -10500/16 GB/1 TB** HDD/USB, 18.5" LED/LCD Monitor, Key Board & Mouse. **(No.s - 2)**
		2. **Dell Vostro 3020 SFF/ I7-13700/16GB** DDR4 RAM/512GB SSD/ Intel UHD Graphics, Wi-fi, Bluetooth, Windows 11Pro, Key Board & Mouse. (**No.s- 72)**
		3. Dell 20" Monitor D2020H **(No.s -72)**
		4. LCD Projector : EPSON Projector EB-E01, S/N: X8824400499
		5.Three Air conditioners
		6. Canon Image Class MF244dw
		7. CISCO Network : 24 Port Switch (4)
		8. UPS – 20 KVA
		List of Experimental Setup in each Laboratory
		Operating Systems: Windows 11, Oracle Virtual Box 7, Ubuntu 22.0 version including(Spark, Hive, Hadoop, Pig, Eclipse),
		• **Languages:** C, C++, JDK 1.8
		• **Open Source Software** : Anaconda Navigator/Python, R Studio, Visual Studio,
		• **Applications:** MS Office 2010, Dev C++
2	AI&DS LAB-2	**List of Major Equipment / Facilities**
		1. **HP Pro 400 G7 Desktop, Core i5 -10500/16 GB/1 TB** HDD/USB, 18.5" LED/LCD Monitor, Key Board & Mouse. **(No.s - 1)**
		2. **Dell Vostro 3020 SFF/ I7-13700/16GB** DDR4 RAM/512GB SSD/ Intel UHD Graphics, Wi-fi, Bluetooth, Windows 11Pro, Key Board & Mouse. (**No.s- 72)**
		3. Dell 20" Monitor D2020H **(No.s -72)**
		4. LCD Projector :
		5. HP Laser MFP 136 A Printer
		6.Three Air conditioners
		7. CISCO Network : 24 Port Switch (4)
		8. UPS – 20 KVA
		List of Experimental Setup in each Laboratory
		Operating Systems: Windows 11, Oracle Virtual Box 7, Ubuntu 22.0 version including(Spark, Hive, Hadoop, Pig, Eclipse),
		• **Languages:** C, C++, JDK 1.8
		• **Open Source Software** : Anaconda Navigator/Python, R Studio, Visual Studio,
		• **Applications:** MS Office 2010, Dev C+

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: CHEMICAL ENGINEERING

S. No.	Name of the Laboratory	Details
1	**Mass Transfer Operations Laboratory**	**List of Major Equipment /Experimental Set up/ Facilities**
		i)Diffusion in CCl_4 equipment
		ii)Wetted wall column
		iii)Drying equipment
		iv)Packed bed Distillation column
		v)Steam Distillation Unit
		vi)VLE Unit
		vii)Simple distillation unit
		viii) Crystallization unit
		ix) Solid –Liquid Extraction unit
		x)Liquid –Liquid Extraction unit
2	**Process Dynamics and Control Laboratory**	**List of Major Equipment /Experimental Set up/ Facilities**
		i) Two Tank interacting & noninteracting System
		ii) Level Control Trainer
		iii) Flow Control Trainer
		iv) Temperature Control Trainer
		v) Pressure Control Trainer
		vi) First and Second Order System
		vii) Control Valve Characteristics
		viii) U-tube manometer
3	**Heat Transfer Laboratory**	**List of Major Equipment /Experimental Set up/ Facilities**
		i) Stefan Boltzmann Apparatus
		ii)Emissivity Measurement Apparatus
		iii) Composite Wall
		iv) Lagged Pipe Apparatus
		v) Pin-Fin Apparatus
		vi) Heat Exchanger
		vii) Critical Heat Flux Apparatus
		viii) Thermal Conductivity of Insulating Powder

