EE 7722

GPU Microarchitecture

Where/When
145 EE Building, Mon. Wed. Fri. 11:30–12:20 Spring 2017
http://www.ece.lsu.edu/gp/

Who
David M. Koppelman, Room 345 ERAD
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Office Hours: Monday–Friday: 14:00–15:00.

Prerequisites
EE 4720 or equivalent. By Topic: Computer architecture and digital logic. Also, students must also have a familiarity with machine language and C++ programming.

Topics
Overview—Accelerators (e.g., NVIDIA GPU, Xeon Phi) and their role in typical systems. Characteristics of workloads. Survey of GPU and manycore programming APIs and systems, such as CUDA, OpenCL, OpenMP, OpenACC. A brief history.


CPU Execution Features—Dynamic scheduling, caches, branch prediction.

Execution Architecture—API thread organizations. Many-thread (NVIDIA GPU) vs. many-core (Xeon Phi) organization. Hardware organization, functional units. Scheduling, instruction execution, latency hiding.


Instruction Sets—Memory access, address spaces, locking, reduction. Predication, reconvergence.


Text
Papers and other references.

Grading
35% Midterm Exam • 35% Final Exam • 30% Homework and Projects
Midterm exam grade may be replaced with final exam grade if it is higher.

Late assignment penalty: 10% per day late deducted. Missed-midterm-exam policy: at instructor’s discretion either a makeup exam, use final exam grade for midterm grade (i.e., 70% final exam weight), or use of zero for midterm grade. Daily attendance: optional, however students are responsible for all material, instructions, and notices presented in class.

A.D.A.
Louisiana State University is committed to providing reasonable accommodations for all persons with disabilities. This syllabus is available in alternate formats upon request. Any student with a documented disability needing academic adjustments is requested to speak with Disability Services and the instructor, as early in the semester as possible. All discussions will remain confidential. Please contact Disability Services in 115 Johnston Hall, 225-578-5919 or at http://www.lsu.edu/disability.