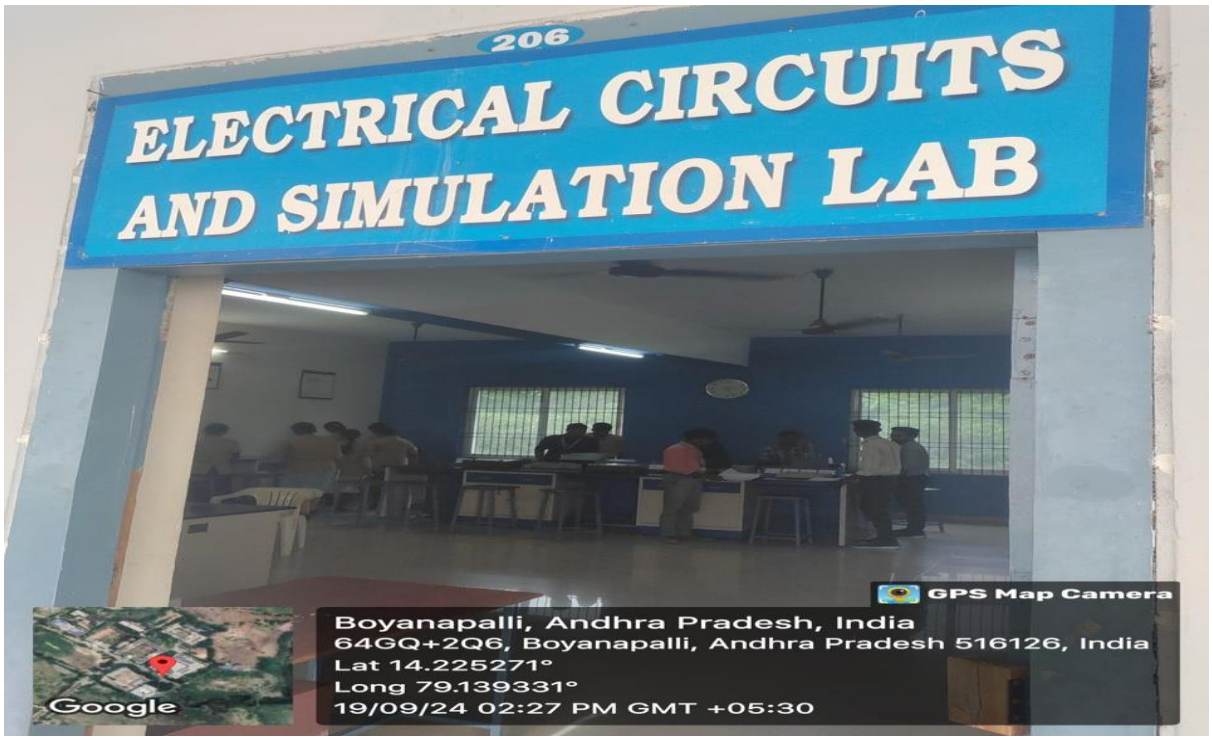
1. Clear Lab photo







2. Lab Description

The **Circuits Laboratory** is established to provide practical exposure to the fundamental concepts of electrical circuits and network theorems. The laboratory is equipped with trainer kits, measuring instruments, desktop systems, and supporting electrical utilities such as transformers, lighting, and ventilation.

This lab enables students to **experimentally validate theoretical principles**, learn parameter measurements, and build strong foundations in **circuit analysis and power measurement**. It also serves as a platform for carrying out mini-projects, research-based learning, and innovative demonstrations.

