LESSON PLAN

DEPARTMENT OF ELECTRICAL ENGINEERING, ITT, CHOUDWAR

SUBJECT:CONTROL SYSTEM ENGG **Periods:** 5 per week **SEMESTER:** 6TH

NAME OF FACULTY: S.Pani **No. of weeks:** 15

Week	Period	Theory / Practical Topics
1st	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
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
	2nd	Gyroscope, Synchros
	3rd	Tachometer, A C servomotors
	4th	DC servomotors
	5th	**BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS** Definition: Basic Elements of Block Diagram Canonical Form of Closed loop Systems
4th	1st	Rules for Block diagram reduction
	2nd	Procedure for of Reduction of Block Diagram
	3rd	Simple Problem for equivalent transfer function
	4th	Basic Definition in Signal Flow Graph & properties
	5th	Construction of Signal Flow graph from Block diagram
5th	1st	Mason's Gain formula
	2nd	Simple problems in Signal flow graph for network
	3rd	**TIME RESPONSE ANALYSIS.** Time response of control system.
	4th	Standard test Signals(Step, Ramp, Parabolic, Impulse Functions
	5th	Laplace transforms of different test signals.
6th	1st	Time Response of first order system with: Unit step response
	2nd	Unit impulse response.
	3rd	Time response of second order system to the unit step input.
	4th	Time response specification.
	5th	Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error
7th	1st	Numerical on time domain specifications
	2nd	Numerical on time domain specifications
	3rd	Steady state error and error constants
	4th	Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	5th	Problems on steady state errors
8th	1st	Effect of adding poles and zero to transfer function.

	2nd	Response with P, PI controller
	3rd	Response with PD and PID controller
	4th	**ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE** Root locus concept.
	5th	Construction of root loci.
9th	1st	Rules for construction of the root locus.
	2nd	Rules for construction of the root locus.
	3rd	Problems on Root Locus.
	4th	Problems on Root locus.
	5th	Effect of adding poles and zeros to G(s) and H(s).
10th	1st	**FREQUENCY RESPONSE ANALYSIS.** Correlation between time response and frequency response
	2nd	Derivation of frequency response specifications
	3rd	Calculation of Gain Margin and Phase margin of a system
	4th	Polar plots.
	5th	Rules to plot polar plot
11th	1st	Question solve on polar plots.
	2nd	Question solve on polar plots.
	3rd	Calculation of Gain margin and Phase margin from Polar plot.
	4th	Bode plots.
	5th	Question solve on bode plot
12th	1st	Question solve on bode plot
	2nd	All pass and minimum phase system.
	3rd	Computation of Gain margin and phase margin from Bode plots
	4th	Problems on Gain margin
	5th	Problems on Phase margin
13th	1st	Log magnitude versus phase plot
	2nd	Closed loop frequency response.
	3rd	**NYQUIST PLOT** Principle of argument
	4th	Nyquist stability criterion
	5th	Nyquist stability criterion applied to inverse polar 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	Probles on Nyquist criterion
	4th	Constant M and N circle
	5th	Nicholas chart.
15th	1st	Previous year Question discussion. & Doubt Clearing Class
	2nd	Previous year Question discussion. & Doubt Clearing Class
	3rd	Previous year Question discussion. & Doubt Clearing Class
	4th	Previous year Question discussion. & Doubt Clearing Class
	5th	Previous year Question discussion. & Doubt Clearing Class

Teaching Faculty