

## CS 498: Program Optimization, Fall 2007

**Location:** room 1131, Siebel Center

**Time:** WF 11:00 am –12:15 pm.

**Instructor:** Maria J. Garzaran

**Phone:** 217 244 8878.

**Office:** 4308, **email:** [garzaran@cs.uiuc.edu](mailto:garzaran@cs.uiuc.edu)

**Office Hours:** By appointment (send me an email).

**Course website:** <http://www.cs.uiuc.edu/class/fa07/cs498mjg/>

**Prerequisites:** CS 232 and CS 225

**Credits:** 3 undergraduate hours; 3 or 4 graduate hours.

**Format:** I plan to use slides in the class. You can access the slides from the course website. I will try to put the slides in advance in the website. There is no book that covers all the material in the course. There will be reading assignment for some of the topics covered during the course.

**Project:** There will be a term project, which will be an important part of the course, since it contributes to a 50% of the grade. The project will have several milestones. The main purpose of the milestone will be to give you feedback on the project and no grade will be given at each milestone. Therefore, you will have the opportunity to improve your results for the final report which is the only one that will receive a grade. However, complete, high quality reports are expected at each milestone.

I expect each team to consist of two members, but I could consider smaller or larger groups. Each team should choose an application to optimize. Students can select any application they want, but they should try to identify an application where they can apply the optimizations requested in the project.

**Exams:** There will be a midterm and a final exam. The final will only cover the material not covered by the midterm. Both exams are closed book and closed notes. The midterm will be in class on October 17. The time and location of the final will be announced shortly.

**Programming Assignment:** Towards the middle of the semester there will be a Programming Assignment. Small kernels such as sorting routines or graph algorithms will be written using the different programming approaches described in class (OpenMP, PThreads, Intel Threading Building Blocks, and Colorama). A survey will be done to evaluate the difficulty and tradeoffs of the different programming approaches.

Students taking 3 credits, will only need to program the kernels using two programming approaches. Students taking 4 credits will need to use the 4 programming approaches.

**Grading:** Final grades will be computed based on the following criteria: midterm 20%, final 20%, programming assignment 20%, project 40%.

**Goal of the course:** The course will cover program optimization. Program optimization can refer to improve:

- Execution
- Power
- Space
- Reliability
- Modularity, Readability
- Accuracy / Completeness

In this course the focus will be on the first goal and will discuss some about the others.

We will discuss issues such as:

- Factors that affect performance
- Program transformations
- Parallel Programming
- Tools
- Automatic Program Synthesis (library generators)