POWER SYSTEM-I LABORATORY

1. Learning Objectives

The Power System-I Laboratory aims to develop practical understanding and analytical skills related to electrical power systems. The main learning objectives are:

1. Study of the basics of power system like SLD of a typical Power System, OH Line Conductors, OH Line Insulators, and UG Cables.
2. Finding the dielectric strength of transformer oil to check its insulation quality.
3. Calculation of the string efficiency of a string of insulators, without and with a guard ring.
4. Measurement of effective earth resistance.
5. Study transmission line characteristics such as impedance, voltage regulation, and efficiency.
6. Perform fault analysis to study the effect of different types of faults in power systems.
7. Develop skills in power system modeling and simulation using tools like MATLAB and Simulink. In addition, analyze power system stability, such as voltage regulation.
8. Enhance practical skills in the measurement, testing, and troubleshooting of power system equipment.

These objectives help students gain both theoretical understanding and hands-on experience necessary for working in the field of electrical power systems.

2. Key Equipment in the Lab

The following key equipment is in the PS-I Lab:

1. OH Line Insulators (08)
2. UG Cables (08)
3. Transformer oil testing setup (Range: 0-60 kV, Input: 0-230 V)
4. Ferranti Effect & ABCD parameter in Transmission Line Panel (0-270 V AC)
5. Ferranti Effect in Transmission Line Panel (0-270 V AC)
6. Earth Resistance test kit (0-100 Ω, 160 rpm); Digital Earth Tester (0-1500 Ω)
7. Hammer
8. Measuring Tape (15 m)
9. Screwdriver set
10. Soldering iron set
11. Earth Electrodes, each of 2 feet
12. Kit for the location of a fault in a cable using a cable fault locator (0-270 V DC)
13. Multimeter (0-600 V AC & DC, 10 A current)
14. Rheostat, 1.1 A, 800 Ω
15. Galvanometer
16. Patch cords for making connections

These equipment help in recreating real-life operating conditions of electrical power systems in a controlled laboratory environment.

3. Current Working Pictures

Fig 1: 4EEE1 (2026)

Fig 2: 4EEE2

Fig 3: 4EEE2

Fig 4: 4EEE2

Fig 5: 4EEE2 (2026)

Fig 6: PS-I lab equipment (1)

