



**2-Year Master of Technology (M.Tech) Curriculum and Syllabus for Electrical Engineering (EE)**

**Second Semester**

**Course Structure**

Sl	Subject Code	Subject	Contacts			Credits
			L	T	P	
<b>Theory</b>						
1	TIU-PEE-T102	Advanced Electric Drives	3	1	0	4
2	TIU-PEE-T104	Solid State Power Supplies	3	1	0	4
3	TIU-PEE-T106	Power Electronics Application in EHV Transmission	3	1	0	4
4	TIU-PEE-T108	Reliability Engineering	3	1	0	4
<b>Practical</b>						
1	TIU-PEE-L102	Advanced Electrical DrivesLab	0	0	3	2
<b>Sessional</b>						
1	TIU-PES-S198	EntrepreneurshipSkill Development	-	-	-	3
<b>Total</b>						<b>21</b>



## Detailed Syllabus

### Advanced Electric Drives

**LTP: 3-1-0**

**Credits: 4**

LCI-IM Drive: Drive configuration, commutation at different speeds, mathematical modeling, control structure, resonance problem and performance.

2. FOC-IM Drive: Drive configuration, mathematical modeling, direct and indirect FOC, influence of parameters, VSI and CSI fed schemes, adaptive drive control.

3. Brushless DC Drive: Self control, CSI with load commutation, low speed commutation, inverter control strategies and performance.

4. Permanent Magnet SM Drive: Principle of operation, converter configuration, synchronization, trapezoidal and sinusoidal drive control structures and performance.

5. Switched Reluctance Motor Drive: Principle of operation, converter circuits, sensors, speed control and performance.

6. Resonant-Link Converter fed Drive: Principle of soft switching in inverters and converters utilizing resonant circuits, modulation strategies and application in IM drives.

### Solid State Power Supplies

**LTP: 3-1-0**

**Credits: 4**

DC Power Supplies: Linear and switching power supplies. Various DC to DC converters and their operating characteristics. Selection of Power Semiconductor Devices. Magnetic component behavior and selection. Control pulse generation and control techniques. Feedback isolation techniques. Auxiliary power supply generation. Parallel operation. Utility interface: Line current harmonics of rectifiers and their effect. Rectifier circuits

with low input current distortion and high power factor. AC Power Supplies: Linear mode AC power supplies. Switching mode Inverters. Sine wave inverters. Parallel operation. AC voltage regulators. UPS



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systems. Special Power Supplies: Power supplies for pulsed gas discharge tubes. High current power supplies. Power supplies for lighting application. Power supplies for other applications. Other Related topics: EMI & EMC considerations, Environmental considerations, MTBF & its estimation.

### **Power Electronics Application in EHV Transmission**

**LTP: 3-1-0**

**Credits: 4**

HVDC Transmission: Converter operation, protection and control of HVDC link, modeling of HVDC system for power system studies. Flexible AC Transmission Systems: Series and shunt devices and principle of operation and control, UPFC and IPFC, modeling of FACTS devices for power system studies. Harmonics in Power System: Sources of harmonics, study of harmonic penetration, harmonic suppression.