

ACADEMIC LESSON PLAN OF SUMMER 2022

Discipline: Electrical	Semester: 6 th (1 st Shift)	Name of the Teaching Faculty: Smt. Sunita Oram
Subject: TH-3 (Control System Engineering)	No. of days/per week class allotted: 4p/week Tutorial: 1p/week	Semester From: 10 th March 2022 to 10 th Jun 2022
Week	Class Day	Theory Topics
1 st	10-03-22	1. FUNDAMENTAL OF CONTROL SYSTEM 1.1. Classification of Control system 1.2. Open loop system & Closed loop system and its comparison
	10-03-22	1.3. Effects of Feed back 1.4. Standard test Signals (Step, Ramp, Parabolic, Impulse Functions)
	12-03-22	1.5. Servomechanism
	12-03-22	2. MATHEMATICAL MODEL OF A SYSTEM 2.1. Transfer Function & Impulse response, 2.2. Properties, Advantages & Disadvantages of Transfer Function
	15-03-22	Tutorial
2 nd	17-03-22	2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network.
	17-03-22	2.5. Mathematical modeling of Electrical Systems (R, L, C, Analogous systems)
	19-03-22	Holiday
	19-03-22	Holiday
	22-03-22	Tutorial
3 rd	24-03-22	3. CONTROL SYSTEM COMPONENTS 3.1. Components of Control System
	24-03-22	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors. (Contd)
	26-03-22	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors. (Contd)
	26-03-22	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.
	29-03-22	Tutorial
4 th	31-03-22	4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS 4.1. Definition: Basic Elements of Block Diagram
	31-03-22	4.2. Canonical Form of Closed loop Systems 4.3. Rules for Block diagram reduction (Contd)
	02-04-22	4.3. Rules for Block diagram reduction (Contd) 4.4. Procedure for of Reduction of Block Diagram
	02-04-22	4.5. Simple Problem for equivalent transfer function (Contd.)
	05-04-22	Tutorial
5 th	07-04-22	4.5. Simple Problem for equivalent transfer function 4.6. Basic Definition in Signal Flow Graph & properties
	07-04-22	4.7. Construction of Signal Flow graph from Block diagram 4.8. Mason's Gain formula
	09-04-22	4.9. Simple problems in Signal flow graph for network (Contd.)
	09-04-22	4.9. Simple problems in Signal flow graph for network.
	12-04-22	Tutorial
6 th	14-04-22	Holiday
	14-04-22	Holiday
	16-04-22	5. TIME RESPONSE ANALYSIS. 5.1 Time response of control system. 5.2 Standard Test signal. 5.2.1. Step signal, 5.2.2. Ramp Signal 5.2.3. Parabolic Signal 5.2.4. Impulse Signal 5.3 Time Response of first order system with: 5.3.1. Unit step response
	16-04-22	5.3.2. Unit impulse response. 5.4 Time response of second order system to the unit step input. 5.4.1. Time response specification. (Contd.)
	19-04-22	5.4.1. Time response specification. 5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling

