Bhoj Reddy Engineering College for Women: Hyderabad

Department of Electronics and Communication Engineering

Lesson plan of faculty member for the academic year 2016–17

Class: III B Tech Branch-Section: ECE - C Semester: I

Subject: Control System Engineering Lectures per week: 4+1 (Tutorial)

Lecture Number	Topics to be covered	Date (s)
UNIT – I: Introduction and Transfer function Representation		
1	Concepts of Control Systems-	13 June 2016
2	Open Loop and closed loop control systems and their differences-	14 June 2016
3	Different examples of control systems- Classification of control systems	15 June 2016
4	Feed-Back Characteristics, Effects of feedback	16 June 2016
5	Tutorial(G3,G1,G2)problems on transfer function	14,17,18 June 2016
6	Impulse Response and transfer functions -	20 June 2016
7	Mathematical models – Differential equations	21 June 2016
8	Translational mechanical systems	22 June 2016
9	Rotational mechanical systems	23 June 2016
10	Tutorial(G3,G1,G2) problems on mechanical model	21,24,25 June 2016
11	Block diagram representation of systems	27 June 2016
12	Block diagram reduction	28 June 2016
13	Block diagram algebra	29 June 2016
14	Block diagram algebra	30 June 2016
15	Tutorial(G3,G1,G2) problems on block diagram reduction	28 June,1,2 July 2016
16	Representation by Signal flow graph	4 July 2016
17	Reduction using mason's gain formula	5 July 2016
18	Tutorial(G3,G1,G2) problems on block diagram reduction	5,8,9 July 2016
19	Block diagram representation of systems	4 July 2016
20	Block diagram algebra	5 July 2016
UNIT – II: TIME RESPONSE ANALYSIS		
21	Standard test signals	8, July 2016
22	Tutorial(G3,G1,G2) problems on block diagram reduction	5,8,9 July 2016
23	Time response of first order systems	11July 2016
24	Characteristic Equation of Feedback control systems	12 July 2016
25	Transient response of second order systems	13 July 2016
26	Time domain specifications, Steady state response	14 July 2016
27	Tutorial(G3,G1,G2) problems on related topic	12, 15, 16 July 2016
28	Steady state errors and error constants	18 July 2016
29	Effects of proportional derivative	19 July 2016
30	Proportional integral systems : PD Systems	20 July 2016
31	Proportional integral systems : PI, PID Systems	21 July 2016
32	Tutorial(G3,G1,G2) problems on Steady state response	19,22,23 July 2016
33	Proportional integral systems : PI, PID Systems	25 July 2016
34	Standard test signals	26 July 2016
35	Standard test signals	27 July 2016
UNIT – III: STABILITY ANALYSIS IN S-DOMAIN		
36	The concept of stability	28 July 2016
37	Tutorial(G3,G1,G2) problems on Root locus concept	26, 29,30 July 2016
38	Routh's stability criterion	1 August 2016
39	Qualitative stability and conditional stability	2 August 2016
40	Root locus concept Construction of root loci	3 August 2016
41	Construction of root loci	4 August 2016

42	Tutorial(G3,G1,G2) problems on Root locus concept	2,5,6 August 2016
43	Effects of adding poles and zeros to G(s)H(s) on the root loci	5 August 2016
44	Effects of adding poles and zeros to G(s)H(s) on the root loci	16 August 2016
UNIT – IV: FREQUENCY RESPONSE ANALYSIS		
45	Introduction, Frequency response analysis	17 August 2016
46	Frequency domain specifications	18 August 2016
47	Tutorial(G3,G1,G2) problems on Bode diagram	16,19,20 August 2016
48	Bode diagrams	22 August 2016
49	Determination of Frequency domain specifications and transfer function from the Bode Diagram	23 August 2016
50	Stability Analysis from Bode Plots	24 August 2016
51	Stability Analysis from Bode Plots	29 August 2016
52	Tutorial(G3,G1,G2) problems on Bode plots	23,26,27 August 2016
53	Stability Analysis from Bode Plots	30 August 2016
54	Polar Plots	31 August 2016
55	Polar Plots	1 September 2016
56	Nyquist Plots	2 September 2016
57	Tutorial G3,G1,G2) problems on polar plots	30,2,3 September 2016
58	Nyquist Plots	6 September 2016
59	Nyquist Plots	7 September 2016
60	Applications of Nyquist criterion to find the stability	8 September 2016
61	Tutorial(G3,G1,G2) problems on Polar Plots and Nyquist Plots	6,9,10 September 2016
62	Effects of adding poles and zeros to G(s)H(s) on Nyquist	13 September 2016
63	Effects of adding poles and zeros to G(s)H(s) on Nyquist	14 September 2016
64	Compensation techniques	15 September 2016
65	Tutorial(G3,G1,G2) Lead-Lag Controllers	13,16,17 September 2016
66	Lag Controllers design in frequency Domain	19 September 2016
67	Lag Controllers design in frequency Domain	20 September 2016
68	Lead Controllers design in frequency Domain	21 September 2016
69	Lead-Lag Controllers design in frequency Domain	22 September 2016
70	Tutorial(G3,G1,G2) problems on Lead-Lag Controllers	20,23,24 September 2016
71	PID Controllers.	26 September 2016
72	PID Controllers.	27 September 2016
UNIT – V: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS		
73	Concepts of state	28 September 2016
74	State variables and state model	29 September 2016
75	Tutorial(G3,G2) problems on state model	27 September ,1 October 201
76	Derivation of state models from block diagrams	3 October 2016
77	Diagonalization	4 October 2016
78	Tutorial(G1,G2) problems on state model	28,29 October 2016
79	Solving the Time invariant state Equations	31 October 2016
80	State Transition Matrix and it's Properties	1 November 2016
81	Controllability and observability	2 November 2016
82	problems on transition matrix	3 November 2016
83	Tutorial(G3,G1,G2) problems on Controllability and Observability	1,4,5 November 2016

Text books:

1. Control System Theory and Application – S.K Bhattacharya
2. Control Systems Engineering – by I.J. Nagrath and M.Gopal, New Age International (P) Limited Publishers, 2nd edition.
3. Control Systems by N.K. Sinha, New Age International (P) Limited Publishers, 3rd edition, 1998.
4. Control Systems Engineering - S. Palani, Tata-McGraw-Hill.

Name and signature of the faculty: A Navila ----

Name and signature of Head of the Department: Ms N Shribala ----