

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN.

B.E. SEMESTER IV (ELECTRONICS & COMMUNICATION)

REVISED NEW SYLLABUS

Subject Code: EC-402

Subject Name: Control Theory

Teaching Scheme		Examination Scheme					
Theory Hrs.	Tutorial Hrs.	Practical Hrs.	Theory Hrs.	Theory Marks	Pract./Viva Marks	Termwork Marks	Total Marks
4	-	2	3	100	25	25	150

Syllabus:

1 Introduction to Control Systems: Introduction, Examples of Control Systems, Closed-loop Control versus Open-Loop Control

2 Mathematical Modeling of Dynamic Systems: Introduction, Transfer Function and Impulse-Response Function, Automatic Control Systems, Modeling in state Space, State-Space Representation of Dynamic Systems, Transformation of Mathematical Models with MATLAB, Mechanical Systems, Electrical and Electronic Systems, Signal Flow Graphs, Linearization of Nonlinear Mathematical Models
3 Mathematical Modeling of Fluid Systems and Thermal systems: Introduction, Liquid-Level Systems, Thermal Systems

4 Transient and Steady-State Response Analyses: Introduction, First-Order Systems, Second-Order Systems, Higher-Order Systems, Transient-Response Analysis with MATLAB, Routh's Stability Criterion, Effects of Integral and Derivative Control Actions on System Performance, Steady-State Errors in Unity-Feedback Control Systems
5 Root-Locus Analysis: Introduction, Root-Locus Plots, General Rules for Constructing Root Loci, Root-Locus Plots with MATLAB, Positive Feedback Systems, Conditionally Stable Systems, Root Loci for Systems with Transport Lag

6 Frequency-Response Analysis: Introduction, Bode Diagrams, Plotting Bode Diagrams with MATLAB, Polar Plots, Drawing Nyquist Plots with MATLAB, Log-Magnitude-versus-Phase Plots, Nyquist Stability Criterion, Stability Analysis, Relative Stability, Closed-Loop Frequency Response of Unity-Feedback Systems

Reference Books:

1. Modern Control Engineering by Katsuhiko Ogata, 4th Edition, Prentice Hall of India.
2. Automatic Control Systems by Benjamin C.Kuo, 8th Edition, Farid Golnaraghi, John Wiley & Sons.