
ANALYSIS OF POWER ELECTRONIC CONVERTERS-II**Course Code:13EE2210****L P C**
4 0 3**Pre requisites:** Power Electronics

Course Educational Objectives: To familiarize the student with switch mode dc & ac power supplies, resonant converters, space vector PWM which find wide application in industry.

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

1. Resonant converters-Zero voltage and zero current switching.
2. Switching DC power supplies.
3. Power conditioners and Uninterruptible power supplies.
4. Principles of PWM & space vector PWM.
5. Concept of current harmonics and their adverse effects

UNIT-I**RESONANT CONVERTERS:**

Introduction, Switch mode inductive current switching, zero voltage and zero current switchings, 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

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), current source dc-dc converters.

UNIT-III

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-IV

SPACE VECTOR PWM:

Principle of PWM, Principle of space vector PWM, converter switching states, linear or under modulation region, over modulation region, implementation steps.

UNIT-V

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. Undelan and William P. Robbins, “*Power Electronics*”, John Wiley & Sons, 2007.
2. Md. H. Rashid, “*Power Electronics*”, Pearson Education, Third Edition, 2008.
3. Bimal K. Bose, “*Modern Power Electronics and AC Drives*”, Prentice-hall Of India Pvt Ltd,2008.

REFERENCE BOOKS:

1. Philip T.Krein, “*Elements of Power Electronics*”, Oxford University Press,2009.
2. L. Umanand, “*Power Electronics:Essentials & Applications*”, Wiley India, 2009.
3. Robert Erickson and Dragon Maksivimovic, “*Fundamentals of Power Electronics*”, Springer Publications, 2001.
- 4 Issa Batarseh, “*Power Electronics*”, John Wiley,2003.