

COURSE: ELECTRIC CIRCUIT & SYSTEM ANALYSIS USING MATLAB/SIMULINK

OBJECTIVE OF COURSE:

To have better understanding of three major subjects in Electrical Engineering i.e. Power Electronics & Control System and Power System via simulation on MATLAB software. Further various techniques/converters studied shall be analyzed on various applications including industrial applications to have an in-depth knowledge with practical approach. It will suffice the requirement of industries to a good extent.

DURATION OF COURSE: 60 HOURS (4 WEEKS)

MINIMUM ELIGIBILITY CRITERIA AND PRE-REQUISITE:

Basic knowledge of MATLAB software; fundamental concepts of subjects such as Power Electronics & Control System.

Course Content

Module 1 (Week 1- 16 hours):

SINGLE PHASE CONVERTERS: Single phase half and full wave converter with R, RL and RLE load, Inverting action of a full control converter, Single phase semi-converter with RL and RLE load

THREE PHASE CONVERTERS: Three phase full controlled converter, three phase semi converter with RL load, Three phase converters applied to induction motor for speed control

COMMON WITH SINGLE PHASE AND THREE PHASE CONVERTERS: Dual converter, Effect of source inductance on converters.

Module 2 (Week 2 - 14 hours):

AC VOLTAGE CONTROLLER & CYCLOCONVERTERS: AC voltage controller applied to single phase induction motor, single phase cycloconverter.

SINGLE AND THREE PHASE INVERTERS: Single phase bridge inverter with R, RL and RLC loads, Single phase inverter with single and multiple Pulse Width Modulation (PWM), three phase 180 degree & 120 degree mode VSI and its application on induction motors.

Module 3 (Week 3 - 16 hours):

TIME RESPONSE ANALYSIS: Step response study on 2nd order system, Performance of P, PI and PD controllers

STABILITY ANALYSIS: Stability analysis by Root locus Technique, Stability analysis by Bode plot, Stability analysis by Nyquist plot.

Module 4 (Week 4 - 14 hours):

SPEED CONTROL OF MOTORS: Speed control of DC motor, speed control of three phase induction motors, speed of BLDC motor, motor speed control using Fuzzy Logic controller.

POWER SYSTEM ANALYSIS: Thyristor based HVDC system, STATCOM, Static VAR compensator, Thyristor Controlled Series Capacitor (TCSC)