GUJARAT TECHNOLOGICAL UNIVERSITY

M.E.in VLSI System Design

Semester: I

Subject Name: **Principles of VLSI Design**
Subject Code: **714201**

Sr. No	Course Content	Total Hrs
1.	**Introduction:** VLSI Design Flow, Design Styles ASIC Design flow, Design Methodologies, Introduction to MOSFETs: Basic principle of MOS Transistor.	5
2.	**Fabrication of MOS Transistor**	10
3.	**The MOS Inverter: Static and Switching Characteristics** Inverter principle, Depletion and enhancement load inverters, the basic CMOS inverter, and transfer characteristics, logic threshold, Noise margins, and Dynamic behavior, Propagation Delay, Power Consumption.	14
4.	**MOS Circuit Layout & Simulation:** MOS SPICE model, device characterization, Circuit characterization, interconnects simulation. MOS device layout: MOS Layers Stick/Layout Diagrams, Transistor layout, Inverter layout.	7
5.	**Combinational MOS Logic Design: Static MOS design**: Complementary MOS, Rationed logic, Pass Transistor logic, complex logic circuits.	8
6.	**Dynamic MOS design:** Dynamic logic families and performances.	5
7.	**Sequential MOS Logic Design** Static latches, Flip flop & Registers, Dynamic Latches & Registers, CMOS Schmitt trigger, Monostable sequential Circuits, Astable Circuits. Memory Design: ROM & RAM cells design	9
8	**BiCMOS Logic Circuits** Overview and Applications of BiCMOS Circuits	5

Laboratory Work: It will consist of 10 to 12 experiment based on above syllabus.

Reference Books:

1. S.M. Kang and Y. Leblebici, CMOS Digital Integrated Circuits: Analysis and Design, Third Edition, MHI.
2. W. Wolf, Modern VLSI Design: System on Chip, Third Edition, PH/Pearson
3. N. Weste, K. Eshraghian and M. J. S. Smith, Principles of CMOS VLSI Design: A system Perspective, Second Edition (Expanded) AW/ Pearson.
4. J. M. Rabaey, A. P. Chanrakasan and B. Nikoli , Digital Integrated Circuits: A Design Perspective, Second Edition, PH/Pearson.
5. D.A Pucknell and K. Eshraghian, Basic VLSI Design: System and Circuits, Third Edition, PHI.
6. J. P. Uyemura, CMOS Logic Circuit Design, Kluwer