Parallel Programming
Course Introduction

This course is being taught by:
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Mike has had over 30 years experience in the computer graphics and high performance computing worlds. He has taught over 100 university classes to a total of around 10,000 students. He has also taught over 100 professional short courses around the world.

In his spare time, he likes to dabble in outreach, particularly where he can apply computer graphics to it. Does that count as "spare time" or "more work"?

... Some Other Characters You Might "Meet"

Zelda
Zelda is a 4-year-old Yellow Lab/Golden Retriever mix with bundles of energy. She "loves my footsteps" and eats her share of snack food.

If you don't see them during your office hours, you will certainly hear them.

What this Course Is

This course is all about parallel programming on the desktop and in a distributed environment (e.g., cluster) for applications that you are attempting to accelerate to improve user interaction and simulation and computational performance.

The goals of this course are to leave you "career-ready" (i.e., both work-ready and research-ready) for tasks that require desktop parallelism, both on a CPU and a GPU.

CS 475/575 topics include:

• Parallel computing (types, limitations)
• Moore's Law, Amdahl's Law
• OpenMP
• Synchronization issues in parallel computing
• Cache issues in parallel computing
• SIMD
• GPU computing
• CUDA
• OpenCL
• MPI

What You Should Know on the Way In:

What this Course Is

Office Hours and Other Help

What You Should Know on the Way In:

the Course Incoming Expectations

Above all, you should be a good C programmer. Being comfortable with function calls, arrays, for-loops, structures, arrays of structures, structures of arrays, pointers, and linked lists is a must. It is strongly suggested that you not use this class as an opportunity to learn C for the first time.

On the math side. You should know algebra. There will be times when we have an equation that solves for "Y given X" and I will ask, "What if we already know Y, how can we then go back and find X?" It would be good if you can do that. It is strongly suggested that you use CS 475/575 as an opportunity to learn programming for the first time.

Many of the assignments can be done on Linux systems, which you will have ready-access to. It would be good if you already know how to use the Linux command line and know at least one Linux-based editor (vim is good). It will help if you know the Linux commands: is, mv, cp, mkdir, cd, pwd, rm, echo, gcc/g++, and diversion to a file (">.").

This class does allow graphing of performance data. You will need access to a program that will let you enter data into a 2D table and graph it (Excel is good, but there are others). You will need to be able to copy-and-paste those tables and graphs into a word processing document, add your own text around them, and then produce a PDF file from it.
There is no textbook for this class. The course material will consist of handouts and notes taken while watching the videos.

If you need further reference material, there are a bunch of links at the end of the class Resources site. You’re not required to go look at any of these. They are just some links that I have found useful. They are there if you need them.