4	**Process Modeling and Simulation Laboratory**	**List of Major Equipment /Experimental Set up/ Facilities**
		i) Desktop computers 30 nos
		ii) MATLAB – Institute Licensed software
		iii) aspenONE – licensed simulation software(UniversityVersion)
5	**Chemical Reaction Engineering Laboratory**	**List of Major Equipment /Experimental Set up/ Facilities**
		i) Plug flow reactor in series with CSTR
		ii) Packed Bed Reactor
		iii) CSTRs in Series
		iv) Adiabatic Batch Reactor
		v) Non ideal Plug Flow Reactor
		vi) Non ideal Packed Bed Reactor
		vii) Batch reactor
		viii) Solid-Liquid reactor
		ix) Liquid-Liquid reactor
6	**Mechanical Unit Operations Laboratory**	**List of Major Equipment /Experimental Set up/ Facilities**
		i) Jaw Crusher
		ii) Roll Crusher
		iii) Pulverizer
		iv) Ball Mill
		v) Cyclone separator
		vi) Drop Weight Crusher
		vii) Vibrating Screen
		viii) Plate and frame filter press
		ix) Sieve shaker
		x) Weighing balance
		xi) Set of sieves
		xii) Batch Sedimentation unit
		xiii) Flotation cell

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: BIOTECHNOLOGY

S. No.	Name of the Laboratory / Workshop	Details
1	BIOCHEMISTRY LAB	**List of Major Equipment / Facilities**
		i. Colorimeter
		ii. Analytical balance
		iii. pH Meter
		iv. Water bath
		v. Magnetic stirrer
		List of Experimental Setup in each Laboratory
		i. Introduction to Biochemistry Lab: Units, Volume / Weight measurements, concentration units
		ii. Preparation of Solutions – percentage solutions, molar solutions, normal solutions and dilution of stock solution
		iii. Measurement of pH
		iv. Preparation of buffers and reagents
		v. Estimation of sugars from the given sample by DNS method
		vi. Estimation of Carbohydrates by Anthrone method
		vii. Estimation of Amino acids by Ninhydrin method
		viii. Estimation of Proteins by Biuret method
		ix. Estimation of Proteins by Lowry method
		x. Determination of Acid value, Saponification value and Iodine Number of Fat
		xi. Estimation of Cholesterol by Liebermann Burchard method
		xii. Estimation of DNA by Diphenylamine method
		xiii. Estimation of RNA by Orcinol method
2	MICROBIOLOGY LAB	**List of Major Equipment / Facilities**
		i. Autoclave (vertical)
		ii. Laminar Airflow (Horizontal)
		iii. Biological Compound Microscope
		iv. Binocular Compound Light Microscope
		v. Orbital shaking incubator
		vi. Refrigerator

		vii.	Rotary Shaker
		viii.	Digital Colony Counter
		ix.	Hot Air Oven
		x.	Incubator
		xi.	Digital balance
		List of Experimental Setup in each Laboratory	
		i.	Calibration of Microscope and Measurement of Microorganisms-Micrometer.
		ii.	Staining and Identification of microorganism: (a) Simple and Differential staining techniques.
		iii.	Sterilization techniques (Autoclaving, Hot Air Oven, Radiation and Filtration).
		iv.	Preparation of culture media (a) broth type of media (b) Agar.
		v.	Culturing of microorganism (a) broth (b) pure culture techniques- Streak plate, Pourplate.
		vi.	Antibiotic tests- Disc diffusion method, minimum inhibitory concentration.
		vii.	Biochemical tests- IMIVC test, Catalase, Coagulase test, Gelatinase test, Oxidase
		viii.	Factors affecting the bacterial growth and study of the growth curve.
		ix.	Measurement of Microbial Growth by Turbidometry and enumeration of bacterial numbers by serial dilution.
		x.	Measurement of Microbial Growth by Viable Count
		xi.	Production of Beer and Wine
		xii.	Coliform test
3	**IMMUNOLOGY LAB**	**List of Major Equipment / Facilities**	
		i.	Microcentrifuge digital timer
		ii.	Immunoelectrophoresis with power pack
		iii.	Micropipettes
		iv.	Hot plate
		List of Experimental Setup in each Laboratory	
		i.	ABO Blood Grouping and Identification of Rh typing
		ii.	Rocket Immunoelectrophoresis
		iii.	Ouchterlony Double Diffusion for Antigen-Antibody Patterns (ODD)
		iv.	Immuno-electrophoresis (IEP)
		v.	Radial Immune Diffusion test (RID)
		vi.	Widal test

