Advances in Low Power Design Methodologies

Lecture Information:

Lecture Time: Tu/Th   3:30 pm – 4:45 pm   CHM 0119
Textbook: No required textbook. Course materials will be provided at ELMS (elms.umd.edu).
Web page: https://elms.umd.edu/
Instructors: Dr. Gang Qu

Office:	1417 A.V. Williams Building	Office hours:	Tuesday 2:00 pm – 3:00 pm
Phone:	301-405-6703		Friday 10:00 am – 11:30 am
Email:	gangqu@umd.edu		and by appointment

Prerequisite:
(1) basic algorithms, data structure, and discrete math (ENEE 641 is preferred, but not required);
(2) digital logic design (ENEE 244 is required, ENEE 644 is preferred);
(3) basic knowledge on computer architecture (ENEE 350);
(4) Research experience in any related field will be a plus.
(5) permission of instructor if necessary.

Course Goals:
(1) understand the source of power dissipation in digital systems
(2) learn the state-of-the-art techniques for power reduction
(3) read critically recent research literatures
(4) apply low power design methodologies to your own research

Course Organization:
(1) Lecture
(2) Literature reading
(3) Paper presentation
(4) (Individual) project

Important dates:

Jan. 27:	first lecture
Feb. 5:	no class (Dr. Qu travel)
Feb. 11:	(Dr. Qu might travel)
Mar. 3:	no class (Dr. Qu travel)
Mar. 17:	no class (Spring break)
Mar. 19:	no class (Spring break)
May 12:	last lecture
May 20:	Final report due

I will try to make up the missed lectures with pre-recorded videos and in-class Q&A sessions. Hope that you will like this blended learning approach.

Core Topics: (some topics in (7)-(10) will be optional)
(1) source of power dissipation.
(2) power models and estimation techniques
(3) dynamic power reduction
(4) static power reduction
(5) power/energy/thermal aware computing
(6) manufacture variation's impact on power/energy efficiency
(7) applications (multimedia, DSP, wireless sensor network, mobile computing systems, IoT devices.)
(8) low power techniques at circuit level, microarchitectural level, compiler, operating systems, memory, bus
(9) low power on multi-processor systems, FPGAs, 3D ICs, and new materials.
(10) energy harvesting and scavenger systems

Grading Policy: (for your curiosity, subject to minor changes)
Letter grade will be granted based on the total score in the following four categories:

Homework	30%	5-6 sets of questions.
Midterm	35%	closed book, in-class, late in the semester
Presentations	20%	paper presentation and report/project presentation
Final report	15%	Due: May 20, 2015 (last day of final exams)

If you have a **documented disability** and wish to discuss academic accommodation with me, please contact Dr. Qu as soon as possible and not later than Tuesday, February 3, 2015

Academic dishonesty will not be tolerated: The University Code of Academic Integrity, available at http://www.inform.umd.edu/CampusInfo/Departments/JPO/ prohibits students from committing the following acts of academic dishonesty: cheating, fabrication, facilitating academic dishonesty, and plagiarism. Instances of academic dishonesty will be referred to Office of Judicial Programs.

Homework 1: Student Information Survey

Due: February 3, 2015. Turn in this hardcopy in class.

Name: Preferred Email address:

Major field: Advisor:

Program (M.S. or Ph.D.):   Time entering the current program (e.g., Fall'14):

Research interests:

Courses taking this semester (both ENEE and non-ENEE):

Circle your project preference (just for my planning purpose, does not need to be your final decision):

(1) a survey paper   (2) research project on my own topic   (3) research project with Dr. Qu

Circle the SCHEDULED CLASSES that you will NOT be able to make (for midterm and presentation scheduling purpose only)

April: 2;   7   9;   14   16;   21   23;   28   30;

May: 5   7;   12

Why are you taking this course? What do you expect to learn? Suggestions?