Module-1

- **Basic MOS Technology:** Introduction to MOS transistors, nMOS fabrication, CMOS fabrication, Bi-CMOS technology. (Text book-1)
- **MOS Transistor Theory:** Introduction, MOS Device Design Equations, nMOS inverter, Alternate form of Pull up, (Text book-1), DC Characteristics of CMOS Inverter, Inverter switching characteristics, Power dissipation (Text book-2),

Module-2

- **Design with MOSFETs:** Ideal switches and Boolean operations, MOSFETs as switches, Basic logic gates in CMOS, Transmission gate (Text book-2)
- **Circuit Design Processes:** MOS layers, Stick diagrams, Design rules and layout – lambda-based design and other rules. Examples. (Text book-1)
- **Additional CMOS Logic Structures:** CMOS Complementary Logic, Bi CMOS Logic, Pseudo-nMOS Logic, Clocked CMOS Logic, Dynamic CMOS Logic, CMOS Domino Logic (Text book-2)

Module-3

- **CMOS Sub System Design:** Introduction, Addition/Subtraction, Single bit addition, Full adder design, Carry-Propagate Adders, Carry Generation and Propagation, PG Carry-Ripple Addition, Manchester Carry Chain Adder, Carry-Skip Adder, Carry-Look ahead Adder, Carry-select adder, Zero/one detectors, comparators, Shifters, Multiplication. (Text book-3)

Module-4

- **Array Subsystems:** Introduction, Static Random-Access Memory (SRAM), Dynamic Random-Access Memory (DRAM), Read only Memory, Serial Access Memories, Content addressable memory. (Text 3)

Module-5

- **The MOS Amplifiers:** The Basis for Amplifier Operation, Analysis of Transfer characteristics (both graphical and Analytical), Small-Signal Operation and Models, The DC Bias Point , The Signal Current in the Drain Terminal, The Voltage Gain, Separating the DC Analysis and the Signal Analysis ,Small-Signal Equivalent-Circuit Models ,The Trans conductance (Text book-4), Single-Stage MOS Amplifiers : The Common-Source (CS) Amplifier , The Common-Source Amplifier resistive load , The Common-Gate (CG) Amplifier ,The Common-Drain or Source-Follower Amplifier , Basic Current mirrors (Text book -5)

TEXT BOOKS:

Douglas A. Pucknell, Kamran E., "Basic VLSI Design", 3rd Edition, *PHI Publication*, India.
John P.Uyemura, "Introduction to VLSI Circuits and Systems", Wiley India Edition, 3rd print, 2007.
Neil H.E. Weste, Harris, Banerjee, "CMOS VLSI design", *Pearson*, Third Edition, 2007.
Adel A. Sedra and K.C. Smith, "Microelectronics Circuits", 7th edition, *Oxford University Press, International Version*, 2009.
Behzad Razavi, "Design of Analog CMOS Integrated Circuits", *TMH*, India, 2007.

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Behzad Razavi, "Fundamentals of Microelectronics", *John Wiley India* Pvt. Ltd, 2008.
Neil Weste and K. Eshragian, "Principles of CMOS VLSI Design: A System Perspective", Second Edition, *Pearson Education (Asia) Pvt. Ltd.* 2000.
Sung Mo Kang & Yosuf Leblebici, "CMOS Digital Integrated Circuits: Analysis and Design", *Tata McGraw-Hill*, Third Edition.
Jhon P Uyemura, "Introduction to VLSI Circuits and Systems", *Wiley India (P) Ltd.*, New Delhi, 2002.
Sung Mo Kang & Yusuf Leblebici, "CMOS Digital Integrated Circuits: *Analysis and Design*", 3rd Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2007.
D.A. Hodges, H.G. Jackson and R.A. Saleh, "Analysis and Design of Digital Integrated Circuits", 3rd Edition, *Tata McGraw-Hill Publishing Co. Limited*, New Delhi, 2007.