

Criterion 6: Facilities and Technical Support (80)

6.1. Adequate and Well-Equipped Laboratories, and Technical Manpower (30)

(Provide details of various laboratories for the program and at the department level. Also, please provide a list of technical support staff appointed by the College for the Department and their qualifications. Please do not give duplicate data from the sections 6.2 and 6.5.)

S.L	Name of the Laboratory	No. of student's per setup (Batch Size)	Name of the major equipment	Weekly utilization status (all the courses for which the lab is utilized)	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
	2018 scheme						
1	Electrical machines laboratory-1	7	Rectifier unit, DC shunt motor with mechanical load , DC compound motor with mechanical load, DC shunt motor coupled to DC shunt generator, DC shunt motor coupled to DC compound generator, DC series motor coupled to DC series generator, DC shunt motor coupled to DC series generator, Ammeters,Voltmeters, Rheostats, Tachometers.	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diploma
2	Electronics laboratory	7	Regulated power supply, DC voltmeters, DC ammeters, Multimeters, Transformers, CRO's, Function Generators, Breadboards, Decade Resistance Box	4 Hours	Ms. Manjushree H		
3	Electrical machines laboratory-2	7	1- ϕ Transformers, 3- ϕ Transformers, 3- ϕ Induction motor with mechanical load, DC shunt motor coupled to 3- ϕ alternator,3- ϕ Synchronous motor, 1- ϕ Induction motor, 1- ϕ and 3- ϕ Auto	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diploma

			Transformer, Rheostats, Wattcmeters .				
4	Op-Amp & LIC Lab	7	Breadboard, Power Supply (Dual/Variable DC Power Supply) $\pm 15V$, $\pm 12V$ commonly used for Op-Amps. Function Generator. Digital/Analog Oscilloscope Digital Multimeter (DMM) CRO (Cathode Ray Oscilloscope) Soldering Kit (optional, for permanent circuit setups) Connecting Wires & Patch Cords	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplor
5	Microcontroller Laboratory	7	Stepper motor, seven-segment display, Interfacing ADC and DAC kit,	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplor
6	Power Electronics Laboratory	7	SCR,IGBT&MOSFET study kit, Gate firing circuits for SCR, Single phase AC voltage controller, Single phase fully controlled bridge converter, DC Jones chopper, 1- ϕ Parallel inverter, 1- ϕ Series inverter, 1- ϕ Cyclo converter, 1- ϕ Half controlled converter CRO's, Regulated power supply, Ammeters, Voltmeters, Multimeters, Isolation Transformers, center tapped transformers.	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplor
7	Control System Laboratory	7	Time Response of Second order system, Characteristics of synchros, Transfer Function of DC motor Kit, DC servo motor, Ac servo motor, Magnetic Amplifier,	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplor

			DC Generator, Programmable Logic Controller, CRO's, etc				
8	DSP Laboratory	7	Intel Core Processor 2.2 GHz with 8GB Ram, LCD Monitor, Open Source software.	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplom
9	Power System Simulation Laboratory	7	Intel Core Processor 2.2 GHz with 8GB Ram, LCD Monitor, Open Source software.	4 hours	Mr. Basavaraj Hiremath	Instructor	Diplom
10	Relay and High Voltage laboratory	7	High voltage relay, High current relay, Transformer testing oil	4 hours	Mr. Basavaraj Hiremath	Instructor	Diplom
	2021 scheme						
11	Electric Machine Lab-1	12	Rectifier unit, DC shunt motor with mechanical load , DC compound motor with mechanical load, DC shunt motor coupled to DC shunt generator, DC shunt motor coupled to DC compound generator, DC series motor coupled to DC series generator, DC shunt motor coupled to DC series generator, Ammeters, Voltmeters, Rheostats, Tachometers.	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplom
12	Circuit Lab using P-Spice	12	Intel Core Processor 2.2 GHz with 8GB Ram, LCD Monitor, Open Source software	4 Hours	Ms. Manjushree H		
13	Electric Machine Lab-2	12	1- ϕ Transformers, 3- ϕ Transformers, 3- ϕ Induction motor with mechanical load, DC shunt motor coupled to 3- ϕ alternator, 3- ϕ Synchronous motor, 1- ϕ Induction motor, 1- ϕ and 3- ϕ Auto Transformer, Rheostats, Wattmeters .	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplom

