Course Description

With the advent of parallel computer architecture, such as multicore processors and clusters of machines interconnected by high-speed networks, there is a growing need to use multiple processors/computers to work together on a common task. Parallel computing allows us to solve problems sooner with multiple concurrent tasks or solve problems at a larger scale. However, development of parallel software has been thought of time and effort intensive due to the inherent complexity of problem decomposition, task parallelization and synchronization. Moreover, parallel program design should also consider the characteristics of the underlying parallel hardware to optimize performance and cost. Finally, given numerous parallel programming models and libraries, selecting the right one for a specific task is also quite difficult.

This course is designed to provide students with the understanding of fundamentals of parallel systems and programming. In this course, we will first introduce the basics of parallel computing, including parallel platforms, parallel program design, representative parallel algorithms, and parallel performance analysis, and later move onto the discussions of popular programming libraries, such as Pthread, MPI, OpenMP, and MapReduce. Upon completion of this course, students are expected to become familiar with the fundamentals of parallel computing and obtain skills for writing simple parallel programs.

Prerequisites

- CS2060, CS2080, CS4200/5200, and CS4500/5500
- Knowledge of UNIX/Linux systems, high-level language C, and computer organization and architecture
- If you want to take the class without the prerequisite, you have the get the permission from the instructor. If approved, if is your responsibilities to make up for the required background

Textbook

Homework Assignments

There will be 3 homework assignments focusing on basic concepts, algorithms, and design principles. Submissions should follow:

- Homework assignments are to be completed individually, no teamwork is allowed
- Submit homework assignments in class on the due day
- Submit only hard copies (printed copies are preferred). No email submission, keep your own record.

Project Assignments

There will be 3 team project assignments based on parallel programming. The project policies are:

- Project assignments are to be completed in teams. 2-person teams are required, though 1-person or 3-person teams are possible. If you want to work on your own or to form a 3-person team, you need instructor’s permission. No bonus will be granted for working on your own (i.e., 1-person team)
- Projects may have different turn-in requirements, which will be announced when released
- Projects assignments should be submitted via email. Make sure to include “CS5060_ProjectX” in the title of your email, where X is the project number. Submit to jrao@uccs.edu
- In class demo of project results may be required for some project(s)

Exams

Both the midterm and final are close-book and close-note exams. However, you are allowed to carry one letter-size double-sided hand-written cheat sheet. The exam schedule is:

- Midterm exam: in class, Wednesday, Mar. 16, 2016
- Final exam: 5:20pm - 7:20pm, Wednesday, May 11, 2016

NO MAKE-UP EXAMS. Please make arrangements to meet the schedule.

Grading Policy

Grading scale

- A: [90, 100], A-: [87, 89]
- B+: [84, 86], B: [80, 83]
- C+: [75, 79], C: [70, 74]
- D+: [65, 69], D: [60, 64]
- E/F: below 60

Distribution of Points

- In-class discussion and attendance: 5%
- Homework assignment: 20%
- Project: 30%
- Midterm exam: 20%
- Final exam: 25%
Course Policy

• The last day to withdraw is **FRIDAY, Feb. 26 5:00 PM**

• If you have a disability for which you are requesting an accommodation, you are encouraged to contact the Disability Services Office within the first week of classes. The Disability Services Office is located in Main Hall #105 (Phone number is 255-3354)

• Students are expected to attend all lectures. However, each student is allowed one absence. For each extra absence, the attendance percentage is reduced proportionally

• Late submission of paper critique and project will incur a 25% penalty on grading for each day after the deadline

• Under extreme non-academic circumstances, such as illness, exceptions can be made in above attendance, submission, and exam policies. You have to provide sufficient and convincing proof, e.g., documents from the doctors

• Adherence to the University’s Code of Ethics will be strictly monitored and enforced. This will be applicable to assignments, projects, and exams

• Academic Integrity violations, such as plagiarism, cheating on an exam etc., will result in a series of actions and penalties, including failing the class

• Any work submitted for a grade must include the following statement and be signed and dated. If this is missing or not signed and dated, the work will be returned ungraded.

  I have neither given nor received unauthorized assistance on this work

  Signed: Date: