

## Lesson Plan

Discipline: ETC		Semester- 6th Summer- 2024	Name of the Teaching Faculty: Payal Bindia Parida(GF, ETC Engg)
Sl. No.	Subject-TH-2 CONTROL SYSTEM & COMPONENT	No. Of Days/Week class allotted:04	Semester From date: 16.01.2024 To date: 26.04.2024 (No of weeks: 15)
Weeks/Months		Class Day	Topic
1	3rd week 16 jan To 20 jan	1st	1. Fundamental of Control System
		2nd	1.1 Classification of Control system
		3rd	1.2 Open loop system & Closed loop system and its comparison
		4th	1.3 Effects of Feed back
2	4th week 22 jan To 27 jan	1st	1.4 Standard test Signals(Step, Ramp, Parabolic, Impulse
		2nd	1.5 Servomechanism
		3rd	1.6 Regulators ( Regulating systems)
		4th	2. Transfer Functions.
3	5th week 29 jan To 1st week 03 feb	1st	2.1 Transfer Function of a system & Impulse response.
		2nd	2.2 Properties, Advantages & Disadvantages of Transfer Function
		3rd	2.3 Poles & Zeroes of transfer Function.
		4th	2.4 Representation of poles & Zero on the s-plane.
4	2nd week 05 feb To 10 feb	1st	2.5 Simple problems of transfer function of network.
		2nd	3. Control system Components & mathematical modelling of physical System.
		3rd	3.1 Components of Control System.
		4th	3.2 Potentiometer, Synchros, Diode modulator & demodulator ,
5	3rd week 12 feb To 17 feb	1st	3.3 DC motors, AC Servomotors
		2nd	3.4 Modelling of Electrical Systems(R, L, C, Analogous systems)
		3rd	4. Block Diagram & Signal Flow Graphs(SFG)
		4th	4.1 Definition of Basic Elements of a Block Diagram
6	4th week 19 feb To 24 feb	1st	4.2 Canonical Form of Closed loop Systems
		3rd	4.3 Rules for Block diagram Reduction
		3rd	4.4 Procedure for of Reduction of Block Diagram.
		4th	4.5 Simple Problem for equivalent transfer function .
7	5th week 26 feb To 1st week 02 march	1st	4.6 Basic Definition in SFG & properties.
		2nd	4.7 Mason's Gain formula
		3rd	4.8 Steps for solving Signal flow Graph.
		4th	4.9 Simple problems in Signal flow graph for network.
8	2nd week 04 march To 09 march	1st	5. Time Domain Analysis of Control Systems.
		2nd	5.1 Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness.
		3rd	5.2 System Time Response.
		4th	5.3 Analysis of Steady State Error.
9	3rd week 11 march To 16 march	1st	5.4 Types of Input & Steady state Error(Step, Ramp, Parabolic)
		2nd	5.5 Parameters of first order system & second-order systems
		3rd	5.6 Derivation of time response Specification (Delay time, Rise time, Peak time, Settling time, Peak over shoot)
		4th	6. Feedback Characteristics of Control Systems.
10	4th week 18 march To 23 march	1st	6.1 Effect of parameter variation in Open loop System & Closed loop Systems.
		2nd	6.2 Introduction to Basic control Action & Basic modes of feedback control: proportional, integral and derivative
		3rd	6.3 Effect of feedback on overall gain, Stability.
		4th	6.4 Realisation of Controllers( P, PI, PD, PID) with OPAMP

	5th week 25 march To 30 march	1st	7. Stability concept & Root locus Method.
		2nd	7.1 Effect of location of poles on stability.
		3rd	7.2 Routh Hurwitz stability criterion.
		4th	7.3 Steps for Root locus method.
12	1st week 01 april To 06 april	1st	7.4 Root locus method of design (Simple problem)
		2nd	8. Frequency-response analysis & Bode Plot
		3rd	8.1 Frequency response, Relationship between time & frequency response
		4th	8.2 Methods of Frequency response.
13	2nd week 08 april To 13 april	1st	8.3 Polar plots & steps for polar plot.
		2nd	8.4 Bode plot & steps for Bode plots.
		3rd	8.5 Stability in frequency domain, Gain Margin & Phase margin.
		4th	8.6 Nyquist plots. Nyquist stability criterion.
14	3rd week 15 april To 20 april	1st	8.7 Simple problems as above.
		2nd	9. State variable Analysis
		3rd	9.1 Concepts of state, state variable, state model,
		4th	Stability in frequency domain, Gain Margin & Phase margin.
15	4th week 22 april To 26 april	1st	Frequency response, Relationship between time & frequency response
		2nd	Effect of feedback on overall gain, Stability
		3rd	Parameters of first order system & second-order systems
		4th	Bode plot & steps for Bode plots.

Signature of the Faculty