



Course Description: This course will cover hardware, architecture, software, and networking aspects of energy efficiency. Students will review the recent literature on energy-aware computing and work on a practical energy-aware software and/or hardware project.

Schedule: Mon and Wed 2-4pm, IC-351.

Office Hours: Scheduled on-demand by email (wanner@unicamp.br)

Website: <http://classroom.google.com>. Access code: c3dyasz.

Prerequisites: Students should be familiar with computer architecture, basic networking, and low-level programming. MC404 (or an equivalent course) is strongly recommended. MC504, MC602, and MC732 are recommended but not required.

Program: • Measurement, sensing, and modeling of energy consumption • Process, Voltage, and Temperature (PVT) variations • Hardware-level techniques • Dynamic power management • Energy proportionality • Duty cycling • Energy and Power-Aware Scheduling • Energy bugs • Low-Power networking • Battery modeling and management

Course components:

Literature review: (L) Students will write a one-page summary and review of selected papers. One student will present and lead the discussion for each paper in class.

Take-home exams: (E) including theoretical, analytical, and practical (implementation) problems.

Project (P): practical implementation project, including implementation, evaluation, presentation and paper describing the results.

Grading: Final grade F will be given by:

$$F = L \times 0.3 + E \times 0.3 + P \times 0.4$$

where L is the arithmetic mean of the grades for the literature review assignments, E is the arithmetic mean of the grades for the take home exams, and P is the grade for the project. MO632 students will be awarded letter grades according to the following criteria: A: $F \geq 8.5$, B: $8.5 > F \geq 7.0$, C: $7.0 > F \geq 5.0$, D: $5.0 > F$. No makeup or supplementary exams will be offered.

Bibliography:

- Jan Rabaey. Low Power Design Essentials. Springer, 2009.
- Massoud Pedram and Jan Rabaey. Power Aware Design Methodologies. Springer, 2002.
- Ishfaq Ahmad and Sanjay Ranka (editors). Handbook of Energy-Aware and Green Computing. Chapman and Hall/CRC, 2012.
- Brian Otis and Jan Rabaey. Ultra-Low Power Wireless Technologies for Sensor Networks. Springer, 2007.
- Recent papers from the energy-aware computing literature.

Academic integrity: Any attempts at plagiarism and receiving or giving aid on assignments will result in a final grade of zero in the course.