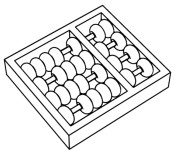

Institute of Computing – UNICAMP
MO632/MC972 – Energy Efficient Computing
First Semester, 2020
Prof. Lucas Wanner

UNICAMP

Alternate development plan in response to the COVID-19 pandemic

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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 an energy-aware software project or survey.

Prerequisites: Students should be familiar with computer architecture, basic networking, and low-level programming. MC404 (or an equivalent course) is strongly recommended. MC504 and MC602 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

Office Hours: Thursdays 6pm. The session will be closed after 15 minutes if there are no participants.

Office Hours Meeting URL: `meet.google.com/ukt-sdee-ycs`

Website: `http://www.lucaswanner.com/eec`

Methods: The course will feature required reading of recent papers in the energy efficient literature every week. Slide presentations for each topic in the program will be made available for self-directed study. Orientation for project and survey preparation will be offered every week during office hours.

Course components:
Literature review: (L) Students will write a one-page summary and review of selected papers.
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.
Survey (S): on a selected topic in energy efficient computing.

Each student may chose between working on a project or writing a survey.

Grading: If a student presents a project, final grade F will be given by:

$$F = L \times 0.3 + E \times 0.3 + P \times 0.5$$

Alternatively, if a student presents a survey, final grade F will be given by:

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

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, P is the grade for the project. S is the grade for the survey. 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.