

520.216 Make a Chip that Sees (Introduction to VLSI)

<http://www.ece.jhu.edu/~andreou/216/index.html>

Course description:

How does one make the complex integrated circuits/systems –chips- in your mobile phone? This is a first course on the systematic engineering design principles for complex systems. The course emphasizes hierarchical abstractions of devices, circuits, functional units with a focus on physical design of integrated circuits. It is a Computer Aided Design (CAD) oriented laboratory course where lectures will introduce principles and fundamental concepts. Students working in groups will design and fabricate a digital CMOS camera integrated circuit.

Staff

Professor Andreas G. Andreou, 400 Barton Hall, 410-516-8361 (agaclass@gmail.com)

Professor Pedro Julian, (pedro.julian@gmail.com)

Professor Philippe Pouliquen, 400 Barton Hall, 410-516-8361

Teaching and laboratory Assistants

TBD

Schedule

Week	Date	Topic	Lecturers
1	1/31	Introduction	Andreou* /Julian
2	2/7	MOS technology, fabrication and design rules	Andreou* /Julian
3	2/14	MOS transistor and mathematical models	Andreou /Julian*
4	2/21	Digital abstraction, MOS abstraction as switch, CMOS inverter	Andreou*/Julian
5	2/28	Interconnects, delay and energy	Andreou /Julian*
6	3/7	Basic and Complex CMOS circuits	Andreou /Julian*
7	3/14	Review and –MIDTERM (March 16th)	Andreou*/Julian
	3/21	Spring Break	
8	3/28	Arithmetics and counters and comparator	Andreou*/Julian
9	4/4	State holding elements, sequential circuits	Andreou /Julian*
10	4/11	Photodetectors, chip architecture	Andreou* /Julian
11	4/18	Analog and interface CMOS circuits (Amplifiers, Mirrors)	Andreou*/Julian
12	4/25	Project work	Andreou /Julian*
13	5/2	Project work and final presentation (May 4 th)	Andreou /Julian*

Time and Place:

Lectures: Hodson 213, Tuesday/Thursday 3:00-4.15pm

Laboratory: Barton Hall, during allocated lecture times and at your own time.

Grading:

Mini Projects and Laboratory Assignments (40%)

Midterm (20%)

Final project and written report (30%)

Class participation (10%)

Text book: Basics of CMOS Cell Design by Etienne Sicard and Sonia Delmas-Bendhia