Discipline- Electrical Engg.	Semester-6th	Name of the teaching faculty- Shilpita Panigrahi
Subject- Control System	No of days/week class allotted-5	No of weeks-15
Week	Class day	Theory topic
1	1st	**FUNDAMENTAL OF CONTROL SYSTEM -** Classification of Control system
	2nd	Open loop system & Closed loop system and its comparison
	3rd	Effects of Feed back
	4th	Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	5th	Servomechanism
2	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 modelling of Electrical Systems(R, L, C, Analogous systems)
3	1st	**CONTROL SYSTEM COMPONENTS -** Components of Control System
	2nd	Gyroscope, Synchros, Tachometer
	3rd	DC servomotors, Ac Servomotors
	4th	Doubt Clearing
	5th	Transfer function Solve
4	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	Practice block diagram reduction problems
	5th	Procedure for of Reduction of Block Diagram
5	1st	Simple Problem for equivalent transfer function
	2nd	Sensitivity Analysis
	3rd	Basic Definition in Signal Flow Graph & properties
	4th	Construction of Signal Flow graph from Block diagram
	5th	Mason‘s Gain formula
6	1st	Simple problems in Signal flow graph for network

	2nd	Problem practice on mason's gain formula
	3rd	**TIME RESPONSE ANALYSIS** Time response of control system.
	4th	Standard Test signal. Step signal
	5th	Ramp Signal, Parabolic signal
7	1st	Impulse Signal
	2nd	Time Response of first order system
	3rd	Unit step response
	4th	Unit impulse response
	5th	Time response of second order system to the unit step input
8	1st	Time response specification, Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error
	2nd	Steady state error and error constants. Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	3rd	Effect of adding poles and zero to transfer function
	4th	Response with P, PI, PD and PID controller
	5th	Numerical solving
9	1st	**ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE**
	2nd	Relative and absolute stability
	3rd	Root locus concept
	4th	Procedure to draw root locus diagram
	5th	Construction of root loci
10	1st	Breakeven point, centroid and asymtote
	2nd	Effect of adding poles and zeros to G(s) and H(s
	3rd	Stability analysis using root locus diagram
	4th	Angle of arrival and departure calculation
	5th	Gain margin and phase margin calculation using root locus
11	1st	Numerical solving
	2nd	**Doubt clearing**
	3rd	**FREQUENCY RESPONSE ANALYSIS -** Correlation between time response and frequency response
	4th	Polar plots
	5th	Polar plots

12	1st	Bode plots
	2nd	Bode plots
	3rd	Bode plots
	4th	All pass and minimum phase system
	5th	Computation of Gain margin and phase margin
13	1st	Computation of Gain margin and phase margin
	2nd	Computation of Gain margin and phase margin
	3rd	Numerical practice
	4th	Log magnitude versus phase plot
	5th	**NYQUIST PLOT -** Principle of argument
14	1st	Principle of argument
	2nd	Nyquist stability criterion
	3rd	Nyquist stability criterion
	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
15	1st	Assessment of relative stability
	2nd	Constant M and N circle
	3rd	Nicholas chart
	4th	Numerical Solving
	5th	Doubt clearing