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**COURSE INFORMATION**

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The course is intended for computer science, engineering, and mathematics students who are interested in high performance and parallel computing.

The course deals with aspects of parallel computing involving clusters and networks of PC workstations. Parallel algorithms are introduced in the context of simplistic abstract parallel models such as the PRAM (Parallel Random Access Machine). They are then transported to more realistic parallel computing models such as the Bulk-Synchronous Parallel model and architecture independent design and analysis of the algorithms is then introduced. Numerical and combinatorial algorithms are presented and their parallel performance analyzed in detail: examples could include FFT computations, odd-even merge sort, bitonic sorting, deterministic and randomized sample-based sorting, matrix computations and financial applications.

Students will use PC cluster resources for the programming part and will be introduced to parallel computing libraries such as LAM-MPI, BSPlib, and PUB-library.

Student evaluation will be based on a set of homework problems and programming assignments.

Knowledge of C or C++ is essential and a prerequisite of this course. Students must have already taken CIS 610 or an equivalent course. Elementary knowledge of linear algebra concepts is also desirable although the course will be self-contained. No prior exposure to parallel computing is required.

**CONTACT INFORMATION**

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COURSE WEB PAGE: <http://www.cs.njit.edu/~alexg/courses/cis786/index.html> (planned)

Prerequisites      CIS 610, C/C++ programming.

Textbook      An Introduction to Parallel Computing: Design and Analysis of Algorithms, Second Edition by A. Grama, V. Kumar et al. Pearson Addison Wesley. ISBN: 0201648652.

Reference      Using MPI - 2nd Edition: Portable Parallel Programming with the Message Passing Interface (Scientific and Engineering Computation) by William Gropp, Ewing Lusk, Anthony Skjellum. MIT Press; 2nd edition (November 26, 1999), ISBN: 0262571323.