		vii.	VDRL tests
		viii.	Total and Differential count of RBC & WBC by Micropipette method
		ix.	Erythrocyte sedimentation rate
		x.	Enzyme-Linked Immunosorbent Assay (ELISA) for Antigen capture and Antibody capture.
		xi.	Estimation of Immunoglobulins by Precipitation with Saturated Ammonium Sulphate
4	**INSTRUMENTATION LAB**	**List of Major Equipment / Facilities**	
		i.	UV-Visible spectrophotometer
		ii.	Spectrophotometer
		iii.	Conductivity meter
		iv.	Nelphometer
		v.	Flame Photometer
		vi.	Refrigerator
		vii.	Digital photo Fluorometer
		viii.	pH meter
		ix.	Water bath
		x.	Distillation Unit
		xi.	Digital weigh balance
		xii.	Centrifuge
		xiii.	Colorimeter
		List of Experimental Setup in each Laboratory	
		i.	The calibration of pH meter and measurement of pH for different solutions
		ii.	Estimation of Ascorbic acid by colorimetric assay
		iii.	Estimation of unknown samples by using a conductivity meter
		iv.	Estimation of different macromolecules by visible spectrophotometer
		v.	Verification of Lambert - Beers law by UV –Visible spectrophotometer
		vi.	Estimation of proteins and nucleic acids by UV method
		vii.	Estimation of turbidity using Nephelometer
		viii.	The separation of different macromolecules by Thin layer chromatography
		ix.	The separation of different macromolecules by paper chromatography
		x.	The separation of different macromolecules by SDS-PAGE
		xi.	Estimation of minerals by Flame photometry
		xii.	Estimation of Thiamine and Riboflavin by Fluorimetry

		xiii.	Preparation of Standard curve using UV-VIS & Flame Photometry
		xiv.	Fractionation of Plasma Proteins by Electrophoresis
		xv.	Membrane protein extraction by differential centrifugation
5	**FERMENTATION LAB**	**List of Major Equipment / Facilities**	
		i.	Orbital shake incubator
		ii.	Fluid bed Reactor
		iii.	Packed bed reactor
		iv.	Probe Sonicator
		v.	Laminar Airflow (Horizontal)
		List of Experimental Setup in each Laboratory	
		i.	Study of rheological parameters in the fermentation broth.
		ii.	Study of batch and fed-batch fermentation processes.
		iii.	Estimation of Specific growth rate and doubling time of microorganisms.
		iv.	Estimation of Monod parameters and determine the growth kinetics
		v.	Bioreactor instrumentation and its control.
		vi.	Study of enzyme immobilization and determine its activity
		vii.	Media optimization by using Plackett-Burman design
		viii.	Production of citric acid by *Aspergillus niger* and its estimation by the titrimetric method.
		ix.	Substrate utilization and product formation kinetics.
		x.	Determination of KLa by Sulphite oxidation method.
6	**ENZYME TECHNOLOGY LAB**	**List of Major Equipment / Facilities**	
		i.	Double Beam UV -Visible Spectrophotometer
		ii.	Hot air oven
		List of Experimental Setup in each Laboratory	
		i.	Preparation of buffers
		ii.	Isolation and extraction of enzymes (Microbial, plant and animal source).
		iii.	Effect of pH on enzyme activity.
		iv.	Effect of temperature on enzyme activity.
		v.	Effect of substrate concentration on enzyme activity.
		vi.	Effect of time interval on enzyme activity.
		vii.	Development of Enzyme Assay.
		viii.	Evaluation of Michaelis-Menten kinetic parameters.
		ix.	Kinetic studies of enzyme inhibition

		x. Determination of growth curve of a supplied microorganism and to determine substrate degradation profile.
		xi. Studies on immobilization of enzyme/cell by gel entrapment method
		xii. Comparative study of activities of free and immobilized enzyme systems.
7	**GENETIC ENGINEERING LAB**	**List of Major Equipment / Facilities**
		i. Gel-Documentation system
		ii. Incubator
		iii. Microcentrifuge with digital timer
		iv. Refrigerated high-speed centrifuge
		v. UV Transilluminator
		vi. PCR- Master cycler
		vii. Cyclomixer
		viii. White light transilluminator
		ix. UV Transilluminator
		List of Experimental Setup in each Laboratory
		i. Isolation of genomic DNA
		ii. Isolation of plasmid DNA
		iii. Visualization of Genomic and Plasmid DNA on Agarose gels
		iv. Restriction digestion
		v. Restriction mapping
		vi. Gel elution.
		vii. DNA ligation
		viii. Preparation of competent cells.
		ix. Genetic transformation and screening for recombinant bacterial cells.
		x. Blotting techniques- southern blotting
		xi. Amplification of DNA fragments by Polymerase Chain Reaction
		xii. DNA sequencing- Sanger's Method
		xiii. Analysis of Recombinant Proteins using SDS-PAGE
8	**FERMENTATION TECHNOLOGY LAB**	**List of Major Equipment / Facilities**
		i. Laminar Airflow (Horizontal)
		ii. Rotary Vacuum Film Evaporator
		List of Experimental Setup in each Laboratory
		r instrumentation and control.
		of microorganisms from soil or water samples for ially useful ended experiments
		on of Media and measuring viscosity
		on of Media and Air.

