GUJARAT TECHNOLOGICAL UNIVERSITY

Signal Processing and VLSI Technology (EC)

M.E. Semester: II

Subject Name: **CMOS Circuit Design II**

Sr. No.	Course Content
1.	**High-Performance CMOS Op-amps:** Buffered op-amps, High-speed/Frequency op-amps, Differential-Output op-amps, Micropower op-amps, Low-noise op-amps, Low-voltage op-amps
2.	**Bandgap References:** General Considerations, Supply-Independent Biasing, Temperature-Independent References, PTAT Current Generation, Constant Gm Biasing, Speed and Noise Issues, Case Study
3.	**Nonlinear Analog Circuits:** Basic CMOS Comparator Design, Characterizing the Comparator, Clocked Comparators, Adaptive Biasing, Analog Multipliers
4.	**Memory Circuits:** Introduction, Sensing Basics, Folded Array, Chip Organization, Sense Amplifier Design, Row/Column Decoder, Row Drivers, SRAM Cell, ROM, Floating Gate Memory, Sensing using ΔΣ Modulation: Examples of DSM, Using DSM for sensing in Flash Memory, Sensing Resistive Memory, Sensing in CMOS Images
5.	**Phase-Locked Loops:** Simple PLL, Charge-Pump PLLs, Nonideal Effects in PLLs, Delay-Locked Loops, Applications
6.	**Digital-Analog and Analog-Digital Converters:** Introduction and Characterization of DAC, Parallel DAC, Introduction and Characterization of ADC, Serial ADC
7.	**Introduction to Switched-Capacitor Circuits:** General Considerations, Sampling switches, Switched-Capacitor Amplifiers, Switched-Capacitor Integrator, Switched-Capacitor Common-Mode Feedback
8.	**Special Purpose CMOS Circuits:** DC Reference, Multivibrator Circuits, Charge Pumps (Voltage Generators)

Reference Books:

1. Design of Analog CMOS Integrated Circuits, Behzad Razavi, TMH
2. J. Rabaey, Digital Integrated Circuits: A Design Perspective, Prentice Hall India
3. CMOS Circuit Design, Layout, and Simulation, R. Jacob Baker, Wiley, 2nd Edition
4. CMOS Analog Circuit Design, Allen and Holberg, Second Edition, Oxford University Press