

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. ECE I - Sem L T/P/D C

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(A50425) LINEAR AND DIGITAL IC APPLICATIONS

Course Objectives:

This main objectives of the course are:

- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and non-linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.
- To teach the theory of ADC and DAC.
- To introduce the concepts of waveform generation and introduce some special function ICs.
- To understand and implement the working of basic digital circuits.

UNIT - I:

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT - II:

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, waveform Generators - Triangular, Sawtooth, Square wave, IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

UNIT - III:

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV:

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing. TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT - V:

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs - All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXTBOOKS :

1. Communication Systems - Simon Haykin, 2 Ed, Wiley Publications.
2. Communication Systems – B.P. Lathi, BS Publication, 2004.

REFERENCES BOOKS:

1. Electronic Communications - Dennis Roddy and John Coolean, 4th Edition, PEA, 2004.
2. Electronic Communication Systems - Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
3. Analog and Digital Communication - K. Sam Shanmugam, Wiley, 2005.
4. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
5. Principles of Communication Systems - H Taub & D. Schilling, Gautam Sahe, TMH, 2007, 3rd Edition

Course Outcomes:

Upon completion of the subject, students will be able to:

- Conceptually understand the baseband signal & system.
- Identify various elements, processes, and parameters in telecommunications systems, and describe their functions, effects, and interrelationship.
- Design procedure of AM Transmission & Reception, analyze, measure, and evaluate the performance of a telecommunication system against given criteria.
- Understand basic knowledge of FM Transmission & Reception.
- Understand various types of SSB Transmission & reception.
- Design typical telecommunication system that consists of basic and essential building blocks.