Faculty of Engineering and Technology

Bachelor of Technology

Effective from Academic Year: 2018-19

Branch Name:	Electronics and Communication Engineering
Semester/Year:	Semester VI / Third Year
Subject Title:	Elective-I:Power Electronics
Subject Code:	1ET1040606
Pre-requisite:	Basic Knowledge of Electronics

Course Objective:

- To provide the students a deep insight in to the working of different switching devices with respect to their characteristics
- To analyze different converters and control with their applications.
- To study advanced converters and switching techniques implemented in recent technology

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total (Marks)
03	00	00	03	70	30	00	00	100

Subject Contents			
Sr. No	**Topic**	**Total Hours**	**Weight (%)**
1	**Introduction:** Application of power electronics, power semiconductor devices, control characteristics of power devices, types of power electronics circuits,	**2**	**10%**
2	**Power semiconductor Devices:** Introduction, Power Diodes, Power BJT, UJT, Triac,Thyristor Characteristics, Two Transistor model of Thyristor, Series and Parallel operation of Thyristors, Power MOSFET, GTO, IGBT, SIT- Device Structures and Characteristics, Handling precautions and power dissipation in all these devices, Turn ON Turn OFF methods and Circuits, Handling precautions and power dissipation in all these devices.	**10**	**20%**
3	**Rectifiers and Choppers:** Single phase half wave rectifiers, Single phase full wave rectifiers, multiphase star rectifiers, three-phase bridge rectifier, Principles of phase control converter operation, single phase semi, full, dual and series converters, three phase half wave, semi, full and dual converters, effect of load and source inductances, Step-up and step-down choppers, performance parameters, converter classifications, switching mode regulators, comparison of regulators, Buck-Boost Converter.	**10**	**25%**
4	**Inverters and AC voltage controllers :** Principal of Operation of Pulse Width Modulated Inverters, Performance Parameters, Single Phase and Three Phase Bridge Inverters, Principles of	**10**	**25%**

	on/off control, principles of phase control, single phase controllers with R and L loads, three phase full wave controllers.		
5	**DC Drives and Applications:** Basic characteristics of DC motors, close loop control of DC drives, Induction motor drives, synchronous motor drives, Uninterruptible Power Supply, Switched mode Power Supply, RF Heating, Battery Charger, Di-electric heating, Induction heating, Transformer Design.	**10**	**20%**

Course Outcome:

- Articulate the basics of power electronic devices
- Express the design and control of rectifiers, inverters.
- Design of power electronic converters in power control applications
- Ability to express characteristics of SCR, BJT, MOSFET and IGBT.
- Ability design AC voltage controller.
- Ability to design Chopper circuits.

Text Book:

1. Power Electronics circuits, devices and application By M.H.Rashid. (PHI)

Reference Books:

1. Power Electronic, M.D. Singh and Khanchandani, Tata McGraw Hill Publications.
2. Power Electronics By Bimbra Khanna Publications.
3. Power Electronic systems: Theory and design By J. P. Agrawal (Pearson Education)