

Lecture Plan

Name of teacher : Dr. Sakshi Kalra

Name of Subject: Control System (EI-210C)

Class: B.Tech/ (EIC.)

Semester: IV Sem

Unit/ Section No.	Name of Topic	Number of Lectures Required
1	System/Plant model, types of models, illustrative examples of plants and their inputs and outputs	2
	servomechanism, regulating system, Synchros, AC and DC techo-generators, servomotors, stepper motors, & their applications, magnetic amplifier.	2
	linear time-invariant (LTI) system, time-varying system, causal system, open loop control system, closed loop control system, illustrative examples of open-loop and feedback control systems, continuous time and sampled data control systems.	2
	Effects of feedback on sensitivity (to parameter variations), stability, external disturbance (noise), overall gain etc. Introductory remarks about non-linear control systems.	2
2	Concept of transfer function, relationship between transfer function and impulse response, order of a system	1
	block diagram algebra	2
	signal flow graphs : Mason's gain formula & its application	2
	characteristic equation, derivation of transfer functions of electrical and electromechanical systems.	1
	Transfer functions of cascaded and nonloading cascaded elements. Introduction to state variable analysis and design	2
3	Typical test signals, time response of first order systems to various standard inputs	2
	time response of 2nd order system to step input, relationship between location of roots of characteristics equation, ω and ω_n , time domain specifications of a general and an underdamped 2nd order system	3
	steady state error and error constants. Effect of adding pole-zero to a system, controllers.	2
4	Necessary and sufficient conditions for stability,	2
	Hurwitz stability criterion, Routh stability criterion and relative stability,	3
	Root Locus technique for stability.	3

5	Relationship between frequency response and time-response for 2nd order system	2
	polar, Nyquist, Bode plots, stability	3
	Gain-margin and Phase Margin, relative stability, frequency response specifications.	3
6	Necessity of compensation	1
	compensation networks,	1
	application of lag and lead compensation.	2

Total Lectures

43

TEXT BOOKS:

1. Control System Engineering : I.J.Nagrath&M.Gopal; New Age
2. Modern Control Engg : K.Ogata; PHI.

REFERENCE BOOKS:

1. Automatic Control Systems: B.C.Kuo, PHI.
2. Control Systems - Principles & Design : MadanGopal; Tata McGraw Hill.
3. Modern Control Engineering.R.C.Dorl& Bishop; Addison-Wesley