		n of specific growth rate and doubling time of a anism
		f E.coli using Batch fermentation technique
		f E.coli using Fed-batch culture techniques.
		tion of citric acid production from A.niger using Plackett- nethod
		n of biomass (dry weight), substrate and product analysis acid fermentation.
		n of Monod parameters for determining growth kinetics
		n of Lactic acid by using a batch reactor
9	**BIOINFORMATICS LAB**	**List of Major Equipment / Facilities**
		i. Computers HP ProDesk 400G7 MicroTowerPC(8CORE 16 MB Cache)(20 no.)
		List of Experimental Setup in each Laboratory
		i. Searching Bibliographic databases for relevant information
		ii. Sequence retrieval from DNA and protein databases.
		iii. BLAST services.
		iv. FASTA services.
		v. Pair-wise comparison of sequences (Local and global alignment).
		vi. Multiple Sequence Alignment.
		vii. Evolutionary studies/Phylogenetic Analysis.
		viii. Protein Databank retrieval and visualization.
		ix. Structure Exploration of Proteins.
		x. Restriction Mapping
		xi. Identification of Genes in Genomes
		xii. NCBI ORF Finder
		xiii. Primer Design
10	**BIOSEPARATION ENGINEERING LAB**	**List of Major Equipment / Facilities**
		i. Centrifuge
		ii. Deep Freezer
		iii. Incubator
		iv. Rotary Vacuum Evaporator
		v. Orbital Shaker incubator
		vi. Bioreactor
		List of Experimental Setup in each Laboratory
		i. Cell Disruption of microorganism using an enzymatic method.
		ii. Cell Disruption of plant cells/animal cells using physical methods.
		iii. Liquid-liquid extraction.
		iv. Separation of solids from a liquid by Sedimentation.

		v.	Separation of microorganisms from fermentation broth by Microfiltration.
		vi.	Separation of solute particles by Dialysis.
		vii.	Separation of protein by Ammonium Sulphate precipitation
		viii.	Isolation and quantification of protein from milk by Isoelectric Precipitation.
		ix.	Separation of biomolecules by Gel Exclusion Chromatography
		x.	Purification of lysozyme from chicken egg white extract by Ion Exchange Chromatography.
		xi.	Purification of proteins by Affinity Chromatography.
		xii.	Simple distillation- vapor-liquid equilibrium
		xiii.	Solid-liquid extraction. /Drying technique
		xiv.	Alpha-amylase activity
11	**TISSUE CULTURE LAB**	**List of Major Equipment / Facilities**	
		i.	Autoclave
		ii.	Benchtop Orbital shaking Incubator
		iii.	Double Distillation Unit
		iv.	Digital weighing Balance
		v.	Hot air oven
		vi.	Laminar Airflow(Vertical)
		vii.	Laminar Airflow (Horizontal)
		viii.	Microscope Inverted
		ix.	Refrigerator
		x.	Inverted LED Microscope including Mac CAM DC-5
		List of Experimental Setup in each Laboratory	
		i.	Preparation of Plant tissue Culture Media • Preparation of MS stock solutions • Preparation of MS callus induction media
		ii.	Surface sterilization
		iii.	Callus induction from mature embryo
		iv.	Cell suspension cultures initiation and establishment
		v.	Organogenesis and Embryogenesis
		vi.	Meristem tip culture for production of virus-free plants
		vii.	Micropropagation of horticultural/medicinally important plants
		viii.	Root induction and acclimatization of *in vitro* plantlets
		ix.	Production of synthetic seeds
		x.	Protoplast isolation

