

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: II B Tech

Branch-Section: ECE-A

Semester: II

Subject: Control Systems

Lectures per week: 4+1 (Tutorial)

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

38	Stability Analysis from Bode Plots	20 February 2018
39	Stability Analysis from Bode Plots	21 February 2018
40	Stability Analysis from Bode Plots	23 February 2018
UNIT-IV: Stability Analysis in Frequency Domain		
41	Tutorial: Polar Plots	23 February 2018
42	Nyquist Plots	26 February 2018
43	Nyquist Plots	27 February 2018
44	Applications of Nyquist criterion to find the stability	28 February 2018
45	Effects of adding poles and zeros to $G(s)H(s)$ on the shape of the Nyquist diagram	2 March 2018
46	Tutorial: Effects of adding poles and zeros to $G(s)H(s)$ on the shape of the Nyquist diagram	2 March 2018
47	Problems	5 March 2018
Classical Control Design Techniques		
48	Compensation techniques	6 March 2018
49	Compensation techniques	7 March 2018
50	Lag Controllers design in frequency Domain	9 March 2018
51	Tutorial: Lag Controllers design in frequency Domain	9 March 2018
52	Lead Controllers design in frequency Domain	12 March 2018
53	Lead Controllers design in frequency Domain	13 March 2018
54	Lead-Lag Controllers design in frequency Domain	14 March 2018
55	Lead-Lag Controllers design in frequency Domain	16 March 2018
56	Tutorial: PID Controllers.	16 March 2018
UNIT-V: State Space Analysis of Continuous Systems		
57	Concepts of state , State variables and State model	19 March 2018
58	Derivation of state models from block diagrams	20 March 2018
59	Derivation of state models from Transfer functions	21 March 2018
60	Diagonalization	23 March 2018
61	Tutorial: Solving the Time invariant state Equations	23 March 2018
62	State Transition Matrix and it's Properties	27 March 2018
63	Concepts of Controllability	28 March 2018
64	Concepts of Observability	2 April 2018
65	Previous JNTU Paper discussion	3 April 2018
66	Revision	4 April 2018

Text books:

1. B C Kuo, "Automatic Control Systems", John wiley and sons, 8/e, 2003.
2. I J Nagrath and M Gopal, "Control Systems Engineering", New Age International (P) Limited, 5/e, 2009.
3. A Nagoor Kani, "Control Systems", 2/e, RBA Publications, 2013.

Name and signature of the faculty: Radhika Ravikrindi ----

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