

Bhoj Reddy Engineering College for Women: Hyderabad

Department of Electronics and Communication Engineering

Lesson Plan of faculty member for the academic year 2017 – 2018

Class: II B.Tech

Branch – Section: ECE - B

Semester: II

Subject: Control Systems (CS)

Lectures per week: 4+1(T)

Lecture Number	Topics to be covered	Date
UNIT – I: INTRODUCTION		
1.	Concepts of Control Systems- Open Loop and closed loop control systems and their differences-	18 December 2017
2.	Tutorial: Different examples of control systems- Classification of control systems	18 December 2017
3.	Feed-Back Characteristics, Effects of feedback	21 December 2017
4.	Mathematical models – Differential equations	22 December 2017
5.	Impulse Response and transfer functions	23 December 2017
6.	Translational mechanical systems	28 December 2017
7.	Problems	29 December 2017
8.	Rotational mechanical systems	30 December 2017
9.	Problems	04 January 2018
TRANSFER FUNCTION REPRESENTATION		
10.	Transfer Function of DC Servo motor	05 January 2018
11.	Transfer Function of AC Servo motor	06 January 2018
12.	Synchro transmitter	08 January 2018
13.	Synchro Receiver	11 January 2018
14.	Block diagram representation of systems	12 January 2018
15.	Block diagram algebra	13 January 2018
16.	Representation by Signal flow graph	18 January 2018
17.	Reduction using mason's gain formula	19 January 2018
UNIT-II : TIME RESPONSE ANALYSIS		
18.	Standard test signals, Time response of first order systems	20 January 2018
19.	Characteristic Equation of Feedback control systems	22 January 2018
20.	Tutorial : Transient response of second order systems	22 January 2018
21.	Time domain specifications	25 January 2018
22.	Steady state response, Steady state errors and error constants	27 January 2018
23.	Effects of proportional derivative	29 January 2018
24.	Tutorial: Proportional integral systems : PD Systems	29 January 2018
25.	Proportional integral systems : PI Systems	01 February 2018
UNIT – III : STABILITY ANALYSIS IN S-DOMAIN		
26.	The concept of stability, Routh's stability criterion	02 February 2018
27.	Qualitative stability and conditional stability	03 February 2018
28.	Root locus concept, Construction of root loci	05 February 2018
29.	Tutorial: Effects of adding poles and zeros to $G(s)H(s)$ on the root loci.	05 February 2018
30.	Effects of adding poles and zeros to $G(s)H(s)$ on the root loci.	10 February 2018
FREQUENCY RESPONSE ANALYSIS		
31.	Introduction, Frequency domain specifications	12 February 2018
32.	Tutorial: Bode diagrams	12 February 2018
33.	Bode diagrams	15 February 2018
34.	Determination of Frequency domain specifications and transfer function from the Bode Diagram	16 February 2018
35.	Phase margin and Gain margin	17 February 2018

36.	Stability Analysis from Bode Plots	19 February 2018
37.	Tutorial: Stability Analysis from Bode Plots	19 February 2018
38.	Stability Analysis from Bode Plots	22 February 2018
UNIT – IV : STABILITY ANALYSIS IN FREQUENCY DOMAIN		
39.	Polar Plots	23 February 2018
40.	Nyquist Plots	24 February 2018
41.	Nyquist Plots	26 February 2018
42.	Tutorial: Applications of Nyquist criterion to find the stability	26 February 2018
43.	Effects of adding poles and zeros to $G(s)H(s)$ on the shape of the Nyquist diagram	02 March 2018
44.	Effects of adding poles and zeros to $G(s)H(s)$ on the shape of the Nyquist diagram	03 March 2018
45.	Problems	05 March 2018
46.	Tutorial: Problems	05 March 2018
CLASSICAL CONTROL DESIGN TECHNIQUES		
47.	Compensation techniques	08 March 2018
48.	Compensation techniques	09 March 2018
49.	Lag Controllers design in frequency Domain	10 March 2018
50.	Lag Controllers design in frequency Domain	12 March 2018
51.	Tutorial: Lead Controllers design in frequency Domain	12 March 2018
52.	Lead Controllers design in frequency Domain	15 March 2018
53.	Lead-Lag Controllers design in frequency Domain	16 March 2018
54.	Lead-Lag Controllers design in frequency Domain	17 March 2018
55.	PID Controllers.	19 March 2018
UNIT – V : STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS		
56.	Tutorial: Concepts of state , State variables and State model	19 March 2018
57.	Derivation of state models from block diagrams	22 March 2018
58.	Derivation of state models from Transfer functions	23 March 2018
59.	Diagonalization	24 March 2018
60.	Solving the Time invariant state Equations	29 March 2018
61.	State Transition Matrix and it's Properties	31 March 2018
62.	Concepts of Controllability	02 April 2018
63.	Tutorial: Concepts of Observability	02 April 2018

TEXT BOOKS:

1. Automatic Control Systems 8th edition – by B.C.Kuo 2003 – John wiley and son's
2. Control Systems Engineering – by I.J.Nagrath and M.Gopal, New Age International (P) Limited Publishers, 2nd edition.

REFERENCE BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt.Ltd., 3rd edition, 1998.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd edition, 1998.
3. Control Systems Engg. By NISE 3rd edition – John wiley.
4. "Modelling and Control of Dynamic Systems" by Narciso F.Macia George J.Thaler, Thomson Publishers.

Name and Signature of the faculty: Ms P A Sravanthi

Name and Signature of Head of the Department: Ms N Shribala