



DEPARTMENT OF ELECTRONICS
MSc Electronics

ELS 457 - POWER ELECTRONICS

Unit I

6 Hours

Power Semi-Conductor Devices

Study of switching devices, - Frame, Driver and snubber circuit of SCR, TRIAC, BJT, IGBT, MOSFET, - Turn-on and turn-off characteristics, switching losses, Commutation circuits for SCR

Unit II

6 Hours

Phase-Controlled Converters

2-pulse, 3-pulse and 6-pulse converters – Effect of source inductance – performance Parameters – Reactive power control of converters – Dual converters - Battery charger.

Unit III

6 Hours

DC to DC Converter

Step-down and step-up chopper - Time ratio control and current limit control – Buck, boost, Buck- boost converter, concept of Resonant switching - SMPS.

Unit IV

6 Hours

Inverters

Single phase and three phase (both 1200 mode and 1800 mode) inverters - PWM techniques: Sinusoidal PWM, modified sinusoidal PWM - multiple PWM – Introduction to space vector modulations - Voltage and harmonic control - Series resonant inverter - Current source inverter.

Unit V

6 Hours

AC to AC Converters

Single phase AC voltage controllers – Multistage sequence control - single and three phase cycloconverters – Introduction to Integral cycle control, Power factor control and Matrix converters.

Textbook

1. M.H. Rashid, „Power Electronics: Circuits, Devices and Applications“, Pearson Education, PHI Third edition, New Delhi 2004.
2. Philip T.Krein, “Elements of Power Electronics” Oxford University Press, 2004 Edition.

References

1. Ashfaq Ahmed Power Electronics for Technology Pearson Education, Indian reprint, 2003.
2. P.S.Bimbra “Power Electronics” Khanna Publishers, third Edition 2003.
3. Ned Mohan, Tore.M.Undeland, William.P.Robbins, „Power Electronics: Converters, Applications and Design“, John Wiley and sons, third edition, 2003.