

**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**

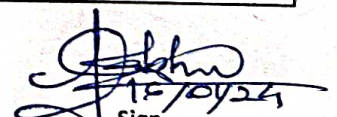
SL NO.	WEEK NO	TOPICS TO BE COVERED	NO OF PERIODS
1	1	<b>1. FUNDAMENTAL OF CONTROL SYSTEM</b> 1.1. Classification of Control system 1.2. Open loop system & Closed loop system and its comparison 1.3. Effects of Feed back 1.4. Standard test Signals(Step, Ramp, Parabolic, Impulse Functions) 1.5. Servomechanism	4
2	2	<b>2. MATHEMATICAL MODEL OF A SYSTEM</b> 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) <b>3. CONTROL SYSTEM COMPONENTS</b> 3.1. Components of Control System 3.2. Gyroscope, Synchros, Tachometer.	5
4	4	3.2. DC servomotors, Ac Servomotors. <b>4. BLOCK DIAGRAM ALGEBRA &amp; SIGNAL FLOW GRAPHS</b> 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	<b>5. TIME RESPONSE ANALYSIS.</b> 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. <b>6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE.</b> 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). <b>7. FREQUENCY RESPONSE ANALYSIS.</b> 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. <b>8. NYQUIST PLOT</b> 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

  
Sign

Academic Coordinator