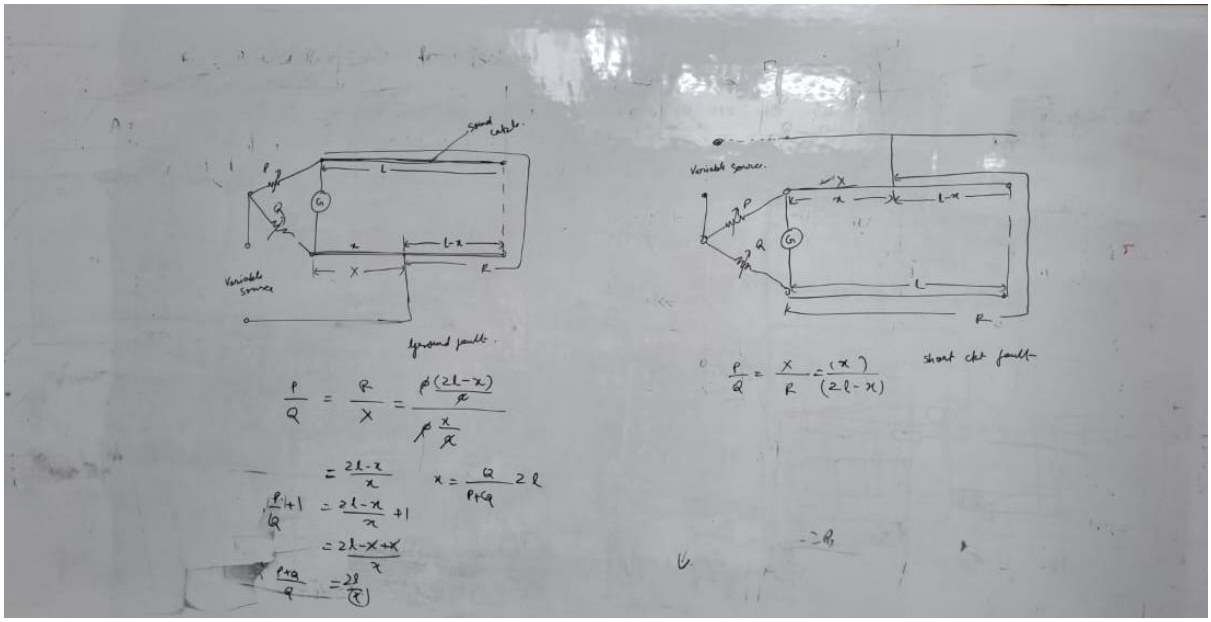

Fig 7: PS-I lab equipment (2)

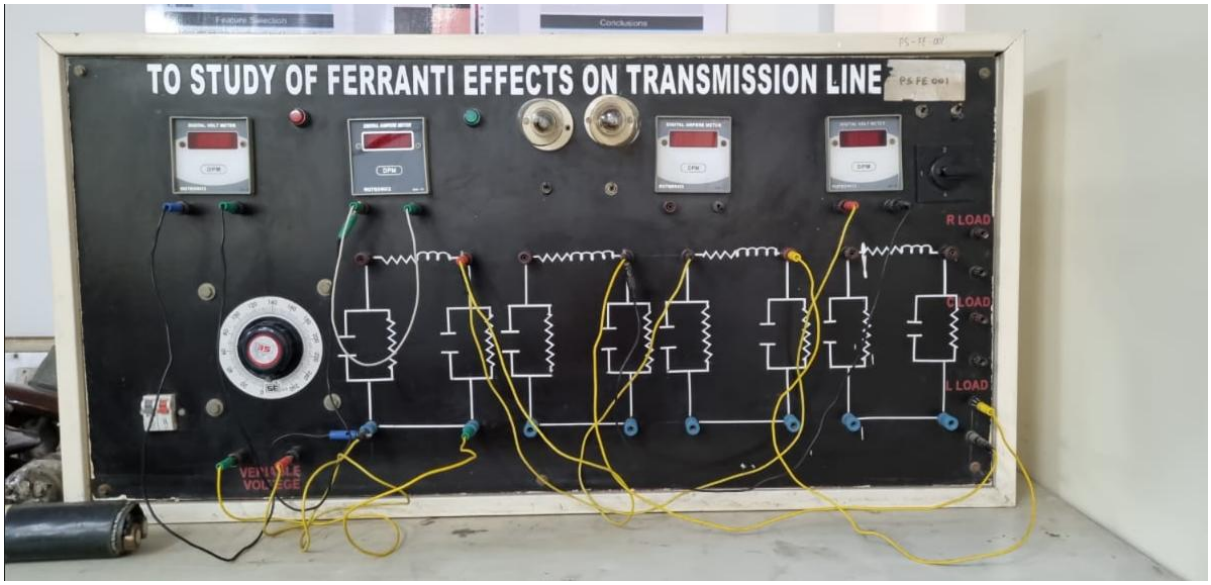

Fig 8: PS-I lab equipment (3)

