

S. No.	Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
								Sessional	Final Exam	Total
4	ECE-604	Control System	PCC	3	2	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Explain the concept for modeling of physical systems in open loop and closed loop.
CO2	Determine the transfer function using block diagram technique and signal flow graph.
CO3	Illustrate the various linear feedback systems for frequency and time domain.
CO4	Design PID controller for linear time invariant system.
CO5	Analyze state space approach for discrete-time systems.

Detailed Syllabus

Section-A

Unit 1: Control systems, types of control systems, feedback and its effects, mathematical modeling of physical systems, block diagrams, representation of control systems, transfer functions, signal flow graphs, mason's gain formula, time domain analysis of control systems: time domain analysis of first and 2nd order control systems, typical test signals for time response of control systems, time domain performance of first and second order control systems.

(10Hrs)

Unit 2: AC and D.C. Servomotors, AC tachometer, synchro transmitter and receiver, synchro pair as control transformer, AC and DC position control system, stepper motor, magnetic amplifier and adaptive control.

(08Hrs)

Unit 3: Stability characteristic equation, stability of linear time invariant systems, Routh-Hurwitz stability Criterion, Root locus plot, Bode plot, Polar Plot, Nyquist Criterion.

(12Hrs)

Section-B

Unit 4: Design specifications in time domain and frequency domain, phase lead, and phase lag design using Bode-plot and root locus techniques, Introduction to P, PI and PID controllers, tuning of PID controllers.

(10 Hrs)

Unit 5: State Space Approach for discrete time systems: State space models of discrete systems, state space analysis. Lyapunov Stability, controllability and observability analysis, effect of pole zero cancellation on the controllability and observability.

(08 Hrs)

Text Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Modern Control System	C. Drof and Robert H. Bishop	Pearson International	14 th (2021)
2	Control System Engineering	Nagrath and Gopal	New Age International	5 th (2016)
3	Linear Control System	B. S. Manke	Khanna	12 th (2009)

Reference Book

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Modern Control Engineering	K. Ogatta	McGraw Hill Education	5 th (2010)
2	Automatic Control Systems	Fard Golnargi, B. C. Kuo,	Mcgraw Hill Education	1 st (2018)