CSC/CPE 419 Applied Parallel Computing

1. CSC/CPE 419 Applied Parallel Computing

2. credit units 4  contact hours 6

3. Course Coordinator: Chris Lupo


5. a. Course Description: Introduction to applied parallel computing paradigms: software models, resource allocation, performance measurement, and data sharing. Emphasis on massively parallel computation and performance improvement for a real-world application of significant scope. 3 lectures, 1 laboratory.
   b. Prerequisite: CPE 357, CPE 315 Recommended
   c. Required/Elective/Selective Elective for CPE, CSC, EE, SE

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6. a. Course Goals/Outcomes
   The student will be able to:
   • Analyze applications that benefit from massive amounts of parallelism.
   • Become familiar with contemporary parallel programming paradigms and the systems on which they are used.
   • Become familiar with GPU computing hardware and programming models
   • Analyze and measure performance of modern parallel computing systems
   • Analyze the impact of communication latency and resource contention on throughput.
   • Master basic parallel computation with the CUDA programming model.
   b. How Student Outcomes addressed
      (“B” = Basic level, “I” = Intermediate level, “A” = Advanced level)

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7. Major Topics Covered: (number of lecture hours each)
Introduction to parallel computing
Parallel programming models
Memory performance models
Performance analysis tools, profiling
Thread model, threading hardware
Memory hardware, Hierarchical memories
Memory conflicts, Atomic operations
Control flow