VLSI TECHNOLOGY & DESIGN
(EC523)

Objective of the Course : *Student gets familirised with the concepts of different processes involved in fabrication process and also with packaging issues. He also have idea on synthesis, RTL architecture.*

UNIT - I
Fabrication Process: Current state of technology, Moore's Law, Wafer preparation, oxidation growth mechanism & Kinetics, Thin oxides, Lithography: Optical Lithography, X-ray, Ion & Electron Lithography, Diffusion, Models of Diffusion in Solids, Fick's I1-D diffusion equation Ion Implantation, metallisation.
N-MOS, CMOS, BiCMOS Fabrication process.

UNIT - II
Layout Generation: MOS transistor, Electrical Parameter, Sttick diagram, Design rules, Layout generation, Sheet Resistance, Standard unit of capacitance, wiring capacitance, delays propagation delay.

UNIT - III
Floor Planning & Packaging: Floor Planning methods, Global interconnect package types, Structure of a typical package, Raut's Rule, VLSI Design rules, Thermal, Electrical & Mechanical Design Considerations.

UNIT - IV
Architecture Design: Register , transfer design, High level synthesis, pipelining, Archetectures for low power testing.

UNIT - V
IP Components, Design methodologies, SOCs.

TEXTBOOKS :

1. Kamran Eshraghian, "Essentials of VLSI circuits and systems", Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition.
2. Weste and Eshraghian, "Principles of CMOS VLSI Design", Pearson Education, 1999.

REFERENCE BOOKS :

1. John P. Uyemura, "Chip Design for Submicron VLSI: CMOS Layout & Simulation", Thomson Learning.
2. John .P. Uyemura, "Introduction to VLSI Circuits and Systems", JohnWiley, 2003.
3. John M. Rabaey, "Digital Integrated Circuits", PHI, EEE, 1997.
4. Wayne Wolf, "Modern VLSI Design", Pearson Education, 3rd ed., 1997.
5. S.M. SZE, "VLSI Technology", 2nd ed., TMH, 2003.

Text Books :

1. M.A. Mazadi & J.G. Mazidi, "The 8051 Micro Controller & Embedded Systems", Pearson Education. Asia -2000.
2. John B. Peatman, "Designing with PIC Micro Controllers", Pearson Education.
3. Jonathan W. Valvano, "Embedded Microcomputer systems, Real Time Interfacing", Brookes/Cole,Thomas learning, 1999

Reference Books :

1. Ajay V Deshmukh, “Microcontrollers Theory and Applications”, Tata McGraw-Hill
2. Kenneth J Ayala, “The 8051 Microcontroller”
3. http://www.sunrom.com/files/P89V51RD2.pdf
4. http://www.eecs.umich.edu/~panalyzer/pdfs/ARM_doc.pdf
5. Raj Kamal, “Microcontrollers : Architecture, Programming, Interfacing and System Design”, Pearson ed.