

COURSE INFORMATION	Location:	TBD
	Class Times:	MW 11:00 – 12:30 or TR 11:00 – 12:30
	Instructor:	Karl Frinkle
	Office:	MTH 112
	Office Hours:	MTWR 12:30-14:00, TR 9:00-9:50, or by appt.
	E-mail:	kfrinkle@se.edu
	Website:	<a href="http://homepages.se.edu/kfrinkle/">http://homepages.se.edu/kfrinkle/</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 to write high performance computing (HPC) programs. All work will be done by programming in C/C++ on the Cumulonimbus cluster. We will focus most of our efforts on writing code in parallel to increase the performance and reduce run times of standard serial code.

**COURSE OUTLINE** Although the course will be more project based, these are some of the key areas 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++
- MPI with C++

IV. Submitting MPI Jobs to the Queue

- Slurm
- batch files
- Job status
- Job output

V. Getting Started with programming

- Simple Hello World
- MPI Hello World

VI. MPI Topics

- Initialization
- Broadcast versus Send/Receive
- Gather and Scatter
- File I/O
- Helpful MPI Commands and their uses
- Optimization
- Even work distribution versus first come first serve work loads

V. Applied Math Code

- Finite Difference Derivatives

- Integration Techniques
- Differential Equations
- Partial Differential Equations

**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.

Rounding to the next letter grade is not automatic and will be at the discretion of the instructor. The grading scale is as follows:

Letter Grade	Percentage Range
A	90-100 %
B	80-89 %
C	70-79 %
D	60-69 %
F	0-59 %

**COURSE MODIFICATION**

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**

**Mental Health Support:** Any student (in-person or online) who desires free, confidential, mental health services is encouraged to contact Student Wellness Services at (580) 745-2988, during business hours, to discuss the options currently available to them. For 24-hour emotional crises, you may call the National Lifeline at 1-800-273-TALK (8255) or use the online chat at [suicidepreventionlifeline.org/chat/](https://suicidepreventionlifeline.org/chat/).

**Disability Accommodations:** Any student needing special accommodations due to a disability should contact the Office of Disability Services, GDJ Student Union Room 328 or call (580) 745-3036. 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. If you have questions regarding disability accommodation process or policy please contact Tiffany Tate, [ttate@se.edu](mailto:ttate@se.edu) for more information.

**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, Title IX Coordinator, (580) 745-3090, or [mdavis@se.edu](mailto: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.

## COVID STATEMENTS

**Conversion to Online Format:** Southeastern students should be aware that in the event of an announced extended University closure due to emergency reasons (including but not limited to: controlling outbreaks such as COVID or flu, weather, issues with campus facilities, etc.) onsite classes may be converted to an online/remote format. Students should plan ahead to ensure they have access to the computer equipment (either PC, MAC, or tablet), webcam, and internet connectivity to continue their classes in an online/remote format. Please read all of your official Southeastern student emails as the transition from onsite to online/remote might require a reorganization in your personal situation. Students will be granted a 72-hour transition and grace period. Online classes will continue as scheduled without disruption unless otherwise announced. When these situations arise stay safe and contact your Instructor as the situation requires. This policy was updated on June 11, 2021 and is subject to change.

**Face Coverings:** Southeastern has removed the previous guidance requiring that masks be worn on campus. The voluntary wearing of masks is still allowed per current CDC guidance. The University strongly recommends masking for all unvaccinated individuals when inside Southeastern's academic, athletic, housing and administrative facilities. Please note that there may be some limited specific areas of campus where mask wearing may be required such as in the student health services area. This policy was updated on June 11, 2021 and is subject to change.

**Attendance Policy:** The guidance surrounding the current pandemic is starting to change, however, while the numbers may be smaller there is still the possibility that people may become infected with COVID. Due to this some of the attendance policies related to COVID will remain in place as follows: students who are sick or need to quarantine should not attend classes. Students should provide proper notification to campus health officials in accordance with the guidelines stated below. (<https://form.jotform.com/201426138264046>)

Faculty will:

- Set attendance policies which should include notifying students regularly about important course information and delivery changes through Blackboard and campus email.
- Consider the overall health of the University community when implementing attendance policies.

Students will:

- Provide notification to campus officials (<https://form.jotform.com/201426138264046>) if they have tested positive for COVID-19 or have to quarantine so we can confirm the reported absence with instructors, monitor, and assist the campus community.
- Notify instructors in advance of the absence.
- Keep up with and/or make up missed classwork or assignments.
- Submit assignments digitally through Blackboard or other means as announced by your instructor.
- Work with their instructors to reschedule exams, labs, and other critical academic activities as allowed and described in the course syllabus.
- Check Blackboard and campus email daily to receive important announcements pertaining to the course.

At this time, all faculty will still continue to establish assigned seating to facilitate roll-taking, and, if necessary, contact tracing. While social distancing is no longer required, quarantines for those who test positive and for those who are vaccinated but show symptoms may occur. Faculty should not ask students if they are vaccinated.

Additionally, we ask all members of the University community to be attentive to their health, and safeguard others, by following the CDC's guideline to "stay home when you are sick." You should stay home if you have symptoms. More information on what to do if you are sick is available at the CDC's website.

These policies and procedures were updated on June 11, 2021 and are subject to change.