

SYLLABUS :-

Introduction: Overview of design approaches, continuous versus digital control, sampling process, effect of sampling rate. Calculus of difference equations. Z-transform. Signal flow graphs. State space approach: Controllability, Observability, Discretization of continuous transfer functions; Digital filter properties. Controller design using transformation techniques: Z-plane specifications. Design in the w, w' domain. PID controller., deadbeat controller. Root Locus design. State space methods: Pole placement design, stabilization and all stabilizing controllers. Observer design. Infinite time optimal regulator, Stability and tracking in SD systems, Quantization effects: limit cycles and dither. Sample rate reduction. Multi-rate sampled data system and stability studies. Design of digital controller using fast output sampling. Microprocessor and DSP control: Mechanization of control algorithms. Iterative computation via parallel, direct, canonical, cascade realization; Effects of computing time. Systems with time delay. Case studies.