



GUJARAT TECHNOLOGICAL UNIVERSITY

Invitation for Faculty of GTU Engineering colleges

Faculty Development Program on

“POWER ELECTRONICS

&

BASIC ELECTRICAL TECHNOLOGY”

BY

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Former VC, WBUT, KOLKATA

Chairman, Eastern Regional Committee, AICTE

Professor, Dept of Electrical Engineering

Indian Institute of Technology, Kharagpur

Date:

1st - 12th June, 2015

Venue:

Gujarat Technological University

Nr. Vishwakarma Government Engineering College

Nr. Visat Three Roads, Visat - Gandhinagar Highway

Chandkheda, Ahmedabad - 382424 - Gujarat

WEEK 1 : POWER ELECTRONICS

Date: 1 June – 5 June, 2015, 10:00 AM - 06:00 PM

Course Outline:

Power Semiconductor Devices

- ✚ Constructional Features, Operating Principle, Characteristics and Specification of Power Semiconductor Diode, Power Bipolar Junction Transistor (BJT), Thyristors and Triacs, Gate Turn Off Thyristor (GTO), Metal Oxide Semiconductor Field Effect Transistor (MOSFET), Insulated Gate Bipolar Transistor (IGBT), Hard and Soft Switching of Power Semiconductors.

AC to DC Converters

- ✚ Single Phase Uncontrolled Rectifier, Single Phase Fully Controlled Rectifier, Single Phase Half Controlled Bridge Converter, Single Phase Uncontrolled Rectifier, Operation and Analysis of the Three Phase Fully Controlled Bridge Converter, Operation and Analysis of Three Phase Half Controlled Converter, Effect of Source Inductance on the Performance of AC to DC Converters, Power Factor Improvement, Harmonic Reduction, Filter.

DC to DC Converters

- ✚ Types of Basic DC-DC Converters, Analysis of Buck Converter (DC-DC) Circuit, Commutation of Thyristor-Based Circuits, Introduction to Switched-Mode Power Supply (SMPS) Circuits, Fly-Back Type Switched Mode Power Supply, Forward Type Switched Mode Power Supply, Cuk and Sepic Converter, Design of Transformer for Switched Mode Power Supply (SMPS) Circuits.

AC to AC Voltage Converters

- ✚ Three-phase AC Regulators, Phase Angle Control in Triac-based Single-phase AC Regulators, Introduction to Cyclo-converters, Three-phase to Single-phase Cyclo-converters, Three-phase to Three-phase Cyclo-converters, Control Circuit for Three-phase to Three-phase Cyclo-converters.

DC to AC Converters

- ✚ Introduction to Voltage Source Inverters, 3-Phase Voltage Source Inverter With Square Wave Output, 3-Phase Pulse Width Modulated (PWM) Inverter, Sine PWM and its Realization, Other Popular PWM Techniques, Current Source Inverter, Load-commutated Current Source Inverter (CSI).

WEEK 2 : BASIC ELECTRICAL TECHNOLOGY

Date: 8 June – 12 June, 2015, 10:00 AM - 06:00 PM

Course Outline:

Introduction

- ✚ Introducing the course, Generation, transmission and distribution of electric power: an overview

DC circuits

- ✚ Introduction to electrical circuits, Loop Analysis of resistive circuit in the context of dc voltages and currents, Node-voltage analysis of resistive circuit in the context of dc voltages and currents, Wye (Y) – Delta (Δ) or Delta (Δ) – Wye (Y) transformations, Superposition Theorem in the context of dc voltage and current sources acting in a resistive network, Thevenin's and Norton's theorems in the context of dc voltage and current sources in a resistive network, Analysis of dc resistive network in presence of one non-linear element .

DC transient

- ✚ Study of DC transients in R-L and R-C circuits, Study of DC transients in R-L-C circuits.

Single phase AC circuits

- ✚ Generation of single phase ac and fundamental aspects, Representation of sinusoidal quantities in phasor with j operator, Steady state analysis of series circuits, Analysis of parallel and series-parallel circuits, Resonance in electrical circuits, Concept of apparent, active and reactive power.

Three phase AC circuits

- ✚ Generation of three-phase voltage, line and phase quantities in star- and delta-connection and their relations, Solution of three-phase balanced circuits, Measurement of three-phase power.

Magnetic circuits & Core losses

- ✚ Simple magnetic circuits, Eddy current & hysteresis losses.

Transformer

- ✚ Ideal single phase transformer, Practical single phase transformer, Testing, efficiency and regulation of transformer, Three phase transformer, Autotransformer, Problem solving on transformers.

Three phase induction motor

- ✚ Concept of rotating magnetic field, Brief construction and principle of operation, Per phase equivalent circuit and power flow diagram, Torque-slip (speed) characteristic, Types of starters, Single-phase induction motor and starting methods.

DC Machines

- ✚ Constructional features of DC machines, Principle of operation of D.C machines, EMF and torque equations, DC Generators, DC motor starting and speed control, Losses, efficiency and testing of D.C machines, Problem solving in DC machines.

Measuring instruments

- ✚ Study of DC and AC measuring instruments, Study of electrodynamic type instruments, Study of single-phase induction type energy meter or watt-hour meter.

To register: <http://goo.gl/forms/9uWSpdnz3Z>

Limited seats are available.

Last Time & Date for registration: 12:00 PM 28-05-2015

Participants will get confirmation Email for FDP by 5:00 PM 29-05-2015.

Convener:

**Mr. Naresh Jadeja
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Coordinators:

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