LESSON PLAN

SUB:-CONTROL SYSTEM ENGINEERING.

BRANCH:- ELECTRICAL ENGG.

SEMESTER: 6TH

NAME OF FACULTY: - NIBEDITA HO

GOVERNMENT POLYTECHNIC, BHADRAK
SESSION:2023-24

Discipline: ELECTRICAL ENGG.	Semester: 5th	Name of the Teaching Faculty : NIBEDITA HO(LECT.IN ELECT.ENGG)	
Subject: CONTROL SYSTEM ENGINEERING	No. of Days/per week class allotted:5	Semester from date: 16.01.24 To Date: 26.04.24 No. of Weeks:15	
Week	Class Day	Theory	
1st	1st	Classification of Control system .	
	2nd	Open loop system & Closed loop system and its comparison & Effects of Feed back	
	3rd	Standard test Signals(Step, Ramp, Parabolic, Impulse Functions	
	4th	Servomechanism	
	5th	Question discussion & Doubt clearing	
2nd	1st	Transfer Function & Impulse response, Properties, Advantages & Disadvantages of Transfer Function	
	2nd	Poles & Zeroes of transfer Function Simple problems of transfer function of network.	
	3rd	Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)	
	4th	Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)	
	5th	Question discussion & doubt clearing	
3rd	1st	Components of Control System	
	2nd	Gyroscope, Synchros	
	3rd	Tachometer, DC servomotors	
	4th	Ac Servomotors	
	5th	Question discussion	
4th	1st	Definition: Basic Elements of Block Diagram &Canonical Form of Closed loop Systems	
	2nd	Rules for Block diagram reduction	
	3rd	Procedure for of Reduction of Block Diagram	
	4th	Simple Problem for equivalent transfer function.	
	5th	Question discussion	
5th	1st	Simple Problem for equivalent transfer function	
	2nd	Basic Definition in Signal Flow Graph & properties Construction of Signal Flow graph from Block diagram	
	3rd	Mason's Gain formula& Simple problems in Signal flow graph for network	
	4th	Simple problems in Signal flow graph for network	
	5th	Question discussion & doubt clearing	
6th	1st	Time response of control system	

Week	Lecture	Topic
	2nd	Standard Test signal • Step signal, • Ramp Signal • Parabolic Signal • Impulse Signal
	3rd	Time Response of first order system with: • Unit step response • Unit impulse response
	4th	Time response of second order system to the unit step input. • Time response specification. • Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
7th	5th	Question discussion & doubt clearing
	1st	Solve problems of different types
	2nd	Steady state error and error constants.
	3rd	Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
8th	4th	Effect of adding poles and zero to transfer function
	5th	Question discussion & doubt clearing
	1st	Response with P, PI, PD and PID controller.
	2nd	Response with P, PI, PD and PID controller.
	3rd	Root locus concept.
9th	4th	Construction of root loci.
	5th	Question discussion & doubt clearing
	1st	Rules for construction of the root locus.
	2nd	Rules for construction of the root locus.
	3rd	Rules for construction of the root locus.
10th	4th	Rules for construction of the root locus.
	5th	Question discussion & doubt clearing
	1st	Solving various types of problems
	2nd	Effect of adding poles and zeros to G(s) and H(s).
	3rd	Effect of adding poles and zeros to G(s) and H(s).
	4th	Effect of adding poles and zeros to G(s) and H(s).
11th	5th	Question discussion & doubt clearing
	1st	Correlation between time response and frequency response
	2nd	Polar plots
	3rd	Polar plots
	4th	Bode plots
	5th	Solving various types of problems
12th	1st	Bode plots
	2nd	All pass and minimum phase system
	3rd	Computation of Gain margin and phase margin
	4th	Log magnitude versus phase plot.
	5th	Question discussion

	Question discussion & noise clearing
	Nicholas chart
	Nicholas chart
	Constant W and I circle
	Constant W and I circle
	Question discussion
	Assessment of relative stability
	Nyquist plot
	Effect of addition of poles and zeros to G(s) H(s) on the shape...
	Question discussion & noise clearing
	Nyquist stability criterion
	Nyquist stability criterion applied to inverse polar plot
	Nyquist stability criterion
	Principle of argument
	Close and frequency response
	Close and frequency response
	Close and frequency response