GANDHI SCHOOL OF ENGINEERING

BHABANDHA, BERHAMPUR

BRANCH:- ELECTRICAL ENGINEERING

SEMESTER:- 6TH

SUBJECT:- CONTROL SYSTEM ENGINEERING

Name of the Faculty- Er. SURABHI TRIPATHY & Er .MONALISHA 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	**13.02.2023 TO 16.02.2023**	1.1 1.2 1.3 1.4 1.5	Classification of Control system Open loop system & Closed loop system and its comparison Effects of Feed back Standard test Signals(Step, Ramp, Parabolic, Impulse Functions) Servomechanism	13.02.2023 14.02.2023 15.02.2023 16.02.2023	
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) .	**17.02.2023 TO 06.03.2023**	2.1 2.2 2.3 2.4 2.5	Transfer Function & Impulse response, Properties, Advantages & Disadvantages of Transfer Function Poles & Zeroes of transfer Function Simple problems of transfer function of network. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems	17.02.2023 20.02.2023 21.02.2023 22.02.2023 23.02.2023 24.02.2023 27.02.2023 28.02.2023 01.03.2023 02.03.2023 03.03.2023 06.03.2023	

3	Control system components	12	3.1. Components of Control System 3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors	**09.03.2023 TO 27.03.2023**	3.1 3.2	Components of Control System Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors	09.03.2023 10.03.2023 13.03.2023 14.03.2023 15.03.2023 16.03.2023 17.03.2023 20.03.2023 21.03.2023 22.03.2023 24.03.2023 27.03.2023	
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	**28.03.2023 TO 17.04.2023**	4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9	Definition: Basic Elements of Block Diagram Canonical Form of Closed loop Systems Rules for Block diagram reduction Procedure for of Reduction of Block Diagram Simple Problem for equivalent transfer function Basic Definition in Signal Flow Graph & properties Construction of Signal Flow graph from Block diagram Mason's Gain formula Simple problems in Signal flow graph for network	28.03.2023 03.04.2023 04.04.2023 05.04.2023 06.04.2023 10.04.2023 11.04.2023 12.04.2023 13.04.2023 17.04.2023	

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.Timeresponse 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	**18.04.2023 TO 03.05.2023**	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	Time response of control system. • Standard Test signal. • Step signal • Ramp Signal • Parabolic Signal • Impulse Signal Time Response of first order system with: • Unit step response • Unit impulse response. Time response of second order system to the unit step input. Time response specification. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error. Steady state error and error constants. Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system] Effect of adding poles and zero to transfer function. Response with P, PI, PD and PID controller	18.04.2023 19.04.2023 20.04.2023 24.04.2023 25.04.2023 26.04.2023 27.04.2023 01.05.2023 02.05.2023 03.05.2023	

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).	**04.05.2023 TO 10.05.2023**	6.1 6.2 6.3 6.4	Root locus concept. Construction of root loci. Rules for construction of the root locus. Effect of adding poles and zeros to G(s) and H(s).	04.05.2023 08.05.2023 09.05.2023 10.05.2023	
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.	**11.05.2023 TO 15.05.2023**	7.1 7.2 7.3 7.4 7.5 7.6 7.7	Correlation between time response and frequency response. Polar plots. Bode plots. All pass and minimum phase system. Computation of Gain margin and phase margin. Log magnitude versus phase plot. Closed loop frequency response	11.05.2023 12.05.2023 15.05.2023	
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.	**16.05.2023 TO 22.05.2023**	8.1 8.2 8.3 8.4 8.5	Principle of argument. Nyquist stability criterion. Niquist stability criterion applied to inverse polar plot. Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot. Assessment of relative stability.	16.05.2023 18.05.2023 22.05.2023 23.05.2023 23.05.2023	

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