

Fall 2024 - ECE 658 - DR. D. MISRA

Course Outline

VLSI Design - I

TEXT: Weste and Harris; CMOS VLSI Design, 4th Ed., Addison-Wesley Publishing Co. 2011.

More Resources on the Text

REF: Weste and Harris; CMOS VLSI Design, 3rd Ed., Addison-Wesley Publishing Co. 2005.

REF: Weste & Eshraghian, Principle of CMOS VLSI Design, Addison-Wesley Publishing, 1993.

REF: K. Roy and S.C. Prasad, Low-Power CMOS VLSI Circuit Design, Wiley-Interscience, 2000.

REF: Amar Mukherjee; Introduction to nMOS & VLSI System Design; Prentice-Hall, 1986

REQUIREMENTS

1. The assignments and projects will be done by using the OSL system using Linux Workstations. You can obtain an account in this system immediately after you register for this course.
2. You can access the OSL system in GITC-Room 2300.
3. To connect from outside you need to connect `oslX.resource.campus.njit.edu` where X is a number 7 to 21

WEEK

TOPIC(TEXT)

1. Introduction, MOS Transistor History, Introduction-Circuit Forms & Methodologies

VLSI Lab (Sec. 1.1-1.3, 1.4, 1.5)

2. Device Current Expressions (2.1-2.3, Notes)

3. CMOS Transfer Characteristics, MOS Circuit Applications and

- Inverter, Transmission Gates Noise Margin (2.4, 2.5)**
- 4. VLSI Technology, Design Rules, Latchup, (3.1, 3.2, 3.4, 3.5)**
- 5. Delay & Timing (Ch. 4)**
- 6. Power, Interconnect: Capacitance and Resistance (Ch5 & Ch 6) & Midterm Exam**
- 7. Spice Simulation, [HSPICE](#)**
- 8. Combinational Circuits (Ch. 9)**
- 9. VLSI Lab**
- 10. Circuit Techniques & Design Methodology (Symbolic Layout) 5.2,5.3, 5.4**
- 11. Clocks and Communication (Symbolic Layout) (Notes) (5.5)**
- 12. I/O Structures (5.6), Super Buffers & Gate Protection**
- 13. Memory Systems (8.3), Finite State Machines (8.4)**
- 14. CMOS Design Methods (8.4)**
- 15. Final Examination**

Honor Code: The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students.

GRADING POLICY:

2 Pop Quizzes.....10%

Assignments.....10%

Project.....20%

1 Midterm.....30% (Tentative: on October 10, 2024)

Final Exam.....30%

Total.....100%

Office Hours: MON 11AM-12PM, WED 4:30-5:30PM OR with appointment. Rm. 339 ECEC, Ext. 5739

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