

5EE3A: CONTROL SYSTEMS (syllabus)

B.Tech. (Electrical) 5th Semester

UNIT	CONTENTS
1	Introduction: Elements of control systems, concept of open loop and closed loop systems, Examples and application of open loop and closed loop systems, brief idea of multivariable control systems.
	Mathematical Modeling of Physical Systems: Representation of physical system (Electro Mechanical) by differential equations, Determination of transfer function by block diagram reduction techniques and signal flow method, Laplace transformation function, inverse Laplace transformation
2	Time Response Analysis of First Order and Second Order System: Characteristic Equations , response to step, ramp and parabolic inputs.
	Transient response analysis, steady state errors and error constants, Transient & steady state analysis of LTI systems
3	Control System Components: Constructional and working concept of ac servomotor, synchronous and stepper motor
	Stability and Algebraic Criteria: concept of stability and necessary conditions, Routh-Hurwitz criteria and limitations. Root Locus Technique: The root locus concepts, construction of root loci.
4	Frequency Response Analysis: Frequency response, correlation between time and frequency responses, polar and inverse polar plots, Bode plots
	Stability in Frequency Domain: Nyquist stability criterion, assessment of relative stability: gain margin and phase margin, M and N Loci, Nichols chart.
5	The design problem and preliminary considerations lead, lag and lead-lag networks, design of closed loop systems using compensation techniques in time domain and frequency domain.
	Brief idea of proportional, derivative and integral controllers.