

DHABALESWAR INSTITUTE OF POLYTECHNIC

LESSON PLAN

Discipline	Semester	Name of the Teaching Faculty
Diploma	6th Sem	Sitikantha Rath
Subject	No. of days per Week Class Alloted	6th Semester from Dt. <u>14/03/22</u> To Dt. <u>04/06/22</u>
Control System	5 days	No. of Weeks: <u>15 weeks</u>
Week	Class Day	Theory / Practical Topics
1st (March)	01	Unit: 1 Fundamental of Control System → Classification of Control System → Open loop system & closed loop system and its comparison → Effects of feed back → Standard test signals (step, ramp, parabolic, impulse function) → Servomechanism → Regulators (Regulating system)
	02	
	03	
	04	
	01	
2nd	02	Unit: 2 Transfer Functions → Transfer function of a system and impulse response. → Properties, Advantage and disadvantage of transfer function → Poles and zeroes of transfer function → Representation of poles and zero on the s-plane. → Simple problem of transfer function of network.
	03	
	04	
	05	
	01	
3rd	02	Unit: 3 Control system components and Mathematical modelling of physical system. → Component of Control System. → Potentiometer, Synchros, decoder modulator and demodulator → DC Motors, AC Servomotors → Modelling of Electrical system (R, L, C Analogous system)
	03	
	04	
	05	
	01	
4th April	02	
	03	
	04	
	05	
5th April	01	
	02	
	03	
	04	

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6th	05	Unit:-4 Block diagram and Signal Flow Graphs (SFG)
	01	→ Definition of Basic Elements of block diagram.
	02	→ Canonical form of closed loop system
	03	→ Rules for block diagram Reduction
	04	→ Procedure for reduction of block diagram.
7th	01	→ simple problem for equivalent transfer function
	02	→ Basic definition in SFG and properties
	03	→ Mason's gain formulae
	04	→ Steps for solving signal flow graph
	05	→ Simple problem in signal flow graph for network
8th (May)	01	Unit:-5 Time Domain Analysis of control system.
	02	→ Definition of time stability, steady-state response, accuracy, transient accuracy, sensitivity & robustness.
	03	→ System time response.
	04	→ Analysis of steady state error
	05	→ Types of input and steady error (step, ramp, parabolic)
9th	01	→ Parameters of first order system and second-order system.
	02	→ Derivation of time response specification (delay time, rise time, peak time, setting time, peak overshoot)
	03	
	04	
	05	

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		Theory / Practical Topics
10th	01	Unit :- 6 Feedback characteristics of control system.
	02	→ Effect of parameter variation in open loop system & closed loop system
	03	→ Introduction to basic control action and basic modes of feedback control
	04	proportional, integral and derivative
	05	→ Effect of feedback on overall gain, stability.
11th	01	→ Realisation of controllers (P, PI, PD, PID) with OPAMP.
	02	Unit :- 7 stability concept and root locus method.
	03	→ Effect of location of poles stability
	04	→ Routh Hurwitz stability criterion.
	05	→ step for root locus method
12th	01	→ Root locus method of design (simple problem)
	02	Unit :- 8 Frequency-response analysis and Bode plot
	03	→ frequency response, Relationship between time and frequency response.
	04	→ Methods of frequency response
13th	01	
June	02	
	03	
	04	

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control system	5 days	
Week	Class Day	Theory / Practical Topics
14th June	01	→ polar plots and steps for polar plots
	02	→ Bode plot and steps for Bode plot
	03	→ stability in frequency domain, gain margin and phase margin
	04	→ Nyquist plots. Nyquist stability criterion
	05	→ simple problem as above
	06	Unit: 9 state variable analysis → Concepts of state variable, state model → state models for linear continuous time functions (simple)

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