Course Name: Switchgear & Protection Lab

Course Code: EENUGPE06
L+T+P = 0 + 0 + 3
Contact hours: 3 hrs/week

Course Objective:

To prepare the students for their future industrial based career assignments by exposing them to the actual relays used in industrial protection. Both the widely used generations of relays (electromechanical and numerical types) are to be used in the laboratory.

Course Outcomes:

CO-1: Students will be able to learn the use of first-generation electromechanical type as well as third-generation Microcontroller based (numerical) relays.

CO-2: Students will be able to learn and verify the settings and calculations of PSM and TMS in actual relays.

CO-3: Students will be able to understand and verify the different characteristics of over-current and differential relays (DMT and IDMT).

CO-4: Students will be able to understand and verify the working of biased and unbiased differential relays.

Assessment Criteria:

➢ Attendance
➢ Lab file (report)
➢ Performance test
➢ Viva voce
➢ Punctuality and discipline

List of experiments:

Part A: Hardware

1. Over-current relay

    a. Microcontroller based over-current relay (DMT type)

    b. Microcontroller based over-current relay (IDMT type)

2. Electromechanical type over-voltage relay

3. Differential relay

    a. Microcontroller based three-phase differential relay (unbiased mode)

    b. Microcontroller based three-phase differential relay (biased mode)

        i.   DMT type

        ii. IDMT type

4. Microcontroller based frequency relay

    a. Over-frequency relay

    b. Under-frequency relay

5. Three-phase electromechanical type under voltage relay

6. Three-phase transmission line fault simulator (L-G, L-L, L-L-G, L-L-L and L-L-L-G faults)

Part B: Simulation

1. Learning of Proteus simulation software for design of numerical relay

2. Microcontroller based DMT/instantaneous Overcurrent Relay