

Discipline : Electrical	Semester : 6th	
Subject: Control system engineering	Theory periods/week: 4 Tutorial/week: 1	Faculty : Sashmita Behera (Lecturer ETC Engg.)
WEEK	DAY	TOPIC
1ST	1st	1. FUNDAMENTAL OF CONTROL SYSTEM 1.1. Classification of Control system
	2nd	1.2. Open loop system & Closed loop system and its comparison
	3rd	1.3 Effects of Feed back 1.4. Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	4th	1.5. Servomechanism
	5th	DOUBT CLEARING CLASS
2ND	1st	2. MATHEMATICAL MODEL OF A SYSTEM 2.1. Transfer Function & Impulse response,
	2nd	2.2. Properties, Advantages & Disadvantages of Transfer Function
	3rd	2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network.
	4th	2.5. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)
	5th	DOUBT CLEARING CLASS
3RD	1st	CLASS TEST
	2nd	3. CONTROL SYSTEM COMPONENTS 3.1. Components of Control System
	3rd	3.2. Gyroscope, Synchros
	4th	Tachometer, DC servomotors
	5th	Ac Servomotors
4TH	1st	DOUBT CLEARING CLASS
	2nd	4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS 4.1. Definition: Basic Elements of Block Diagram
	3rd	4.2. Canonical Form of Closed loop Systems
	4th	4.3. Rules for Block diagram reduction 4.4. Procedure for of Reduction of Block Diagram
	5th	4.5. Simple Problem for equivalent transfer function
5TH	1st	4.6. Basic Definition in Signal Flow Graph & properties
	2nd	4.7. Construction of Signal Flow graph from Block diagram
	3rd	4.8. Mason's Gain formula
	4th	4.9. Simple problems in Signal flow graph for network
	5th	DOUBT CLEARING CLASS
6TH	1st	CLASS TEST
	2nd	5. TIME RESPONSE ANALYSIS. 5 . 1 Time response of control system.

		5 . 2 Standard Test signal. 5.2.1. Step signal, 5.2.2. Ramp Signal 5.2.3. Parabolic Signal 5.2.4. Impulse Signal
	3rd	5 . 3 Time Response of first order system with: 5.3.1. Unit step response 5.3.2. Unit impulse response.
	4th	5 . 4 Time response of second order system to the unit step input. 5.4.1. Time response specification.
	5th	5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
7TH	1st	-----do-----
	2nd	5.4.3. Steady state error and error constants.
	3rd	5 . 5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	4th	-----do-----
	5th	5 . 6 Effect of adding poles and zero to transfer function
8TH	1st	5 . 7 Response with P, PI, PD and PID controller.
	2nd	DOUBT CLEARING CLASS
	3rd	CLASS TEST
	4th	6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE. 6 . 1 Root locus concept.
	5th	6 . 2 Construction of root loci.
9TH	1st	-----do-----
	2nd	6 . 3 Rules for construction of the root locus
	3rd	Problems
	4th	Problems
	5th	Problems
10TH	1st	6 . 4 Effect of adding poles and zeros to G(s) and H(s).
	2nd	Problems
	3rd	DOUBT CLEARING CLASS
	4th	CLASS TEST
	5th	7. FREQUENCY RESPONSE ANALYSIS. 7 . 1 Correlation between time response and frequency response.
11TH	1st	7 . 2 Polar plots.
	2nd	Problems
	3rd	7 . 3 Bode plots.
	4th	Problems
	5th	7 . 4 All pass and minimum phase system.
12TH	1st	7 . 5 Computation of Gain margin and phase margin.
	2nd	7 . 6 Log magnitude versus phase plot.

	3rd	Problems
	4th	7 . 7 Closed loop frequency response.
	5th	DOUBT CLEARING CLASS
13TH	1st	CLASS TEST
	2nd	8. NYQUIST PLOT 8.1 Principle of argument.
	3rd	8.2 Nyquist stability criterion.
	4th	8.3 Nyquist stability criterion applied to inverse polar plot.
	5th	Problems
14TH	1st	8.4 Effect of addition of poles and zeros to $G(S)$ $H(S)$ on the shape of Nyquist plot.
	2nd	Problems
	3rd	8.5 Assessment of relative stability.
	4th	Problems
	5th	8.6 Constant M and N circle
15TH	1st	8.7 Nicholas char
	2nd	Problems
	3rd	DOUBT CLEARING CLASS
	4th	CLASS TEST