

LESSON PLAN

Discipline:- Elect. Engg.	Semester-6th	Name of the Teaching faculty:- Sri Suryamani Sahoo
Subject:- Control System Engg.	No. of days/per week class allotted- 04	Semester from date : 09.12.2019 to 31.03.2020 No. of weeks :- 15 (excluding X-Mass Holidays)
Week	Class day	Theory
1st	1st	1. Signal flowgraph:- Review of block diagrams and transfer function of multi variable system
	2nd	Review of block diagrams and transfer function of multi variable system
	3rd	Review of block diagrams and transfer function of multi variable system
	4th	Construction of signal flow graph.
2nd	1st	Basic properties of signal flow graph.
	2nd	Signal flow graph algebra
	3rd	Related problem discussion
	4th	Construction of signal flow graph for control system
3rd	1st	Related problem discussion
	2nd	2. Time response of analysis:- Time response of control system
	3rd	Standard test signal, 1) Step signal 2) Ramp 3) Parabolic 4) Impulse signal
	4th	Time response of first order system with 1) Unit step input 2) Unit impulse response
4th	1st	Time response of second order system to the unit step input.
	2nd	Time response specification
	3rd	Derivation of expression for rise time,
	4th	Derivation of expression peak time, peak overshoot.
5th	1st	Setting time and steady state error. Steady state error and error constant.
	2nd	Related numerical problem discussion
	3rd	Related numerical problem discussion

	4th	Types of control system [Steady state errors in Type-0, Type-1, Type-2 system]
6th	1st	Effect of adding poles and zeros to transfer function.
	2nd	Response with P, PI, controller
	3rd	Response with PD, PID controller
	4th	Numerical problem discussion
7th	1st	3. Analysis of stability by root Locus Technique:- Root Locus concept
	2nd	Construction of root Locus
	3rd	Construction of root Locus continued.
	4th	Rules for construction of the root Locus
8th	1st	Rules for construction of the root Locus continued.
	2nd	Rules for construction of the root Locus continued.
	3rd	Solving related problems.
	4th	Effect of adding poles to $G(S)$. $H(S)$
9th	1st	Effect of adding zeros to $G(S)$. $H(S)$
	2nd	Solving related numerical problem
	3rd	4. Frequency response analysis:- Co-relation between time response and frequency response
	4th	Polar plots
10th	1st	Solving numerical problems related to polar plot
	2nd	Concept of Bode plots
	3rd	Bode plots continued.
	4th	All pass and minimum phase system.
11th	1st	Computation of Gain margin & phase margin
	2nd	Solving related problems related G.M, F.M
	3rd	Solving related problems.
	4th	Log magnitude versus phase plot

12th	1st	Closed loop frequency response
	2nd	Closed loop frequency response
	3rd	5. Nyquist plot:- Principle of argument
	4th	Nyquist stability criteria
13th	1st	Nyquist stability criteria applied to inverse polar plot
	2nd	Effect of addition of poles to $G(S)$. $H(S)$ on the shape of Nyquist plot.
	3rd	Effect of addition of zeros to $G(S)$. $H(S)$ on the shape of Nyquist plot.
	4th	Solving problems
14th	1st	Solving problems
	2nd	Assessment of relative stability.
	3rd	Constant M circle
	4th	Constant N circle
15th	1st	Nicholas chart
	2nd	Doubt clearing & problem discussion
	3rd	Revision
	4th	Revision