## **13EE3107-LINEAR CONTROL SYSTEMS**

**(Common for EEE, ECE)**

Instruction/week: 4 hrs. Max. Sessional marks: 40

Univ. Exam: 3 hrs. Univ. Exam marks: 60

**UNIT –I**

Introduction to classical control systems: Open loop and closed loop control systems- Types of feedback, Feedback and its effects- 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: Introduction, Standard test signals, Time response specifications – steady state error constants.

Stability of control systems : Routh Hurwitz criterion- Root Locus – rules for the construction of root loci- Introduction to proportional, derivative and integral controllers.

### **UNIT-IV**

Frequency domain Analysis: introduction- Frequency domain specifications- Polar plots – Bode Plots- Nyquist stability criterion

### **UNIT-V**

Design of compensators : Introduction - Need for compensators. Lag and lead compensators design in frequency domain.

**TEXT BOOKS:**

1. “Control system Engg” : I.J.Nagrath and M.Gopal, Wiley Eastern Ltd.
2. “Control System Engg” – A. Nagoor kani
3. “Control System Engg” – A. Anand kumar

**REFERENCE BOOKS:**

1. “Automatic Control systems”- by B.C.Kuo, PHI.
2. “.Discrete Time Control Systems”: by K.Ogata, Pearson education. .
3. “Control system Engineering” by NISE, Wiley, 2000.