14	Simulation of Op-Amp Circuit Lab	12	Breadboard, Power Supply (Dual/Variable DC Power Supply) $\pm 15V$, $\pm 12V$ commonly used for Op-Amps. Function Generator. Digital/Analog Oscilloscope Digital Multimeter (DMM) CRO (Cathode Ray Oscilloscope) Soldering Kit (optional, for permanent circuit setups) Connecting Wires & Patch Cords	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplom
15	Power Electronics Lab	12	SCR,IGBT&MOSFET study kit, Gate firing circuits for SCR, Single phase AC voltage controller, Single phase fully controlled bridge converter, DC Jones chopper, 1- ϕ Parallel inverter, 1- ϕ Series inverter, 1- ϕ Cyclo converter, 1- ϕ Half controlled converter CRO's, Regulated power supply, Ammeters, Voltmeters, Multimeters, Isolation Transformers, center tapped transformers.	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplom
16	DSP Lab	12	SCR,IGBT&MOSFET study kit, Gate firing circuits for SCR, Single phase AC voltage controller, Single phase fully controlled bridge converter, DC Jones chopper, 1- ϕ Parallel inverter, 1- ϕ Series inverter, 1- ϕ Cyclo converter, 1- ϕ Half controlled converter CRO's, Regulated power supply, Ammeters,	4 Hours	Mr. Rajendra Ghivari	Asst. Professor	M.Tech

			Voltmeters, Multimeters, Isolation Transformers, center tapped transformers.				
	2022 Scheme						
17	Transformers and Generators Lab	15	Single-phase Transformers (various ratings). Three-phase Transformers (star-delta, delta-star, etc.). Auto-transformers. Instrument. Transformers (CTs & PTs) Variable Transformers	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplom
18	Circuit Lab using P-Spice	15	Intel Core Processor 2.2 GHz with 8GB Ram, LCD Monitor, Open Source software, Computer systems	4 Hours	Ms. Manjushree H		
19	Electric Motors Lab	15	DC Shunt Motor DC Series Motor Single-phase Induction Motor (capacitor start/run types) Three-phase Squirrel Cage Induction Motor Three-phase Slip Ring Induction Motor Synchronous Motor	4 Hours	Mr. Basavaraj Hiremath	Instructor	Diplom
20	MATLAB for electrical & Electronics Measurements	15	Intel Core Processor 2.2 GHz with 8GB Ram, LCD Monitor, Open Source software, Computer systems	4 Hours	Ms. Vinaychandrika Kale	Asst. Professor	M.Tech
21	Power Electronics Lab	15	SCR, IGBT & MOSFET study kit, Gate firing circuits for SCR, Single phase AC voltage controller, Single phase fully controlled bridge converter, DC Jones chopper, 1- ϕ Parallel inverter, 1- ϕ Series inverter, 1- ϕ Cyclo converter, 1- ϕ Half controlled	4 Hours	Mr. Ramesh Ashtekar	Asst. Professor	M.Tech

			converter CRO's, Regulated power supply, Ammeters, Voltmeters, Multimeters, Isolation Transformers, center tapped transformers.				
22	Energy Audit Project	15	--	2 Hours	Mr. Kantesh	HOD	M.Tech
23	Control System Lab	15	Intel Core Processor 2.2 GHz with 8GB Ram, LCD Monitor, Open Source software, Computer systems	4 Hours	Mr. Rajendra Ghivari	Asst. Professor	M.Tech

Table No.6.1.1: List of laboratories and technical manpower.

6.2. Additional Facilities Created for Improving the Quality of Learning Experience in Laboratories
(25) (Provide details of various additional facilities provided by the department to enhance the quality of learning in laboratories. Please do not give duplicate data from the sections 6.1 and 6.5. Including any labs funded by external agencies)

Table No.6.2.1: List of additional facilities.

S.N	Name of the Facility	Details	Purpose for creating facility	Utilization	Areas in which students are expected to have enhanced learning	Relevance to POs/PSOs
1	Internet Lab	Equipped with Computer Systems, LAN connectivity.	For faculties & students to enhance their knowledge	Faculties, Research Scholars & UG students. It is available throughout the year for utilization	Inculcate self-learning Skills and communication skills	POs-1,2,5,6,8,9,10
2	Projector	A presentation device installed in a classroom	Computer or Video Source on a large screen in order to benefit easier viewing for a larger number of viewers.	All Semesters	Concepts of experiments	POs-1,2, 3, 5,12

3	Department Library	All semester text books and relevant notes.	Referring for faculties and students.	For all faculties and students	For enhancing their knowledge.	
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6.3. Maintenance of Laboratories and Overall Ambiance (10)

(Provide details of overall laboratories maintenance and overall ambiance in the Department.)

