

# ACADEMIC LESSON PLAN FOR SUMMER-2026

*Dept. of Electronics & Telecommunication, Govt. Polytechnic, Balasore*

Name of the Faculty : Jadunath Murmu(Sr. Lect, in E&TC)

## Th.2- CONTROL SYSTEMS & COMPONENT

Theory : 4P/W

Class Test/Internal Assessment :20 Mark

Total Periods : 60P/Sem.

End Sem. Exam : 70 Mark

Total Marks :100

Sem : 6TH Sem

Start of Class :22/12/2025

Week	Class Day	Topics
1st	1st	Fundamental of Control System 1.1 Classification of Control system
	2nd	1.2 Open loop system & Closed loop system and its comparison
	3rd	1.3 Effects of Feed back 1.4 Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	4th	1.5 Servomechanism
2nd	1st	1.6 Regulators ( Regulating systems)
	2nd	Transfer Functions 2.1 Transfer Function of a system & Impulse response,
	3rd	2.2 Properties,Advantages& Disadvantages of Transfer Function
	4th	2.3 Poles & Zeroes of transfer Function
3rd	1st	2.3 Poles & Zeroes of transfer Function
	2nd	2.4 Representation of poles & Zero on the s-plane
	3rd	2.5 Simple problems of transfer function of network
	4th	2.5 Simple problems of transfer function of network
4th	1st	2.5 Simple problems of transfer function of network
	2nd	Control system Components & mathematical modelling of physical System 3.1 Components of Control System
	3rd	3.2 Potentiometer, Synchros, Diode modulator & demodulator
	4th	3.3 DC motors, AC Servomotors
5th	1st	3.4 Modelling of Electrical Systems(R, L, C, Analogous systems)
	2nd	3.4 Modelling of Electrical Systems(R, L, C, Analogous systems)
	3rd	Block Diagram & Signal Flow Graphs(SFG) 4.1 Definition of Basic Elements of a Block Diagram
	4th	4.2 Canonical Form of Closed loop Systems
6th	1st	4.3 Rules for Block diagram Reduction
	2nd	4.4 Procedure for of Reduction of Block Diagram 4.5 Simple Problem for equivalent transfer function
	3rd	4.6 Basic Definition in SFG & properties
	4th	Mason's gain formula
7th	1st	4.8 Steps foe solving Signal flow Graph
	2nd	4.9 Simple problems in Signal flow graph for network
	3rd	Time Domain Analysis of Control Systems 5.1 Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness.
	4th	Time Domain Analysis of Control Systems 5.1 Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness.
8th	1st	5.2 System Time Response
	2nd	5.3 Analysis of Steady State Error
	3rd	5.4 Types of Input & Steady state Error(Step ,Ramp, Parabolic)
	4th	5.5 Parameters of first order system & second-order systems
	1st	5.6 Derivation of time response Specification (Delay time, Rise time, Peak time,Setting time,Peak over shoot)

Week	Class Day	Topics
9th	2nd	5.6 Derivation of time response Specification (Delay time, Rise time, Peak time, Setting time, Peak over shoot)
	3rd	Feedback Characteristics of Control Systems 6.1 Effect of parameter variation in Open loop System & Closed loop Systems
	4th	6.2 Introduction to Basic control Action & Basic modes of feedback control: proportional, integral and derivative
10th	1st	6.2 Introduction to Basic control Action & Basic modes of feedback control: proportional, integral and derivative
	2nd	6.3 Effect of feedback on overall gain, Stability
	3rd	6.4 Realisation of Controllers (P, PI, PD, PID) with OPAMP
	4th	6.4 Realisation of Controllers (P, PI, PD, PID) with OPAMP
11th	1st	Stability concept & Root locus Method 7.1 Effect of location of poles on stability
	2nd	Stability concept & Root locus Method 7.1 Effect of location of poles on stability
	3rd	7.2 Routh Hurwitz stability criterion.
	4th	7.2 Routh Hurwitz stability criterion.
12th	1st	7.3 Steps for Root locus method
	2nd	7.3 Steps for Root locus method
	3rd	7.4 Root locus method of design (Simple problem)
	4th	7.4 Root locus method of design (Simple problem)
13th	1st	Frequency-response analysis & Bode Plot 8.1 Frequency response, Relationship between time & frequency response
	2nd	8.2 Methods of Frequency response
	3rd	8.3 Polar plots & steps for polar plot
	4th	8.4 Bode plot & steps for Bode plots
14th	1st	8.5 Stability in frequency domain, Gain Margin & Phase margin
	2nd	8.6 Nyquist plots. Nyquist stability criterion.
	3rd	8.7 Simple problems as above
	4th	State variable Analysis- 9.1 Concepts of state, state variable, state model,
15th	1st	9.1 Concepts of state, state variable, state model,
	2nd	9.2 state models for linear continuous time functions (Simple)
	3rd	9.2 state models for linear continuous time functions (Simple)
	4th	Revision

Signature of Sr. Lect. *[Signature]* 22/12/2025

Signature of HOD *[Signature]* 22/12/25