CPE 419 Applied Parallel Computing

1. **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; Corequisite: CSC 141 or CSC 348; Recommended: CPE 315
   
   **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.
   - Discuss, evaluate, and use contemporary parallel programming paradigms and the systems on which they are used.
   - Construct and evaluate programs using 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.
   - Demonstrate mastery of basic and intermediate parallel computation with GPU programming models.

   **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