COSC 480 - Topics in Computer Science
Introduction to GPU Programming
Fall 2015
Syllabus

How to trick a GPU into doing regular math.

Just the Facts

Course Number: COSC 480
Title: Topics in Computer Science - Intro to GPU Programming
Semester: Fall 2015
Meeting Time: MWF 10:40-11:50 am
Locale: Schaefer 160
Instructor: Alan Jamieson
Office: Schaefer 154
Office Hours: MW 1:30-2:30 pm, 5-6pm
Email: acjamieson@smcm.edu
Google Messenger: acjamieson@smcm.edu
Facebook: via COSC480 Group **Online Office Hours:** Most evenings and weekends
Required Textbook: *Sanders and Kandrot, CUDA by Example, Addison Wesley.*
Recommended Textbook: *Wilt, The CUDA Handbook, Addison Wesley.*
Website: http://ripark.github.io/f15/cosc480.html

Catalog Description: This course is a rigorous study of an important field in computer science. Examples: data security; bioinformatics; natural language processing; compilers. A detailed course description will be available before registration. The course may be repeated for credit where the topic is not repetitive. Prerequisite: COSC 201 or permission of the instructor.

Overview: Intro to GPU programming is a topics course focusing on programming that targets graphics processing units (GPUs) for general computational tasks, rather than rendering. GPUs are well suited for massively parallel projects and are increasingly being used as the backbone of the powerful clusters that power applications such as financial modeling, weather forecasting, and physics and mathematical simulations. In this course, students will be exposed to programming techniques and fundamentals of GPUs as they are applied to parallel and distributed computing and the course should be treated as an extension of COSC 420. No previous experience with parallel and distributed programming is required, though it would help.

Purpose: One of the major career paths for computer scientists is through the various modeling and simulation programs undertaken by major corporations and, primarily, various government and academic labs. The trouble is that all of these programs need computer scientists that are well versed in massively parallel and distributed programming, and, increasingly, GPU-based general computation. Because of the specialized need for these programs, many of the jobs will go unfilled for months due to a lack of qualified candidates. This course focuses on this somewhat niche area of programming not only because it is a fulfilling and lucrative career path, but because it is increasingly useful in areas outside of simulation and modeling.

Grade Distribution:

> Labs/quizzes/homework - 20%
> Miniprojects - 15% each
> Major Project - 40%
> Major Project Presentation - 10%

You will be expected to participate in class by asking questions and answering questions posed by myself and those in class. Rather than a drab lecture, the class sessions will be run in a discussion style environment. Activity and debate are highly encouraged.

Final Information: There will not be a final exam in this class, but teams will be presenting their final projects during the final period Tuesday, December 16th at 2pm in Schaefer 160.

Assignments: There will be three projects in this course, two smaller and one major. The major project will be a half-semester team project. Each team will take on some large simulation problem and data set and then present the results during the final period. In addition, there will be a smattering of "lab" in-class and homework programming assignments.

Blackboard Use: I will be utilizing Blackboard primarily for your grades in this course. Course materials will be provided on the course website.

GitHub Use: Major project files and some other sources will be maintained on GitHub. Any questions, concerns or objections should be noted during the first week of classes. You will be given a primer on how to use GitHub during the first part of the semester.

Policies

Cell Phones: Please, turn off or turn to silent any cell phones prior to getting to class. If they go off in class they are distraction not only to myself, but to everyone else in the class as well. Habitual offenders will be excused from the class with a 0 for any quizzes and class participation for that day.

Computer Use: Computer use in this lab is for academic use only. If you bring a laptop with you to this class I expect you to be only using it for purposes related to this class. The same goes for the computers in this lab.

Attendance and Tardiness: Attendance is highly recommended. Missing a class not only causes you to miss the information disseminated in that lecture, but can cause you to miss important information in regards to assignments and the potential of receiving a 0 for a quiz that day. I start class promptly on the hour and expect the students to be in class at that time. If you have circumstances that can prevent you from being in class on time, please let me know as soon as possible. Habitual offenders will be excused from the class with a 0 for any quizzes and class participation for that day.

Exams and Quizzes: There will a single midterm in this class, scheduled at least a week ahead. Every class has the potential of having a quiz to reinforce the ideas from the lecture the previous class. These will not be announced ahead of time. They will be 1-3 question quizzes that can be easily done in 15 minutes either at the start or the end of the class period.

Assignments: Assignments and other outside of class work should be done on an individual basis unless otherwise specified in the description of the assignment. Assignments and other outside of class work will not be taken late except under extraordinary and documented circumstances.

Extra Credit: I will not be offering any extra credit opportunities in this class.

Communication: The simplest way to get in touch with me is by coming by my office during my office hours or contacting me via email. The easiest way to get in touch with me "after hours" is to send me an email. I habitually check my St. Mary's email account all hours of the day. If you come by my office and the door is open, feel free to stop in to chat. The open door indicates that I'm not working on anything that has to keep my undivided attention at that time so do not feel that you are interrupting me or anything like that. I do make appointments if you have a certain time that you'd like to meet with me. If it fits in my schedule (meaning I'm not teaching class during that time) I will be happy to meet with you.

Academic Honesty: Academic misconduct policies are covered in the Student Code and Student Rights and Responsibilities, Article III. Pay close attention to the definitions of academic misconduct noted in Section 1. This can be found in the Student Handbook.

Disability: If you have any kind of disability that can affect your performance in this class, please let me know privately through email or stopping by my office.

Schedule: The schedule for the class will be posted to the class website. The schedule is subject to change (multiple times).

Closing: The most important thing in any of my classes is that you are learning and expanding your horizons. If you are having any undue difficulty with your work as it pertains to this class, please contact me as soon as possible. Always remember that professors succeed when you don't need us any longer. I want you to be bouncing ideas off of each other throughout the class and it is my hope that by the end of the semester that you are driving the class session rather than me.