

(Common to EEE, EIE and ICE)

UNIT I POWER SEMICONDUCTOR DEVICES 9

Power diodes – Power transistors – MOSFET and IGBT – Construction and characteristics of SCR – Turn-on and Turn-off methods – Two-transistor model – Switching performance – Triggering circuits – TRIAC – Snubber circuits – Special semiconductor devices.

UNIT II PHASE-CONTROLLED CONVERTERS 9

2-pulse – 3-pulse and 6-pulse converters – Performance measures – Inverter operation of fully controlled converter – Effect of source impedance – Effect of load inductance

UNIT III DC TO DC CONVERTERS 9

Step-down and step-up choppers – Time ratio control and current limit control – Switching mode regulators – Buck – Boost – Buck-Boost and cuk converter – Resonant switching based SMPS.

UNIT IV INVERTERS 9

Forced commutation techniques – Single-phase and three-phase (both 120° mode and 180° mode) inverters – PWM techniques – Voltage and harmonic control – Series resonant inverter – Voltage and current source inverters.

UNIT V AC VOLTAGE CONTROLLERS 9

Principle of on-off control and phase control – Single-phase bidirectional controllers with R and RL loads – Three-phase full-wave controllers – Three-phase bidirectional delta-connected controllers – PWM control – Cycloconverters: Single-phase and Three-phase

L: 45 T: 15 Total: 60

TEXT BOOKS

1. Muhammad H. Rashid, “Power Electronics: Circuits, Devices and Applications”, 3rd Edition, Pearson Education/Prentice Hall, 2004.
2. Singh, M.D. and Khanchandani, K.B., “Power Electronics”, 2nd Edition, Tata McGraw Hill, 2004.

REFERENCES

1. Bhimbra, P. S., “Power Electronics”, 4th Edition, Dhanpat Rai and Sons, 2000.
2. Bimal K. Bose, “Modern Power Electronics and AC Drives”, Pearson Education, 2003.
3. Ned Mohan, Tore M. Undeland, William P. Robbins, “Power Electronics Converters Applications and Design”, 3rd Edition, John Wiley and Sons, 2003.