CARLETON UNIVERSITY
School of Computer Science
COMP 5105 Parallel Processing Systems
Fall 2005

Course Objectives: The aim of the course is to introduce the issues involved in designing and using parallel processing systems. Topics will be selected from the following: vector processing systems, shared-memory systems, distributed-memory systems, distributed shared memory, cache coherency issues, interconnection networks, fault-tolerance and reliability, hot-spot contention in multiprocessors and multicomputers, scheduling and task allocation. Of necessity, the course will only survey these topics. However, a student interested in a specific topic can explore the topic further by working on the term paper.

Time: Wednesday 6:05 – 8.55 p.m.

Room: ME 3235

Instructor: Sivarama Dandamudi

Office: 5328HP

Office Hours: Tuesday: 11:45 AM - 1 PM
Wednesday: 3 - 4 PM

Required Texts: None

Grading:

Project:	30%
Term Paper:	20% (due in the last class i.e., December 1)
Class Presentation:	10% (about 30 minutes – exact details in class)
Final Examination:	40% (take home exam.)

Notes:

- Project involves programming. You should be familiar with C and UNIX.
- Student presentations will start on November 23.
- Term paper topic proposal should be submitted **in class** on October 12.
- Course home page: `http://www.scs.carleton.ca/~sivarama/5105`

Course Outline (Time permitting, the following topics will be covered)

1. **Overview of Parallel Processing Systems (PPS)**
    - Taxonomy of PPS
    - Applications of PPS

2. **Vector Processing**
    - Principles
    - Architecture

3. **Clusters Systems**
    - Introduction to cluster computing
    - Overview of PVM and MPI
    - Examples
    - Project details

4. **Distributed-Memory Systems (Multicomputers)**
    - Multicomputer system components
    - Architecture
    - Resource management
    - Example systems

5. **Shared-Memory Systems (Multiprocessors)**
    - Multiprocessor system components
    - Architecture
    - Example systems
    - Overview of OpenMP
    - Process scheduling

6. **Interconnection Networks**
    - Static, Dynamic, and Hierarchical Interconnection Networks
    - Fault-Tolerance and Reliability
    - Hot-spot contention
    - Routing

7. **Parallel Database Systems**
    - Overview
    - Architecture
    - Example systems