

# Syllabus for ICS432

## Concurrent and High-Performance Programming

### Fall 2008

**Overview:**

This class is about the art of writing concurrent programs, meaning programs that are designed to do multiple things at once, typically using multi-threading. The needs for concurrent programming are diverse, ranging from better program interactivity to higher program performance. While concurrent programs for higher interactivity have been mainstream for decades (e.g., most graphical user interfaces), the importance of concurrent programming for high performance has suddenly become mainstream as well, due to the advent of **multi-core** computer architectures. Therefore, knowing how to write concurrent programs is critical for today's computer scientists and has become a highly sought after skill. By the end of the course, students will be proficient in performance tuning of non-concurrent programs, in multi-threaded programming in C and in Java, and in debugging and performance tuning of these multi-threaded programs on multi-processor and multi-core architectures. Students will also be exposed to computing on cluster platforms, which are the most popular high-performance computing platforms today. The last month of the semester will be spent doing a project in which each student will further apply and gain hands-on experience with concurrent programming.

**Prerequisites:**

ICS311 or consent

**Textbook:**

There will be no textbook for this class. All content will be provided in the form of lecture notes and pointers to publicly available on-line material.

**Lectures:**

Tuesday / Thursday, 3PM-4:15PM, Holmes 247

**Instructor:**

Henri Casanova  
Office/Phone: POST 310C / 956-2649  
Office hours: Wednesdays 1PM-4PM  
e-mail: [henric@hawaii.edu](mailto:henric@hawaii.edu)

**Course Website:**

[http://navet.ics.hawaii.edu/~casanova/courses/ics432\\_fall08](http://navet.ics.hawaii.edu/~casanova/courses/ics432_fall08)

The Website is the main source for lecture materials and assignments.

**Exams, assignments, and grading:**

This class will have homework/programming assignments (60% of the grade), one midterm exam (15% of the grade), and a final exam (25% of the grade).

Grading will be as follows

> 90%	A
≥ 80% and < 90%	B
≥ 70% and < 80%	C
≥ 60% and < 70%	D
< 60%	F

**Assignments: What to turn in?**

- Turn in your own work. It is okay to discuss homework with others, but the work you turn in should always be your own.
- Answers should always include how the answer was derived.

**Assignments: How to turn in?**

- *E-mail* (preferred): to [henric@hawaii.edu](mailto:henric@hawaii.edu), including the course number and the assignment number in the subject line of the e-mail
- *Hard copy*: At the beginning of the lecture on the day the assignment is due. But note that most assignments will require that you write software, and thus an electronic copy will be necessary.

**Late Work:**

Late work will not be accepted unless previously authorized by the instructor. Late work will receive a grade of 0.

**Academic Dishonesty:**

All occurrences of academic dishonesty, as defined below, will result in a grade of 0 for the assignment or exam, and in a memo in your ICS department file describing the incident. Which will be done for all students involved. Should there be more than one memo of this type in your file, the incident will be referred to the Dean of Students. Disciplinary sanctions range from a warning to expulsion from the university, as seen at: <http://www.hawaii.edu/student/conduct/discipline.html>.

The University of Hawaii defines academic dishonesty as follows:

Because UHM is an academic community with high professional standards, its teaching, research, and service purposes are seriously disrupted and subverted by academic dishonesty. Such dishonesty includes cheating and plagiarism as defined below. Ignorance of these definitions will not provide an excuse for acts of academic dishonesty.

1. Cheating includes but is not limited to giving or receiving unauthorized assistance during an examination; obtaining unauthorized information about an examination before it is given; submitting another's work as one's own; using prohibited sources of information during an examination; fabricating or falsifying data in experiments and other research; altering the record of any grade; altering answers after an examination has been submitted; falsifying

any official University record; or misrepresenting of facts in order to obtain exemptions from course requirements.

2. Plagiarism includes but is not limited to submitting, in fulfillment of an academic requirement, any work that has been copied in whole or in part from another individual's work without attributing that borrowed portion to the individual; neglecting to identify as a quotation another's idea and particular phrasing that was not assimilated into the student's language and style or paraphrasing a passage so that the reader is misled as to the source; submitting the same written or oral or artistic material in more than one course without obtaining authorization from the instructors involved; or "drylabbing," which includes obtaining and using experimental data and laboratory write-ups from other sections of a course or from previous terms.