Maintenance of Laboratory Equipment's:

Maintenance of laboratory equipment includes computer system, CRO, digital kit ,Function generator, single phase transformers, 3 phase transformers, multi-function meters, loading rheostats, induction motors, energy metres by instructor and faculty.

Maintenance is done in two ways:

Regular maintenance: Regular maintenance of computer system is done by deleting unnecessary files and formatting the system. As per requirement minor repairs are carried out by the lab assistant & faculty member. Major repairs are outsourced by following the procedure of the institute.

Overall Ambience:

1. All laboratories have a seating capacity as per the requirements.
2. Laboratories are equipped with white board. The boards are installed in places with proper lighting. The laboratories are spacious, well ventilated and well furnished.
3. The laboratories are provided with un-interrupted power supply.
4. House Keeping will be done regularly.
5. The cleanliness of the laboratory is maintained. The overall ambience of the laboratories is serene and provide excellent learning environment

6.4 Project Laboratories (5)

Research plays an important role in the educational experience and provides practical skills for future employment of engineering students. The objective of this lab is to motivate and encourage students to do in-house project. This lab provides a place where the students can make & assemble their mini and major projects while working in groups. Management took initiation and developed R&D center in the Department of Electrical & Electronics Engineering. At this center, student can design, implement advanced solutions, thus preparing students for job readiness, lifelong problem solving, and leadership in the industry

6.5. Safety Measures in Laboratories (10)

(Provide details of various safety measures deployed in each laboratory within the Department.)

Table No. 6.5.1: List of various safety measures in laboratories.

Sl. No	Laboratory Name	Safety Measures
1	Computer simulation Labs	1.Fire Extinguisher 2.Do's and Dont's board 3.First aid box 4.Antivirus software 5.Centralized power backup CCTV 6.LAN
2	Analog Electronics lab ,Op AMP and LIC Lab, Logic Design Lab, Microcontrollers Lab, Digital Signal Processing Lab	1.Fire Extinguisher 2.Do's and Dont's board 3.First aid box 4.Antivirus software 5.Centralized power backup CCTV 6.LAN
3	Power Electronics Lab, Electrical Machines Lab-1,2, Control Systems Lab, Relay & High Voltage Lab, Basic Electrical Lab	1.Fire Extinguisher 2.Do's and Dont's board 3.First aid box 4.Antivirus software 5.Centralized power backup CCTV 6.LAN 7. Rubber mat

S.N	Name of the Laboratory	Safety Measures
1	BASIC ELECTRICAL ENGINEERING LABORATORY	1. Use approved tools, equipment and protective devices. 2. Do not work under poor light or when you are tired. 3. Do not work in damp areas or in wet shoes or clothes. 4. Keep tools and equipment's clean and in good working condition. 5. Read all instructions carefully before using the appliances. 6. To prevent electrical hazards, DO NOT immerses appliances in water or other liquids. 7. Always unplug an appliance before cleaning, or whenever it is not in use. Ensure that you pull by the plug and not the cord. 8. DO NOT operate any appliance with a damaged cord or plug. 9. Always use an appliance on a dry, level surface. 10. Keep appliances away from heated surfaces and open flames. 11. Check the electric power supply from the switch position
2	ELECTRONIC CIRCUITS LABORATORY	1. Ensure your presence 10 minutes before the commencement of the lab. 2. Attend all the lab sessions without fail. 3. Come well prepared for every lab session. 4. Bring the Lab records regularly. 5. Ensure the proper polarity of cables before connecting the kits. 6. Check the circuit before connections.

