CMOS VLSI Design
ETC - 920 (Elective)
M.E. 1st Sem.(For E&T.C, E.E and C.S.T students)

Goals: This course can be taken by C.S.T., E.E., and E&T.C. 1 st semester M.E. students as elective. Upon completion of this course, the students will get exposers on CMOS analog and digital circuits. Students of the above three branches will be able to develop, lay out and simulate fabrication design of VLSI building - block modules, such as counters, registers, arithmetic units, operational amplifier etc. Also this course will help to design medium scale VLSI chips design applicable to their respective specialization.

Prerequisites by Topics:

Logic design: combinational and sequential; computer organization and microprocessor, MOS transistor theory ; basic network theory.

Topics:
 1. CMOS Devices Characteristics and processing   (1)
 2. Basic MOS transistor theory   (2)
 3. Switch level simulation, timing analysis   (2)
 4. Performance estimation, resistance, capacitance, power, fall and rise times (3)
5. Transistor sizing   (2)
6. Scalable design and design rules   (1)
7. Charge sharing   (1)
8. CMOS logic families ad circuit techniques   (3)
9. Latch-up and solutions   (1)
10. Clocks and multiphase clocking   (4)
11. VLSI building blocks - Inverters, gates, multiplexers, registers,
    arithmetics and logic units   (4)
12. Analog VLSI building blocks - Op-amp. switch capacitors .   (3)
13. Delay analysis of VLSI block   (3)
14. Hierarchical, modular and bit-sliced design techniques   (2)
15. Pipelining and chaining concepts   (3)
16. Area - time- power trade offs in VLSI design   (2)
17. Behavioral and structural modeling in VHDL   (2)
18. Other VLSI design issues   (1)
Total Classes: 40 Hours

Textbooks:

1. Jan. M. Rabaey: Digital Integrated circuits: A design Perspective, Pentice Hall
 2. N. Weste and K. Eshraghian: Principles of CMOS VLSI Design: A Systems Perspective, Addison- Wesley

3. Kang and Leblebici ; CMOS digital integrated circuits analysis and design, Tata McGra Hill