Bhoj Reddy Engineering College for Women: Hyderabad

Department of Electronics and Communication Engineering

Lesson plan of faculty member for the academic year 2017–18

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

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

Lecture Number	Topic to be covered	Date(s)
UNIT – I: Introduction		
1	Concepts of Control Systems	12 July 2017
2	Open Loop and closed loop control systems and their differences	14 July 2017
3	Different examples of control systems- Classification of control systems	15 July 2017
4	Tutorial(G3,G2) Review of basics	14,15 July 2017
5	Tutorial(G1,G3,G2) Problems on OLCS and CLCS	18,22,21 July 2017
6	Feed-Back Characteristics, Effects of feedback	19 July 2017
7	Impulse Response and transfer functions	21 July 2017
8	Mathematical models – Differential equations	22 July 2017
9	Translational mechanical systems	24 July 2017
10	Rotational mechanical systems	26 July 2017
11	Tutorial(G1,G3,G2) problems on mechanical model	25, 29, 28 July 2017
12	Electrical systems and Analogy between mechanical and electrical systems	28 July 2017
13	Block diagram representation of systems and Block diagram reduction	29 July 2017
14	Block diagram algebra	31 July 2017
15	Tutorial(G1,G3,G2) problems on block diagram reduction	1, 4, 5, August 2017
16	Representation by Signal flow graph	2 August 2017
17	Reduction using mason's gain formula	4 August 2017
UNIT - II: Time Response Analysis		
18	Standard test signals	5 August 2017
19	Time response of first order systems	7 August 2017
20	Tutorial(G1,G3,G2) problems on signal flow graph	8 August 2017
21	Characteristic Equation of Feedback control systems	9 August 2017
22	Transient response of second order systems	11 August 2017
23	Time domain specifications, Steady state response	12 August 2017
24	Tutorial(G3,G2) problems on related topic	18, 19, August 2017
25	Steady state errors and error constants	16 August 2017
26	Effects of proportional derivative	18 August 2017
27	Proportional integral systems : PD Systems	19 August 2017
28	Proportional integral systems : PI systems	21 August 2017
29	Tutorial(G1,G2) problems on Steady state response	22,26 August 2017
30	PID Systems and Problems on PD,PI and PID systems	23 August 2017
UNIT – III: Stability Analysis in S-Domain		
31	The concept of stability ,Routh's stability criterion	26 August 2017
32	Qualitative stability and conditional stability, Limitations of Routh's stability	28 August 2017
33	Tutorial (G1,G3) problems on related topic	29 August ,1 September 2017
34	Root locus concept, Construction of root loci	30 August 2017
35	Effects of adding poles and zeros to G(s)H(s) on the root loci.	1 September 2017
UNIT – IV: Frequency Response Analysis		
36	Introduction, Frequency domain specifications	4 September 2017
37	Tutorial(G3,G1) problems on Root locus concept	5,9 September 2017
38	Bode diagrams	9 September 2017
39	Bode diagrams	11 September 2017

40	Tutorial(G1,G3,G2) problems on related topic	12, 15,16 September 2017
41	Determination of Frequency domain specifications and transfer function from the Bode Diagram	13 September 2017
42	Phase margin and gain margin, Stability Analysis from Bode Plots	15 September 2017
43	Stability Analysis from Bode Plots	16 September 2017
44	Stability Analysis from Bode Plots	18 September 2017
45	Tutorial(G1,G3,G2) problems on Bode Plots	19,22, 23 September 2017
46	Polar Plots	22 September 2017
47	Nyquist Plots	23 September 2017
48	Tutorial(G1,G3,G2) problems on polar Plots	3 ,6,7 October 2017
49	Nyquist Plots	4 October 2017
50	Applications of Nyquist criterion to find the stability	6October 2017
51	Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagram	7 October 2017
52	Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagram	9 October 2017
53	Tutorial(G3,G1) problems on Polar Plots and Nyquist Plots	10,13,14 October 2017
54	Compensation techniques	11 October 2017
55	Lag Controllers design in frequency Domain	13 October 2017
56	Lag Controllers design in frequency Domain	14 October 2017
57	Lead controller design in frequency Domain	16 October 2017
58	Tutorial(G3,G1) problems on related topic	17, 20, 21 October 2017
59	Lead-Lag Controllers design in frequency Domain	20 October 2017
60	Lead-Lag Controllers design in frequency Domain	21 October 2017
61	PID Controllers.	23 October 2017
62	Tutorial(G1,G3,G2) problems on controller	24, 27,28 October 2017
63	PID Controllers.	25 October 2017
UNIT – V: State Space Analysis of Continuous Systems		
64	Concepts of state	27 October 2017
65	State variables and state model	28 October 2017
66	Derivation of state models from block diagrams	30 October 2017
67	Tutorial(G1,G3) problems on state model	31 October,3 November 2017
68	Diagonalization	1 November 2017
69	Solving the Time invariant state Equations	3 November 2017
70	State Transition Matrix and it's Properties	6 November 2017
71	Concepts of Controllability and Observability	7 November 2017

TEXT BOOKS:

1. Control Systems Engineering – by I.J.Nagrath and M.Gopal, New Age International (P) Limited Publishers, 2nd edition.
2. Control Systems Theory and Applications – S K Bhattacharya, Pearson
3. Control Systems – A Anand Kumar, PHI
4. Problems and Solutions of Control Systems by A K Jairath

Name and signature of the faculty: N.Ritishree ----

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