CONTROL SYSTEMS LAB

Course Code	20EE3551	Year	III	Semester(s)	I
Course Category	Professional Core	Branch	EEE	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	NIL
Continuous Internal Evaluation:	15	Semester End Evaluation:	35	Total Marks:	50

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	**Analyze** the performance characteristics and working of Magnetic amplifier, DC & AC servo motors and synchros. **(L4)**
CO2	**Determine** the transfer functions of DC Motor and DC generator **(L3)**
CO3	**Demonstrate** the time response analysis and performance of PID controllers **(L3)**
CO4	**Develop** MATLAB programming and construct the truth table of logic gates using PLC **(L3)**
CO5	Conduct experiments as a **team / individual** by using equipment available in the laboratory
CO6	Make an effective **report** based on experiments

Contribution of Course Outcomes towards achievement of Program Outcomes &Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		3		3									2	1
CO2	3			3									2	1
CO3	3			3									2	1
CO4	3		3	3	3						3	3	2	1
CO5									3				1	
CO6										3			1	

Syllabus		
Expt. No.	Contents	Mapped CO
Part-A (Any eight experiments)		
1	Time response of Second order system	CO1, CO3, CO5,CO6
2	Characteristics of AC servo motor	CO1, CO5, CO6
3	Effect of P, PD, PI, PID Controller on a second order systems	CO1, CO3, CO5, CO6
4	Transfer function of DC motor	CO1, CO2, CO5, CO6
5	Temperature controller using PID	CO1, CO3, CO5, CO6
6	Characteristics of magnetic amplifiers	CO1, CO5, CO6
7	Characteristics of Synchros	CO1, CO5, CO6
8	Characteristics of DC servo motor	CO1, CO5, CO6
9	Transfer function of DC generator	CO1, CO2, CO5, CO6
10	Programmable logic controller – Study and verification of truth	CO4, CO5, CO6

	tables of logic gates	
Part-B (Any two experiments)		
11	Time response of first order systems for standard test signals using MATLAB	CO1, CO3, CO4, CO5, CO6
12	Kalman's test of Controllability and Observability using MAT LAB.	CO4, CO5, CO6
13	Bode Plot, Root locus for the transfer functions of systems using MATLAB.	CO1, CO4, CO5, CO6
14	State space model for classical transfer function and vice versa using MATLAB – Verification.	CO4, CO5, CO6

Learning Resources
Text Books
1. James C. Squire, Julie Phillips Brown, "Programming for Electrical Engineers: MATLAB and Spice", Academic Press; 1st edition, 2020. 2. JR.Hackworth & F.DHackworth Jr., "Programmable Logic Controllers-Programming Methods and Applications", Pearson, 1st edition 2003