18PEE35	DIGITAL SIMULATION OF POWER ELECTRONICS SYSTEM	L	T	P	C
		3	0	0	3

Course Objectives:

To provide knowledge on modeling and simulation of power electronic circuits and systems

UNIT I	NUMERICAL METHODS IN PASSIVE COMPONENTS	9	+	0

Review of numerical methods. Application of numerical methods to solve transients in D.C. Switched R, L, R-L, R-C and R-L-C circuits. Extension to AC circuits.

UNIT II	SIMULATION AND MODELLING OF ACTIVE AND PASSIVE COMPONENTS	9	+	0

Modeling of diode in simulation. Diode with R, R-L, R-C and R-L-C load with ac supply. Modeling of SCR, TRIAC, IGBT and Power Transistors in simulation. Application of numerical methods to R, L, C circuits with power electronic switches. Simulation of gate/base drive circuits, simulation of snubber circuits.

UNIT III	STATE SPACE MODELLING AND SIMULATION OF LINEAR SYSTEMS	9	+	0

State space modeling and simulation of linear systems. Introduction to electrical machine modeling: induction, DC, and synchronous machines, simulation of basic electric drives, stability aspects.

UNIT IV	SIMULATION OF CONVERTERS AND DC DRIVES	9	+	0

Simulation of single phase and three phase uncontrolled and controlled (SCR) rectifiers, converters with self commutated devices- simulation of power factor correction schemes, Simulation of converter fed dc motor drives ,Simulation of thyristor choppers with voltage, current and load commutation schemes, Simulation of chopper fed dc motor.

UNIT V	SIMULATION OF INVERTERS AND AC DRIVES	9	+	0

Simulation of single and three phase inverters with thyristors and self-commutated devices, Space vector representation, pulse-width modulation methods for voltage control, waveform control. Simulation of inverter fed induction motor drives.

Total (L+T)= 45 Periods

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1	:	*Understand the concepts of modeling and simulation of power electronics and drives circuits.*
CO2	:	*Develop algorithm and software models for power electronics and drives applications*
CO3	:	*Aanalyze the transient and steady performance of the designed models.*
CO4	:	*Choose suitable devices or models for appropriate applications*
CO5	:	*Identify suitable hardware components for implementation*

Reference Books:

1.	Simulink Reference Manual , Math works, USA.
2.	Robert Ericson, 'Fundamentals of Power Electronics', Chapman & Hall, 1997.
3.	Issa Batarseh, 'Power Electronic Circuits', John Wiley, 2004Simulink Reference Manual , Math works, USA.

PO / CO	CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO9	PO1 0	PO1 1
CO1	*Understand the concepts of modeling and simulation of power electronics and drives circuits.*	3	2	2	2	2	1	2	1	2	1	1
CO2	*Develop algorithm and software models for power electronics and drives applications*	3	3	3	3	3	3	2	2	2	1	1
CO3	*Aanalyze the transient and steady performance of the designed models.*	3	3	3	2	2	2	3	3	2	1	1
CO4	*Choose suitable devices or models for appropriate applications*	3	3	2	3	3	2	2	2	1	2	1
CO5	*Identify suitable hardware components for implementation*	3	2	2	2	2	1	2	1	2	1	1