III Year B.Tech, EEE, I-Semester

L	T	P	C
0	0	3	1.5

CONTROL SYSTEMS LAB

Prerequisite: Basic Electrical Engineering, Network Theory

Course Objectives:

- To understand the different ways of system representations such as Transfer function representation and state space representations
- To assess the system performance using time domain analysis and methods for improving it
- To assess the system performance using frequency domain analysis and techniques for improving the performance
- To get the performance of various devices (Servo motors etc.)
- To design various controllers and compensators to improve system performance

The following experiments are required to be conducted as compulsory experiments:

Part – A

1. Time response 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. (a) Effect of feedback on DC servo motor (b) Characteristics of AC servo motor

5. Transfer function of DC motor & DC generator

6. Temperature controller using PID

7. Effect of P, PD, PI, PID Controller on a second order systems

8. Lag and lead compensation – Magnitude and phase plot

In addition to the above eight experiments, at least any TWO of the experiments from the following list are required to be conducted

Part – B

1. a) Simulation of P, PI, PID Controller.

b) Linear system analysis (Time domain analysis, Error analysis) using MATLAB

2. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB.

3. State space model for classical transfer function using MATLAB.

4. Design of Lead-Lag compensator for the given system and with specification using MATLAB.

5.Magnetic amplifier- series and parallel connections.

Course Outcomes: After completion of this course the student is able to

1. Obtain the transfer function of DC Motor and DC Generators
2. Develop the logic to realize the Boolean expressions and able to control the speed and directions of stepper motor by Programmable logic controller.
3. Analyze the time response of second order RLC system .
4. Analyze the P PI and PID controllers on the second order systems.
5. Design Lag ,Lead and Lag- Lead compensators.
6. Analyze by simulation State space models , stability by root locus and bode plots for classical transfer function using MATLAB software.–

1)
2)
3)
4)
5)
6)
7)
8)
9)
10)
11)
12)
13)
14)
15)
16)