LESSON PLAN 2024(Summer)

Dicipline: Electrical	Semester :6th Sem	Name of the Teaching faculty: Sudhansu Sekhar Munda Lect in E &TC
Subject: **Control System**	No.of days/per week classalloted:5p(55Minutes)/week	Semester From date: 13.01.2024 to Date: 24.04.2024 No . Of Weeks:
1st	1st	**FUNDAMENTAL OF CONTROL SYSTEM** : 1.1. Classification of Control system
	2nd	1.2. Open loop system & Closed loop system and its comparison
	3rd	1.3. Effects of Feed back
	4th	1.4. Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	5th	1.5. Servomechanism
2nd	1st	**2. MATHEMATICAL MODEL OF A SYSTEM:** 2.1. Transfer Function & Impulse response
	2nd	2.2. Properties, Advantages & Disadvantages of Transfer Function
	3rd	2.3. Poles & Zeroes of transfer Function
	4th	2.4. Simple problems of transfer function of network.
	5th	2.5. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)
3rd	1st	**3. CONTROL SYSTEM COMPONENTS:** 3.1. Components of Control System
	2nd	3.2. Gyroscope, Synchros, Tachometer.
	3rd	DC servomotors, Ac Servomotors
	4th	**4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS:**
	5th	4.1. Definition: Basic Elements of Block Diagram
4th	1st	4.2. Canonical Form of Closed loop Systems
	2nd	4.3. Rules for Block diagram reduction
	3rd	4.4. Procedure for of Reduction of Block Diagram
	4th	4.5. Simple Problem for equivalent transfer function
	5th	4.6. Basic Definition in Signal Flow Graph & properties
5th	1st	4.7. Construction of Signal Flow graph from Block diagram
	2nd	4.8. Mason's Gain formula
	3rd	4.9. Simple problems in Signal flow graph for network
	4th	5. TIME RESPONSE ANALYSIS.
	5th	5 . 1 Time response of control system.

6th	1st	5 . 2 Standard Test signal.
	2nd	5.2.1. Step signal,
	3rd	5.2.2. Ramp Signal
	4th	5.2.3. Parabolic Signal
	5th	5.2.4. Impulse Signal
7th	1st	5 . 3 Time Response of first order system with
	2nd	5.3.1. Unit step response
	3rd	5.3.2. Unit impulse response.
	4th	5 . 4 Time response of second order system to the unit step input.
	5th	5.4.1. Time response specification.
8th	1st	5.4.2. Derivation of expression for rise time, peak time, peak overshoot,settling time and steady state error.
	2nd	5.4.3. Steady state error and error constants.
	3rd	5 . 5 Types of control system.[Steady state errors in Type-0, system]
	4th	5 . 5 Types of control system.[Steady state errors in Type-1 system]
	5th	5 . 5 Types of control system.[Steady state errors in Type-2 system]
9th	1st	5 . 6 Effect of adding poles and zero to transfer function.
	2nd	5 . 7 Response with P, PI, PD and PID controller.
	3rd	6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE. 6 . 1 Root locus concept.
	4th	6 . 1 Root locus concept
	5th	6 . 2 Construction of root loci.
10th	1st	6 . 3 Rules for construction of the root locus.
	2nd	6 . 4 Effect of adding poles and zeros to G(s) and H(s).
	3rd	7. FREQUENCY RESPONSE ANALYSIS. 7 . 1 Correlation between time response and frequency response.
	4th	7. FREQUENCY RESPONSE ANALYSIS. 7 . 1 Correlation between time response and frequency response.
	5th	7 . 2 Polar plots.
11th	1st	7 . 2 Polar plots.
	2nd	7 . 3 Bode plots
	3rd	7 . 3 Bode plots
	4th	7 . 4 All pass and minimum phase system.
	5th	7 . 4 All pass and minimum phase system.
12th	1st	7 . 5 Computation of Gain margin and phase margin
	2nd	INTERNAL ASSESSMENT
	3rd	INTERNAL ASSESSMENT
	4th	7 . 5 Computation of Gain margin and phase margin
	5th	7 . 6 Log magnitude versus phase plot.
	1st	7 . 6 Log magnitude versus phase plot.

	2nd	8. NYQUIST PLOT 8.1 Principle of argument.
	3rd	8. NYQUIST PLOT 8.1 Principle of argument.
	4th	8.2 Nyquist stability criterion.
13th	5th	8.2 Nyquist stability criterion.
	1st	8.3 Niquist stability criterion applied to inverse polar plot
	2nd	8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot.
	3rd	8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot.
	4th	8.5 Assessment of relative stability.
14th	5th	8.5 Assessment of relative stability.
	1st	8.6 Constant M and N circle
	2nd	8.6 Constant M and N circle
	3rd	8.7 Nicholas chart.
15th	4th	8.7 Nicholas chart.

Sudhansu Sekhar Munda
Lect in Electronics