GOVERNMENT POLYTECHNIC BARGARH

LESSON PLAN

SUMMER-2023

CONTROL SYSTEM ENGINEERING

SEMESTER- 6TH

BRANCH- ELECTRICAL ENGINEERING

PREPARED BY

SMT. PRITEE PRAVA MINZ

SR. LECT.(ELECTRICAL)

DISCIPLINE: ELECTRICAL Engg.	SEMESTER: 6TH	NAME OF THE TEACHING FACULTY: Pritee Prava Minz (Sr. Lect. in Elect. Engg.)
SUBJECT: Control System Engineering (TH 3)	NO. OF DAYS/ WEEK CLASS ALLOTTED - 05	SEMESTER FROM DATE 14.02.2023 TO 23.05.2023
WEEK	CLASS DAY	TOPICS TO BE COVERED AS PER SYLLABUS
1	1 14/02/2023	**1.FUNDAMENTAL OF CONTROL SYSTEM** Classification of Control system Open loop system & Closed loop system and its comparison
	2 15/02/2023	Effects of Feed back
	3 16/02/2023	Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	4 17/02/2023	Servomechanism
2	5 20/02/2023	**2.MATHEMATICAL MODEL OF A SYSTEM** Transfer Function & Impulse response,
	6 21/02/2023	Properties, Advantages & Disadvantages of Transfer Function Poles & Zeroes of transfer Function
	7 22/02/2023	Simple problems of transfer function of network.
	8 23/02/2023	Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)
	9 24/02/2023	**CONTROL SYSTEM COMPONENTS** Components of Control System , Gyroscope
3	10 27/02/2023	Synchros, Tachometer

		11 28/02/2023	DC servomotors
		12 1/03/2023	Ac Servomotors.
		13 2/03/2023	**BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS** Definition: Basic Elements of Block Diagram Canonical Form of Closed loop Systems
		14 3/03/2023	Rules for Block diagram reduction
4		15 6/03/2023	Procedure for of Reduction of Block Diagram
		16 9/03/2023	Simple Problem for equivalent transfer function
		17 10/03/2023	Basic Definition in Signal Flow Graph & properties
5		18 13/03/2023	Construction of Signal Flow graph from Block diagram
		19 14/03/2023	Mason's Gain formula
		20 15/03/2023	Simple problems in Signal flow graph for network
		21 16/03/2023	**TIME RESPONSE ANALYSIS.** Time response of control system.
		22 17/03/2023	Standard Test signal: Step signal, Ramp Signal Parabolic Signal Impulse Signal
6		23 20/03/2023	Time Response of first order system with: Unit step response, Unit impulse response.
		24 21/03/2023	Time response of second order system to the unit step input
		25 22/03/2023	Time response specification Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error
		26 23/03/2023	Steady state error and error constants
		27 24/03/2023	Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
7		28 27/03/2023	Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
		29 28/03/2023	Effect of adding poles and zero to transfer function.

		30 29/03/2023	Response with P, PI, PD and PID controller.
		31 31/03/2023	**ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE.** Root locus concept.
8		32 3/04/2023	Construction of root loci.
		33 4/04/2023	Construction of root loci.
		34 5/04/2023	Rules for construction of the root locus
		35 6/04/2023	Rules for construction of the root locus.
9		36 10/04/2023	Rules for construction of the root locus.
		37 11/04/2023	Rules for construction of the root locus.
		38 12/04/2023	Rules for construction of the root locus.
		39 13/04/2023	Effect of adding poles and zeros to G(s) and H(s).
10		40 17/04/2023	Effect of adding poles and zeros to G(s) and H(s).
		41 18/04/2023	**FREQUENCY RESPONSE ANALYSIS.** Correlation between time response and frequency response..
		42 19/04/2023	Polar plots.
		43 20/04/2023	Bode Plot
		44 21/04/2023	Bode Plot
11		45 24/04/2023	Bode Plot
		46 25/04/2023	Bode Plot
		47 26/04/2023	All pass and minimum phase system.
		48 27/04/2023	Computation of Gain margin and phase margin.
		49 28/04/2023	Log magnitude versus phase plot.
12		50 1/05/2023	Closed loop frequency response.

		51 2/05/2023	**NYQUIST PLOT** Principle of argument.
		52 3/05/2023	Nyquist stability criterion.
		53 4/05/2023	Solve Numerical on Nyquist stability criterion.
13		54 8/05/2023	Nyquist stability criterion.
		55 9/05/2023	Niquist stability criterion applied to inverse polar plot.
		10/05/2023	Niquist stability criterion applied to inverse polar plot.
		56 11/05/2023	Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot
		57 12/05/2023	Assessment of relative stability.
14		58 15/05/2023	Constant M and Constant N circle
		59 16/05/2023	Nicholas chart.
		60 17/05/2023	Revision
		61 18/05/2023	Revision
15		62 22/05/2023	Revision
		63 23/05/2023	Discussion on Previous year semester question
		64 24/05/2023	Discussion on Previous year semester question
		65 25/05/2023	Discussion on Previous year semester question

Signature of subject teacher   Signature of HOD Electrical