Instructor: Prof. Mohamed Zahran (mzahran@cs.nyu.edu)
Meeting time: Wednesdays 5:00pm – 6:50pm
Meeting place: WWH 1302
Office hours: TBA

This course will examine the architecture and capabilities of modern GPUs (graphics processing unit). Many computations can be performed faster on the GPU than on a traditional CPU. This is why GPUs are present now in almost all computers; and the majority of Top 500 supercomputers in the world are built around GPUs. GPUs are now used for a diverse set of applications not only traditional graphics applications; which introduces the concept of general-purpose GPUs or GPGPUs.
In this course, we will cover architectural aspects of modern GPUs. We will also learn how to program GPUs to solve different type of problems.

Topics Covered:

- Why GPUs
- GPU Architecture
- GPU-CPU Interaction
- GPU programming model
- GPU programming languages
- CUDA
- GPU benchmarking
- A quick glimpse at OpenCL
- Solving real-life problems using GPUs

The grade will be distributed among homework assignments, programming assignments, and a final exam, as follows:

- Homework assignment: 10%
- Programming assignments: 30%
- Project: 20%
- Final exam: 40%

Text:

Title: Programming Massively Parallel Processors: A Hands-on Approach
2nd Edition
Authors: David B. Kirk and Wen-mei W. Hwu
Publisher: Morgan Kaufmann
Year: 2012
ISBN: 9780124159921
**Feedback**: I would like as much feedback/criticisms as possible from you, as early as possible, so that I can try to improve the way the course is taught. Please feel free to give me any suggestions (anonymously if you wish) that you think could improve the way the course is handled. Keep in mind that you are not alone. If you have a question, undoubtedly others do too; and we will all benefit from your input. Do not be shy to ask about anything you do not understand in the course.

**Good Luck and Have fun!**