

Bhoj Reddy Engineering College for Women: Hyderabad  
Department of Electronics and Communication Engineering  
Lesson plan of faculty member for the academic year 2018–19

Class: II B Tech

Branch-Section: ECE-A

Semester: II

Subject: Control Systems

Lectures per week: 4+1 (Tutorial)

Lecture Number	Topic to be covered	Date(s)
<b>UNIT – I: Introduction</b>		
1	Concepts of Control Systems	27 December 2018
2	Open Loop and closed loop control systems and their differences	28 December 2018
3	Tutorial: Different examples of control systems- Classification of control systems	29 December 2018
4	Feed-Back Characteristics, Effects of feedback, Mathematical models – Differential equations	31 December 2018
5	Impulse Response and transfer functions	03 January 2019
6	Problems on transfer function	04 January 2019
7	Tutorial: Translational mechanical systems	05 January 2019
8	Problems on Translational mechanical systems	07 January 2019
9	Rotational mechanical systems	08 January 2019
10	Problems on Rotational mechanical systems	10 January 2019
11	Problems on mechanical model	11 January 2019
12	Tutorial: Transfer Function Representation: Transfer Function of DC Servo motor	12 January 2019
13	AC Servo motor	17 January 2019
14	Synchro transmitter and Receiver	18 January 2019
15	Tutorial: Block diagram representation of systems considering electrical systems as examples	19 January 2019
16	Block diagram algebra	21 January 2019
17	Problems on block diagram reduction	22 January 2019
18	Representation by Signal flow graph	24 January 2019
19	Reduction using mason's gain formula	25 January 2019
20	Problems on signal flow graph	28 January 2019
<b>UNIT - II: Time Response Analysis</b>		
21	Standard test signals	29 January 2019
22	Time response of first order systems	31 January 2019
23	Characteristic Equation of Feedback control systems	01 February 2019
24	Tutorial: Transient response of second order systems	02 February 2019
25	Transient response of second order systems	04 February 2019
26	Problems on related topic	05 February 2019
27	Time domain specifications, Steady state response	07 February 2019
28	Steady state errors and error constants	08 February 2019
29	Tutorial: Problems on steady state errors	09 February 2019
30	Effects of proportional derivative systems	11 February 2019
31	Effects of proportional integral systems	12 February 2019
<b>UNIT – III: Stability Analysis</b>		
32	<b>Stability Analysis:</b> The concept of stability, Routh's stability criterion	14 February 2019
33	Problems on stability	15 February 2019
34	Tutorial: Qualitative stability and conditional stability, Limitations of Routh's stability	16 February 2019
35	<b>Root Locus Technique:</b> Root locus concept, Construction of root loci	21 February 2019

36	Effects of adding poles and zeros to $G(s)H(s)$ on the root loci.	22 February 2019
37	Tutorial: Effects of adding poles and zeros to $G(s)H(s)$ on the root loci.	23 February 2019
38	<b>Frequency Response Analysis:</b> Introduction, Frequency domain specifications	25 February 2019
39	Bode diagrams	26 February 2019
40	Bode diagrams	28 February 2019
41	Determination of Frequency domain specifications and transfer function from the Bode Diagram	01 March 2019
42	Tutorial: Determination of Frequency domain specifications and transfer function from the Bode Diagram	02 March 2019
43	Phase margin and gain margin, Stability Analysis from Bode Plots	05 March 2019
44	Stability Analysis from Bode Plots	07 March 2019
<b>UNIT – IV: Stability Analysis in Frequency Domain and Classical Control Design Techniques</b>		
45	<b>Stability Analysis in Frequency Domain:</b> Polar Plots	08 March 2019
46	Tutorial: Problems on Polar plots	09 March 2019
47	Nyquist Plots	11 March 2019
48	Problems on Nyquist Plots	12 March 2019
49	Applications of Nyquist criterion to find the stability	14 March 2019
50	Effects of adding poles and zeros to $G(s)H(s)$ on the shape of the Nyquist diagram	15 March 2019
51	Tutorial: Effects of adding poles and zeros to $G(s)H(s)$ on the shape of the Nyquist diagram	16 March 2019
52	<b>Classical Control Design Techniques:</b> Compensation techniques	18 March 2019
53	Lag Controllers design in frequency Domain	19 March 2019
54	Lag Controllers design in frequency Domain	22 March 2019
55	Tutorial: Lead Controllers design in frequency Domain	23 March 2019
56	Lead-Lag Controllers design in frequency Domain	25 March 2019
57	Lead-Lag Controllers design in frequency Domain	26 March 2019
58	PID Controllers.	28 March 2019
59	problems on controller	29 March 2019
60	Tutorial: Problems on controller	30 March 2019
<b>UNIT – V: State Space Analysis of Continuous Systems</b>		
61	Concepts of state	01 April 2019
62	State variables and state model	02 April 2019
63	State variables and state model	04 April 2019
64	Problems on state model	08 April 2019
65	Derivation of state models from block diagrams	09 April 2019
66	Derivation of state models from block diagrams	11 April 2019
67	Diagonalization	12 April 2019
68	Tutorial: Solving the Time invariant state Equations	13 April 2019
69	Solving the Time invariant state Equations	15 April 2019
70	State Transition Matrix and it's Properties	16 April 2019
71	State Transition Matrix and it's Properties	18 April 2019
72	Tutorial: Revision	20 April 2018

**TEXT BOOKS:**

1. "I. J. Nagrath and M. Gopal", "Control Systems Engineering", New Age International (P) Limited, Publishers, 5th edition, 2009
2. "B. C. Kuo", "Automatic Control Systems", John Wiley and sons, 8th edition, 2003.
3. "NISE", "Control Systems Engineering", John Wiley, 6th Edition, 2011.
4. "A. Anand Kumar", Control Systems, PHI
5. "Katsuhiko Ogata", "Modern Control Engineering", Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

Name and signature of the faculty: S Manjula ----

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