EEE 573 Control Engineering

State space description of linear system concept of controllability and observability; state feedback , model control observers, realization of systems having specified transfer function, application to circuit synthesis and signal processing. Relay control system and the describing function techniques. Introduction to calculus of variations: system identification Kalman filter, least square error controller for second order systems. Numerical Controllers-

Elements of adaptive control systems practice. Definition, properties and theorems of Z-transform, inverse Z-transform. The pulse transfers functions of systems. Pole-zero mapping signal. Flow-graph method applied to digital systems. Multi-rate digital systems. Z-transform of the closed – loop systems, Systems with samplers in cascades. Closed-loop system. Stability in discrete systems. Stability boundary, Routh's method. Jury's methods and Raible's method. Time domain analysis, root locus analysis and frequency domain analysis. Computer Software-based solution. Use of SPICE. Lab view analyzer software packages.

Describing function principles; Phase plane principles; Lyapunov functions; Lyapunov's method of stability analysis; stability regions for non- linear systems; On-line Computer control, derivation of digital control algorithms. Application of Microprocessors to control systems.