

LESSON PLAN

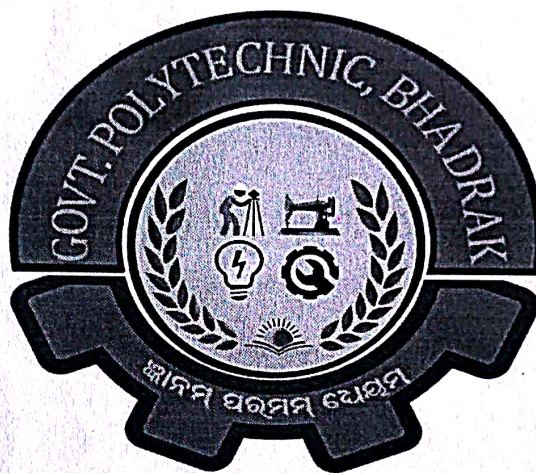


SUB:-CONTROL SYSTEM ENGINEERING

BRANCH:- ELECTRICAL ENGG.

SEMESTER: 6TH

NAME OF FACULTY: UMESH KUMAR DALAI



**GOVERNMENT POLYTECHNIC,
BHADRAK**

SESSION:2024-25

HOD Electrical
HOD (ELECT.)
G.P.BHADRAK

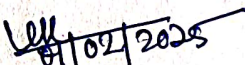
Academic Co-ordinator

Principal
Govt. Polytechnic Bhadrak

Discipline: ELECTRICAL ENGG.	Semester: 5 th	Name of the Teaching Faculty : UMESH KUMAR DALAI(LECT.IN ELECT.ENGG)
Subject: CONTROL SYSTEM ENGINEERING	No. of Days/per week class allotted:5	Semester from date: 04.02.2025 – 17.05.2025 No. of Weeks:15
Week	Class Day	Theory
1 st	1 st	Classification of Control system .
	2 nd	Open loop system & Closed loop system and its comparison & Effects of Feed back
	3 rd	Standard test Signals(Step, Ramp, Parabolic, Impulse Functions
	4 th	Servomechanism
	5 th	Question discussion & Doubt clearing
2 nd	1 st	Transfer Function & Impulse response, Properties, Advantages & Disadvantages of Transfer Function
	2 nd	Poles & Zeroes of transfer Function Simple problems of transfer function of network.
	3 rd	Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)
	4 th	Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)
	5 th	Question discussion & doubt clearing
3 rd	1 st	Components of Control System
	2 nd	Gyroscope, Synchros
	3 rd	Tachometer, DC servomotors
	4 th	Ac Servomotors
	5 th	Question discussion
4 th	1 st	Definition: Basic Elements of Block Diagram & Canonical Form of Closed loop Systems
	2 nd	Rules for Block diagram reduction
	3 rd	Procedure for of Reduction of Block Diagram
	4 th	Simple Problem for equivalent transfer function.
	5 th	Question discussion
5 th	1 st	Simple Problem for equivalent transfer function
	2 nd	Basic Definition in Signal Flow Graph & properties Construction of Signal Flow graph from Block diagram
	3 rd	Mason's Gain formula& Simple problems in Signal flow graph for network
	4 th	Simple problems in Signal flow graph for network
	5 th	Question discussion & doubt clearing
6 th	1 st	Time response of control system

	2 nd	Standard Test signal <ul style="list-style-type: none"> • Step signal, • Ramp Signal • Parabolic Signal • Impulse Signal
	3 rd	Time Response of first order system with: <ul style="list-style-type: none"> • Unit step response • Unit impulse response
	4 th	Time response of second order system to the unit step input. <ul style="list-style-type: none"> • Time response specification. • Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
	5 th	Question discussion & doubt clearing
7 th	1 st	Solve problems of different types
	2 nd	Steady state error and error constants.
	3 rd	Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	4 th	Effect of adding poles and zero to transfer function
	5 th	Question discussion & doubt clearing
8 th	1 st	Response with P, PI, PD and PID controller.
	2 nd	Response with P, PI, PD and PID controller.
	3 rd	Root locus concept.
	4 th	Construction of root loci.
	5 th	Question discussion & doubt clearing
9 th	1 st	Rules for construction of the root locus.
	2 nd	Rules for construction of the root locus.
	3 rd	Rules for construction of the root locus.
	4 th	Rules for construction of the root locus.
	5 th	Question discussion & doubt clearing
10 th	1 st	Solving various types of problems
	2 nd	Effect of adding poles and zeros to $G(s)$ and $H(s)$.
	3 rd	Effect of adding poles and zeros to $G(s)$ and $H(s)$.
	4 th	Effect of adding poles and zeros to $G(s)$ and $H(s)$.
	5 th	Question discussion & doubt clearing
11 th	1 st	Correlation between time response and frequency response
	2 nd	Polar plots
	3 rd	Polar plots
	4 th	Bode plots
	5 th	Solving various types of problems
12 th	1 st	Bode plots
	2 nd	All pass and minimum phase system
	3 rd	Computation of Gain margin and phase margin
	4 th	Log magnitude versus phase plot.
	5 th	Question discussion
13 th	1 st	Closed loop frequency response
	2 nd	Closed loop frequency response
	3 rd	Principle of argument

	4 th	Nyquist stability criterion
	5 th	Question discussion & doubt clearing
4 th	1 st	Nyquist stability criterion.
	2 nd	Nyquist stability criterion applied to inverse polar plot
	3 rd	Effect of addition of poles and zeros to $G(S)$ $H(S)$ on the shape of Nyquist plot
	4 th	Assessment of relative stability.
	5 th	Question discussion
15 th	1 st	Constant M and N circle
	2 nd	Constant M and N circle
	3 rd	Nicholas chart.
	4 th	Nicholas chart.
	5 th	Question discussion & doubt clearing


 Signature of faculty
 Lect.in Elect.Engg.
 Govt.Poly.Bhadrak