Parallel Algorithms
CSC 726
Course Syllabus

Fall 2024

Instructor: Dr. Grey Ballard
Email: ballard@wfu.edu
Office: Manchester 237
Office Hours: T 2-3pm, Th 10-11am, or by drop-in or appointment
Class: 2:00–3:15 MW, Manchester 017
Course Schedule: `http://users.wfu.edu/ballard/teaching/CSC726/`

1 Course Description

A thorough, current treatment of parallel processing and supercomputing. Modern high-performance commercial architectures, parallel programming, and various supercomputing applications are discussed. Hands-on experience is emphasized. Students are given access to a variety of machines.

2 Learning Outcomes

By the end of this course, students should be able to:

1. evaluate parallel algorithms using various parallel machine models,
2. analyze the data movement requirements of sequential and parallel algorithms,
3. design and implement efficient parallel algorithms for a variety of problem areas,
4. read, critique, and present both classic and current research papers, and
5. write a research-style paper involving the design and/or analysis of parallel algorithms.

This class is a graduate class, and there will be high demands of classroom preparedness and participation. I will assume that all students have taken an undergraduate algorithms course (an equivalent of CSC 301) and have reasonable experience coding in C/C++. Readings for each lecture will be posted on the course schedule, and they will come from a variety of sources.

3 Projects

The project can be done individually or in groups of 2 and should either be connecting your research to topics in this class or digesting a topic of interest related to this class. The main output of the project is a report (in ACM format: `https://www.acm.org/publications/proceedings-template`) and a presentation to the class at the end of the semester. Projects must include theoretical analysis of a parallel algorithm or a parallel implementation (or both). They may focus on parallel computing pedagogy, along with some artifact (such as a lesson plan, assignment scaffolding, and/or demonstration).

4 Assessment and Grading

Course grades are determined using the following weightings:

- 50% assignments
- 25% tests
- 25% project

Letter grades are assigned based on the following categorization:

A	93 or above	**B**$^-$	80–82.99
A$^-$	90–92.99	**C**$^+$	77–79.99
B$^+$	87–89.99	**C**	70–76.99
B	83–86.99	**F**	below 70

5 Contacting Me

In general, email is the best way to reach me, and I'm happy to take questions over email. The easiest way to find me in person is to stop by my office during office hours, though please feel free to drop by any time. If you want to be sure to find me then you can also email ahead to schedule a time; it helps to propose a few times that work for you so that I can choose one that works for me too.

6 Academic Integrity

In-class tests are to be done independently and without outside resources. Assignments/homework may be discussed with other students (this is encouraged!), however the work submitted must be your own work and reflect your

understanding of the material. Take-home tests must be done individually (with no human help), but you may use non-human resources. If you find helpful resources online (including generative AI) or in print and use ideas that are not your own, you must cite your sources. Copying of work from other students or from online resources is not acceptable and will be dealt with through the Honor System.

7 Emergency Preparedness Policy

In the event of a major disruption of normal university activities (such as might result from a health emergency or other disaster), a course continuation contingency plan will be enacted in order to allow completion of the course. During this time, students should continue with the reading and other assignments listed on the syllabus and monitor email, Canvas, and the WFU website for information. If students have questions or are in doubt about how to proceed, they should contact the instructor by email if available, otherwise they should contact by phone.

8 Center for Learning, Access, and Student Success

Wake Forest University provides reasonable accommodations to students with disabilities. If you are in need of an accommodation, then please contact me privately as early in the term as possible. Retroactive accommodations will not be provided. Students requiring accommodations must also consult the Center for Learning, Access, and Student Success (118 Reynolda Hall, 336-758-5929, `class.wfu.edu`).

9 Grievance Procedure

For complaints in the academic (i.e., classroom) setting, the student should talk personally with or send a written complaint explaining the concern directly to the instructor. Should the student and instructor be unable to resolve the conflict, the student may then turn to the chair of the involved department (in the Wake Forest School of Business, this would be the dean) for assistance. The chair (or dean) will communicate with both parties, seek to understand their individual perspectives, and within a reasonable time, reach a conclusion and share it with both parties. If the student's complaint is not resolved by these procedures, the student should consult with the Office of Academic Advising for assistance. The Associate Dean for Academic Advising will consult with the parties to obtain a resolution. Finally, a student may appeal to the Committee on Academic Affairs which will study the matter, taking input from all parties,

and reach a final decision concerning resolution. https://bulletin.wfu.edu/undergraduate/wake-forest-college/student-complaints/