

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma in Instrumentation and Control Engineering

Semester: 3

Subject Code

Subject Name BASIC CONTROL SYSTEM

Sr. No.	Course content
1.	INTRODUCTION TO CONTROL SYSTEMS : 1.1 Basic Components of a Control System. 1.2 Classification of Control System 1.3 Open Loop and Closed Loop Control System 1.4 Examples of Control Systems 1.5 Brief introduction of servomechanism 1.6 Mathematical model of simple mechanical and electrical control system. 1.7 Transfer function definition and explanation. 1.8 Derivation of Transfer Function for simple electrical and mechanical system. 1.9 Block diagram of a closed loop system. 1.10 Procedure for drawing block diagram of a system. 1.11 Rules of block diagram Algebra 1.12 Signal flow graph drawing using Mason's Gain formula
2.	TIME RESPONSE ANALYSIS : 2.1 Standard test signals. 2.2 Time Response of first order system to step input. 2.3 Time Response of second order system to step input. 2.4 Time Response specifications of the second order system. 2.5 All definition relevant to transient response. 2.6 Steady-state errors and error constants.
3.	CONCEPT OF STABILITY : 3.1 Concept of Stability 3.2 Conditions for Stability 3.3 Routh-Hurwitz Criteria for stability
4.	THE ROOT LOTUS TECHNIQUE : 4.1 Introduction 4.2 The Root Locus Concept 4.3 Root Locus Construction Procedure 4.4 Root Locus Construction Rules
5.	FREQUENCY RESPONSE ANALYSIS : 5.1 Bode plot and plotting Bode plot 5.2 Polar plot 5.3 Nyquist Stability Criterion

Reference Books:

1. Control System Engineering – Nagrath & Gopal (New Age International)
2. Control Systems Engineering – S K Bhattacharya (Pearson Education)
3. Modern Control System – Ogata
4. Linear Control Systems- B.S. Manke (Khanna Publishers)