No	Course Information (semester I)	
1	Unit name:	Power Electronics
2	Code:	EP 3101 4
3	Classification:	Engineering subject
4	Credit value:	2.5
5	Semester/ Year Offered:	1/3
6	Pre-requisite:	Basic Electronics
7	Mode of delivery:	Lecture, Practical
8	Assessment system and breakdown of marks:	
	Test	20%
	Mid-term	30%
9	Academic staff teaching unit:	
10	Course outcome of unit: In this course students will be able to • To explain the characteristics of power electronics system • To calculate the average load current and load power for DC to DC chopper • To calculate the average value of load voltage and current for AC to DC thyristor converters • To calculate the maximum load current and load power for DC to AC inverters • To test the switching characteristics and chopper with resistive loads • To test the wave form of full-wave & half-wave rectifier using Ni Multisim software	
11	Synopsis of unit: ➢ Topic: The course covers the essential fundamental of power electronics such as IGBT, BJT, power Mosfets.The course introduces students to understand the integrated electronics, digital electronics problems and its solutions. Learnthe various types of electronic device and statement their advantages , DC chopper, single phase half wave controlled rectifier, full wave fully controlled bridge inductive load.	

	Chapter Title
	1.The power electronic system • Introduce the power electronic system • Switching Characteristics • Choice of power switch • Power conditioner • Application of power electronic **2. DC to DC Choppers** • Step-down choppers • Choppers with resistive loads • Choppers with inductive loads • DC series motor • Series motor chopper drive • Step-up choppers **3.AC to DC Thyristor Converters** • Introduction • Single-phase half-wave controlled rectifier • Thyristor turn-on • Single-phase full-wave controlled rectifier • Full-wave half controlled rectifier • Half-controlled bridge with resistive load • Half-controlled bridge with highly inductive load • Full-wave fully controlled bridge with highly inductive load • The SEDC motor • Fully controlled bridge with SEDC motor • Half-controlled bridge with SEDC motor • Three-phase half wave converter • Three-phase full wave converter

	4.DC to AC Inverters • Half- bridgewith resistive load • Half- bridgewith an R- L load • Full-wave bridge inverter • Full-wave bridge inverter • Half-controlled bridge inverters • Three-phase bridge inverters
14	Main references: Bird, B.M., King, K.G., Pedder, D.A.G. 1993: An introduction to power electronics. Chichester: Wiley. Bradley, D.A. 1987: Power electronics. Wokingham: Van Nostrand. Hart, D.W. 1997: Introduction to power electronics. New York: Prentice-Hall. Kusko, A. 1969: Solid-state DC motor drives. Cambridge, MA: MIT Press. Lander, C.W. 1993: Power electronics. London: McGraw-Hill. Larson, B. 1983: Power control electronics. New York: Prentice-Hall. Murphy, J.M.D., Tumbull, F.G. 1989: Power control of AC motors. Oxford: Pergamon. Pearman, R. 1980: Power electronics solid state motor control. New York: Prentice-Hall. Ramshaw, R., Schurman, D. 1997: PSPICE simulation of power electronic circuits. London: Chapman & Hall. Ramshaw, R.S. 1993: Power electronic semiconductor switches. London: Chapman & Hall. Rashid, M.H. 1993: Power electronics. New York: Prentice-Hall. Vithayathil, J. 1995: Power electronics. New York: McGraw-Hill. Williams, B.W. 1992: Power electronics. Basingstoke: Mcmillan.1.Fundamentals of Electric
15	Additional references:

Information onLab Practical

Lab	Activity
	JOB-1Switching Characteristics with ThyristorUsing Ni Multisim Software **Objectives:** Upon the completion of this activity, the student must be able to • To realize the operation of switching characteristics with Thyristor and thyristor act as a switch when the gate terminal fed the pulse from function generator • To construct the circuit of switching characteristics with Thyristor • To measure the voltage of the circuit of switching characteristics with Thyristor • To apply the theory of kirchoff's voltage law: $V_s = V_T + V_L$ **Requirement Equipment**: • Thyristor (2N1599) • Resistor (1kΩ) • DC power source (12V) • Voltmeter • Function generator **JOB-2Chopper with Resistive Load Using Ni Multisim Software** **Objectives:** Upon the completion of this activity, the student must be able to • To realize the control of chopper with resistive load • To construct the circuit of the control of chopper with resistive load • To measure the value of the voltage and current probe, digital probe and power probe on the circuit of the control of chopper with resistive load **Requirement Equipment**: • SCR (2N1599) • Resistor (24Ω) • DC power source (48V) • Voltage and Current Probe • Power Probe

- Digital Probe
- Function generator(f = 250 Hz)

JOB-3Half Wave Rectification with Resistive Load Using Ni Multisim Software

Objective:

Upon the completion of this activity, the student must be able to

- To understand the work operation and application equipment
- To connect the half wave rectifier circuit
- To use the Ni Multisim software

Requirement Equipment:

- SCR (2N1599)
- Resistor (20Ω)
- AC power source (110Vrms,50Hz)
- Oscilloscope
- Function Generator (square wave ,D = 50%, f= 50 Hz)

JOB-4Full Wave Rectification With Ni Multisim Software

Objective:

Upon the completion of this activity, the student must be able to

- To understand the work operation and application equipment
- To connect the full wave rectifier circuit
- To use the Ni Multisim software

Requirement Equipment:

- Diode (1BH62)
- Resistor (10kΩ)
- AC power source (12Vrms,50Hz)
- Oscilloscope

JOB-Full Wave Fully Controlled Bridge With Highly Inductive Load With Ni Multisim Software

Objective:

Upon the completion of this activity, the student must be able to

- To understand the work operation and application equipment
- To connect the full wave rectifier circuit
- To use the Ni Multisim software

Requirement Equipment:

- Diode (1BH62)
- Resistor
- Inductor
- AC power source (12Vrms,50Hz)
- Oscilloscope