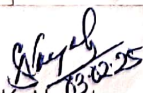
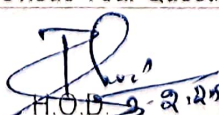


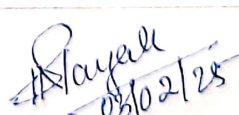
ACADEMIC SESSION : 2024-25

Discipline : Electrical, Engineering	Semester : 6TH	Name and Designation of the Teaching Faculty : Sri Shailesh Kumar Nayak, Lecturer Stage-II (ETC)
Subject : Control System Engineering	Nos. of days / week class allotted: 05	Semester wef : 04.02.2025 to 17.05.2025 Nos. of Weeks per Semester : 15
Week	Class Day	Theory/ Practical Topics
1ST	1 st	Fundamental of Control System Classification of Control system
	2 nd	Open loop system & Closed loop system and its comparison
	3 rd	Effects of Feed back
	4 th	Standard test Signals (Step, Ramp, Parabolic, Impulse Functions)
	5 th	Servomechanism
2ND	1 st	Mathematical Model of a System Transfer Function & Impulse response,
	2 nd	Properties, Advantages & Disadvantages of Transfer Function
	3 rd	Poles & Zeroes of transfer Function
	4 th	Simple problems of transfer function of network.
	5 th	Mathematical modelling of Electrical Systems (R, L, C, Analogous systems)
3RD	1 st	Components of Control System
	2 nd	Gyroscope, Synchros,
	3 rd	Tachometer
	4 th	DC servomotors
	5 th	Ac Servomotors
4TH	1 st	Definition: Basic Elements of Block Diagram
	2 nd	Canonical Form of Closed loop Systems, Rules for Block diagram reduction
	3 rd	Procedure for of Reduction of Block Diagram
	4 th	Simple Problem for equivalent transfer function
	5 th	Simple Problem for equivalent transfer function
5TH	1 st	Basic Definition in Signal Flow Graph & properties
	2 nd	Construction of Signal Flow graph from Block diagram
	3 rd	Mason's Gain formula
	4 th	Simple problems in Signal flow graph for network
	5 th	Simple problems in Signal flow graph for network
6TH	1 st	Time response of control system, Standard Test signal, Step signal,
	2 nd	Ramp Signal, Parabolic Signal, Impulse Signal
	3 rd	Time Response of first order system with Unit step response and Unit impulse response.
	4 th	Time response of second order system to the unit step input.
	5 th	Time response specification. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
7TH	1 st	Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
	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	Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	5 th	Effect of adding poles and zero to transfer function.

8 TH	1 st	Effect of adding poles and zero to transfer function.
	2 nd	Response with P, PI, PD and PID controller
	3 rd	Response with P, PI, PD and PID controller
	4 th	Root locus concept.
	5 th	Root locus concept.
9 TH	1 st	Construction of root loci.
	2 nd	Construction of root loci.
	3 rd	Rules for construction of the root locus.
	4 th	Rules for construction of the root locus.
	5 th	Effect of adding poles and zeros to $G(s)$ and $H(s)$.
10 TH	1 st	Effect of adding poles and zeros to $G(s)$ and $H(s)$.
	2 nd	Simple Problem
	3 rd	Simple Problem
	4 th	Simple Problem
	5 th	Correlation between time response and frequency response.
11 TH	1 st	Polar plots.
	2 nd	Polar plots.
	3 rd	Bode plots.
	4 th	Bode plots.
	5 th	All pass and minimum phase system.
12 TH	1 st	Computation of Gain margin and phase margin.
	2 nd	Computation of Gain margin and phase margin.
	3 rd	Log magnitude versus phase plot.
	4 th	Log magnitude versus phase plot.
	5 th	Closed loop frequency response
13 TH	1 st	Simple Problem
	2 nd	Simple Problem
	3 rd	NYQUIST PLOT, Principle of argument.
	4 th	Nyquist stability criterion.
	5 th	Nyquist stability criterion applied to inverse polar plot.
14 TH	1 st	Nyquist stability criterion applied to inverse polar plot.
	2 nd	Effect of addition of poles and zeros to $G(S)$ $H(S)$ on the shape of Nyquist 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	Constant M and N circle
15 TH	1 st	Constant M and N circle, Nicholas chart
	2 nd	Nicholas chart, Simple Problem
	3 rd	Simple Problem
	4 th	Simple Problem
	5 th	Review and Previous Year Question Discussion


 S. K. Nayak
 Lecturer Stage-II (ETC)
 GP Sonapur


 H. O. D.
 Electrical Engineering
 GP Sonapur


 Academic Coordinator
 G. P. Sonapur