DEPARTMENT OF ELECTRICAL ENGINEERING

SUBJECT- CONTROL SYSTEM ENGINEERING SEM- 6TH SEMSESSION- SUMMER-24

NAME OF THE FACULTY-OMKAR PRASAD PANDEY DATE-

16.01.2024 TO 26.04.2024

SL NO.	WEEK NO	TOPICS TO BE COVERED	NO OF PERIODS
1	1	**1. FUNDAMENTAL OF CONTROL SYSTEM** 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	4
2	2	**2. MATHEMATICAL MODEL OF A SYSTEM** 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.	5
3	3	2.5. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems) **3. CONTROL SYSTEM COMPONENTS** 3.1. Components of Control System 3.2. Gyroscope, Synchros, Tachometer.	5
4	4	3.2. DC servomotors, Ac Servomotors. **4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS** 4.1. Definition: Basic Elements of Block Diagram 4.2. Canonical Form of Closed loop Systems 4.3. Rules for Block diagram reduction	3
5	5	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	4
6	6	**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	3
7	7	5 . 3 Time Response of first order system with: 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

8	8	5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.VI Sem Electrical Page 11 of 28 5.4.3. Steady state error and error constant 5 . 5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]	4
9	9	5 . 6 Effect of adding poles and zero to transfer function. 5 . 7 Response with P, PI, PD and PID controller. 6. **ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE.** 6 . 1 Root locus concept. 6 . 2 Construction of root loci.	4
10	10	6 . 3 Rules for construction of the root locus. 6 . 4 Effect of adding poles and zeros to G(s) and H(s). 7. **FREQUENCY RESPONSE ANALYSIS.** 7 . 1 Correlation between time response and frequency response. 7 . 2 Polar plots.	5
11	11	7 . 5 Computation of Gain margin and phase margin. 7 . 6 Log magnitude versus phase plot. 7 . 7 Closed loop frequency response.	5
12	12	7 . 3 Bode plots. 7 . 4 All pass and minimum phase system. 8. **NYQUIST PLOT** 8.1 Principle of argument.	4
13	13	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.	5
14	14	8.5 Assessment of relative stability. 8.6 Constant M and N circle 8.7 Nicholas chart. REVISION	6

Sign
Lecturer

15/07/24
Sign
Academic Coordinator