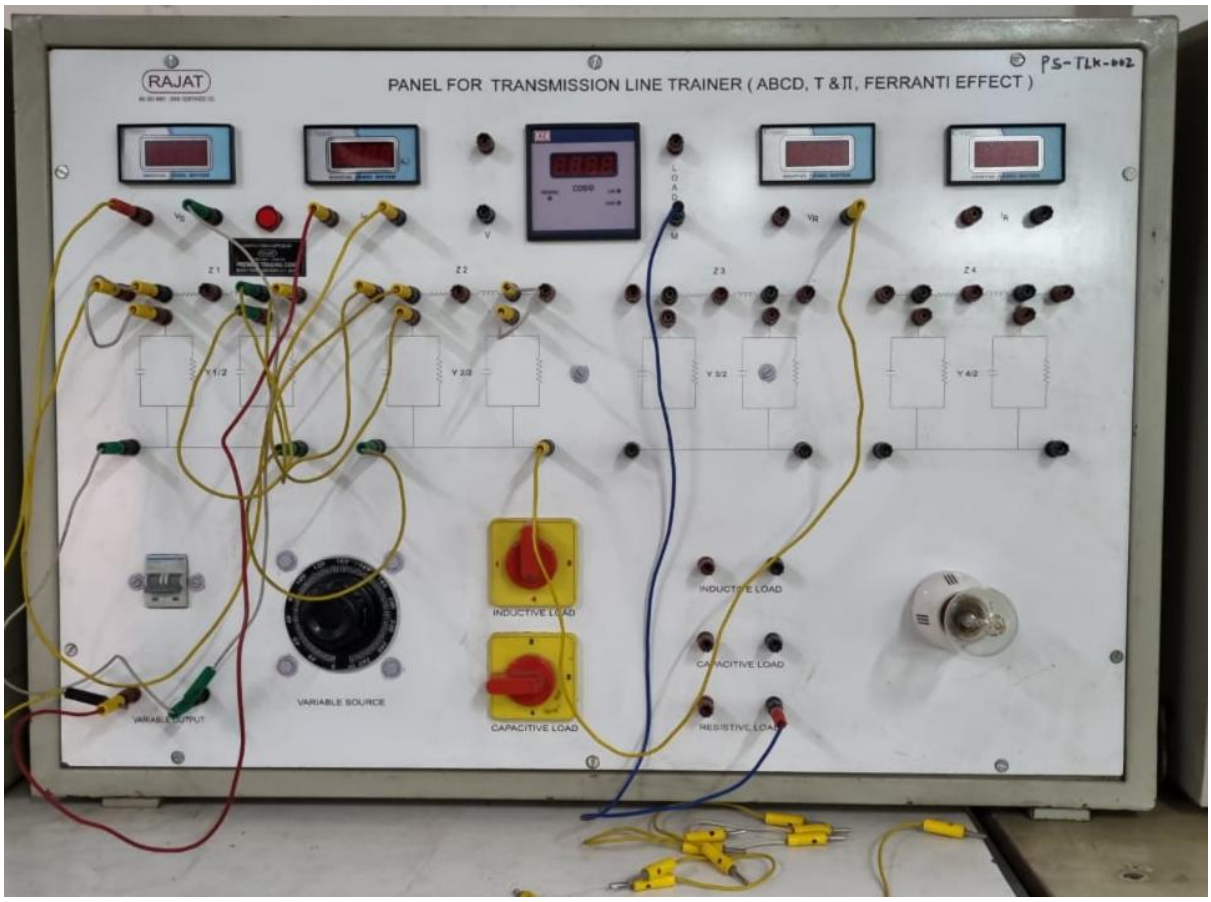

Fig 9: PS-I lab equipment (4)

4. Lab Overview

A Power System Laboratory is a vital part of electrical engineering education. It provides students with practical exposure to the transmission and distribution of electrical power. The

laboratory complements theoretical learning by allowing students to perform experiments on various power system components, analyze system behavior under different operating conditions, and understand the real-world operation of electrical power networks. It also helps in developing analytical thinking and problem-solving abilities that are essential for designing and operating modern power systems.

The primary objective of this laboratory is to help students understand the basic components of a power system and the methods used to transmit electrical power over long distances. Through practical experiments, students gain hands-on experience with fundamental power system concepts and operational principles.

The Power System Laboratory is designed to provide practical knowledge of electrical power systems. It enables students to study the structure, behavior, and performance of transmission systems through experiments and simulations, thereby bridging the gap between classroom theory and practical applications.

In this laboratory, students conduct experiments related to the basic components of power systems and transmission line models. They examine important components such as insulators, overhead line conductors, and underground cables, and study important aspects of transmission systems including voltage regulation, no-load conditions, and lightly loaded conditions of transmission lines. The laboratory also familiarizes students with modern simulation tools like MATLAB and Simulink for modeling and analyzing power networks.

Overall, the Power System Laboratory enhances students' practical skills, analytical capabilities, and understanding of fundamental power system concepts required for the design, analysis, and operation of electrical power systems.