GANDHI SCHOOL OF ENGINEERING

BHABANDHA, BERHAMPUR

BRANCH:- ELECTRICAL ENGINEERING

SEMESTER:- 6TH

SUBJECT:- CONTROL SYSTEM ENGINEERING

GROUP- 1&2

Name of the Faculty- ER. AMARESH CHOUDHURY & ER. MONALISA GOUDA

		Topic to be taken				Actual topictaken		
Sl. No	**Topic/Module**	**No. of period**	**Details of the topics**	**Date**	**Topic No.**	**Topic Name**	**Date**	**Remarks**
1	Fundamental of control system	04	1.1. Classification of Control system 1.2. Open loop system & Closed loop system and its comparison 1.3. Effects of Feed back 1.4. Standard test Signals(Step, Ramp, Parabolic, Impulse Functions) 1.5. Servomechanism	18.01.2024 TO 22.01.2024	1.1 1.2 1.3 1.4 1.5	1.1. Classification of Control system 1.2. Open loop system & Closed loop system and its comparison 1.3. Effects of Feed back 1.4. Standard test Signals(Step, Ramp, Parabolic, Impulse Functions) 1.5. Servomechanism	18.01.2024 19.01.2024 20.01.2024 22.01.2024	
2	Mathematical model of a system	12	2.1. Transfer Function & Impulse response, 2.2. Properties, Advantages & Disadvantages of Transfer Function 2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network. 2.5. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems) .	24.01.2024 TO 12.02.2024	2.1 2.2 2.3 2.4 2.5	2.1. Transfer Function & Impulse response, 2.2. Properties, Advantages & Disadvantages of Transfer Function 2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network. 2.5. Mathematical modeling of Electrical Systems(R, L, C,	24.01.2024 25.01.2024 31.01.2024 01.02.2024 02.02.2024 03.02.2024 05.02.2024 06.02.2024 07.02.2024 08.02.2024 09.02.2024 10.02.2024 12.02.2024	

						Analogous systems)		

3	Control system components	12	3.1. Components of Control System 3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors	13.02.2024 TO 27.02.2024	3.1 3.2	3.1. Components of Control System 3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors	13.02.2024 15.022024 16.02.2024 17.02.2024 19.02.2024 20.02.2024 21.02.2024 22.02.2024 23.02.2024 24.02.2024 26.02.2024 27.02.2024	
4	Control system components	10	4.1. Definition: Basic Elements of Block Diagram 4.2. Canonical Form of Closed loop Systems 4.3. Rules for Block diagram reduction 4.4. Procedure for of Reduction of Block Diagram 4.5. Simple Problem for equivalent transfer function 4.6. Basic Definition in Signal Flow Graph & properties 4.7. Construction of Signal Flow graph from Block diagram 4.8. Mason‘s Gain formula 4.9. Simple problems in Signal flow graph for network	28.02.2024 TO 13.03.2024	4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9	4.1. Definition: Basic Elements of Block Diagram 4.2. Canonical Form of Closed loop Systems 4.3. Rules for Block diagram reduction 4.4. Procedure for of Reduction of Block Diagram 4.5. Simple Problem for equivalent transfer function 4.6. Basic Definition in Signal Flow Graph & properties 4.7. Construction of Signal Flow graph from Block diagram 4.8. Mason‘s Gain formula 4.9. Simple problems in Signal flow graph for network	28.02.2024 29.02.2024 01.03.2024 02.03.2024 04.03.2024 06.03.2024 07.03.2024 11.03.2024 12.03.2024 13.03.2024	

5	TIME RESPONSE ANALYSIS	10	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 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. 5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error. 5.4.3. Steady state error and error constants. 5.5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system] 5.6 Effect of adding poles and zero to transfer function. 5.7 Response with P, PI, PD and PID controller	14.03.2024 TO 27.03.2024	5.1 5.2 5.2.1 5.2.2 5.2.3 5.2.4 5.3 5.3.1 5.3.2 5.4 5.4.1 5.4.2 5.4.3 5.5 5.6 5.7 5.5 5.6 5.7	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 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. 5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error. 5.4.3. Steady state error and error constants. 5.5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system] 5.6 Effect of adding poles and zero to transfer function. 5.7 Response with P, PI, PD and PID controller	14.03.2024 15.03.2024 16.03.2024 18.02.2024 19.03.2024 20.03.2024 21.03.2024 22.03.2024 23.03.2024 27.03.2024	

6	ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE.	10	6.1 Root locus concept. 6.2 Construction of root loci. 6.3 Rules for construction of the root locus. 6.4 Effect of adding poles and zeros to G(s) and H(s).	28.03.2024 TO 10.04.2024	6.1 6.2 6.3 6.4	6.1 Root locus concept. 6.2 Construction of root loci. 6.3 Rules for construction of the root locus. 6.4 Effect of adding poles and zeros to G(s) and H(s).	28.03.2024 30.03.2024 02.04.2024 03.04.2024 04.04.2024 05.04.2024 06.04.2024 08.04.2024 09.04.2024 10.04.2024	
7	FREQUENCY RESPONSE ANALYSIS.	10	7.1 Correlation between time response and frequency response. 7.2 Polar plots. 7.3 Bode plots. 7.4 All pass and minimum phase system. 7.5 Computation of Gain margin and phase margin. 7 . 6 Log magnitude versus phase plot. 7.7 Closed loop frequency response.	12.04.2024 TO 24.04.2024	7.1 7.2 7.3 7.4 7.5 7.6 7.7	7.1 Correlation between time response and frequency response. 7.2 Polar plots. 7.3 Bode plots. 7.4 All pass and minimum phase system. 7.5 Computation of Gain margin and phase margin. 7 . 6 Log magnitude versus phase plot. 7.7 Closed loop frequency response.	12.04.2024 13.04.2024 15.04.2024 16.04.2024 18.04.2024 19.04.2024 20.04.2024 22.04.2024 23.04.2024 24.04.2024	
8	NYQUIST PLOT	10	8.1 Principle of argument. 8.2 Nyquist stability criterion. 8.3 Niquist stability criterion applied to inverse polar plot. 8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot. 8.5 Assessment of relative stability. 8.6 Constant M and N circle 8.7 Nicholas chart.	25.04.2024 TO 27.04.2024	8.1 8.2 8.3 8.4 8.5 8.6 8.7	8.1 Principle of argument. 8.2 Nyquist stability criterion. 8.3 Niquist stability criterion applied to inverse polar plot. 8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot. 8.5 Assessment of relative stability. 8.6 Constant M and N circle 8.7 Nicholas chart.	25.04.2024 26.04.2024 27.04.2024	

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