



# Techno College of Engineering Agartala

An Engineering College Approved by AICTE, MHRD, Govt. of India

Affiliated to Tripura University (A Central University),

Department of Electrical Engineering



## List of Laboratory Experiments

Control System Laboratory							
Course Code	Hours / Week				Maximum Marks		
PC EE 606	L	T	P	C	CIA	SEE	Total
	0	0	2	1	40	60	100
<b>Number of classes: 24 hours</b>			<b>Prerequisites: Electromagnetic Field Theory</b>				
<b>Branch: EE</b>			<b>Semester: VI</b>				

### Course overview:

**Control Systems Laboratory** provides practical experience in modeling, analysis, and control of DC servomechanisms and electro-mechanical systems. Students perform experiments to derive transfer functions, analyze steady-state errors, and implement various controllers (P, PI, PD, PID) for position and speed control. The lab also explores velocity feedback effects, pole placement using state feedback, and disturbance handling in multi-disc systems. Through hands-on work, students gain a deeper understanding of second-order system behavior, feedback control, and modern control strategies.

### Course objectives:

1. To develop practical skills in modeling and analyzing DC servomechanisms using time and frequency domain methods.
2. To understand and evaluate the performance of control systems through steady-state error and transient response analysis.
3. To design and implement various control strategies (P, PI, PD, PID) for position and speed control.
4. To explore advanced control techniques such as velocity feedback and state feedback for multi-body electro-mechanical systems.

### Course outcomes:

CO Number	CO Description	K-level
CO-1	Determine the Transfer function of DC servomotor from Experimental results.	K-3
CO-2	Examine the characteristics of time response of Position control system from Hardware experiments and their Steady-state analysis.	K-4
CO-3	Understand the effect of Velocity feedback in position control systems.	K-2



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CO-4	Evaluate the effect of Pole Placement by state feedback for the better control of Electro-Mechanical Systems.	K-5
SI. No.	EXPERIMENT NAME	CO
1.	Determination of Transfer function of D.C. Servo Motor by applying Step input and verification of Transfer function from frequency response graph of D.C. Servomotor (at different Mechanical loadings).	CO1
2.	Determination of steady state error of DC Servomechanism due to Step, Ramp and Parabolic inputs.	CO1
3.	Position Control of second order DC Servomechanism and determination of Parameters of the System from the experimental Results.	CO2
4.	Study the effect of Velocity feedback on Position control of DC Servomechanism and determination of Parameters due to velocity feedback at different values.	CO2
5.	Experiments for speed Control of D.C. Servo Motor with PI Controller + derivative output Compensation technique.	CO3
6.	Position control of D.C. Servo Mechanism using P, P+I, P+D, P+I+D Controllers to study the characteristics of second order System and indication of Position Control using Gray-coded disk.	CO3
7.	Position Control of Electro-Mechanical Plant having at least two mechanically coupled discs with feedback for the identification of controlled positions of discs using Pole placement of the Plant by State feedback of the System.	CO4
8.	Study of disturbances of Torques on PD & PID Rigid body system using Electro-Mechanical Plant having at least two Mechanically Coupled discs with feedback arrangements.	CO4