

CSc 8530

Parallel Algorithms

Spring 2019

Class	Location: Sparks Hall, Rm. 421 Hours: TR 12:45 pm – 2:30 pm
Instructor	Rolando Estrada Email: restradal@gsu.edu Office: 1 Park Place, Suite 634 Office hours: T 11:30 am – 12:30 pm or by appointment
Grader	Saeid Motevalialamoti Email: smotevalialamoti1@student.gsu.edu Office: 1 Park Place, Suite 633 Office hours: TR 11:00 am – 12:00 am or by appointment
Prerequisite	CSc 4520/6520 (Design & Analysis of Algorithms) or CSc 4310/6310 (Parallel & Distributed Computing) or equivalent senior-level course Note: Students without the necessary prerequisites are encouraged to drop the class.
Required Texts	<i>An Introduction to Parallel Algorithms, 1st edition</i> by Joseph JáJá, Addison-Wesley, 1992 <i>Programming Massively Parallel Processors: A Hands-on Approach, 3rd edition</i> by David B. Kirk and Wen-mei W. Hwu, Morgan Kaufmann, 2016
Course Content	Asymptotic analysis of parallel algorithms Parallel data handling and message passing Parallel algorithm design techniques (e.g., divide and conquer) Parallel graph algorithms CUDA/GPU programming
Course Grade	Your final course grade will encompass the following rubrics:

Rubric	Percentage
Homework*	20%
Midterm exam	20%
Paper presentation†	15%
Final project†	45%

* The lowest homework grade will be dropped.

† Grades for group projects will be assigned individually.

Letter grades will be assigned relative to class performance. The TA is responsible for grading all homework. In case you have questions about any of your grades, you must ask the TA first, before contacting the instructor.

Rubrics

Homework

Homework assignments will be given throughout the semester. You must submit all assignments through iCollege (we will review the process at the beginning of the semester); emailed assignments will **not** be accepted. All assignments must be typed (not handwritten or scanned) and in PDF or MS Word/OpenOffice format.

Midterm Exam

There will be an in-class midterm exam on Thursday, February 21st, 2019 that will cover all the material up to that point. The test will be closed-book, but you will be allowed to bring in a *one-sheet, handwritten* cheat sheet. If your cheat sheet is typed, you will not be able to use it.

Paper Presentation

After Spring Break, students will give a 20-minute presentation on a state-of-the-art research paper on parallel algorithms (2 students per paper, unless otherwise noted). Each group will submit their chosen paper, published within the last five years, for approval, shortly after the midterm.

Final Project

The centerpiece of the course will consist of a research-intensive, group project (3 students per group, unless otherwise noted). Students will give a 20-minute presentation during the last few weeks of class and submit a publication-level report at the end of the semester. Some possible types of projects include:

- **Comparative analysis:** Implement, analyze, and validate **two or more** state-of-the-art parallel algorithms and provide a thorough comparison of their theoretical and real-world performance.
- **Application-driven:** Implement, analyze and validate one or more state-of-the-art parallel algorithms in the context of a novel domain (e.g., medical imaging, physics simulations, financial markets, etc.).
- **Research project:** Implement, analyze and validate one or more state-of-the-art parallel algorithms and try to refine or

extend it (e.g., improve its asymptotic running time, modify it to work on other types of data structures, modify it to work on a different type of hardware, etc.).

Regardless of the type of project, students are expected to compare their chosen parallel algorithm(s) with the best-available sequential one. Each group will provide an outline of their chosen project for approval before Spring Break.

Policies

Late/Missing Assignments or Tests

Late work will **not** be accepted; no credit will be given for an assignment if it is turned in after the due date. Likewise, there will be no make-up tests. In both cases, exceptions will only be made for family or medical emergencies (with proper documentation). Note that any late/missing work will receive a grade of 0.

Academic Honesty & Plagiarism

Students are expected to submit their own work; any form of cheating (e.g., copying another student's answers on a homework or test, having other people help you with an assignment, etc.) will result in a zero for that assignment and potentially an F for the course. Furthermore, any plagiarized work will also result in a zero grade and potentially a failing grade for the course. (Please refer to the *University Catalog* for more information on what constitutes plagiarism).

Unless noted otherwise, all homework, tests, and projects must be completed individually, without help from other people. If you use a written source, other than the class textbook, to help you with a homework assignment (e.g., another textbook, Wikipedia, etc.), you must document it.

Cell Phone/Laptop policy

Please turn off or set your phone to silent prior to the start of class. No texting, chatting, use of social media, etc. are allowed during class.

This syllabus represents a general plan for the course; deviations may be necessary.