

## PPE SWITCHED MODE POWER SUPPLIES & UPS

<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3.5</b>

**Course Objectives:** To understand development of switched mode power supplies

**DC-DC CONVERTERS:** Principles of step-down and step-up converters – Analysis and state space modeling of Buck, Boost, Buck- Boost and Cuk converters.

**SWITCHING MODE POWER CONVERTERS:** Analysis and state space modeling of flyback, Forward, Half bridge and full bridge converters, control circuits and PWM techniques.

**RESONANT CONVERTERS:** Introduction- classification- basic concepts- Resonant switch, Load Resonant converters, ZVS, Clamped voltage topologies, DC link inverters with Zero Voltage Switching- Series and parallel Resonant inverters, Voltage control.

**DC-AC CONVERTERS:** Single phase and three phase inverters, control using various (sine PWM, SVPWM and advanced modulation) techniques, various harmonic elimination techniques, Multilevel inverters, Concepts, Types: Diode clamped, Flying capacitor, Cascaded types, Applications.

**POWER CONDITIONERS, UPS & FILTERS:** Introduction- Power line disturbances- Power conditioners, UPS: offline UPS, Online UPS, Applications, Filters: Voltage filters, Series-parallel resonant filters, filter without series capacitors, filters for PWM VSI, current filter, DC filters, Design of inductor and transformer for PE applications, Selection of capacitors.

**Course outcomes:** After the completion of course the student may be able

- To analyse dc dc buck-boost converters
- To realise control strategies of resonant converters
- To realise harmonic elimination using PWM techniques
- To design and develop active and passive filters

### **Recommended Books**

1. M.H. Rashid – *Power Electronics handbook*, Elsevier Publication, (2001)
2. Kjeld Thorborg, “*Power Electronics – In theory and Practice*”, Overseas Press, First Indian Edition (2005).
3. Philip T Krein, “*Elements of Power Electronics*”, Oxford University Press
4. Ned Mohan, Tore. M. Undeland, William. P. Robbins, *Power Electronics converters, Applications and design- Third Edition- John Wiley and Sons. (2006)*
5. M.H. Rashid – *Power Electronics circuits, devices and applications- third edition Prentice Hall of India New Delhi, (2007).*

### **Evaluation Scheme:**

S. No.	Evaluation Elements	Weightage (%)
1.	MST	30
2.	EST	45
3.	Sessionals (May include Assignments/Projects/Tutorials/Quizes etc.)	25