

Vidyalankar

S.E. Sem. IV [EXTC]

Analog and Digital IC – Design and Applications

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks

Term Work : 25 Marks

Oral : 25 Marks

1. Circuits with Resistive Feedback :

Basic Op-Amp Configurations, Ideal Op-Amp Circuits analysis, Negative Feedback, Current-to-voltage Converters, Voltage-to-Currents Converters, current Amplifiers, Difference Amplifier, Instrumentation Amplifier, Instrumentation Applications.

2. Active Filters :

The Transfer function, First-Order Active Filters, Standard Second-Order Responses, KRC Filters, Multiple-Feedback Filters, State-Variable and Biquad Filters, Filter approximations, cascade design, generalized impedance converters, direct design, Switched capacitor filters.

3. Analog IC's :

All Types of A/D Converter. Comparator Circuits and Their Applications, Sample and Hold Circuits, IC Power Amplifiers. Analog Multipliers (Logarithmic multipliers, Log and Antilog Amplifiers. 555 Timer. VCO ICs(566). PLL ICs(565, 4046B). Function Generator IC 8038, XR 2206.

4. Sequential logic design :

Clocked synchronous state machine analysis, Clocked synchronous state machine design, designing state machines using state diagrams, state machine synthesis using transition lists, decomposing state machines, feedback sequential circuits, VHDL sequential circuit, VHDL sequential circuit design features.

5. Synchronous logic Design practices.

Sequential circuits documentation standards, use of latches and flipflops like switch debouncing, counters-ripple, synchronus and MSI, decoding binary counter states, counter in VHDL. Shift Registers, ring counter Johnson counter, linear feedback shift register counter, Shift register in VHDL.

6. Memory, CPLDs and FPGAs

Types of memory devices, Read-only memory (ROM), Read/write memory, static RAM, Dynamic RAM, Introduction to Xilinx XC9500, CPLD family and Xilinx XC 4000 FPGA family.

References :

1. Design with Operational Amplifiers and Analog Integrated Circuits (*Sergio Franco*) 3rd edition, McGraw Hill International edition, 2002.
2. Digital Logic Design Principles (*Norman Balabnian and Bradley Carlson*) John Wiley and Sons, 2004.
3. Fundamentals of Digital Logic with VHDL Design (*Stephen Brown & Zvonko Vranesic*) First Edition, McGraw Hill International edition, 2000.
4. Micro Electronic Circuits (*S. Sedra and K. C. Smith*) Saunders College Publishing, Third Edition, 1991.
5. Digital Integrated Electronics (*H. Taub and D. Schilling*) McGraw-Hill Publications, 1997.

