Administrativia

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Schedule: the class meets on Tuesdays and Thursdays, 4:00pm - 5:15pm, room 5502 at Sennott Square.  
Webpage: http://coco.sam.pitt.edu/~emeneses/teaching/cs1645

Goal

High Performance Computing (HPC) has been identified as one key area to sustain technological innovation and foster high-impact scientific discoveries. This course offers an introduction to the fundamentals of HPC. It includes a survey of the main architectural components of a supercomputer, the major parallel programming paradigms, and relevant parallel algorithms in computational science. The contents of the course provide a balance of theoretical and practical aspects in parallel computing. A student of this course is expected to develop the right skills to design parallel applications and to effectively use modern HPC platforms.

Textbook

The official textbook for the class is:  
The rest of the material for the class will be extracted from the HPC and parallel computing literature, including these two other sources:  

Prerequisites

This course has the following prerequisites:  
• CS 449: Introduction to Systems Software.  
• CS 1501: Algorithm Implementation.  
The machine problems assume the student is familiar with the C programming language.
Topics

This course will cover:

1. High performance computing systems
2. Models of parallel processing
3. Performance metrics
4. Multiprocessor architectures
5. Interconnection networks
6. Cache coherence in symmetric multiprocessors
7. Programming shared-memory machines using OpenMP.
9. Programming distributed-memory machines using MPI.
10. Parallel algorithms

Grading

- Midterm Examination: 20%
- Final Examination: 30%
- Homeworks and Project: 50%

Policy on Cheating

The highest academic integrity standard is expected from every student in this course. The solutions to all the assignments and examinations in this course should be the result of the student’s individual effort. Presenting the words or ideas of somebody else under your name hinders your skills in academic research and violates the university’s policy on academic integrity (http://www.provost.pitt.edu/info/ai1.html). Cheating on an exam or plagiarizing a homework will result in a score of “0” for all the students involved. Multiple violations to this policy will result in a final grade “F” in the course.

Students with Disability

Contact the Office of Disability Resources and Services, 216 William Pitt Union (412-648-7890), as soon as possible in the term. They will determine a reasonable accommodation for this course.

Acknowledgments

This course is based on the courses taught by Prof. Rami Melhem at the University of Pittsburgh, Prof. Laxmikant Kalé at the University of Illinois, and Prof. Michael T. Heath at the University of Illinois.