

## COURSE PROSPECTUS

Name of the Group: Power Electronics, Analog Digital Electronics, Consumer Electronics

Name of the Course: Present Power Electronics and Future Trends

Starting Date: 15<sup>th</sup> May 2017

Duration: **Weeks (hours)** 4 weeks (120 Hrs.)

Preamble: Elber Moll and his team working in Bell Labs, and Subsequently R.A. York and his associates working in General Electric Company USA developed 1st P-N-P-N Device Thyristor which could handle large Electrical Power and could be controlled Electronically using very low power. Subsequently other Power Electronic Devices were developed, G.T.O, I.G.B.T, MOSFET, Triac. Compared to Electrical conventional methods of using Rheostats, Power Electronic control offers following advantages:

- 1) High Efficiency.
- 2) Compact.
- 3) Accurate Control.
- 4) Light Weight.
- 5) Low cost.

Objective of the Course: The course aims at imparting up to date knowledge to the students and to improve their understanding of “Power Electronics.”, so that they can become competent in that field, in Academics or in Industries.

Outcome of the Course: There will be increase in confidence level of candidate and the Competence of the candidate will improve which will help the candidate for career development.

## Course Structure:

The course consists of the following modules as given in the table below.		
Name of the course ( duration in weeks )		
<b>Present Power Electronics and Future Trends    4 weeks (120 Hrs)</b>		
Sub Modules		Duration
<b>Core Modules</b>	Power Devices	Total 4 Weeks
	DC Motors, AC Motors	
	DC Drives	
	AC Drives	
	Transformers, SMPS	
	Recent Trends in Power Electronics	

## Other Contents

- Course Fees : Rs.8000/-
- Eligibility: Diploma/B.E/B.Tech/M.E./M.Tech Electrical/Electronics
- Number of Seats : 10
- How to Apply: By filling registration through the web link:  
<http://nielit.gov.in/aurangabad/content/short-term-courses-3>
- Discontinuing the course: No fees under any circumstances shall be refunded in the event of a student discontinuing the course. A student can however, be eligible for module certificates (applicable only for courses which provide for modular admission) which he has successfully completed provided he has paid the entire course fees.
- Course Timings : The classes and labs are from 9:30 AM to 12:30 PM and 2:00 PM to 5.25 PM, Monday to Friday.
- Location and how to reach: NIELIT Aurangabad is located inside Dr BAMU University Campus and is about 6 Kms from the Aurangabad ( Maharashtra ) city bustand.
- Course enquiries : Students can enquire about the various courses either on telephone or by personal contact between 9.15 A.M. to 5.15 P.M. (Lunch time 1.30 pm to 2.00 pm).

- i. Placement: Usually students contact companies directly by sending resumes in response to job advertisements and get placed.
- j. Hostel facilities : Available

k. **Course Contents :**

**Power Devices-** Power Diode, Power Transistor, Thyristor, Triac, G.T.O., Mosfet. I.G.B.T., Symbol, Principle of working, Characteristics, Applications. Series and Parallel operation of Power Devices. Comparative Study of Power Devices. Protection of Power Devices.

**DC Motors-** Principle of operation, Start, Run and Stop Operations. Dynamic Braking, Torque, Speed, and Power. Speed Torque Characteristics. Series, Shunt, and Compound DC Motors. Armature reaction in DC Motors. Remedial Measures. Losses and Efficiency.

**DC Drives-** Single phase SCR Semiconverter. Free wheeling diode. Single phase SCR full converter. Converter mode and Inverter mode. Regenerative action. Two Quadrant operation. Three phase SCR semiconverter and full converter. SCR Dual Converter. Four Quadrant operation.

**AC Motors-** Single phase Induction Motor, Principle of operation. Three Phase Induction Motor, Principle of operation. Speed-Torque Characteristics. Slip, Torque, Speed concepts. Methods of speed Control, V, F and V/F control. Various applications.

**AC Drives-** Single Phase and Three Phase Inverters. Control of output voltage and output frequency. Harmonics and Efficiency. Use of Inverter for speed control of Induction Motors.

**Transformers-** Principle of operation. Faraday's law of Electromagnetic Induction. Voltage regulation of transformer. Hysteresis & Eddy current losses. Copper loss. Efficiency of **Transformer**.

**S.M.P.S. -** Principle of operation. High frequency switching of Power Devices. Ferrite core high frequency transformers. Advantages of S.M.P.S. Protections. R.F.I. and E.M.I. protections

**Recent Trends-** Power factor and its improvement. Methods of Power

Factor improvement in converters. Zero current switching.  
High frequency switching for making compact designs  
and low ripple. Use of Mosfets and I.G.B.T.for High frequency.  
Harmonic reduction methods,PWM, SPWM.