



EC 535

Digital VLSI Design

S'2012

Course Outline

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<b>Objective:</b>	The objective of this course is to achieve an understanding CMOS Digital Design circuits and Layout
<b>Text:</b>	"CMOS VLSI DESIGN", Neil H.E Weste and David Harris, Addison Wisley Press, 2005
<b>References:</b>	1. Lecture Notes. 2. Principle of VLSI Design, Neil H.E. Weste
<b>Online Resources</b>	<a href="http://www.ac.tut.fi/aci/courses/76527/">http://www.ac.tut.fi/aci/courses/76527/</a>
<b>Grading:</b>	<b>7<sup>th</sup> Week (30%):</b> ✓ Exam I: 20 % ✓ Assignments: 10 %  <b>Project 30%</b>  <b>Final Exam (40%)</b>

Week of		E V E N T	
1	20 <sup>th</sup> Feb	<b>Lecture</b>	Introduction to MOS transistor
		<b>Tutorial</b>	Introduction to Microwind_1
2	27 <sup>th</sup> Feb	<b>Lecture</b>	Basic Gates Design: Inverter, NAND, Combinational Logic and NOR Gates
		<b>Tutorial</b>	Basic Inverter and NAND design using Microwind
3	5 <sup>th</sup> March	<b>Lecture</b>	Digital design logic using Stick Diagram-Compound Gates-Pass Transistors and Transmission Gates-Tristates
		<b>Tutorial</b>	From Stick Diagram to Layout
4	12 <sup>th</sup> March	<b>Lecture</b>	MUX design -Latches and flip flop Design-Top level Interface-Block Diagram Circuit and Physical Design
		<b>Tutorial</b>	MUX, Latches and flip flops using microwind
5	19 <sup>th</sup> March	<b>Lecture</b>	MOS Transistor Theory_1 : Introduction Ideal I-V Characteristics C-V Characteristics Non Ideal I-V Characteristics
		<b>Tutorial</b>	Problem Sets 1
6	26 <sup>th</sup> March	<b>Lecture</b>	MOS Transistor Theory_2: DC Transfer Characteristics
		<b>Tutorial</b>	Microwind Quiz
7	2 <sup>nd</sup> April	<b>Lecture</b>	Exam I
		<b>Tutorial</b>	Revision
8	9 <sup>th</sup> April	<b>Lecture</b>	Circuit Characterization and Performance Estimation_1: Introduction – Delay Estimation- Logical Effort and transistor sizing-Power Dissipation
		<b>Tutorial</b>	Problem Sets 2
9	16 <sup>th</sup> April	<b>Lecture</b>	Circuit Characterization and Performance Estimation_2: Interconnect
		<b>Tutorial</b>	Delay in logic circuit using Microwind and DSCH
10	23 <sup>th</sup> April	<b>Lecture</b>	Combinational Circuit Design: Dynamic Circuits – Pass Transistor Circuits Sequential Circuit Design_1: Introduction- Sequencing Static Circuit
		<b>Tutorial</b>	Problem Sets 3
11	30 <sup>th</sup> May	<b>Lecture</b>	Sequential Circuit Design_2: Circuit Design of Latches and Flip Flops [Conventional CMOS circuits]
		<b>Tutorial</b>	Problem sets 4
12	7 <sup>th</sup> May	<b>Lecture</b>	Testing and Verifications
		<b>Tutorial</b>	Projects Discussion
13	14 <sup>th</sup> May	<b>Lecture</b>	VHDL
		<b>Tutorial</b>	Introduction to VHDL
14	21 <sup>st</sup> May	<b>Lecture</b>	Revision
		<b>Tutorial</b>	
15	28 <sup>th</sup> May	<b>Final Exam</b>	

*Good Luck*