

520.216 Make a Chip that Sees (Introduction to VLSI)

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 , 400 Barton Hall, 410-516-8361 (pedro.julian@gmail.com)

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

Teaching and laboratory Assistants

TBD

Schedule

Week	Date	Topic	Lecturers
1	1/26	Introduction	Andreou* /Julian
2	2/2	CMOS fabrication and design rules	Andreou* /Julian
3	2/9	MOS transistor and models	Andreou /Julian*
4	2/16	MOS abstraction as switch, CMOS inverter	Andreou*/Julian
5	2/23	Basic CMOS gates	Andreou /Julian*
6	3/1	Complex CMOS gates	Andreou /Julian*
7	3/8	–MIDTERM (Tuesday)- State holding elements	Andreou*/Julian
	3/14	Spring Break	
8	3/22	Sequential circuit design	Andreou*/Julian
9	3/29	Arithmetics and counters and comparator	Andreou /Julian*
10	4/5	Interconnects - delay and energy	Andreou* /Julian
11	4/12	Analog CMOS circuits (Amplifiers, Mirrors)	Andreou*/Julian
12	4/19	Interface circuits (A/D, Clocks)	Andreou /Julian*
13	4/26	Imager Arrays / Memory arrays	Andreou /Julian*
14	5/3	Final Project Lab /Class Presentations	Andreou / Julian

Time and Place:

Lectures: Krieger 308, Tuesday/Thursday 3:00-4.15pm

Laboratory: Barton Hall 410, during allocated lecture times and at your own time.

Grading:

Quizzes (15%)

Mini Projects and Laboratory Assignments (25%)

Midterm (25%)

Final project and written report (35%)

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