

Electronics Devices & Circuits

S.E. Sem. III [CMPN]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25
Term Work	–	25

SYLLABUS

1. Introduction to BJT Amplifiers

- Principles of operation of BJT, DC biasing, Fixed Bias, Collector to Base Bias, Voltage Divider Bias circuits.
- Small signal operation and analysis of CE, CB, CC amplifier configuration
- SPICE simulation example of amplifier

2. Differential Amplifiers

- Types of differential amplifier, Differential amplifier with swamping resistors, DC analysis.
- AC analysis, Differential gain, common mode gain, CMRR
- Constant current bias, current mirror circuits.
- SPICE simulation example of differential amplifier.

3. Operational Amplifiers and its General Linear Applications

- Block diagram representation, Ideal Op–amp, Equivalent circuit, Openloop configuration, Transfer characteristics. Op–amp with negative feedback, Frequency response. Popular Op–amp with negative feedback, Frequency response. Popular Op–amp IC 741 specifications and performance characteristics.
- Basic op–amp applications : Adder, Scalar, Subtractor, Difference amplifier, I–V converter, V–I converters, Integrator, Differentiator, Instrumentation amplifier using 2 and 3 op–amp stages.
- SPICE simulation of Op–amp.

4. Active Filters and Oscillators

- First order low pass Butterworth filter, Second order low pass Butterworth filter, First order high pass Butterworth filter, Second order high pass Butterworth filter, Band pass filter, Band reject filter, All pass filter
- Oscillator : principle, Phase shift oscillator, Wien bridge oscillator, Quadrature oscillator, amplitude stabilization in oscillators.
- SPICE simulation of Filters and Oscillators.

5. Signal Generators and Wave Shaping Circuits

- Op-amp used as basic comparator, Zero crossing detector, Schmitt trigger comparator and transfer characteristics.
 - Precision rectifier circuits, Peak detector, clamping circuit.
 - Square wave generators, Triangular wave generator, Saw tooth wave generators
 - Astable multivibrator, Monostable multivibrator
 - Data Converters : Analog to digital converter and Digital to analog converter principles, D–A converter with binary weighted resistors, D–A converter with R–2R Ladders. Successive approximation A–D converter
 - SPICE simulation examples.
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6. Specialized IC Applications

- Timer IC 555 and its use as monostable and astable multivibrator, Specifications and performance characteristics.
- Voltage regulator IC 723 and its use as variable voltage regulator, Specifications and performance characteristics.

Reference :

1. OP–Amps and Linear Integrated Circuits – (*Ramakant A. Gayakwad*), Pearson Education.
2. Linear Integrated Circuits – (*D. Roy Choudhary & Shail Jain*), New Age International Publishers.
3. Microelectronics Analysis and Design – (*Sundaram Natarajan*), Tata McGraw–Hill Publishing Company Limited.
4. Microelectronic Circuits, 5th Edition, (*Adel S. Sedra & Kenneth C. Smith*), Oxford University Press
5. Electronic Devices and Circuits – (*David Bell*), Oxford University Press.
6. Millman’s Electronic Devices and Circuits – (*Jacob Millman, Christos C. Halkias, Satyabrata JIT*), McGraw Hill International Edition.
7. Electronic devices and circuits – (*S. Salivahanan, N. Suresh Kumar, A. Vallavaraj*), Tata McGraw Hill.

