

**GOVERNMENT POLYTECHNIC, SAMBALPUR, RENGALI**

**DEPARTMENT OF E&TC ENGINEERING**

**LESSON PLAN**

**SUBJECT- CONTROL SYSTEM AND COMPONENTS (TH-2)  
SEMESTER-6<sup>TH</sup>**

**NAME OF THE FACULTY- MS. LOPAMUDRA BHOI**

**TOTAL NO. OF PERIODS-60(4/W)**

<b>UNIT</b>	<b>DATE</b>	<b>PERIOD</b>	<b>TOPICS TO BE COVERED AS PER SYALLABUS</b>
1	1st week of February,2023		<b>Fundamental of Control System</b>
		1	Classification of Control system
		2	Open loop system & Closed loop system and its comparison
		3	Effects of Feed back
		4	Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
		5	Servomechanism
		6	Regulators ( Regulating systems)
		7	Previous year questions discussion & assignments
2	3 <sup>rd</sup> week of February ,2023		<b>Transfer Functions</b>
		1	Transfer Function of a system & Impulse response
		2	Properties, Advantages & Disadvantages of Transfer Function
		3	Poles & Zeroes of transfer Function
		4	Representation of poles & Zero on the s-plane
		5	Simple problems of transfer function of network
		6	Previous year questions discussion & assignments
3	1 <sup>st</sup> week of March,2023		<b>Control system Components &amp; mathematical modelling of physical System</b>
		1	Components of Control System
		2	Potentiometer, Synchros, Diode modulator & demodulator
		3	DC motors, AC Servomotors
		4	Modelling of Electrical Systems(R, L, C, Analogous systems
		5	Previous year questions discussion & assignments
4	3 <sup>rd</sup> week of March, 2023		<b>Block Diagram &amp; Signal Flow Graphs(SFG)</b>
		1	Definition of Basic Elements of a Block Diagram
		2	Canonical Form of Closed loop Systems
		3	Rules for Block diagram Reduction
		4	Procedure for of Reduction of Block Diagram
		5	Simple Problem for equivalent transfer function
		6	Basic Definition in SFG & properties
		7	Mason's Gain formula
		8	Steps foe solving Signal flow Graph
		9	Simple problems in Signal flow graph for network
		10	Previous year questions discussion & assignments
5	1st week of April ,2023		<b>Time Domain Analysis of Control Systems</b>
		1	Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness.

		2	System Time Response
		3	Analysis of Steady State Error
		4	Types of Input & Steady state Error(Step ,Ramp, Parabolic)
		5	Parameters of first order system & second-order systems
		6	Derivation of time response Specification (Delay time, Rise time, Peak time, Setting time, Peak over shoot)
		7	Previous year questions discussion & assignments
6	3rd week of April,2023		<b>Feedback Characteristics of Control Systems</b>
		1	Effect of parameter variation in Open loop System & Closed loop Systems
		2	Introduction to Basic control Action& Basic modes of feedback control: proportional, integral and derivative
		3	Effect of feedback on overall gain, Stability
		4	Realisation of Controllers( P, PI,PD,PID) with OPAMP
		5	Previous year questions discussion & assignments
7	1st week of May,2023		<b>Stability concept&amp; Root locus Method</b>
		1	Effect of location of poles on stability
		2	Routh-Hurwitz stability criterion.
		3	Steps for Root locus method
		4	Root locus method of design(Simple problem)
		5	Previous year questions discussion & assignments
8	3 <sup>rd</sup> week of May,2023		<b>Frequency-response analysis&amp; Bode plot</b>
		1	Frequency response, Relationship between time & frequency response
		2	Methods of Frequency response
		3	Polar plots & steps for polar plot
		4	Bodes plot & steps for Bode plots
		5	Stability in frequency domain, Gain Margin& Phase margin
		6	Nyquist plots, Nyquist stability criterion.
		7	Simple problems as above
		8	Previous year questions discussion & assignments
9	1 <sup>st</sup> week of June,2023		<b>State variable Analysis</b>
		1	Concepts of state, state variable, state model,
		2	state modelsfor linear continuous time functions(Simple)
		3	Previous year questions discussion & assignments