

UNDERGRADUATE PROGRAMME IN INSTRUMENTATION

ELI -8

Electrical Instruments

48 Periods

UNIT 1

Basic Power Devices and Circuits

SCR, Diacs and Triacs, Two transistor model of SCR, Resistive and RC triggering circuits. **Applications of SCR:** Basic series inverter circuit, Chopper circuit – Basic concept, step up and step down choppers.

12 Periods

UNIT 2

Types of motors and Motor Drives: Constructional features and characteristics of DC Motors, AC Motors, Induction Motors, Single and three phase Motors, Synchronous Motors, Stepper Motors, and Servo Motors. Motor driving and speed control circuits and their applications, motor starters.

14 Periods

UNIT 3

Generators: AC and DC generators, comparison between generator and motor action (without constructional comparison).

AC Machines: Types of transformers, Transformer Construction, E.M.F. equation, Transformer Losses, Condition for maximum efficiency, All day efficiency, Auto transformers.

12 Periods

UNIT 4

Supplies: Regulated power supply, Un interrupted power supply (UPS) and Switched mode power supply (SMPS).

10 Periods

Essential Books:

UNIT 1

Chapter- 2, 3, 5, 8, 9 M. D. Singh, K. B.Khanchandani, Power Electronics, Tata McGraw Hill.

UNIT 2

Chapter- 29, 30, 34, 35, 36, 38, 39, B. L. Thareja and A. K. Thareja, Electrical Technology, 23rd Edition, S. Chand & Sons.

UNIT 3

Chapter- 26, 32, B. L. Thareja and A. K. Thareja, Electrical Technology, 23rd Edition, S. Chand & Sons.

UNIT 4

Chapter- 24, A. Malvino, D. J. Bates, Electronic Principles, Tata McGraw Hill.

Chapter- 11, P. S. Bimbhra, Power Electronics, Khanna Publishers.

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Suggested Books:

1. Dutta, Power Electronics, Prentice Hall Company.
2. P.C. Sen, Power Electronics, Tata McGraw Hill.
3. M.H. Rashid, Power Electronics- Circuits Devices and applications, PHI publications.
4. De and P. K. De, Electric Drives, N. K. Prentice Hall of India (1999).
5. S. Ghose, Electrical Machines, Pearson Education (2005).
6. J.B. Gupta, Electrical Technology, Bharat Law House.
7. I. J. Nagrath and D. P. Kothari, Electrical Machines, Tata McGraw Hill (1997).

Electrical Instruments (Practical based on ELI - 7)

(Any eight)

1. Study of I-V characteristics of SCR.
2. Study of I-V characteristics of DIAC.
3. Study of I-V characteristics of TRIAC.
4. Power measurement in single & three phase circuit.
5. Load characteristics of D.C. motor.
6. Speed control of D.C. motor.
7. Break test of D.C. motor.
8. Break test of induction motor.
9. Study the stepper motor.
10. To study the induction motor starter.