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## **EC6653 POWER ELECTRONICS AND DRIVES**

### **DETAILED SYLLABUS**

#### **UNIT I REVIEW OF POWER SEMICONDUCTOR DEVICES**

Power diodes – Power transistors – Characteristics of SCR, TRIAC, Power MOSFET, IGBT– Thyristor protection circuits – Thyristor triggering circuits.

#### **UNIT II CONVERTERS**

Single phase – Three phase – Half controlled – Full controlled rectifiers – Dual converters – Effect of source and load inductance – AC regulators. (No derivations)

#### **UNIT III INVERTERS AND CHOPPERS**

Voltage Source inverters –bridge inverters, Current source inverters – voltage and waveform control of inverters. DC choppers – step up and step down – uninterrupted power supplies. INTRODUCTION TO DRIVES Basic Elements of Drive – Load characteristics – Selection of Drive

#### **UNIT IV DC DRIVES**

Basic characteristics of DC motor – Operating modes – quadrant operation of chopper – Closed loop control of DC drives.

#### **UNIT V AC DRIVES**

Induction motor – Performance characteristics – Stator and rotor voltage control, frequency and voltage control – Current Control – Introduction to synchronous motor, stepper motor, switched reluctance motor drives – Basics of vector control.

#### **TEXT BOOKS**

1. Rashid M H, “Power Electronics – Circuits, Devices and Applications”, PHI, New Delhi, 2004.
2. Dubey G K, “Power semiconductors and Drives”, Prentice Hall, 1989.

#### **REFERENCES**

1. Bimal K Bose, “Modern Power Electronics and AC Drives”, Pearson Education, 2002.

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2. Joseph Vithyathil, "Power Electronics", McGraw Hill, USA, 1995.
3. Mohan and Udeland and Robbins, "Power Electronics", John Wiley and sons, New York, 2003.
4. Vedam Subramaniam, "Thyristor control of Electrical Drives", Tata McGraw-Hill, New Delhi, 1998.

**OBJECTIVES**

- To get overview of different types of power semiconductor devices and their switching characteristics.
- To understand the operation, characteristics and performance parameters of controlled rectifiers.
- To study the operation, switching techniques and basics topologies of DC-DC switching regulators.
- To learn the different modulation techniques of pulse width modulated invertors and to understand harmonic reduction methods.
- To study the operation of AC voltage controller and various configurations.