ACADEMIC SESSION: 2025-26

Discipline: Electrical Engineering	Semester: 6th	Name of the Teaching Faculty: Sri Shailesh Kumar Nayak Lecturer Stage-II(ETC)
Subject: Control System Engineering	No. of days / week class allotted	Semester wef: 22/12/2025 to 18/04/2026 Nos. of Weeks per semester: 15
Week	Class Day	Theory Topics
1ST	1st	Fundamental Of Control System 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	Standard test Signals (Step, Ramp, Parabolic, Impulse Functions) Servomechanism
	5th	Servomechanism
2ND	1st	Mathematical Model of a System Transfer Function & Impulse response,
	2nd	Properties, Advantages & Disadvantages of Transfer Function
	3rd	Poles & Zeroes of transfer Function
	4th	Simple problems of transfer function of network.
	5th	Mathematical modeling of Electrical Systems (R, L, C, Analogous systems)
3RD	1st	Control System Components Components of Control System Gyroscope,
	2nd	Synchros
	3rd	Tachometer
	4th	DC servomotors
	5th	Ac Servomotors
4TH	1st	Block Diagram Algebra & Signal Flow Graphs Definition: Basic Elements of Block Diagram
	2nd	Canonical Form of Closed loop Systems
	3rd	Rules for Block diagram reduction
	4th	Procedure for of Reduction of Block Diagram Simple Problem for equivalent transfer function
	5th	Simple Problem for equivalent transfer function
5TH	1st	Basic Definition in Signal Flow Graph & properties
	2nd	Construction of Signal Flow graph from Block diagram
	3rd	Mason's Gain formula
	4th	Simple problems in Signal flow graph for network
	5th	Simple problems in Signal flow graph for network

6TH	1st	Time Response Analysis Time response of control system	
	2nd	Standard Test signal. Step signal, Ramp Signal, Parabolic Signal, Impulse Signal	
	3rd	Time Response of first order system with: Unit step response	
	4th	Time Response of first order system with: Unit impulse response.	
	5th	Time response of second order system to the unit step input. Time response specification.	
7TH	1st	Time response of second order system to the unit step input. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.	
	2nd	Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.	
	3rd	Steady state error and error constants	
	4th	Types of control system. [Steady state errors in Type-0, Type-1, Type-2 system]	
	5th	Types of control system. [Steady state errors in Type-0, Type-1, Type-2 system]	
8TH	1st	Effect of adding poles and zero to transfer function.	
	2nd	Effect of adding poles and zero to transfer function.	
	3rd	Response with P, PI, PD and PID controller.	
	4th	Response with P, PI, PD and PID controller.	
	5th	Revision	
9TH	1st	Analysis Of Stability By Root Locus Technique Root locus concept	
	2nd	Construction of root loci.	
	3rd	Construction of root loci.	
	4th	Rules for construction of the root locus.	
	5th	Rules for construction of the root locus.	
10TH	1st	Effect of adding poles and zeros to G(s) and H(s).	
	2nd	Effect of adding poles and zeros to G(s) and H(s).	
	3rd	Simple Problem	
	4th	Simple Problem	
	5th	Revision	
11TH	1st	Frequency Response Analysis Correlation between time response and frequency response	
	2nd	Polar plots.	
	3rd	Bode plots.	
	4th	All pass and minimum phase system.	
	5th	Computation of Gain margin and phase margin.	

12th	1st	Computation of Gain margin and phase margin.
	2nd	Log magnitude versus phase plot.
	3rd	Closed loop frequency response.
	4th	Revision
	5th	Revision
13th	1st	Nyquist Plot Principle of argument.
	2nd	Nyquist stability criterion.
	3rd	Niquist stability criterion applied to inverse polar plot
	4th	Niquist stability criterion applied to inverse polar plot
	5th	Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot.
14th	1st	Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot.
	2nd	Assessment of relative stability.
	3rd	Constant M and N circle
	4th	Constant M and N circle
	5th	Nicholas chart.
15th	1st	Nicholas chart.
	2nd	Simple Problem
	3rd	Simple Problem
	4th	Revision
	5th	Revision

Prepared By
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