GUJARAT TECHNOLOGICAL UNIVERSITY

M.E

Communication Engineering

Subject Name: **Microelectronics chip fabrication**

Sr.No	Course content
1	Environment for VLSI Technology: Clean room and safety requirements. Wafer cleaning processes and wet chemical etching techniques.
2	Impurity incorporation: Solid State diffusion modeling and technology; Ion Implantation modeling, technology and damage annealing; characterization of Impurity profiles.
3	Oxidation: Kinetics of Silicon dioxide growth both for thick, thin and ultra-thin films. Oxidation technologies in VLSI and ULSI; Characterization of oxide films; High k and low k dielectrics for ULSI.
4	Lithography: Photolithography, E-beam lithography and newer lithography techniques for VLSI/ULSI; Mask generation.
5	Chemical Vapour Deposition techniques: CVD techniques for deposition of poly-silicon, silicon dioxide, silicon nitride and metal films; Epi-taxial growth of silicon; modeling and technology, In-process measurements.
6	Metal film deposition: Evaporation and sputtering techniques. Failure mechanisms in metal interconnects; Multi-level metallization schemes.
7	Plasma and Rapid Thermal Processing: PECVD, Plasma etching and RIE techniques; RTP techniques for annealing, growth and deposition of various films for use in ULSI.
8	Carrier lifetime measurement techniques, Process integration for NMOS, CMOS and Bipolar circuits; Advanced MOS technologies.

Reference Books:

1. C.Y. Chang and S.M.Sze (Ed), ULSI Technology, McGraw Hill Companies Inc, 1996.
2. S.K. Ghandhi, VLSI Fabrication Principles, John Wiley Inc., New York, 1983.
3. S.M. Sze (Ed), VLSI Technology, 2nd Edition, McGraw Hill, 1988.