

## COURSE DESCRIPTION

**Department and Course Number:** COMP 6330

**Course Title:** Parallel and Distributed Computing

**Total Credits:** 3

**Required:** No

**Prerequisites:** COMP 3500 or COMP 3510

**Class meetings per week:** 3 hours

**Lab meetings per week:** 0 hours

**Course Coordinator:** Dr. Sanjeev Baskiyar

**Date Prepared:** February 18, 2004

### **Current Catalog Description:**

Overview of hardware and software issues in parallel systems: fundamental parallel architectures, programming languages, tools and algorithms, and parallel applications.

### **Textbooks:**

Hwang, K. 1993. *Advanced Computer Architecture*. McGraw Hill. ISBN 0-07-031622-8.

### **References:**

Selected current conference and journal articles.

### **Course Objectives:**

1. Be able to systematically partition a program for parallel computing.
2. Be able to match problem at hand to a parallel computing environment.
3. Be able to program in a parallel programming language.
4. Be able to analyze issues in the design of a distributed system.

### **Prerequisites by Topic:**

1. Operating systems
2. Processes scheduling
3. Resource management
4. Security

### **Topics Covered:** (specify number of hours on each)

1. Parallel computer models (3 hours)
2. Program and network properties (6 hours)
3. Principles of scalable performance (6 hours)
4. Processors and memory hierarchy (6 hours)
5. Multiprocessors and multicomputers (3 hours)
6. Multivector and SIMD Computers (3 hours)
7. Scalable, multithreaded and dataflow architectures (3 hours)
8. Parallel models, languages and compilers (3 hours)
9. Parallel program development and environments (3 hours)
10. Unix for parallel computers (3 hours)

11. Grid Computing (3 hours)
12. Exams (3 hours)

**Laboratory Projects:** (specify number of weeks on each)

1. Term Project – software development using a parallel programming language (12 weeks)

**Oral and Written Communications:**

All students are required to apply their documentation skills as part of the course programming assignments.

**Social and Ethical Issues:**

None.

**Theoretical Content:**

Fundamentals of parallel computing techniques are presented in focused lessons (6 hours) and then applied as appropriate throughout the course.

**Problem Analysis and Solution Design:**

All students apply fundamental software engineering practices to analyze, design, implement, test, and document solutions to all programming assignments. Students apply the analysis and design skills already acquired to the development of software components in a parallel programming language. Each component has stated requirements and students are responsible for applying a controlled, iterative process for development.