CS 677 Parallel Programming for Many-core Processors Syllabus

The syllabus below describes a recent offering of the course, but it may not be completely up to date. For current details about this course, please contact the course coordinator. Course coordinators are listed on the course listing for undergraduate courses and graduate courses.

Text Books

Required
David Kirk and Wen-mei Hwu , *Programming Massively Parallel Processors: A Hands-on Approach* , Morgan Kaufmann, 2012 (2nd edition) ISBN: 978-0124159921

Week-by-Week Schedule

Week	Topics Covered	Reading	Assignments
1	Introduction to massively parallel programming and CUDA	Kirk & Hwu Ch. 1, 2 and 3	
2	CUDA threads and atomics; CUDA memories	Kirk & Hwu Ch. 4 and 5	
3	Performance considerations	Kirk & Hwu Ch. 6	Assignment 1 is due
4	More performance considerations and floating point representation.	Kirk & Hwu Ch. 6 and 7	Assignment 2 is due
5	Case study: MRI reconstruction and timers	Kirk & Hwu Ch. 11	Assignment 3 is due
6	Project ideas; convolution, constant memory and cache, reduction trees	Kirk & Hwu Ch. 8	Assignment 4 is due
7	Project proposals; convolution (cont.), paralle patterns; prefix sum; sparse matrix and vector operations summed area tables	Kirk & Hwu Ch. 9 and 10	Project proposal preparation
8	Midterm		Midterm preparation
9	Case study: electrostatic potential calculation; input binning; computational thinking	Kirk & Hwu Ch. 12 and 13	Project
10	CUDA streams; Thrust; more libraries	Notes	Project
11	Project mid-point presentations; OpenCL	Kirk & Hwu Ch. 11 and notes	Project mid-point presentation preparation
12	More on OpenCL	Notes	Project
13	Fermi and Kepler; CUDA 4.0, 5.0 and 6.0; OpenACC; DirectCompute	Kirk & Hwu Ch. 5	Project
14	Project presentations		Project presentation preparation