TITLE : Basic Electronic Circuits

COURSE CODE : IEC103

CREDITS : 3-1-3-5

SEMESTER : Spring-2018

FACULTY NAME : Dr. Rambabu Kalla

OBJECTIVE : To build and analyze simple electronic circuits using **operational amplifiers** as basic building blocks.

COURSE TOPICS :

1. Introduction to Signals and Systems: Different types of signals, Linear systems, Principle of superposition, LTI systems, Standard test signals.

2. Frequency Response Analysis: Specifications of an amplifier, Transfer function, Poles and zeros, Bode plots, Frequency responses of various types of filters.

3. Introduction to Operational Amplifiers (op-amps): Characteristics of an op-amp, Different stages of an op-amp, Pin diagram of 741 op-amp, Characteristics of an ideal op-amp, Ideal op-amp analysis, Concept of virtual ground, Inverting and non-inverting amplifiers using op-amp, Differential and common mode gain of an op-amp, CMRR, Bandwidth of an op-amp, Slew rate.

4. Linear Op-amp Circuits: Summing Amplifier, Averaging Amplifier, Difference Amplifier, Integrator, Differentiator, Instrumentation amplifier

5. Feedback and Stability of an Electronic System: Concept of feedback, types of feedback, Advantages of negative feedback, Voltage amplifiers, Trans-resistance amplifier, Trans-conductance amplifier, Current amplifier, Different types of mixing and sampling, Different feedback configurations, Practical amplifiers.

6. Nonlinear Op-amp Circuits: Comparators, Zero Crossing detector, Level detector, Operation Amplifier based Electronic Circuits, Logarithmic and exponential amplifier. Concept of hysteresis, Schmitt Trigger.

7. Oscillators: Condition for oscillations, Square wave generator, Triangular wave generator, Sinusoidal oscillators

8. Diode Circuits: Introduction to diode, Types of diodes, Characteristics of a diode, Specifications of a diode, Rectifiers using diodes, Half-wave rectifier, Full-wave rectifier, Full-wave bridge rectifier

9. DC Power Supplies: Introduction to power supplies, Different stages of a power supply, Realization of each stage of a power supply, Design of simple power supply using Zener regulator and capacitor filter.

10. BJT and BJT Circuits: Introduction to BJTs, Different types of BJTs, Input-output characteristics of a BJT, Different types of BJT connections, Biasing BJTS, Small signal model of a BJT, Small signal analysis of BJT Amplifiers, Multi-stage amplifiers, Cascade and Cascode connection, Darlington pair.

PREFERRED TEXT BOOK: Material uploaded to the course portal (Moodle)

GRADING POLICY:
1. Assignments/Quizzes : 10 %
2. Mid-term Examinations : 35 %
3. End Semester Examination : 35 %
4. Lab : 20 %

OFFICE HOURS: Friday 5:00 to 7:00PM (Room No: A5-303)