

**3/4 B.Tech. FIFTH SEMESTER****EE5L3****CONTROL SYSTEMS LAB****Credits: 2****Lecture: --****Internal assessment: 25 marks****Lab: 3 period /week****Semester end examination: 50 marks****Course Objective:**

This course helps to familiarize modeling, control and simulation experiments on control systems and to expose the students to the concepts, performance characteristics, time and frequency response of linear systems.

**Course Outcomes:**

Upon completion of the course, students will be able to:

1. Understand the operating characteristics of servo motors
2. Understand the effects of P, PI & PID controllers used in design of control system.
3. Find the transfer function of motor, generator etc., which helps in mathematical model of control system.
4. Analyze the time response of second order systems.
5. Write programs in MATLAB software for finding the stability etc., and PLC programming which will help them in doing their projects

**List of experiments****Any Eight Of The Following Experiments Are To Be Conducted:**

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – study and verification of truth tables of logic gates, and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Lag and lead compensation – magnitude and phase plot
8. Transfer function of DC generator
9. Temperature controller using PID
10. Characteristics of magnetic amplifiers
11. Characteristics of AC servo motor

**Any Two of following simulation experiments are to be conducted:**

1. Linear system analysis (time domain analysis, error analysis) using MATLAB.
2. Stability analysis (Bode, Root Locus, Nyquist plot) of linear time invariant system using MATLAB
3. State space model for classical transfer function using MATLAB – Verification.

**Reference Books:**

1. “MATLAB and its tool box user’s manual”, Mathworks, USA.
2. “Programmable Logic Controllers-Programming Method and Applications” by ‘JR.Hackworth &F.DHackworth Jr.’, Pearson publications, 2004.