

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Power Electronics	Course No (to be assigned by Academic Cell)				
Dept. offering the course	ECE	Structure (LTPC)	3	1	0	4
To be offered for (UG/PG)	UG/PG	Status	Core		Elective	
Faculty Proposing the course	Dr.Chitti Babu. B	Type	New		Modification	
Pre-requisite (if any)	BEE, Network analysis and Synthesis	Submitted for approval	_____ Senate			
Learning Objectives	1. To introduce students to the basic theory of power semiconductor devices and passive components, their practical application in power electronics. 2. To familiarize the operation principle of AC-DC, DC-DC, DC-AC conversion circuits and their applications.					
Learning Outcomes	At the end of the course, a student will be able to: 1. Understand basic operation of various power semiconductor devices and passive components. 2. Analyze and design AC/DC rectifier circuit, DC/DC converter circuit and DC/AC inverter circuit. 3. Understand the role power electronics play in the improvement of energy usage, efficiency and the development of renewable energy technologies.					
Contents of the course (With approximate break up of hours)	Introduction to power electronics; Linear vs Power electronics, Power computations, instantaneous power , energy, inductors, capacitors, energy recovery, power computation of sinusoidal and Non-sinusoidal AC circuits, Applications and the role of power electronics. (L4+T2) Introduction to power semiconductor devices: operating characteristics of Power Diode, SCR, Power BJT, Power MOSFET and IGBT; Driver circuits and Snubber circuits. (L8+T2) Introduction to AC/DC rectifiers: Principle of operation of phase controlled rectifiers, single phase and three phase AC-DC line commutated converters, dual converter, Applications: Power factor correction and Battery chargers, Circuit Simulation using PSpice (L10+T3) Introduction to DC/DC converters: Principle of operation of DC/DC (Buck, Boost, Buck-Boost, Cuk, Fly-back and Forward) converters. Applications: Power supply, DC motor drives and SMPS. Circuit Simulation using PSpice. (L10+T3) Introduction to DC/AC inverters: Principle of operation of single phase and three phase DC-AC inverters (Square wave and PWM inverters). PWM techniques, AC/AC					

	voltage controllers, Applications: AC motor drives, UPS, active filters, CFL, renewable power generation, Circuit Simulation using PSpice (L10+T4)
Text Books	1. Rashid, M.H, 'Power Electronics - Circuits, Devices and Applications', Pearson Education, 4th Edition, 2017. 2. Ned Mohan, Tore M. Undeland, William P. Robbins, 'Power Electronics', John Wiley & Sons Publications, 3rd Edition, 2007.
Reference Books	1. Daniel W. Hart, Power Electronics, 1st Edition, McGraw-Hill, 2010. 2. L. Umanand, Power Electronics: Essentials & Applications,, 1st Edition, John Wiley, 2009. 3. M.D.Singh and K.B.Kanchandhani, 'Power Electronics', McGraw-Hill,, 2nd Edition, 2017.