		xi. Agrobacterium-mediated gene transfer: induction of Hairy roots
12	**ANIMAL BIOTECHNOLOGY LAB**	**List of Major Equipment / Facilities**
		i. Bench Centrifuge
		ii. CO_2 Incubator with cylinder
		iii. Micro plate Elisa reader
		iv. Biosafety Cabinet
		v. Refrigerator
		vi. Deep freezer -80°C
		vii. Milli Q water
		List of Experimental Setup in each Laboratory
		i. Microscopic visualization of Human Buccal Epithelial cells
		ii. Separation of serum from whole blood
		iii. Preparation of cell culture growth media
		iv. Primary culture of chicken embryo fibroblast culture
		v. Isolation of Hepatocytes from Chicken liver cells
		vi. Enumeration and counting of animal cells using a Hemocytometer
		vii. Staining and microscopic visualization of adherent animal cells
		viii. Evaluation of cell viability/cytotoxicity in animal cells
		ix. Cell viability of cells using trypan blue dye
		x. Trypsinization or subculture of the adherent cell line

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Name of the Department: PHYSICS

S. No.	Name of the Laboratory / Workshop	Details
1	Radiation Assessment Lab	**List of Major Equipment / Facilities**
		SSNTD etching unit
		Spark Counter
		GM Counter
		Micro-R-Survey meter
2	Functional Materials Lab	High Temperature Box Furnace
		Hydraulic Press
		Spray Pyrolysis
		Analytical Balance (0.1 mg readability)
		Magnetic stirrer with hot plate
3	Physics Lab-1 (Physics Lab)	**List of Major Experimental Setup**
		-Nil-
		List of Experimental Setup
		Young's Modulus
		Ultrasonic Interferometer
		Helmholtz Resonator
		Compound Pendulum
		Viscosity-Lamp & Scale
		Fly Wheel
		Torsional pendulum
		Sonometer
		Melde's Experiment
		Coupled Oscillator
4	Physics Lab- 2 (Optics Lab)	**List of Major Experimental Setup**
		-Nil-
		List of Experimental Setup
		Single Slit Expt.
		Double Sit Expt.
		Fiber Optics
		Laser Expt.
		Polarimeter
		Grating
		Malus's Law
		Fresnel’s Biprism
		R.P.Telescope
		Double Refraction
		Newton’s Rings

5	**Physics Lab -3 (Electricity & Magnetism Lab)**	**List of Major Experimental Setup**
		-Nil-
		List of Experimental Setup
		LCR Circuit
		M & H Values
		B-H Curve
		Thermo Electric Power
		e/m of an Electron
		Planck's Constant
		Dielectric Constant
6	**Physics Lab -4 (Semiconductor Physics lab)**	**List of Major Experimental Setup**
		Hall Effect
		List of Experimental Setup
		Thermister
		LED Characteristics
		Solar Cell
		P-N Junction Diode
		Energy Gap

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Name of the Department: CHEMISTRY

