ECE 449 Power Systems Laboratory 2 Syllabus

Credits— 2 credits

Contact hours— 3 contact hours

Name of instructor: Ratna Raj

I**nstructional Materials**— Online Lab Manual. (ECE449 Lab Manual)

Specific course information :
The experiments are designed towards understanding power generation, transmission, distribution, and consumption.

P**rerequisites:**
ECE442 Power Systems **OR** ECE610 Power Systems Steady State Analysis.
Elective course, required by students taking the power track

Educational objectives for the course CLOs:
By the end of the course, the students will

1. Have comprehensive and practical knowledge of high-power transmission.
2. Be able to analyze and calculate performance parameters under various fault conditions.
3. Understand and simulate Planning Dimensioning, Commissioning, and local network Voltage regulation of a grid-integrated PV system.
4. Assemble and examine single-phase and three-phase transformers. Connect and create autotransformers in different ways and understand the advantages of each connection.
5. Learn to calculate reactive power in transmission systems and consumption and how to compensate for the reactive power for power factor improvement.
6. Study different methods to identify the phase sequence of a three-phase power system.
7. Create a Scott-connection circuit using single-phase transformers to provide a balanced two-phase and single-phase power supply from a three-phase power supply to balanced and unbalanced two-phase and single-phase loads respectively and observe the benefits of Scott-connections.

ABET Criterion 3 Student Learning Outcomes:
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (CLO 1-7);
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives (CLO 1-7)
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (CLO 1-7).
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies (CLO 1-7).

List of Experiments:

1. Power Transmission
2. Energy Management
3. Three Phase Transformers
4. PV Systems
5. Phase Sequence Measurements
6. Scott Connections of transformers