3. Total cost of lab

Rs. 636069

4. List of equipment with cost and quantity

S.No.	NAME OF THE EQUIPMENT	RATING	MAKE	QUANTITY	UNIT PRICE IN RS.	TOTAL PRICE IN RS.
1	MOVING IRON AC AMMETER	(0-1/2)A	HI-Q	1	1085/-	1085/-
		(0-10)A	PHYSITECH	03	5700	17100/-
		(0-2)A	PHYSITECH	03	5700	17100/-
2	BREAD BOARD TRAINER KIT	(0-20) V source-2 Ammeter(0-2)mA/Micro Amp	VALIKA	12	5000/-	60,000/-
			PHYSITECH	5	4500/-	22500
			SS LAB	10	5500	55000/-
3	DIGITAL MULTIMETER	-	VALIKA	10	1950	19500/-
			PHYSITECH	10	2100	21000/-
			HI-Q	10	1475	14750/-
			SS LAB	10	1200	12000/-
4	DECADE RESISTANCE BOX	-	VALIKA	01	1950	1950
			PHYSITECH	03	2350	6900
			SS LAB	01	1800	1800
5	DECADE INDUCTANCE BOX	-	VALIKA	01	2350	2350
			PHYSITECH	03	3170	9510
			SS LAB	01	1800	1800
6	DECADE CAPACITANCE BOX	-	VALIKA	1	2450	2450
			PHYSITECH	3	2800	8400
			SS LAB	1	3800	3800
7	DESKTOPS	-	LENOVO	03	23,666	70998
8	DIGITAL STORAGE OSCILLOSCOPE	-	AKADEMKA LAB	1	22000	22000
			PHYSITECH	03	21000	63000
			SS LAB	01	21000	21000
9	DIMMERSTATS	230V/(0-270)V	AE MAKE	1	4300	4300
			HI-Q	03	12000	36000
			SS LAB	01	7800	7800
10	1 MHZ FUNCTION GENERATOR	-	VALIKA	1	5500	5500
			PHYSITECH	03	7800	23400
			SS LAB	01	5000	5000
11	5 KVA SERVO CONTROLLED VOLTAGE STABILIZER	-	VALIKA	1	10500	10500

12	SINGLE PHASE TRANSFORMER	230/115 V,50 HZ 2 KVA	HI-Q	01	5830	5830
			PHYSITECH	03	8890	26670
			SS LAB	01	9500	9500
13	MOVING IRON AC VOLTMETER	(0-75/150)V	HI-Q	1	1085	1085
		(0-75/150)V	PHYSITECH	03	1900	5700
		(0-150/300)V	PHYSITECH	03	1900	5700
14	WATTMETER (300/600/750V,10A, LPF)	-	VALIKA	2	5313	10626
15	NI MULTISIM SOFTWARE			10 USER	--	240000

5. List of Experiments

1. Verification of Ohm's law.

2. Verification of Thevenin's and Norton's theorems.

3. Verification of Maximum Power Transfer theorem.

4. Verification of Superposition theorem.

5. Verification of Reciprocity and Millman's theorems.

6. Determination of self and mutual inductances and co-efficient of coupling.

7. Determination of Z and Y Parameters.

8. Determination of Transmission and hybrid parameters.

9. Series and Parallel resonance.

10. Measurement of single-phase Active power for Star and Delta connected balanced loads.

11. Measurement of single-phase Reactive power for Star and Delta connected balanced loads.

12. Measurement of Active Power in a 3-Phase System Using the Two-Wattmeter Method.

13. Determination of cold and hot resistance of electric lamp.

6. List of Experiments Beyond Syllabus

- Verification of Compensation theorem
- Verification of **Delta–Star and Star–Delta conversion**
- Study of **unbalanced 3-phase loads**
- Measurement of **3-phase reactive power** using the two-wattmeter method
- Simulation of **network theorems** using MATLAB / PSPICE
- Testing of **RLC series circuit transient response**

7. Out of Box Experiments

- IoT-based **energy monitoring of lab loads**
- Measurement of **non-linear load power factor using smart meters**
- Demonstration of **harmonics in CFL/LED lighting loads**

- Small-scale **solar PV integration with resistive loads**
- Design of a **mini-UPS circuit using breadboard kits**

8. Scope of Research Carried Through the Lab

- Validation of **power system network models** through experimental setups
- Study of **power quality issues** due to non-linear lab equipment
- Research on **loss minimization techniques** using network theorem applications
- Exploration of **renewable energy integration in microgrids** through simulated and hardware-based models
- Development of **low-cost educational kits** for enhanced teaching and learning