

Year & Sem: E1SS	Course Code: EC2203	Course Name: Linear Control Systems	No. of Credits: 4	L 2	T&PS 2	P 0
UNIT – I: Introduction to classical control systems: Open loop and closed loop control systems- Transfer functions- Block diagrams and their reduction - Signal flow graphs - Mason's gain formula UNIT – II: Mathematical modeling of physical systems: Mathematical modeling and transfer functions of electrical, mechanical and electro-mechanical elements. - DC servo motors- two-phase a.c. servo motors – synchros. UNIT – III: Time domain analysis: Standard test signals, step response of first and second order systems – Time response specifications – steady state error – static error and generalized error coefficients – response with proportional, derivative and integral controllers UNIT – IV: Stability of control systems: concept – characteristic equation – location of roots in the s-plane for stability – Routh Hurwitz criterion – Nyquist stability criterion – Gain margin and Phase margin – Root locus – rules for the construction of root loci UNIT – V: Frequency domain analysis: Introduction - Polar plots - Bode plots - M&N circles – Nicholas charts – Need for compensators - Lag and lead compensators design in frequency domain Unit-VI: State Space Analysis of Continuous Time Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization Solving the Time invariant state Equations- State Transition Matrix and its Properties – Concepts of Controllability and Observability. References/Text Books: 1. “Control system Engg” : I.J.Nagrath and M.Gopal, 5th edition ,New Age International (P) Limited Publishers ,2007 “Control system Engineering” by Norman S. Nise, 5th edition ,Wiley India, 2000. 1. “Automatic Control systems”- by B.C.Kuo 8th edition ,2003 John Wiley and Sons 2. “Modern Control Engineering”: by K.Ogata, 5th edition , Prentice Hall of India Pvt.Ltd.,2010. . Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations. Video Lectures (Web Links): 1. http://nptel.ac.in/courses/108102043/ 2. http://nptel.ac.in/courses/108101037/ 3. http://nptel.ac.in/courses/108102044/ 4. http://nptel.ac.in/courses/108101037/						