

DRONACHARYA COLLEGE OF ENGINEERING

KHENTAWAS, FARRUKHNAGAR, GURGAON, HR

Department: ECE

Academic Session: 2020-2021(MAY- AUG, 2021)

Lecture Plan with Assignment questions

Subject with code: Control System (PCC-ECE302G)

Name of Faculty with designation : Ms. Dimple Sapru , Associate Professor

S.No.	Month	Date & Day	Sem-Class	Unit	Topic/Chapter covered	Write Lecture Wise Questions
1			VI ECE	I	Terminology and Basic Structure-Feed forward and Feedback control theory	Q1) Input -Output Configuration of closed -loop system. Q2) Functional block diagram of the system
2			VI ECE	I	Electrical and Mechanical Transfer Function Models	Q1.What are the basic elements used for modeling mechanical translational system? Q2. Write the force balance equation of basic elements.
3			VI ECE	I	Block Diagram Algebra	Q1.What is Block Diagram? Q2.What are the basic components of Block diagram?
4			VI ECE	I	Block Diagram Algebra	Q1.A control system whose step response is $-0.5(1+e^{-2t})$ is cascaded to another control block whose impulse response is e^{-t} . What is the transfer function of the cascaded combination? Q2.If the initial conditions for a system are inherently zero, what does it physically mean?
5			VI ECE	I	Block Diagram Algebra	Q1. What is the overall transfer function from block diagram reduction for cascaded blocks? Q2.What is the overall transfer function of two blocks in parallel are
6			VI ECE	I	Models-Signal flow Graphs Models	Q1.Transfer function of the system is defined as the ratio of Laplace output to Laplace input considering initial conditions Q2.Oscillations in output response is due to :
7			VI ECE	I	Models-Signal flow Graphs Models	Q1.A signal flow graph is the graphical representation of the relationships between the variables of set linear algebraic equations. Q2What is a node.
8			VI ECE	I	Models-Signal flow Graphs Models	Q1.What do you mean by overall gain of the system Q2.Write the mason Gain equation

9			VI ECE	I	DC Servo Systems	Q1 Define transfer function. Q2) Write down the equation for Armature Control Dc Motor
10			VI ECE	I	AC Servo Systems	Q1.What is Servomechanism? Define back e.m.f Q2.
11			VI ECE	I	Multivariable Control System	Q1.Block Diagram Representation of multivariable control Q2.What is the resonant peak?
12			VI ECE	II	Transient response-steady state response	Q1.What is transient response Q2.What is steady state response Q3.Test signals used in time response analysis.
13			VI ECE	II	Measures of performance of the standard first order	Q1. Determine an expression for the time response when the system is subjected to i. Unit impulse input function and ii. Unit step function
14			VI ECE	II	Second order system-effect on an additional zero	Q1.Find out the time response of a second order system due to unit step input. Draw the response for under damped case and find steady state error.
15			VI ECE	II	Proportion Control,Derivative Control,integral Control	Q1. Write a note on Proportion Control Q2. Write a note on Derivative Control
16			VI ECE	II	PID Controller	Q1.What is the need of introducing compensating networks in a system? Q2.Describe Phase –Lead compensation in detail
17			VI ECE	II	Concept of stability- Input Bounded - Output stability	Q1.What is Stability Q2.Types of Systems based on Stability
18			VI ECE	II	Routh stability criterion	Q1 What is Routh Hurwitz Stability Criterion? Q2.What are marginally stable systems?
19			VI ECE	II	Root locus	Q1.What Guidelines for sketching root locus. Q2,Plot the Root locus of the equation $Ks/(S+1)$
20			VI ECE	III	Root locus	Q1.Determine the stability of the system represented by the characteristics equation $S^5 + S^4 + 2S^3 + 2S^2 + 3S + 5 = 0$. Comment on the location of the roots of characteristic equation. Q2.What is break away point
21			VI ECE	III	Bode Plot	Q1.What is the Correlation between time domain & frequency Domain for second order control system? Q2.What is angle of arrival
22			VI ECE	III	Bode Plot	Q1.What is Gain Margin? Q2.What is phase cross-over frequency?
23			VI ECE	III	Polar Plot	Q1. What is the difference between absolute stability and relative stability Q2.sketch the polar plot for $g(s)=1/s(s+1)$
24			VI ECE	III	Nyquist plots	Q1.Explain Nyquist stability criterion to determine the stability of closed - loop systems. Q2. What will be the effect on the stability of the System while increasing the Value of gain factor K of the sytem

25			VI ECE	III	Nyquist plots	Q1.By Nyquist stability criterion determine the stability of closed loop system, whose open loop transfer function is given by, $G(S) H(S) = \frac{(s+2)}{(s+1)(s-1)}$
26			VI ECE	III	Design of compensators using Bode plots-Cascade lead compensation-Cascade lag compensation-Cascade lag-lead compensation	Q1.What is the need of introducing compensating networks in a system? Q2.Describe Phase –Lead compensation in detail
27			VI ECE	IV	State variable representation-Conversion of state variable models to transfer functions	Q1.Advantages of state variable analysis. Q2. Define state Variable of the sytem
28			VI ECE	IV	Conversion of transfer functions to state variable models-Solution of state equations	Q1.Write the State space Representation of nth order differential equation Q2.Write the State Space representation for transfer Function
29			VI ECE	IV	Concepts of Controllability and Observability-Stability of linear systems-Equivalence between transfer function and state variable representations.s	Q1.Explain the term controllability observability. Q2. The transfer Function of the control sytem is given by $s+2/S^3+9s^2+26s+24$
30			VI ECE	IV	Equivalence between transfer function and state variable representations.	Q1 What is the Eigen Value of nXn non singular matrix Q2.Obtain the state space equation for the Transfer function Given $10(s+1)/(s+4)(s+2)^2$