PADMASHREE KRUTARTHA ACHARYA INSTITUTE OF ENGINEERING & TECHNOLOGY, BARGARH

LESSON PLAN
Session-2024-2025

Semester: 6th   Discipline: _Electrical_ Engg.

Subject: _Control System Engineering._

Name of the Teaching Faculty: _Subhasis Nanda_

Subject **Control System Engineering**   No. of Days/per week class: **5**

Semester From Date: 04.02.25 To Date: 17.5.25 No. of Week **15**

Week	class D;	Theory/Practical Topics
1	1	FUNDAMENTAL OF CONTROL SYSTEM
	2	Classification of Control system
	3	Open loop system
	4	Closed loop system
	5	its comparison
2	6	Effects of Feed back
	7	Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	8	Servomechanism
	9	MATHEMATICAL MODEL OF A ELECTRICAL SYSTEM
	10	MATHEMATICAL MODEL OF A MECHANICAL SYSTEM
	11	Transfer Function
	12	Impulse response

04/02/2025

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Subject **Control System Engineering**   No. of Days/per week class   **5**

Semester From Date: 4.2.25 To Date: 12.5.25 No. of Week **15**

Week	class Date	Theory/Practical Topics
3	13	Properties, Advantages & Disadvantages of Transfer Function
	14	Poles & Zeroes of transfer Function
	15	Simple problems of transfer function of network
4	16	Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)
	17	Components of Control System
	18	Gyroscope
	19	Synchros
	20	Tachometer
5	21	DC servomotors
	22	Ac Servomotors
	23	BLOCK DIAGRAM ALGEBRA 1
	24	Basic Elements of Block Diagram

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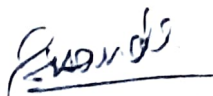
Week	class D:	Theory/Practical Topics
	25	Definition
	26	Canonical Form of Closed loop Systems
	27	Rules for Block diagram reduction
6	28	Procedure for of Reduction of Block Diagram
	29	Simple Problem for equivalent transfer function
	30	SIGNAL FLOW GRAPHS
	31	Basic Definition in Signal Flow Graph & properties
	32	Construction of Signal Flow graph from Block diagram
7	33	Mason's Gain formula
	34	Simple problems in Signal flow graph for network
	35	TIME RESPONSE ANALYSIS, Time response of control system
	36	Standard Test signal, Step signal, Ramp Signal, Parabolic Signal, Impulse Signal

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Subject **Control System Engineering**   No. of Days/per week class: **5**

Semester From Date: 4.2.25 To Date: 19.5.25 No. of Week   **15**

Week	class D:	Theory/Practical Topics
8	37	Time Response of first order system with: Unit step response
	38	Time Response of first order system with: Unit impulse response
	39	Time response of second order system to the unit step input
	40	Time response specification.
9	41	Derivation of expression for rise time, peak time
	42	Derivation of expression for peak overshoot, settling time
	43	steady state error
	44	Steady state error and error constants
	45	Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
10	46	Effect of adding poles and zero to transfer function
	47	P, PI controller
	48	Response with PD controller

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Subject **Control System Engineering**   No. of Days/per week class   **5**
Semester From Date: 4.2.25 To Date: 17.5.25 No. of Week   **15**

Week	class Date	Theory/Practical Topics
	49	Response with PID controller
	50	Root locus concept
	51	Construction of root loci
	52	Rules for construction of the root locus
11	53	4 Effect of adding poles and zeros to G(s) and H(s).
	54	FREQUENCY RESPONSE ANALYSIS
	55	Correlation between time response and frequency response
	56	Polar plots
	57	Polar plots
12	58	Bode plots
	59	Bode plots
	60	Bode plots

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Subject **Control System Engineering**   No. of Days/per week class **5**

Semester From Date: 4.2.25 To Date: 17.5.25 No. of Week **15**

Week	class Date	Theory/Practical Topics
13	61	All pass and minimum phase system
	62	Computation of Gain margin and phase margin
	63	Log magnitude versus phase plot
	64	Closed loop frequency response
	65	Principle of argument
14	66	Nyquist stability criterion
	67	Niquist stability criterion applied to inverse polar plot, NYQUIST PLOT
	68	Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot
	69	Assessment of relative stability
	70	Constant M circle
	71	Constant N circle
	72	Nicholas chart

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Semester From Date: 4.2.25   To Date: 17.5.25 No. of Week **15**

Week	class Da	Theory/Practical Topics
15	73	PROBLEM PRACTICE
	74	PROBLEM PRACTICE
	75	PROBLEM PRACTICE

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