S. No.	Name of the Laboratory / Workshop	Details
1	Lab-I Volumetric	**List of Major Equipment / Facilities**
		i) Water Bath, Hot Plate /Power connection and laboratory tables to perform the experiment.
		List of Experimental Setup in each Laboratory
		i) Water Bath(02), Hot Plate(01), Digital weighing machine(01)
		ii) Oxalic Acid, HCI, NaOH, Phenolphthalein, Methyl Acetate, KI,$K_2S_2O_8$, $Na_2S_2O_3$, Starch, Acetic acid
		iii) Burettes, Conical Flasks, Pipettes, Measuring Jars, Standard Flasks, Beakers,
2	Lab-II Instrumentation	**List of Major Equipment / Facilities**
		i) Potentiometers and Magnetic Stirrers / Power connection and laboratory tables to perform the experiment.
		List of Experimental Setup in each Laboratory
		i) Potentiometers (14), Magnetic Stirrers (11), Digital weighing machine(01)
		ii) Saturated calomel and Platinum electrodes (28)
		iii) Quinhydrone Powder
		iv) Oxalic acid, Mohr's salt, Oxalic acid, $KMnO_4$, H_2SO_4, KCl , Distilled Water, NaOH, Phenolphthalein
		v) Burettes, Conical Flasks, Pipettes, Measuring Jars, Standard Flasks, Beakers
		vi) Magnetic stirrers, Magnetic Beads, Salt Bridge
3	Lab-III Instrumentation	**List of Major Equipment / Facilities**
		i) Conductometers / Power connection and laboratory tables to perform the experiment.
		List of Experimental Setup in each Laboratory
		i)Conductometers(14)
		ii) Conductivity cell (14), Digital weighing machine(01)
		iii) Oxalic acid, NaOH, Distilled Water, HCI, Acetic Acid, Phenolphthalein
		iv) Burettes, Conical Flasks, Pipettes, Measuring Jars, Standard Flasks, Beakers, Glass Rod,
4	Lab-IV Volumetric	**List of Major Equipment / Facilities**
		i) Water Bath, Hot Plate /Power connection and laboratory tables to perform the experiment.
		List of Experimental Setup in each Laboratory
		i) Water Bath(02), Hot Plate(01), Digital weighing machine(01)
		ii) Oxalic Acid, HCI, NaOH, Phenolphthalein, Methyl Acetate, KI,$K_2S_2O_8$, $Na_2S_2O_3$, Starch, Acetic acid
		iii) Burettes, Conical Flasks, Pipettes, Measuring Jars, Standard Flasks, Beakers,

S. No.	Name of the Laboratory / Workshop	Details
5	Lab-V Instrumentation	**List of Major Equipment / Facilities**
		i) Conductometers / Power connection and laboratory tables to perform the experiment.
		List of Experimental Setup in each Laboratory
		i)Conductometers(14)
		ii) Conductivity cell (14), Digital weighing machine(01)
		iii) Oxalic acid, NaOH, Distilled Water, HCI, Acetic Acid, Phenolphthalein
		iv) Burettes, Conical Flasks, Pipettes, Measuring Jars, Standard Flasks, Beakers, Glass Rod,
6	Lab-VI Instrumentation	**List of Major Equipment / Facilities**
		i) Potentiometers and Magnetic Stirrers / Power connection and laboratory tables to perform the experiment.
		List of Experimental Setup in each Laboratory
		i) Potentiometers (14), Magnetic Stirrers (11), Digital weighing machine(01)
		ii) Saturated calomel and Platinum electrodes (28)
		iii) Quinhydrone Powder
		iv) Oxalic acid, Mohr's salt, Oxalic acid, $KMnO_4$, H_2SO_4, KCl , Distilled Water, NaOH, Phenolphthalein
		v) Burettes, Conical Flasks, Pipettes, Measuring Jars, Standard Flasks, Beakers
		vi) Magnetic stirrers, Magnetic Beads, Salt Bridge

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Name of the Department: ENGLISH

S. No.	Name of the Laboratory / Workshop	Details
1	**CALL LAB** **K.Block 3rd Floor** **English Lab**	**List of Major Equipment / Facilities** 1) 28 Computers in CALL LAB (DELL Optiplex 3020 Intel ® Core ™ i5-4590cpu@3030GHz 3.30 GHz 8GB 64 -bit OS 2) A/Cs DAIKIN (02) 3) 30 Headsets (HP) etc. 4) Printer HP Laserjet p1007, UPS 10KV, 5) BATTERIES Power inn **List of Experimental Setup in each Laboratory** 1) Software in CALL Lab :-SoftXPvt. Ltd.
2	**CALL LAB** **M.Block Ground Floor** **English Lab**	1) 35 Computers in CALL LAB Intel (R) Core (TM) i5-3470 CPU@3.20GHz 3.20GHz, 4GB, 64-bit OS 2) One white board, 3) A/Cs Toshiba (02) 4) 35 Headsets (HP) etc. 5) BATTERIES Power inn **List of Experimental Setup in each Laboratory** 1) Software in CALL Lab :-SoftXPvt. Ltd.
3	**ICS LAB** **K.Block 3rd Floor** **English Lab**	**List of Major Equipment / Facilities** 1) 01 Computer in ICS LAB (DELL Optiplex 3020 Intel ® Core ™ i5-4590cpu@3030GHz 3.30 GHz 8GB 64 -bit OS 2) 01 Projector (NEC) 3) A/Cs DAIKIN (02) **List of Experimental Setup in each Laboratory** 1) Software in CALL Lab :-SoftXPvt. Ltd.
4	**ICS LAB** **M.Block Ground Floor** **English Lab**	**List of Major Equipment / Facilities** 1) 01 Computer in ICS LAB (DELL Optiplex 3020 Intel ® Core ™ i5-4590cpu@3030GHz 3.30 GHz 8GB 64 -bit OS 2) 01 Projector (NEC) **List of Experimental Setup in each Laboratory** 1) Software in CALL Lab :-SoftXPvt. Ltd.
5	**SOFT SKILLS LAB** **M. Block Ground Floor**	**List of Major Equipment / Facilities** **03 Labs** 1) **03 Computers** Intel ® Core ™ i5- 7500 CPU@3.40GHz 3.41 GHz 8GB 64 -bit OS 2) **03 Projectors** Projector With Screen NEC 3) Woofer with 2 speakers (each lab) etc. **List of Experimental Setup in each Laboratory** ----

