I Year I Semester	**L**	**P**	**C**
Code: 17PE111	**4**	**0**	**3**

SIMULATION LABORATORY
(Common to PE, P&ID, PE&ED, PE&D, PE&S, EM&D)

Prerequisites: Concepts of Power Electronics & Closed loop control.

Course Educational Objectives:

1. To understand the characteristics of Thyristor MOSFET & IGBT by simulation.
2. To understand the operation of power electronics converters by simulation.
3. To understand how to implement PWM techniques in simulation.
4. To understand and analyse the speed control of AC motors in open and closed loop in simulation

Any 10 of the following experiments are to be conducted.

List of experiments:

1. Switching characteristics simulation analysis of Thyristor, MOSFET, and IGBT.
2. Simulation analysis of single phase full converter using R-L load, R-L-E load with and without LC Filter.
3. Simulation analysis of Three phase full converter using R-L-E Load.
4. Simulation analysis of single phase AC Voltage controller with PWM control for RL load.
5. Simulation analysis of three phase AC Voltage controller using RL load.
6. Simulation analysis of single phase inverter with sinusoidal PWM control for R& RL-loads.
7. Simulation analysis of three phase inverter with Sinusoidal PWM control for R& RL -loads.
8. Simulation analysis of Buck, Boost& Buck-Boost DC-DC converters.
9. Simulation analysis of three phase converter fed DC motor.
10. Development of mathematical model and simulation analysis of induction machines under balanced and symmetrical conditions for the following
    a. dq model in synchronous reference frame
    b. dq model in stator reference frame
    c. dq model in rotor reference frame
11. Simulation analysis of Volts/Hz closed-loop speed control of an induction motor drive.
12. Simulation analysis of Open-loop Volts/Hz control of a synchronous motor drive.
13. Simulation analysis of Speed control of a permanent magnet synchronous motor.
14. Simulation analysis of Capacitor-start capacitor-run single-phase induction motor.

Course outcomes:

- After completion of this course the students will be able to:
- Analyse the characteristics of power semiconductor devices in simulation.
- Analyse the operation of various power electronic converters in simulation.
- Analyse and implementing the speed controlling techniques for AC machines in Simulation.
- Analyse and implementing PWM techniques in simulation.