<u>Course Number and Name</u>: ECE449 Power Systems Laboratory 2 <u>Credits</u>— 2 credits

<u>Contact hours</u>— 3 contact hours

Name of instructor: Ratna Raj

Instructional Materials — Online Lab Manual. (ECE449 Lab Manual)

Specific course information :

The experiments are designed towards understanding power generation, transmission, distribution, and consumption.

Prerequisites:

ECE442 Power Systems <u>OR</u> 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
- Energy Management
 Three Phase Transformers
 PV Systems

- Phase Sequence Measurements
 Scott Connections of transformers