CSCI 4974 / 6974 Hardware Reverse Engineering

Important info:

- Classes: Tuesday/Friday, 2:00 - 3:50, Low 3130
- Professor: Bulent Yener (yener@cs.rpi.edu). Office hours TBA
- TA: Andrew Zonenberg (zonena@rpi.edu). Office hours AE 119 Tuesday/Friday 5-7 PM.
- Download the Syllabus

Timeline
Draft notes for upcoming lectures are provided for advance study purposes only and are subject to change. The version posted as of the end of lecture is authoritative as far as material which will be covered on quizzes etc.

Date	Class
1/21/2014	Lecture 1: Course overview, motivation, legal issues, switch model of CMOS logic
1/24/2014	Lecture 2: Package construction
1/28/2014	Quiz 1: CMOS schematics, packaging Quiz 1a: Makeup exam Lecture 3: Depackaging
1/31/2014	Lab 1: Depackaging demo (Lab group A only, no class for group B. Location: MRC 166 EM lab)
2/4/2014	Lab 1: Depackaging demo (Lab group B only, no class for group A. Location: MRC 166 EM lab)
2/7/2014	Lab 1a reports due Quiz 2: Depackaging Lecture 4: CMOS layout Download the example layouts
2/11/2014	Lab 1b reports due Quiz 3: CMOS layout Homework 1 out Homework 1 images More homework 1 images Lecture 5: Fabrication processes
2/14/2014	No class: Canceled due to heavy snow.
2/18/2014	No class: Follow Monday schedule.
2/21/2014	Lecture 6: Deprocessing
2/25/2014	Quiz 4: Process ID and deprocessing Lecture 7: CPLD architecture
2/28/2014	Quiz 5: CPLD architecture Lecture 8: Microscopy and Imaging Files for in-class exercise
3/4/2014	Lab 2: SEM Imaging (Lab group A only, no class for group B. Location: MRC EM lab)

3/7/2014	Lab 2: SEM Imaging (Lab group B only, no class for group A. Location: MRC EM lab)
3/11/2014	No class: Spring break
3/14/2014	No class: Spring break Happy pi day!
3/18/2014	Homework 1 due (tentative) Lab 2 reports due (both groups) Quiz 6: Microscopy and imaging Lecture 9: Mask ROM layout
3/21/2014	Lecture 10: PROM/EPROM/EEPROM/efuse/Flash layout
3/25/2014	Lecture 11: SRAM layout
3/28/2014	Quiz 7: Memory technology Lecture 12: Non-invasive attacks on logic
4/1/2014	Lecture 13: Fault attacks on crypto (joint lecture by Prof. Yener and graduate student Brennan) Prof. Yener's slides Brennan's slides
4/4/2014	Lecture 14: Invasive and semi-invasive attacks Lab 3: UV light attacks on PIC12F683 (both groups, during normal class period)
4/8/2014	Lab 4: Invasive attacks (Lab group A only, no class for group B. Location: Cleanroom test area)
4/11/2014	Lab 4: Invasive attacks (Lab group B only, no class for group A. Location: Cleanroom test area)
4/15/2014	Quiz 8: Attacks Homework 2 out: PCB RE (see slides) Lecture 15: PCB RE: Component ID, block diagram extraction
4/18/2014	Lecture 16: Guest lecture by Danny Walters (MITRE) on electromagnetic side-channel attacks
4/22/2014	Lecture 17: Anti-tamper / anti-analysis techniques
4/25/2014	Lecture 18: PCB RE: Fab, deprocessing, netlist extraction
4/29/2014	Quiz 9: PCB RE Lecture 19: Programmable logic: FPGAs
5/2/2014	Lecture 20: Machine vision, automated RE tools
5/6/2014	Homework 2 presentations. No final exam.

Announcements

- 1/25/2014: Syllabus updated for new lab schedule and office hour times/locations
- 1/28/2014: Check out the list of interesting chips we might decap in lab #1. If anyone has votes, send them to the TA. (Large CPU packages are off limits for the lab because they tend to take a while to process.)
- 2/2/2014: Lab 1a data is available:
  - Xilinx XC3S50AN (70% nitric, live decap)
  - Xilinx XC9572XL (70% nitric, bare die)
  - Xilinx XC2C128 (98% sulfuric, bare die)
  - Photos from lab session

- 2/4/2014: You may find this blog post on UMC's 180nm process an interesting read.
- 2/4/2014: Lab 1b data is being uploaded. Stay tuned for more!
  - Silicon Image SII1364 (70% nitric, bare die)
  - Xilinx XC95144XL (98% sulfuric, bare die
  - Winbond W9751G6KB (98% sulfuric, bare die, started prior to lab)
  - Xilinx XC3S50A (98% sulfuric, bare die, started prior to lab)
  - Atmel ATmega3216 (70% nitric, live decap)
  - Photos from lab session
- 2/23/2014: Office hours moved one hour later, new time is 5-7 PM. Same location and days.
- 3/4/2014: Lab 2a data is now available
- 3/13/2014: Lab 2b data is now available
- 3/31/2014:
  - Some scheduling changes for the later part of the semester have been made, please pay attention to the calendar above.
  - This blog post is a sneak peek at what to expect from lab 4.
  - The final project has been removed and final course grades will be computed from HW1/2, lab grades, and quiz grades only. HW2 is now a group assignment and presentations are due the last day of class.
- 4/13/2014: Lab 4 data is now available
  - FIB photos
  - Cleanroom photos
