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COURSE INFORMATION	Location:	CB 133
	Class Times:	MW 14:30–15:45
	Instructor:	Karl Frinkle
	Office:	MTH 112
	Office Hours:	MW 12:30–14:30, TR 10:00–12:00, F by appointment only
	E-mail:	kfrinkle@se.edu
	Website:	<a href="http://homepages.se.edu/kfrinkle/">http://homepages.se.edu/kfrinkle/</a>
	Cluster URL:	<a href="http://cumulonimbus.se.edu/">http://cumulonimbus.se.edu/</a>

**COURSE OVERVIEW** In this course, we will use MPI (Message Passing Interface) in a C/C++ environment running under the *openHPC* cluster operating system (<https://openhpc.community>) to write high performance computing (HPC) programs. All work will be done by programming in C/C++ on the Cumulonimbus cluster (<http://cumulonimbus.se.edu>). We will focus most of our efforts on writing code in parallel to increase the performance, and reduce run times, of serial code. In particular, this will be a project based course, where we will attempt to write parallel code to search for Mersenne primes.

**COURSE OUTLINE** Although the course will be more project based, these are some of the key computer science topics we will cover:

I. Introduction:

- Hardware inspection of the Cumulonimbus cluster
- Overview of parallel versus serial programming

II. Working on the Cluster

- Connecting to the cluster using SSH
- User accounts, privileges, and responsibilities
- Editors: Vi, nano

III. Compiling Programs

- C
- C++
- MPI with C
- MPI with C++

IV. Submitting MPI Jobs to the Queue

- Queus
- .qsub files
- Job Status
- Job Output

V. Getting Started with programming

- Simple Hello World
- MPI Hello World

VI. MPI Topics

- Initialization
- Broadcast and Communication
- File I/O

- Helpful MPI Commands and their uses
- Optimization

**COURSE WORK** Most work will consist of writing programs, analyzing the results, and revising programs after the analysis is complete. You will be expected to hand in programs which compile and execute as described by the given assignment. A major emphasis will be placed on the revising of programs based upon runtime analysis. You will be expected to be able to present your work, analysis, and revisions in a coherent manner, not just to the instructors, but to your fellow students.

**GRADES** Programming will count for the entirety of your grade. You will be expected to turn in programming assignments in a timely manner, and will receive subsequent feedback in a timely manner.

**POLICIES** All cell phones must be silenced and put away before class begins. If you are caught using a cell phone during class, your final grade will be dropped by **one letter grade per incident**. It is also expected that everyone will behave in a kind and courteous manner towards fellow students and the instructor.

I reserve the right to change any policies as I see fit to ensure that you are indeed receiving the best possible education that I can give you in the subject matter at hand. If I feel a certain aspect of the course does not appear to be effective in its method, I will attempt to change it (for the better I hope).

**MANDATORY STATEMENTS** **Counseling Center:** Any student experiencing mental or emotional issues who desires free, confidential, clinical counseling is encouraged to contact the SE Counseling Center at (580) 745-2988 to schedule an appointment during normal working hours Monday-Friday, 8:00AM to 5:00PM. For after-hours mental health emergencies, please call SE Campus Police at (580) 745-2911 or the Mental Health Crisis Hotline at 1-(800) 522-1090.

**Disability Accommodations:** Any student needing special accommodations due to a disability should contact the Office of Compliance and Safety, Administration Building, Suite 311 or call (580) 745-3090 (TDD# 745-2704). It is the responsibility of each student who anticipates or experiences barriers to their academic experience to make an official request for disability related accommodations in a timely manner.

**Equity and Non-Discrimination Statement:** Southeastern Oklahoma State University, in compliance with all applicable federal and state laws and regulations, does not discriminate on the basis of race, color, religion, national origin, sex, age, disability, sexual orientation, gender identity, or status as a veteran in any of its policies, practices, procedures, or programs. This includes, but is not limited to: admissions, employment, financial aid, and educational services. Inquiries regarding non-discrimination and equity policies may be directed to: Michael Davis, Director of Compliance and Safety & Title IX Coordinator, (580) 745-3090, or mdavis@se.edu

**Academic Dishonesty:** Academic dishonesty of any kind will not be tolerated. You may fail an assignment, fail the course or be expelled from the University for academic dishonesty. As a student, it is your responsibility to be familiar with and abide by The Student Code of Conduct, which may be viewed in the Student Handbook. Please note that your own original work is expected for all assignments that you submit. Ignorance is not generally accepted as an excuse.