

PEI6D001 POWER ELECTRONICS (HONOR)

University(80%)

Module-1 12Lecturers

Power semiconductor devices: Switching and V-I characteristic of devices Thyristor family: SCR, TRIAC, GTO, RCT, MCT, and Transistor Family: BJT, IGBT, and MOSFET
Triggering Methods: SCR: UJT and R-C triggering scheme, Power Transistor: MOSFET Gate drive, BJT base drive, IGBT gate drive, Isolation of gate and base drive.

Protection of Devices: SCR: Over voltage, over current, dv/dt , di/dt , Gate Protection.

Transistor: protection of power BJT, IGBT and power MOSFET, dv/dt & di/dt limitation.

Module-2 12Lectures

AC to DC converter: Un controlled Diode rectifier : Single phase half wave and full wave rectifiers with R-L and R-L-E load ,3 phase bridge rectifier with R-L and R-L-E load
Controlled rectifiers : Principle of phase controlled converter operation, single phase full converter with R-L and R-L-E load, 3 phase full converter with R-L and R-L-E load ,single phase semi converter with R-L and R-L-E load, 3 phase semi convertewith R-L and R-L-E load.

Single phase PWM rectifier, Three phase PWM rectifier.

AC –AC converter : AC voltage controller: Single phase bi-directional controllers with R and R-L load, single phase cycloconverters, ac-voltage controllers with PWM control.

Module3 12Lectures

DC to DC converter: Classification: First quadrant, second quadrant, first and second quadrant, third and fourth quadrant, fourth quadrant converter. Switching mode regulators: Buck regulators, Boost regulators, Buck-Boost regulators, Cuk regulators, Isolated Types: Fly Back Converters, Forward converters, Push Pull Converters, Bridge Converter.

DC to AC converter: Inverters: PWM inverters, Single phase Bridge Inverters, 3-Phase Inverters-180 deg. conduction, 120 deg. conduction. voltage control of 3-Phase Inverters: Sinusoidal PWM , space vector modulation, Current Source Inverter, Soft-switching, Zero Current Switching resonant inverters, Zero Voltage Switching resonant inverter.

Text Books:

1. *Power Electronics: Circuits, Devices and Applications* by M H Rashid, 3rd Edition, Pearson

Reference Books:

1. *Power Converter Circuits* by W Shepherd and L Zhang, CRC, Taylor and Francis, Special Indian Edition
2. *Power Electronics: Converters, Applications, and Design* by Mohan, Undeland and Robbins, Wiley Student Edition.