		time and steady state error.(Contd.)
7 th	21-04-22	5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
	21-04-22	Tutorial
	23-04-22	5.4.3. Steady state error and error constants(cont.)
	23-04-22	5.4.3. Steady state error and error constants
	26-04-22	5 .5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
8 th	28-04-22	5 .6 Effect of adding poles and zero to transfer function.
	28-04-22	Tutorial
	30-04-22	5 .7 Response with P, PI, PD and PID controller(Contd.)
	30-04-22	5 .7 Response with P, PI, PD and PID controller
	03-05-22	Holiday
9 th	05-05-22	6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE. 6. 1 Root locus concept.(cont.)
	05-05-22	6. 1 Root locus concept.
	07-05-22	Tutorial
	07-05-22	6. 2 Construction of root loci.(cont.)
	10-05-22	6. 2 Construction of root loci.
10 th	12-05-22	6. 3 Rules for construction of the root locus. (cont.)
	12-05-22	6. 3 Rules for construction of the root locus.(cont.)
	14-05-22	Tutorial
	14-05-22	6. 3 Rules for construction of the root locus.(cont.)
	17-05-22	6. 3 Rules for construction of the root locus.(cont.)
11 th	19-05-22	6. 3 Rules for construction of the root locus.
	19-05-22	6. 4 Effect of adding poles and zeros to G(s) and H(s).
	21-05-22	Tutorial
	21-05-22	7. FREQUENCY RESPONSE ANALYSIS. 7. 1 Correlation between time response and frequency response.
	24-05-22	7. 2 Polar plots.(cont.)
12 th	26-05-22	7. 2 Polar plots.(cont.)
	26-05-22	7. 2 Polar plots.(cont.)
	28-05-22	Tutorial
	28-05-22	7. 3 Bode plots.(cont.)
	31-05-22	7. 3 Bode plots.(cont.)
13 th	02-06-22	7. 3 Bode plots.(cont.)
	02-06-22	7. 4 All pass and minimum phase system. 7. 5 Computation of Gain margin and phase margin(contd,)
	04-06-22	7. 4 All pass and minimum phase system. 7. 5 Computation of Gain margin and phase margin
	04-06-22	Tutorial
	07-06-22	7. 6 Log magnitude versus phase plot.
14 th	09-06-22	7. 7 Closed loop frequency response.
	09-06-22	8. NYQUIST PLOT 8.1 Principle of argument
	Extra Class	8.2 Nyquist stability criterion.(cont.)
	Extra Class	Tutorial
	Extra Class	8.3 Nyquist stability criterion applied to inverse polar plot.(cont.)
15 th	Extra Class	8.3 Nyquist stability criterion applied to inverse polar plot.(cont.)
	Extra Class	8.3 Nyquist stability criterion applied to inverse polar plot.
	Extra Class	8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Nyquist plot.
	Extra Class	Tutorial
	Extra Class	8.5 Assessment of relative stability.
16 th	Extra Class	8.6 Constant M and N circle.(cont.)
	Extra Class	8.6 Constant M and N circle
	Extra Class	8.7 Nicholas chart.(contd.)
	Extra Class	8.7 Nicholas chart.
	Extra Class	Tutorial

Signature of Teaching Faculty

Discipline: Electrical	Semester: 6 th (2 nd Shift)	Name of the Teaching Faculty: Sunita Oram
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	14-03-22	1.3. Effects of Feed back 1.4. Standard test Signals (Step, Ramp, Parabolic, Impulse Functions)
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	15-03-22	2. MATHEMATICAL MODEL OF A SYSTEM 2.1. Transfer Function & Impulse response, 2.2. Properties, Advantages & Disadvantages of Transfer Function
	16-03-22	Tutorial
2 nd	18-03-22	Holiday
	21-03-22	2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network. (contd)
	22-03-22	2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network.
	22-03-22	2.5. Mathematical modeling of Electrical Systems (R, L, C, Analogous systems) (Contd.)
	23-03-22	2.5. Mathematical modeling of Electrical Systems (R, L, C, Analogous systems)
3 rd	25-03-22	Tutorial
	28-03-22	3. CONTROL SYSTEM COMPONENTS 3.1. Components of Control System
	29-03-22	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors. (Contd)
	29-03-22	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors. (Contd)
	30-03-22	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.
4 th	04-04-22	Tutorial
	05-04-22	4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS 4.1. Definition: Basic Elements of Block Diagram
	05-04-22	4.2. Canonical Form of Closed loop Systems 4.3. Rules for Block diagram reduction (Contd.)
	06-04-22	4.3. Rules for Block diagram reduction (Contd) 4.4. Procedure for of Reduction of Block Diagram
	08-04-22	4.5. Simple Problem for equivalent transfer function (Contd.)
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		5 . 4 Time response of second order system to the unit step input. 5.4.1. Time response specification.(Contd.)
	22-04-22	5.4.1. Time response specification. 5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.(Contd.)
7 th	25-04-22	5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
	26-04-22	Tutorial
	26-04-22	5.4.3. Steady state error and error constants(cont.)
	27-04-22	5.4.3. Steady state error and error constants
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	18-05-22	6. 3 Rules for construction of the root locus.(cont.)
	20-05-22	Tutorial
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	24-05-22	6. 3 Rules for construction of the root locus.(cont.)
	24-05-22	6. 3 Rules for construction of the root locus.
	25-05-22	6. 4 Effect of adding poles and zeros to G(s) and H(s).
	27-05-22	Tutorial
12 th	31-05-22	7. FREQUENCY RESPONSE ANALYSIS. 7. 1 Correlation between time response and frequency response.
	31-05-22	7. 2 Polar plots.(cont.)
	01-06-22	7. 2 Polar plots.(cont.)
	03-06-22	7. 2 Polar plots.(cont.)
	06-06-22	Tutorial
13 th	07-06-22	7. 3 Bode plots.(cont.)
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	Extra Class	Tutorial
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