		7. Don't wear loose outfits in the lab. 8. Wearing shoes is compulsory. 9. Don't bring the Cell phone and food items to Lab. 10. Don't switch ON voltage supplies after making circuit. Connections in the absence of the teacher. 11. Do not MOVE EQUIPMENT around the room except under the supervision of an instructor. 12. Don't rotate the Knobs unnecessarily.
3	ELECTRICAL MACHINES LABORATORY	1. While performing experiments in the Electrical Machines Laboratory-1, you must follow stringent safety rules and precautionary measures for your own safety as well as for safety of your co-workers. Always remember that you are working at voltage levels much higher compared to normal working voltage. 2. Don't attempt to enter the lab except when asked for and accompanied by concerned Lab Staff / Instructors 3. Every student should obtain a set of instruction sheets entitled manufacturing processes Laboratory. 4. For reasons of safety, every student must come to the laboratory in shoes (covering the whole feet). It is unsafe for the students to come to the laboratory wearing garments with parts that hang about loosely and as such the lab users are requested to avoid wearing garments with loose hanging pans Students should preferably use hall-sleeve shirts wherever possible The Students should also ensure that floor around the machine is clear and dry (not oily) to avoid slipping. Please report immediately to the lab staff on seeing any coolant / oil spillage 5. Instruments and tools will be issued from the Lab Staff Instructors Every student must produce his identity card for the purpose Tools. etc must be returned to the Lab Staff / Instructors on the same day after work hours.

		6. The student should take the permission and guidance of the Lao Staff / Instructors before operating any machine Do not attempt to operate any equipment yourself without permission of the concerned teachers / instructors You should never be in casual while in the lab. Be careful that you don't operate any button etc. by mistake it may lead to serious mal operation and hazards. Unauthorized usage of any machine without prior guidance may lead to fatal accidents arid injury. 7. Always maintain sufficient distance from the live objects to avoid electrical shock due to induction 8. Before taking entry in the lab. always double check that all the apparatus and equipment are disconnected from supply and are properly grounded. 9. Use the ground rod to earth all apparatus before putting hands on them. 10. The student will not lean on the machine or take any kind of support of the machine at any point of time If found leaning on a machine without proper reasons serious action would be taken. 11. Laboratory reports should be submitted on A4 size sheets. The students must submit report on next working day. These have associated some grades. Reports will not be returned to the students. Students may see the graded reports while in the laboratory
4	POWER ELECTRONICS LABORATORY	1. Students should report to the labs concerned as per the timetable well within the scheduled time. 2. Follow all written and verbal instructions carefully. If you do not understand the instructions, the handouts and the procedures ask the instructor or teaching assistant. 3. Never work alone. You should be accompanied by your laboratory partner and/or the instructors/teaching assistant all the time.

		4. Perform only those experiments authorized by the instructors 5. The work place has to be tidy before, during and after the experiments. 6. Read the handout and procedures before starting experiment. 7. Intentional misconduct will lead to the exclusion from the lab. 8. The components used should be placed back in the rack after completing the experiment. 9. No food or drinks are allowed in the lab.
5	CONTROL SYSTEM LABORATORY	1. Students should report to the labs concerned as per the timetable well within the scheduled time. 2. Much of the equipment we will use is very expensive and quite sensitive, great care should be taken to protect the equipment from damage. 3. Do not eat or drink in the laboratory. 4. Malfunctioning equipment should be reported to the instructor. 5. The components required pertaining to the experiment should be collected from Lab in-charge. 6. When the experiment is completed, students should disconnect the setup made by them, and should return all the components/instruments taken for the purpose. 7. Any damage of the equipment or burnout of components will be viewed seriously either by putting penalty or by dismissing the total group of students from the lab for the semester/year. Students should be present in the labs for the total scheduled duration

Sl. No	Laboratory Name	Safety Measures
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1	Computer simulation Labs	1.Fire Extinguisher 2.Do's and Dont's board 3.First aid box 4.Antivirus software 5.Centralized power backup CCTV 6.LAN
2	Analog Electronics lab ,Op AMP and LIC Lab, Logic Design Lab, Microcontrollers Lab, Digital Signal Processing Lab	1.Fire Extinguisher 2.Do's and Dont's board 3.First aid box 4.Antivirus software 5.Centralized power backup CCTV 6.LAN
3	Power Electronics Lab, Electrical Machines Lab-1,2, Control Systems Lab, Relay & High Voltage Lab, Basic Electrical Lab	1.Fire Extinguisher 2.Do's and Dont's board 3.First aid box 4.Antivirus software 5.Centralized power backup CCTV 6.LAN 7. Rubber mat