DESIGN AND SIMULATION OF POWER ELECTRONIC CIRCUITS
(Elective-II)

Course Code:13EE2217 **L P C**
4 0 3

Pre requisites: Basics of Power Electronics

Course Educational Objectives: To study

1. Basics of simulation, Analysis of power electronic systems
2. Different algorithms for analysis, Future trends in simulation
3. Fourier analysis of harmonics, modeling of power electronic devices
4. Time domain analysis, Fourier analysis of power electronic devices, Simulation of power electronic circuits for different types of loads.

Course Outcomes:

After completion of the course, the student should be able to know about

1. Simulation basics
2. Power electronic systems analysis
3. Simulation of power electronic circuits for different types of loads
4. Simulation of power electronic circuits for different type of loads.

UNIT-I: SIMULATION TECHNIQUES-I

Importance of Simulation – Methods of analysis of power electronic systems - Analysis of power electronic systems in a sequential manner–coupled and decoupled systems

UNIT-II: SIMULATION TECHNIQUES-II

Various algorithms for computing steady state solution in power electronic systems – Future trends in computer simulation.

UNIT-III: MODELING OF POWER ELCTRONIC DEVICES
Introduction – AC sweep and DC sweep analysis – Transients and the time domain analysis – Fourier series and harmonic components, BJT, FET, MOSFET and its model- Amplifiers and Oscillator – Non- linear devices.

UNIT-IV: SIMULATION OF POWER ELECTRONIC CIRCUITS
Introduction – Schematic capture and libraries – Time domain analysis – System level integration and analysis – Monte Carlo analysis Sensitivity/ stress analysis – Fourier analysis.

UNIT-V: CASE STUDY
Simulation of Converters, Choppers, Inverters, AC voltage controllers, and Cyclo-converters feeding R, R-L, and R-L-E loads, Simulation of Converters, Choppers, Inverters, AC voltage controllers, and Cyclo-converters feeding R, R-L, and R-L-E loads

TEXT BOOKS:

1. Rashid, M., "*Simulation of Power Electronic Circuits usingPSPICE*", PHI, 2006.

REFERENCES:

1. Rajagopalan, V. "*Computer Aided Analysis of Power Electronic systems*"- Marcell Dekker Inc., 1987.

2. John Keown "*Microsim, Pspice and circuit analysis*"-Prentice Hall Inc., 1998.