GIET POLYTECHNIC, JAGATPUR, CUTTACK

LESSON PLAN

Discipline: ELECTRICAL	Semester: 6th	Name Of The Teaching Faculty: RUPAK KUMAR SAHOO
Subject: CONTROL SYSTEM & COMPONENTS	No. Of Days Per Week Class Allotted: 04 P	Semester From Date: To Date: No. of weeks: 15
Week	Class Day	Theory Topic
1st week	1st	UNIT 1 : FUNDAMENTAL OF CONTROL SYSTEM • 1.1: Classfication of control system • 1.2: Open loop system
	2nd	• 1.2: Closed loop system & its comparision
	3rd	• 1.3: Effects of feed back • 1.4: Standard test signals (step, ramp)
	4th	• 1.4: Standard test signals(parabolic, impulse functions)
2nd week	1st	• 1.5: Servomechanism • 1.6: Regulators (Regulating systems)
	2nd	UNIT 2 : TRANSFER FUNCTIONS • 2.1: Transfer function of a system & impulse response
	3rd	• 2.2: Properties of a transfer function
	4th	• 2.2: Advantages & Disadvantages of transfer function
3rd week	1st	• 2.3: Poles & Zeroes of transfer function
	2nd	• 2.4: Representation of poles & zero on the s-plane
	3rd	• 2.4: Representation of poles and zero on the s-plane
	4th	• 2.5: Simple problems on transfer function of network
4th week	1st	• 2.5: Simple problems on transfer function of network
	2nd	UNIT 3 : CONTROL SYSTEM COMPONENTS & MATHEMATICAL MODELLING OF PHYSICAL SYSTEM • 3.1: Components of control system
	3rd	• 3.2: Potentiometer,syncros
	4th	• 3.2: Diode modulator & demodulator
5th week	1st	• 3.3: DC motors , ac servomotors
	2nd	• 3.4: Modelling of electrical systems (R,L,C analogous system)
	3rd	UNIT 4 : BLOCK DIAGRAM & SIGNAL FLOW GRAPHS • 4.1: Definition of basic elements of a block diagram
	4th	• 4.2: Chemical form of closed loop system
6th week	1st	• 4.3: Rules for block diagram reduction
	2nd	• 4.4: Proceedure for reduction of block diagram
	3rd	• 4.5: Simple problem for equivalent transfer function
	4th	• 4.6: Basic definition in sfg & properties
7th week	1st	• 4.7: Mason's gain formula • 4.8: Steps for solving signal flow graph

	2nd	• 4.9: Simple problems in signal flow graph for network
	3rd	UNIT 5 : TIME DOMAIN ANALYSIS OF CONTROL SYSTEMS • 5.1: Definition of time stability, steady state response
	4th	• 5.1: Definition of accuracy, transient accuracy, in-sensitivity & robustness
8th week	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 & second order system
9th week	1st	• 5.6: Derivation of time response specification (delay time , rising time)
	2nd	• 5.6: Derivation of time response specification(peak time , setting time , peak overshoot)
	3rd	UNIT 6 : FEEDBACK CHARACTERISTICS OF CONTROL SYSTEMS • 6.1: Effect of parameter variation in open loop system
	4th	• 6.1: Effect of parameter variation in closed loop system
10th week	1st	• 6.2: Introduction to basic control action & basic modes of feedback control: proportional, integral & derivative
	2nd	• 6.3: Effect of feedback on overall gain , stability
	3rd	• 6.4: Realisation of controllers (P, PI) with OPAMP
	4th	• 6.4: Realisation of controllers (PD, PID) with OPAMP
11th week	1st	UNIT 7 : STABILITY CONCEPT & ROOT LOCUS METHOD • 7.1: Effect of location of poles on stability
	2nd	• 7.1: Effect of location of poles on stability
	3rd	• 7.2: RouthHurwitz stability criterion
	4th	• 7.2: RouthHurwitz stability criterion
12th week	1st	• 7.3: Steps for root locus method
	2nd	• 7.4: Root locus method of design
	3rd	• 7.4: Simple problems
	4th	• 7.4: Simple problems
13th week	1st	UNIT 8: FREQUENCY RESPONSE ANALYSIS & BODE PLOT • 8.1: Frequency response , relationship between time & frequency response
	2nd	• 8.2: Method of frequency response
	3rd	• 8.3: Polar plots & steps for polar plots
	4th	• 8.4: Bode plots & steps for bode plots
14th week	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	UNIT 9: STATE VARIABLE ANALYSIS • 9.1: Concept of state , state variable, state model
15th week	1st	• 9.1: Concept of state , state variable, state model
	2nd	• 9.2: Steps model for linear continuous time function(simple)
	3rd	• 9.2: Steps model for linear continuous time function(simple)
	4th	• REVISION