

## VLSI

**Digital Electronics over view:** Fundamentals of Digital Electronics • various topics in Digital Electronics • Different mapping techniques • Introduction to flip - flops • various types of flip flops • Introduction to other digital devices.

**Analog Electronics over view:** Fundamentals of Analog Electronics • Basic electronic devices • Different configurations of transistors • Other Electronics devices • Introduction to opto-electronic devices • various topics in opto-electronic devices • Applications and advantages of analog devices.

**Verilog and VHDL Languages :** Introduction to HDL • Emergence of HDL & design of HDL • Design Methodologies • Different levels of modeling • Various topics under modeling • Modeling Techniques • FSM concepts • State Machines, Synthesis.

**FPGA ASIC Design:** Introduction to FPGA • FPGA Design flow • FPGA Configuration Process • Timing Constraints • Introduction to timing analyzer • Floor planner • FPGA Editor and constrained paths • Need for ASIC • ASIC adv & disadvantages • ASIC Design flow • ASIC methodology • Behavioral Synthesis • Formal verification.

**Analog Devices:** Different types of components • Implementation • Linear Integrated circuits • Operational Amplifiers • RC-RL-RLC Circuits.

**CMOS Device Physics:** Introduction to MOS technology • various types of MOS technology • Boolean Equations • CMOS Inverter region steps • CMOS fabrication

**Physical Layout:** Physical Layout Design • Processing Layout Design steps • Layout Design using various rules • Layout Design using Lambda rule • Floor Planning, Placement and Routing.

## Embedded Systems

**C Language:** C Language preliminaries • Input-Output • Operators and expressions • Control statements • Storage types • Functions • Arrays • Strings • Pointers • Structures • File Structure • I/O Handling

**8051:** Introduction to ESD • Introduction to 8051 • Instruction sets • Basic & Port Programming • Timers • Interrupts • Serial Communication • LCD & 7 segment Display • Embedded C Programming • Introduction to Robotics • Actuators & Motors • Sensors and other Peripherals

**PIC 16/18 Microcontrollers:** PIC 16/18 Series Architecture • instruction sets • Introducing MPLAB • Programming in Assembly & 'c' • working with time: interrupts • counters and timers • Actuators & Sensors DC, DAC, PWM • Serial Communication Programming: UART, SPI, I2C

**ARM7/9 Microcontroller:** Introduction to 16 / 32-bit Processors • ARM Architecture and Organization • ARM/THUMB Programming Model • ARM/THUMB Instruction Set • ARM Exception Handling • ARM/THUMB Assembly and C Programming (GNU Tools) • ARM/THUMB Interworking • Timers / Counters • UART, SPI, PWM, WDT, Input Capture • Output Compare Modes, I2C, CAN • LED, Switches, ADC, DAC, LCD, RTC • Emerging Bus Standards (USB, Compact PCI)