LESSON PLAN

Subject :- TH:3 Control System Engineering **(Code) TH-3** **Name of faculty:-** Er Bikram Keshari Parida

Semester :-6th **Class allotted 4p/w** **Branch :- Electrical Engineering**

Discipline	Semester:-6TH	From date:-23/12/25 To date:18/4/26	45P/45H
Subject:CSE	No. of days/ per week 4p/w:	Theory –Topics/Lesson	
DATE	**PERIOD**	**TOPIC COVERED**	**REMARKS**
23/12/25 to 15/1/26		**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 **2. MATHEMATICAL MODEL OF A SYSTEM** 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)	
16/1/26 to 07/02/26		**3. CONTROL SYSTEM COMPONENTS** Components of Control System Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors. **4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS** 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	
09/02/26 to27/02/26		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 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. **6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE.** 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).	
28/02/26 to 21/03/26		**7. FREQUENCY RESPONSE ANALYSIS.** 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.	

23/03/26 to 18/4/26		**8. NYQUIST PLOT** 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.	

Signature of HOD **Signature of Faculty**