CS 211: High Performance Computing

Zizhong Chen --- Fall 2023

Instructor: Zizhong (Jeffrey) Chen
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Class Room: SSC 335

Lecture: MWF 2:00PM ~ 2:50PM (In person class)
Office Hours: MWF 2:50PM ~3:00PM or by appointment
Blackboard: **https://elearn.ucr.edu/**

TA: Zizhe Jian
TA Office: WCH-459
TA Email: zjian106@ucr.edu

Textbook: No required textbook.

Objectives:

> ➢ To study how to optimize the performance of sequential programs.
> ➢ To learn how to develop parallel programs using MPI
> ➢ To learn how to analyze the performance of parallel programs

Course Description:

> This course provides students with knowledge and fundamental concepts of high performance computing as well as hands-on experience of the core technology in the field. The objective of this class is to understand how to achieve high performance on a wide range of computational platforms. Topics include: optimizing the performance of sequential programs based on modern computer memory hierarchies, parallel algorithm design, developing parallel programs using MPI, analyzing the performance of parallel programs.

Prerequisites: Strong programming experience in C/C++/Fortran under Unix-like
environments or permission of instructor.

Assignments:

Assignments based on the lecture and related materials will be assigned during the quarter. Additional help sessions for assignments may be scheduled. Please make sure that your programs are properly documented and indented. Make sure you provide instructions on how to run your programs, give example runs, and analyze your results and/or performance. Your solution to the assignments must be typed. All assignments are due on specified due time. **No credit** will be given to assignments submitted late except for **legitimate** reasons. Legitimate reasons are usually such reasons as emergency (with documented evidence verifiable by me). You must talk to the instructor for any grade appeal about an assignment, and it must be made **within 48 hours** after the grade is available.

Exams:

There will be two exams during the quarter. Reviews and additional Q&A sessions may be scheduled prior to the exam. The time and location of the exam are to be announced.

Make-up Exams:

No make-up exams unless you have a medical emergency. You MUST contact me (by email) **before** an exam in order to schedule a make-up-exam. You will need a **strong verifiable** reason (as determined by me) in order to make up the test. I always verify students' claims with related people. The make-up test will be DIFFERENT from the original test. If you decide to stop attending classes please see me about dropping the class. My office location is noted above.

Attendance Policy:

It is required for *everyone* to be present for *every* class. You are responsible for all announcements and for all materials presented in the lectures. There may be in class quizzes occasionally. You may miss at most **4** classes without losing any attendance points. **Missing 5 or more classes will cause the loss of the attendance points.**

Collaboration and Plagiarism:

All homework assignments and projects are to be done individually unless otherwise specified. You are allowed and even encouraged to verbally discuss the assignment material with your classmates or consult others for debugging assistance, but you must prepare the solution on your own. Plagiarism and other anti-intellectual behavior are not tolerated and are subject to severe penalties. **Plagiarism will result in a <u>grade of zero for ALL</u> students involved.**

Other Course Policies:

All current UCR policies will apply. All students are expected to attend class fully prepared with appropriate materials and all devices which make noise turned to the off or silent position (e.g., cellular phones, personal stereos, etc.). Any student behavior deemed disruptive by the professor will result in expulsion of the student from the classroom, with an absence for the day and possible disciplinary action. According to the Americans with Disabilities Act, UCR will provide reasonable access and appropriate accommodations for otherwise qualified disabled students. If you need such access or accommodations, please consult with your professor immediately.

Grading:

- Attendance (5%)
- Assignments (15%)
- Exam 1 (40%)
- Exam 2 (40%)

Letter Grade

- A+   Score>=95%
- A   95%>Score>=90%
- B+   90%>Score>=85%
- B   85%>Score>=80%
- C+   80%>Score>=75%
- C   75%>Score>=70%
- D+   70%>Score>=65%
- D   65%>Score>=60%
- F   60%>Score