ARYAN SCHOOL OF ENGINEERING & TECHNOLOGY

Dicipline: ELECTRICAL	Semester: 6	Name of the Teaching Faculty: Er. Tapan Ku Mohanty.	
Subject: CONTROL SYSTEM ENGINEERING	No of Days/Week Class Allotted: 4	Semester From date: 10.3.2022 To date 18.6.2022	No.of Weeks:

WEEK	Class Day	Theory Topics
1st	1st	FUNDAMENTAL OF CONTROL SYSTEM:- Classification of Control system.
	2nd	Open loop System & closed loop System and its Comparison
	3rd	Effects of Feed back.
	4th	Standard test Signals (step, Ramp, parabolic, Impulse Functions), Servomechanism.
	5th	
2nd	1st	MATHEMATICAL MODEL OF A SYSTEM: Transfer Function & Impulse response.
	2nd	Properties, Advantages & Disadvantages of Transfer Function.
	3rd	Poles & Zeroes of transfer function.
	4th	Simple problems of transfer function of network
	5th	
3rd	1st	Mathematical modeling of Electrical Systems (R, L, C, Analogous Systems)
	2nd	CONTROL SYSTEM COMPONENTS: Components of Control System.
	3rd	BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS: Definition. Basic Elements of Block Diagram.
	4th	Canonical Form of closed loop Systems.
	5th	

WEEK	Class Day	Theory Topics
4th	1st	Rules for Block diagram reduction
	2nd	Procedure for Reduction of Block Diagram
	3rd	Simple Problem for equivalent transfer function
	4th	Basic definition on Signal Flow graph & properties.
	5th	
5th	1st	Construction of signal Flow graph from Block diagram
	2nd	Mason's Gain formula
	3rd	Simple problems in signal flow graph for network.
	4th	TIME RESPONSE ANALYSIS :- Time response of control system, Standard Test signal.
	5th	
6th	1st	Step signal, Ramp signal, Parabolic signal & Impulse signal.
	2nd	Time response of first order system with unit step response
	3rd	Time response of first order system with unit impulse response
	4th	Time response of second order system to the unit step input.
	5th	

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pline: ELECTRICAL	Semester: 6	Name of the Teaching Faculty: Er. Tapan Ku Nayak	
ubject: CONTROL SYSTEM ENGINEERING	No of Days/Week Class Allotted: 4	Semester From date: 16/3/2022 To date 8/6/2022	No of Weeks:

WEEK	Class Day	Theory Topics
7th	1st	Time response — Specification.
	2nd	Derivation of expression for rise time, Peak time, & Peak Overshoot.
	3rd	Derivation of expression for Settling time & Steady state error.
	4th	Steady state error and error constants.
	5th	
8th	1st	Type of control system (Steady state error in type-0, Type-1, Type-2 systems)
	2nd	Effect of adding poles and zero to transfer function.
	3rd	Response with P Controller
	4th	Response with PI Controller
	5th	
9th	1st	Response with PD Controller
	2nd	Response with PID Controller
	3rd	ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQ Basic Concept & Stability (i) Absolute (ii) Conditional (iii) Marginal.
	4th	Routh-Hurwitz Stability Criterion

WEEK	Class Day	Theory Topics
10th	1st	Special Cases in Routh-Array.
	2nd	Basic Concept of root locus
	3rd	Construction of root locus
	4th	Rules for construction of root locus
	5th	
11th	1st	Effect of adding poles and zeros to $G(s)H(s)$
	2nd	FREQUENCY RESPONSE ANALYSIS: Correlation between time response & frequency response.
	3rd	Polar Plots
	4th	Basic Concept of Bode Plots
	5th	
	1st	Rules for construction of Bode Plots
	2nd	Stability analysis using Bode Plots.
	3rd	All pass & minimum phase system
	4th	Computation of gain margin & phase margin

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...me: ELECTRICAL	Semester: 6	Name of the Teaching Faculty: Er. Tapan Ku Mohanty	
...ject: CONTROL SYSTEM ENGINEERING	No of Days/Week Class Allotted: 4	Semester From date: 11.3.2022 To date 15.6.2022	No.of Weeks:

WEEK	Class Day	Theory Topics
13th	1st	Log magnitude Versus Phase Plot
	2nd	Closed loop frequency response
	3rd	NYQUIST PLOT:- Principle argument
	4th	Nyquist Stability criterion
	5th	
14th	1st	Nyquist stability criterion applied to inverse Polar plot
	2nd	Effect of addition of Poles to G(s) H(s)
	3rd	Effect of addition of zeros to G(s)H(s)
	4th	Assessment of relative stability.
	5th	
15th	1st	Numerical Problem Solving.
	2nd	Constant M circle.
	3rd	Constant N Circle
	4th	Nichols Chart.