III Year I Semester

15AEEE21-CONTROL SYSTEMS AND SIMULATION LAB

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Course Objectives:

- *To understand the fundamental concepts of Control systems and mathematical modeling of the system.*
- *To study the concept of time response and frequency response of the system.*
- *To understand the basics of Simulation of stability analysis of the system.*

Any Eight of the following experiments are to be conducted

1. Time Response analysis of Second Order System
2. Characteristics of Synchros
3. Programmable Logic Controller – Study and Verification of Truth Tables of Logic Gates, Simple Boolean Expressions and Application of Speed Control of Motor.
4. Effect of Feedback on DC Servo Motor
5. Transfer Function of DC Machine
6. Effect of P, PD, PI, PID Controller on a Second Order Systems
7. Lag and Lead Compensation – Magnitude and Phase Plot
8. Temperature Control Using PID controller.
9. Characteristics of Magnetic Amplifiers
10. Characteristics of AC Servo Motor

Any two simulation experiments are to be conducted:

1. PSPICE Simulation of Op-Amp Based Integrator and Differentiator Circuits.
2. Linear System Analysis (Time Domain Analysis, Error Analysis) Using MATLAB.
3. Stability Analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant System Using MATLAB
4. State Space Model for Classical Transfer Function Using MATLAB – Verification.

Course Outcomes:

- *To help the students understand and practice the modeling, simulation, and implementation of a physical dynamical system by a linear time invariant ordinary differential equation*
- *To study the effects of Lead, Lag and Lag-Lead series compensator on a second order system transient and steady state system response.*
- *To investigate the Servo-Motor speed and position control principles by designing and selecting specific P, I and PI gains for specific responses.*
- *Simulation using PSPICE and MATLAB Software.*

REFERENCE BOOKS:

1. Simulation of Electrical and Electronics Circuits using PSPICE – by M.H.Rashid, M/s PHI Publications.
2. PSPICE A/D user's manual – Microsim, USA.
3. MATLAB and its Tool Books user's manual and – Mathworks, USA.

BOS-chairman