CONTROL SYSTEM LESSON PLAN (134AM)

S.no	Unit no	Topic	Week	No of sessions planned	Mode of teaching BB/PPT/OHP/MM	Reference *	Remarks
1	I	Concepts of Control System		1	BB	T1 & R3	
2	I	Open Loop and Closed Loop control systems and their differences		1	BB	T1 & R3	
3	I	Different Examples of Control systems		1	BB	T1 & R3	
4	I	Classification of control systems, Feedback characteristics		1	BB	T1 & R3	
5	I	Effects of feedback		1	BB	T1 & R3	
6	I	Mathematical models-Differential Equations, Impulse response, transfer functions		1	BB	T1 & R3	
7	I	Mathematical modeling of mechanical (translation and rotational) Electrical-mechanical analogies		2	BB	T1 & R3	
8	I	Functions of Dc servo motor – AC servo motor		1	BB	T1 & R3	
9	I	Transfer function of armature controlled and field controlled dc motor		2	BB	T1 & R3	
10	I	Synchro transmitter and Receiver		1	BB	T1 & R3	
11	I	block diagram representation of systems considering electrical systems as examples		2	BB	T1 & R3	
12	I	block diagram algebra		1	BB	T1 & R3	
13	I	Signal flow graphs		2	BB	T1 & R3	
14	I	Reduction using Mason's gain formula		1	BB	T1 & R3	

Sl.no	TB No.	NAME OF THE TEXT BOOK	AUTHOR		
1	T1	Control Systems Engineering	I.J NAGRATH & M.GOPAL		
2	T2	Modern Control Engineering	Katsuhiko Ogata		
3	R1	Control Systems	N.K. Sinha		
4	R2	Control Systems Engg	NISE		
5	R3	CONTROL SYSTEM	A.NAGOORKANI		
6	R4	CONTROL SYSTEM	JAIRATH		

BB	Black Board
PPT	Power Point Presentation
OHP	Over Head Projector
MM	Multimedia (Audio - Vedio)

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15	II	Standard test signals		1	BB	T1 & R3	
16	II	Time Response of first order systems		1	BB	T1 & R3	
17	II	Characteristic equation of Feedback control systems		1	BB	T1 & R3	
18	II	Transient response of second order systems		1	BB	T1 & R3	
19	II	Time domain specifications		2	BB	T1 & R3	
20	II	Steady state response		1	BB	T1 & R3	
21	II	Steady state errors and error constants		1	BB	T1 & R3	
22	II	Effects of proportional derivative and proportional integral systems		1	BB	T1 & R3	
23	II	Problems		1	BB	T1 & R3	
24	III	Stability analysis – characteristics		1	BB	T1 & R3	
25	III	Location of roots in s-plane for stability		1	BB	T1 & R3	
26	III	Routh's stability criterion		2	BB	T1 & R3	
27	III	Relative stability and conditional stability		1	BB	T1 & R3	
28	III	Root locus technique: root locus concept		2	BB	T1 & R3	
29	III	Effects of adding poles and zeros to G(s)H(s) on the root locus		1	BB	T1 & R3	
30	III	Introduction		1	BB	T1 & R3	
31	III	Frequency domain specifications		1	BB	T1 & R3	
32	III	Bode diagrams		2	BB	T1 & R3	
33	III	Determination of Frequency domain specifications and transfer function from the Bode Diagrams		1	BB	T1 & R3	
34	III	Phase margin and Gain margin		1	BB	T1 & R3	
35	III	Stability Analysis from Bode plots		1	BB	T1 & R3	
36	III	Problems		1	BB	T1 & R3	

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37	IV	Polar plots		2	BB	T1 & R3	
38	IV	Constant M and N circles		1	BB	T1 & R3	
39	IV	Problems		1	BB	T1 & R3	
40	IV	Nyquist plot		2	BB	T1 & R3	
41	IV	Nyquist Chart		1	BB	T1 & R3	
42	IV	Problems		1	BB	T1 & R3	
43	IV	Compensation Techniques		1	BB	T1 & R3	
44	IV	Lag, Lead		1	BB	T1 & R3	
45	IV	Lead – Lag controllers design in frequency domain		1	BB	T1 & R3	
46	IV	Design of lead, lag, lead-lag compensation networks using bode plot technique		1	BB	T1 & R3	
47	IV	Problems		1	BB	T1 & R3	
48	IV	PID Controllers		1	BB	T1 & R3	
49	IV	Design of PI, PD and PID using bode plot technique		1	BB	T1 & R3	
50	IV	Problems		1	BB	T1 & R3	
51	V	Concepts of state, state variables and state models		1	BB	T1 & R3	
52	V	Derivation of state models from block diagrams		1	BB	T1 & R3	
53	V	Diagonalization – Solving Time invariant state equations		1	BB	T1 & R3	
54	V	State transition matrix and its properties		1	BB	T1 & R3	
55	V	Concepts of Controllability and Observability		1	BB	T1 & R3	

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