CS 435 / 535: Accelerated Computing
Summer 2020
Instructor: Professor Karavanic

Course Description

Manycore architectures offer the potential for performance gains, but also raise challenging research questions related to achieving all or most of that potential. We will cover the basics of manycore computing, then we will focus on heterogeneous approaches that use special-purpose processors to accelerate the execution of a variety of applications. This approach is receiving widespread attention because it can yield a very high rate of operations per watt of power - therefore it is considered a Green approach. We will focus specifically on the use of NVIDIA Graphics Processing Units (GPUs) and Intel Xeon Phi's. Our hands on programming will focus on GPUs and Intel Xeon Phi's. Students will complete programming projects using NVIDIA Kepler and Intel Xeon Phi; project and homework work may require your attendance on campus. Some work will be completed on special-purpose hardware in PPerfLab that will be available to the class.

Ph.D. students are welcome, please email the instructor before the first class to discuss your additional requirements.

Accounts:
You will need a CS account to log in to the Linux Lab systems (linuxlab.cs.pdx.edu) provided by the college. If you don't already have an account, go to http://www.cat.pdx.edu for instructions.

Google Group:
Some information is communicated on this mailing list, including general questions, information, updates, hints on the homeworks, schedule changes. Your pdx.edu address is added automatically to this group.

Required Textbook
Programming Massively Parallel Processors, Third Edition: A Hands-on Approach 3rd Edition
   by David B. Kirk and Wen-mei W. Hwu
   ISBN-13: 978-0128119860
   ISBN-10: 0128119861

Additional required readings will be from freely available notes, papers and articles.

Workload: Reading assignments, Zoom lectures, practice exercises, homeworks, group project.
Assessment (Grading):
        Homeworks (60%)
        Project (40%)
Policies
   - If an extraordinary situation (for example severe illness) prevents you from working for a period of time, contact the instructor as soon as possible to discuss your situation and arrange a special schedule or incomplete.
   - Requests for regrading must be submitted to the instructor in writing within one week of the time the graded assignment was made available for pickup. You must be specific in saying why you feel the grading is incorrect. A request for regrade will result in a re-evaluation of the entire assignment and your total grade may increase or decrease as a result.
   - Mastery of Material: In order to pass this course, a score of 35% or higher must be earned on EVERY assignment. If this condition is not met, you will be given a grade of F for the course.

Academic Honesty Students are prohibited from handing in work as their own which they did not create. This includes handing in assignments in which a substantial amount of the material was done by someone else. Students need to be especially careful that in the process of discussing problems with other students they do not inadvertently end up using someone else's work. Similarly, failing to cite a source that contributed substantially to the solution of a problem is also considered to be cheating. It is not necessary to cite the textbook for the course on your homeworks, other than for direct quotes. All other sources should be referenced precisely.

In the event a case of cheating is discovered, the student will automatically receive a score of zero (0) for that assignment or exam. Additional penalties may be applied by the Department, College, or University.

FEEDBACK I value student's opinions regarding the course and I will take them into consideration to make this course as exciting and engaging as possible. Thus, through the semester I will ask students formal and informal feedback. Formal feedback includes short surveys on preferred teaching methods and pace of the class. Informal feedback will be in the form of polls or in-class questions regarding learning preferences. You can also leave anonymous feedback in the form of a note in my departmental mail box. Remember that it is in the best interest of the class if you bring up to my attention if something is not working properly (e.g. the pace of the class is too slow, the projects are boring, my teaching style is not effective) so that I can make the corrective steps.

CLASSROOM ENVIRONMENT I would like to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.) To help accomplish this:

If you have a preferred name and/or set of pronouns that differ from those that appear in your official PSU records, please let me know.

If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me.

If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it.

As a participant in course discussions, you should strive to honor the diversity of your classmates, and to treat everyone in the room with respect.

Access and Inclusion for Students with Disabilities
PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me.

The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment. If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center 503-725-4150, drc@pdx.edu, https://www.pdx.edu/drc.

- If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations.