

## ST: CDA 6938: Multi-core/Many-core Architectures and Programming Syllabus

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### Description

The course teaches both the architecture of modern multi-core/many-core processors and the parallel programming principles to exploit the computational power of multi-core/many-core processors.

Lectures: Tu Th 3:00pm ~ 4:15pm HEC 302  
Office hours: Tu Th 4:15pm ~ 5:30pm, HEC 243

Course website: <http://csl.cs.ucf.edu/courses/CDA6938/> (*check it often for updates*)

### Reading/Supplementary Material (all optional textbooks)

- *GPU Gems 3* edited by H. Nguyen, Addison-Wesley, ISBN 0-321-51526-9
- *Patterns for Parallel Programming* by T. G. Mattson, B. A. Sanders, and B. L. Massingill, Addison-Wesley, ISBN 0-321-22811-1
- *Multi-Core Programming: Increasing Performance through Software Multithreading*, by S. Akhter and J. Roberts, Intel Press, ISBN 0-9764832-4-6
- *Computer Organization and Design: The Hardware/Software Interface* by David A. Patterson, John L. Hennessy, 4<sup>th</sup> edition (Appendix), Morgan Kaufmann, ISBN: 978-0-12-374493-7
- *Research papers and lecture notes*

### Course Outline

Introduction to multi-core/many-core architecture  
Introduction to multi-core/many-core programming  
AMD/ATI GPU architectures and the programming model for GPGPU (Brook+ and CAL)  
NVidia GPU architectures and the programming model for GPGPU (CUDA)  
IBM Cell BE architecture and the programming model for GPGPU  
Data-level parallelism and the associated programming patterns  
Thread-level parallelism and the associated programming patterns  
Future multi-core/many-core architectures  
Future programming support for multi-core/many-core processors

Grading: +/- grading system will be used.

Homework assignments: 25%  
Participation in discussion: 10%  
Projects: 65% (including two in-class presentations for project proposal and project results)

A:90~100 B+: 85~90 B: 80~85 B-: 75~80 C+:70~75 C: 65~70 C-:60~65 F:0~59