

CSCI-GA.3033-012
Graphics Processing Units (GPUs): Architecture and Programming
Fall 2012

Instructor: Prof. Mohamed Zahran (mzahran@acm.org)

Meeting time: Thursdays 7:10pm – 9pm

Meeting place: WWH 1302

Office hours: Wednesdays 5-7pm

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
- GPU benchmarking
- 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**

Authors: David B. Kirk and Wen-mei W. Hwu

Publisher: Morgan Kaufmann

Year: 2010

ISBN: 0123814723

