

**EC 535 Digital VLSI Design**

**COURSE INFORMATION**

Prerequisites	Academic Year & Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Laboratory	
CC 216 EC 432	5	9	2	0	2	3

**COURSE AIM**

To introduce students to the basic principles of designing a digital VLSI chip and using CAD tools and to simulate the design.

**COURSE WEEKLY CONTENTS**

- 1 Revision (MOSFET Physics).
- 2 Mapping Boolean functions to transistor level.
- 3 Euler’s Path, Stick Diagramming Rules, Color Codes, Design Rules.
- 4 The CMOS Inverter – DC Characteristics.
- 5 Pass Transistor Logic, Transmission Gates.
- 6 CMOS IC Fabrication Steps, and Design Rules.
- 7 7th week assessment + Midterm Exam and Delay in logic circuits, Logical Effort (1).
- 8 Logical Effort (2).
- 9 Interconnects, Crosstalk.
- 10 Power Dissipation.
- 11 Combinational Circuit Families (1).
- 12 Combinational Circuit Families (2).
- 13 Sequential Circuit Design (1).
- 14 Sequential Circuit Design (2).
- 15 Concepts of Pipelining, Latency, and Throughput.

**STUDENT GRADING & ASSESSMENT**

Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	20 Midterm	←	10	MARKS		→	30
		To be freely distributed among possible assessments					
8 to 12	←		20	MARKS		→	20
13 to 15	←		10	MARKS		→	10
16 or 17	40 Final						40
<b>Total</b>	<b>Exams</b>	<b>Assign.</b>	<b>Quizzes</b>	<b>Reports</b>	<b>Present.</b>	<b>Lab.</b>	100

**REFERENCES**

**Textbook** • N. Weste, K. Eshraghian, “Principles of CMOS VLSI Design”, 2<sup>nd</sup> ed., Addison Wesley, 1993.

**Other**

- R. L. Geiger, P. E. allen and N. R. Strader, "VLSI Design Techniques for Analog and Digital Circuits", McGraw-Hill, 1990.
- P. Allen, D. Holberg, "CMOS Analog Circuit Design", 2nd ed., Oxford University Press, 2002.
- Glasler, Dobberpuhi, "The Design & Analysis of VLSI Circuits", AW, 1988.