II Year II Semester **L T P C**

Code: 20EE4106 **0 0 3 2**

CONTROL SYSTEM LAB

Preamble-The significance of the control systems laboratory, is renowned in the various fields of engineering applications. For an electrical engineer, it is obligatory to have the practical ideas about the control systems and its applications in real world.

Course Objectives: Students are supposed

1. To operate and analyse the performance characteristics of basic control system components such as magnetic amplifiers, D.C. servo motors, A.C. Servo motors, synchro's and potentiometer.
2. To operate and analyse the effects of P, PI, PD and PID controller gains on a process and suggest the appropriate controller to attain the desired output.
3. To express the knowledge of MATLAB-SIMULINK to analyse dynamical system response by applying different input signals.
4. To design lag, lead and lag–lead compensators for the dynamical systems to meet the desired specification using the MATLAB Programming

Course Outcomes: At the end of the course, the students can able

1. To operate and analyse the working and performance characteristics of industrial applied control components
2. To extract time/frequency response of a second order dynamical system using MATLAB/Simulink and analyse the stability.
3. To transform dynamical system transfer function model to state-space model and vice-versa.
4. To design the suitable controller/compensator for the second order dynamical system to improve the stability and performance using a MATLAB programming.

CO – PO & CO – PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	3	-	-	-	-	1	-	-	-	1	2	-
CO2	1	3	-	-	2	-	-	-	-	-	-	-	1	2	-
CO3	1	3	-	-	2	-	-	-	-	-	-	-	1	2	-
CO4	1	-	3	-	2	-	-	-	-	-	-	-	1	2	-

*1 – Weak, 2 – Moderate and 3 – Strong

S.No **List of Experiments**

1. Time response of typical Second order system
2. Characteristics of Synchro's
3. Design of Lag, Lead & Lag-Lead compensator using MATLAB Program
4. Characteristics of Magnetic amplifiers
5. Conversion of Transfer function model to state space model and vice-versa
6. Characteristics of AC servo motor
7. Characteristics of DC servo motor
8. Temperature controller using PID
9. DC position control system
10. Transfer function of DC motor
11. LEAD/LAG/LEAD-LAG network simulator
12. PID Controlled DC Motor via State Space Approach using MATLAB-Simulink

Text Books:

1. Control Systems principles and design, M. Gopal, Tata McGraw Hill education Pvt Ltd., 4th Edition.
2. Control system components, M.D.Desai, PHI Learning Books

Reference Books:

1. MATLAB Programming for Engineers, Stephen J. Chapman, Book ware Companion Series.
2. Automatic control systems, Benjamin C. Kuo, Farid Golnaraghi. Prentice Hall of India, 2nd Edition.