



# SANTHIRAM ENGINEERING COLLEGE, NANDYAL

*Department of Electrical and Electronics Engineering*

**Name of the Laboratory: POWER SYSTEMS & SIMULATION**

**Regulation: R15**

**Branch: Electrical and Electronics Engineering**

**Year & Sem: IV- I**

### Course Objectives

- Experimental determination (in machines lab) of sequence impedance and subtransient reactance's of synchronous machine
- Conducting experiments to analyze LG, LL, LLG, LLLG faults
- The equivalent circuit of three winding transformer by conducting a suitable experiment.
- Developing MATLAB program for formation of Y and Z buses.
- Developing MATLAB programs for gauss-seidel and fast decoupled load flow studies.
- Developing the SIMULINK model for single area load frequency control problem.

### Course Outcomes

- Experimental determination (in machines lab) of sequence impedance and subtransient reactance's of synchronous machine
- Conducting experiments to analyze LG, LL, LLG, LLLG faults
- The equivalent circuit of three winding transformer by conducting a suitable experiment.
- Developing MATLAB program for formation of Y and Z buses.
- Developing MATLAB programs for gauss-seidel and fast decoupled load flow studies.
- Developing the SIMULINK model for single area load frequency control problem.

### List of Experiments

1. Determination of Sequence Impedances of Cylindrical Rotor Synchronous Machine.
2. Fault Analysis – I (LG Fault AND LL Fault)
3. Fault Analysis – II (LLG Fault AND LLLG Fault)
4. Determination of Sub transient reactance's of salient pole synchronous machine.
5. Equivalent circuit of three winding transformer.
6. Y bus formation using MATLAB
7. Z bus formation using MATLAB
8. Gauss-Seidel load flow analysis using MATLAB
9. Fast decoupled load flow analysis using MATLAB
10. Develop a Simulink model for a single area load frequency control problem

### List of Equipments

1. Shunt Wound DC Motor Coupled to 3-Phase 415 V, 1500 RPM, 50 Hz 4 Pole Rotor Wound, Star Salient Pole Alternator
2. DC Shunt Motor Coupled to 3-Phase 415 V, 1500 RPM, 3.5 KVA Alternator
3. 5 Hp, 220 V, 1500 RPM Shunt Wound DC Motor Coupled to 3-Phase 415 V, 1500 RPM, 50 Hz 4 Pole Rotor Wound, Star Salient Pole Alternator
4. Shunt Wound DC Motor Coupled to 3-Phase 415 V, 3Kva 1500 RPM, 50 Hz 4 Pole Rotor Wound, Star Salient Pole Alternator
5. 3-Phase Transformer (Dry Type) 3 KVA with 3-Phase Auto Transformers (0-470V/10A).
6. Computer with MATLAB Software



#### Lab Instructor:

**Mr. U. M. Sandeep Kumar,**  
Asst. Professor,  
Dept. of EEE,  
SREC.



#### Lab Assistant:

**Mr. N. Chennaiah,**  
Dept. of EEE,  
SREC.