

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL**

**New Scheme Based On AICTE Flexible Curricula**

**Electrical & Electronics Engineering, VIII-Semester**

**Open Elective EX- 803 (C) VLSI circuits and systems**

**UNIT-I MOSTRANSISTORPRINCIPLE**

NMOS and PMOS transistors, Process parameters for MOS and CMOS, Electrical properties of CMOS circuits and device modeling, Scaling principles and fundamental limits, CMOS inverter scaling, propagation delays, Stick diagram, Layout diagrams

**UNIT-II COMBINATIONAL LOGIC CIRCUITS**

Examples of Combinational Logic Design, Elmore's constant, Pass transistor Logic, Transmission gates, static and dynamic CMOS design, Power dissipation – Low power design principles.

**UNIT-III SEQUENTIAL LOGIC CIRCUITS**

Static and Dynamic Latches and Registers, Timing issues, pipelines, clock strategies, Memory architecture and memory control circuits, Low power memory circuits, Synchronous and Asynchronous design.

**UNIT-IV DESIGNING ARITHMETIC BUILDING BLOCKS**

Data path circuits, Architectures for ripple carry adders, carry look ahead adders, High speed adders, accumulators, Multipliers, dividers, Barrel shifters, speed and area tradeoff

**UNIT-V IMPLEMENTATION STRATEGIES**

Full custom and Semi custom design, Standard cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures.

**REFERENCE BOOKS**

1. N.Weste, K.Eshraghian, "Principles of CMOS VLSI Design", Second Edition, Addison Wesley 1993
2. R.Jacob Baker, Harry W.LI., David E.Boyee, "CMOS Circuit Design, Layout and Simulation", Prentice Hall of India 2005
3. A.Pucknell, Kamran Eshraghian, "BASIC VLSI Design", Third Edition, Prentice Hall of India, 2007.