

08.504 INDUSTRIAL ELECTRONICS (MP)

L-T-D: 2-1-0

Credits : 3

Module I

Thyristors-Working and characteristics of SCR, TRIAC. Structure and working of power BJT. Working and characteristics of UJT and IGBT. Converters- Single phase half wave and Bridge converters. Dielectric heating and Induction heating - Principle and applications. Resistance welding-sequence timer. Photoelectric devices- principle of operations of APD, Photo transistor and Photovoltaic cell. Applications for industrial measurement and control.

Module II

Data acquisition system-block diagram and explanation of each block. Transducers – LED, Laser diode and Thermistors .Actuators. Micro controllers – Intel 8051 – Architecture, memory organization, register banks, special function registers, addressing modes. Instruction set of 8051 – Programming examples (addition, subtraction, 8 bit multiplication and 8 bit division, interfacing with 7-segment LED display only). Application of 8051 - microcontroller based temperature control system. ADC , DAC.

Module III

Control systems: Open loop and closed loop control systems, Transfer function-electrical system, mechanical system. Second order systems - response to step input, time domain specifications-rise time, delay time, peak time, peak overshoot and falling time. Frequency response -frequency domain specifications-bandwidth and resonant peak. Stability of a system-definition, stability analysis using Routh hurwitz criterion. Stability analysis in frequency domain using Bode plot. Principle of PD, PI and PID controllers.

References

1. Harish C. Rai, *Industrial and power electronics*, PHI.
2. Ayala, *The 8051 Microcontroller*, 3/e., Thomson India edition
3. Muhammad H Rashid, *Power Electronics*, 2/e, PHI
4. Ned Mohan, *Power Electronics; Converters, application and Design*, 2/e., John Wiley and sons.
5. Benjamin C. Kuo, *Automatic control system*, 6/e, PHI, New Delhi.

This subject shall be handled by faculty of Dept. of Electronics and Communications in the colleges.

Question Paper

The question paper shall contain two parts. Part A and Part B. Part A shall contain 10 compulsory questions of 4 marks each covering the entire syllabus (10 x 4 = 40). Part B shall contain 2 questions of 20 marks each from module I, II and III. One full question from each module has to be answered (3 x 20 =60)