

## ANALYSIS OF POWER ELECTRONIC CONVERTERS-II

**Course Code:**15EE2210

<b>L</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>3</b>

**Pre requisites:** Power Electronics

**Course Outcomes:** At the end of the course, the students will be able to

**CO1:** Analyze resonant converters –Zero voltage and Zero current switching converters.

**CO2:** Analyze DC power supplies with high frequency link.

**CO3:** Explain Power conditioners and Uninterruptible power supplies.

**CO4:** Describe Principles of Operation & Features of Multilevel Inverters.

**CO5:** Explain the Concept of current harmonics and their adverse effects.

### UNIT-I

(10-Lectures)

#### RESONANT CONVERTERS:

Introduction, Switch mode inductive current switching, zero voltage and zero current switching, Classification of resonant converters-load resonant converters-resonant switch converters-resonant dc link converters. Basic resonant circuit concepts-series resonant circuits-parallel resonant circuits.

Load resonant converters-series loaded resonant dc-dc converters-parallel loaded resonant dc-dc converters.

Resonant switch converters-ZCS resonant switch converters-ZVS resonant converters, Comparison of ZCS and ZVS topology.

### UNIT-II

(10-Lectures)

#### SWITCHING DC POWER SUPPLIES:

Introduction, Linear power supplies, overview of switching power supplies, Flyback converters (derived from buck-boost converters), forward converter (derived from step-down converter), push-pull converter (derived from step-down converter).

Half bridge converter (derived from step down converter), full bridge converter (derived from step down converter).

### **UNIT-III** (10-Lectures)

#### **POWER CONDITIONERS AND UNINTERRUPTIBLE POWER SUPPLIES:**

Introduction, Power line disturbances-types of disturbances-sources of disturbances-effect of sensitive equipment, power conditioners, UPSs-rectifiers-batteries-Inverters-static transfer switch.

### **UNIT V** (10-Lectures)

#### **MULTI LEVEL INVERTERS:**

Introduction, Multilevel Concept, Types of Multilevel Inverters- Diode-Clamped Multilevel Inverter, Principle of Operation, Features of Diode-Clamped Inverter, Improved Diode-Clamped Inverter.

### **UNIT-V** (10-Lectures)

#### **OPTIMIZING THE UTILITY INTERFACE WITH POWER ELECTRONIC SYSTEMS:**

Introduction, generation of current harmonics, current harmonics and power factor, harmonic standards and recommended practices, need for improved utility interface, improved single phase utility interface, improved three phase utility interface, electromagnetic interference.

#### **TEXT BOOKS:**

1. Ned Mohan, Tore M. Undeland and William P. Robbins, "Power Electronics", John Wiley & Sons, 2007.
2. Md. H. Rashid, "Power Electronics", Pearson Education, Third Edition, 2008.

#### **REFERENCE BOOKS:**

1. Bimal K. Bose, "Modern Power Electronics and AC Drives", Prentice-hall Of India Pvt Ltd, 2008.
2. Philip T. Krein, "Elements of Power Electronics", Oxford University Press, 2009.

3. L. Umanand, “Power Electronics: Essentials & Applications”, Wiley India, 2009.
4. Robert Erickson and Dragomir Maksimovic, “Fundamentals of Power Electronics”, Springer Publications, 2001.