DEPARTMENT OF ELECTRICAL ENGINEERING

GOVERNMENT POLYTECHNIC, BARGARH

LESSON PLAN

LINEAR CONTROL SYSTEM ENGINERING (TH 4B)

4th SEMESTER

ELECTRICAL ENGINEERING

PREPARED BY SMT. PRITEE P. MINZ

SR. LECTURER (ELECTRICAL)

DEPARTMENT OF ELECTRICAL ENGINEERING

VISION:

To produce Electrical Engineer professionals who can contribute for socio-economic and technological development to meet global needs.

MISSION:

M1 - To strengthen academic infrastructure leading to quality professional by using modern technical tools and technologies.

M2 - To impart innovative knowledge among the students and make more industry-institution programs to make them successful professionals for serving the society.

M3 - To provide a learning environment to improve problem solving abilities, leadership abilities, ethical responsibilities and lifelong learning.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Apply electrical engineering knowledge and practical skills to solve well-defined engineering problems using modern tools and techniques.

PEO2: Perform effectively in industry and society as competent junior engineer, supervisors, or entrepreneurs with ethical and sustainable engineering practices.

PEO3: Demonstrate teamwork, communication, leadership, and project management skills in professional engineering activities.

PEO4: Engage in lifelong learning and adapt to emerging technologies for career growth and higher education.

PROGRAM SPECIFIC OUTCOMES

The electrical diploma engineers will be able to:

PSO1:-Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate engineering problems of electric circuits, analog and digital electronics, control system, electrical machines and power system.

PSO2:- Apply the appropriate techniques and modern engineering hardware and software tools in electrical engineering to engage in life-long learning and to successfully adapt in multidisciplinary environments.

PSO3:-Work professionally in power systems engineering, Electrical machinery and electrical circuit.

DISCIPLINE: ELECTRICAL Engg.	SEMESTER: 4TH	NAME OF THE TEACHING FACULTY: Pritee Prava Minz, Sr. Lecturer (EE)
SUBJECT: Linear Control System Engineering (TH4B) NO. OF DAYS/ WEEK CLASS ALLOTTED – 45 Hrs SEMESTER FROM DATE:22.12.2025 to 18.04.2026		

WEEK	CLASS DAY	THEORY TOPICS
1	1	**Introduction to Laplace Transform.** Open loop and closed loop control systems
	2	Feedback principle
	3	Transfer function of LTI systems
2	4	Mechanical and Electromechanical systems
	5	Force voltage and force current analogy
	6	block diagram representation
3	7	block diagram reduction Rule.
	8	signal flow graph - Mason's gain formula
	9	Numerical based on SFG
4	10	**Control system components:** DC and AC servo motors
	11	synchro
	12	gyroscope
5	13	stepper motor - Tacho generator.
	14	**Time domain analysis of control systems:** Transient and steady state responses
	15	time domain specifications
6	16	step responses of first order systems.
	17	step responses of second order systems.
	18	Numerical based on time domain specifications, first and second order systems, step responses of first and second order systems.
7	19	Error analysis: Steady-state error analysis
	20	static error coefficient of type 0, 1, 2 systems
	21	Dynamic error coefficients
8	22	Numerical on static error coefficient of type 0, 1, 2 systems
	23	Concept of stability: Time response for various pole locations
	24	stability of feedback system
9	25	Routh's stability criterion
	26	Special cases of Routh's stability criterion
	27	Class Test beyond IA
10	28	**Root locus and Polar plot:** General rules for constructing Root loci
	29	General rules for constructing Root loci
	30	stability from root loci with suitable example
11	31	stability from root loci with suitable example
	32	effect of addition of poles and zeros
	33	Lag, Lead and Lead-Lag compensators
12	34	Polar plot: Procedure to sketch polar plot and find system stability.
	35	Nyquist stability criterion
	36	Nyquist stability criterion
13	37	Nichols chart - Non-minimum phase system - transportation lag.
	38	Frequency domain analysis: Frequency domain specifications
	39	Analysis based on Bode plot and find system stability of type 0 system.

14	40	Analysis based on Bode plot and find system stability of type 1 system.
	41	Analysis based on Bode plot and find system stability of type 2 system.
	42	Log magnitude vs. phase plot
15	43	State space model
	44	State Transition matrix
	45	Performance Test II
16	46	Practice of previous semester exam paper
	47	Practice of previous semester exam paper
	48	Practice of previous semester exam paper
	49	Practice of previous semester exam paper
	50	Practice of previous semester exam paper

Signature of the Subject Teacher