LESSON PLAN FOR ACADEMIC SESSION: 2023-24(Summer-24)

Discipline: Electrical Engineering		Semester : 6th	Name of the Teaching Faculty : PRABHUDATTA PUJAPANDA
Subject : CONTROL SYSTEM	No. of days / week class allotted		Semester From : 16.01.24 to 23.04.2024 Nos. of Weeks per semester : 15
Week	Class Day	Chapter	Theory Topics
1ST	1st	Chapter-1 FUNDAMENTAL OF CONTROL SYSTEM	1.1. Classification of Control system
	2nd		1.2. Open loop system & Closed loop system and its comparison 1.3. Effects of Feed back.
	3rd		1.4. Standard test Signals (Step, Ramp, Parabolic, Impulse Functions)
	4th		1.5. Servomechanism.
2ND	1st	Chapter-2 MATHEMATICAL MODEL OF A SYSTEM	2.1. Transfer Function & Impulse response,
	2nd		2.2. Properties, Advantages & Disadvantages of Transfer Function 2.3. Poles & Zeroes of transfer Function
	3rd		2.4. Simple problems of transfer function of network.
	4th		2.5. Mathematical modeling of Electrical Systems (R, L, C, Analogous systems)
3RD	1st	Chapter-3 CONTROL SYSTEM COMPONENTS	3.1. Components of Control System
	2nd		Continue...
	3rd		3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.
	4th		Continue...
4TH	1st	Chapter-4 BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS	4.1. Definition: Basic Elements of Block Diagram 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	1st		4.6. Basic Definition in Signal Flow Graph & properties
	2nd		4.7. Construction of Signal Flow graph from Block diagram
	3rd		4.8. Mason's Gain formula.
	4th		4.9. Simple problems in Signal flow graph for network
6TH	1st	Chapter-5 TIME RESPONSE ANALYSIS.	5 . 1 Time response of control system
	2nd		5 . 2 Standard Test signal. 5.2.1. Step signal, 5.2.2. Ramp Signal 5.2.3. Parabolic Signal 5.2.4. Impulse Signal
	3rd		5 . 3 Time Response of first order system with: 5.3.1. Unit step response 5.3.2. Unit impulse response.
	4th		5 . 4 Time response of second order system to the unit step input. 5.4.1. Time response specification. 5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.

7TH	1st		5.4.3. Steady state error and error constants.
	2nd		5 . 5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	3rd		5. 6 Effect of adding poles and zero to transfer function.
	4th		5 . 7 Response with P, PI, PD and PID controller.
8TH	1st		Continue...
	2nd	Chapter-6 ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE.	6 . 1 Root locus concept.
	3rd		Continue...
	4th		6 . 2 Construction of root loci
9TH	1st		Continue...
	2nd		6 . 3 Rules for construction of the root locus
	3rd		Continue...
	4th		Continue...
10TH	1st		6 . 4 Effect of adding poles and zeros to G(s) and H(s).
	2nd		Continue...
	3rd		Continue...
	4th	Chapter-7 FREQUENCY RESPONSE ANALYSIS	7 . 1 Correlation between time response and frequency response.
11TH	1st		5 7 . 2 Polar plots.
	2nd		Continue...
	3rd		7 . 3 Bode plots.
	4th		Continue...
12th	1st		Continue...
	2nd		7 . 4 All pass and minimum phase system
	3rd		7 . 5 Computation of Gain margin and phase margin.
	4th		Continue...
13th	1st		7 . 6 Log magnitude versus phase plot..
	2nd		7 . 7 Closed loop frequency response.
	3rd	Chapter-10 NYQUIST PLOT	8.1 Principle of argument. 8.2 Nyquist stability criterion
	4th		8.3 Niquist stability criterion applied to inverse polar plot.
14th	1st		Continue......
	2nd		8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot.
	3rd		Continue......

	4th		8.5 Assessment of relative stability
15th	1st		Continue……
	2nd		8.6 Constant M and N circle
	3rd		8.7 Nicholas chart.
	4th		Continue……

P. Pujapanda
14.01.24
Prepared by
Prabhudatta Pujapanda
Lecturer(Electrical Engg.)
G.P Sonepur

14.01.24
H.O.D
G.P Sonepur

14/01/24
Academic Co-ordinator
G.P Sonepur