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Name of the Department: MCA

S. No.	Name of the Laboratory / Workshop	Details
1	MCA LAB - I	**List of Major Equipment / Facilities**
		i) hardware a) HP 3330 Desktop Core i5-34701, 8GB RAM, I TB HDD, GRAPHIC Card, TFT Color Monitor, DVD RW, 10/100/1000 Mbps Ethernet Card, Keyboard and mouse. – 28 Nos. b) K4Q81AV-HP 400G2 Desktop core 17-4770/3, 64ghz / 890/1 TB/DVD RW, USB/KB and mouse/005/333 G9/W86AA-HP V193, LED 18.5" Monitor – 02 Nos. c) Dello Optiplex-3060, Core i5, 8GB RAM, I TB HDD, 20" Monitor - 02 d) HP – 280 GB Desktop, Core i7, Model No: 11700, 16GB/256 GB SSD, HP P204 V 19.5" Monitor – 05 Nos
		ii) Network accessories and peripherals a) 24 Port D Link Switch -02 b) HP LaserJet 1005 – 01 c) 6-U Communication Rack -01 d) HP 3 in one printer cum scanner cum Xerox machine e) HP Laser jet P1007 - 01
		iii)Electrical equipment a) Cassette Air conditioners -02 b) Ceiling fans -04 c) Panasonic LCD Projector -01
		List of experimental setup in each laboratory
		i) Computer Programming Lab using 'C' ii) Data Structures Lab using C++ iii) Database Management Systems Lab iv) Machine Learning Lab using Python v) Web Technologies Lab
2	MCA LAB - II	**List of Major Equipment / Facilities**
		i)Hardware: a) VASTRO 3020 SFF, Intel i7 Processor, 13 Gen, 8 GB RAM, 512 GB SSD-HDD, 20" Monitor – 17 Nos. b) K4Q81AV-HP 400G2 Desktop core 17-4770/3, 64ghz / 890/1 TB/DVD RW, USB/KB and mouse/005/333 G9/W86AA-HP V193, LED 18.5" Monitor – 13 Nos c) HP – 280 GB Desktop, Core i7, Model No: 11700, 16GB/256 GB SSD, HP P204 V 19.5" Monitor – 05 Nos.
		ii) Network Accessories And Peripherals a) 24 Port D Link 10/100 Switch -02, b) HP Laser jet P1020 plus printer-01, c) 6-U Communication Rack -01
		iii) Electrical equipment a) Cassette Air conditioners – 02, b) 10KVA CONSUL UPS with half an hour backup -01 (for Lab-I & II), c) Panasonic LCD Projector-01, d) Voltas Water Dispenser -01 (for Staff and Students of MCA Dept.)
		List of Experimental Setup in each laboratory
		i) Object Oriented Programming Lab using Java ii) Database Management Systems Lab iii) Object Oriented System Development Lab iv) Web Technologies Lab

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LIST OF MAJOR EQUIPMENT / FACILITIES & EXPERIMENTAL SETUP IN EACH LABORATORY / WORKSHOP

Name of the Department: MBA

S. No.	Name of the Laboratory / Workshop	Details
1	Lab 1 & 2 (Computer Lab)	**List of Major Equipment / Facilities**
		i) 60 Computers (30 each)
		List of Experimental Setup in each Laboratory
		i) Statistical Lab.