# Course Objectives

The goal of this course is to provide a comprehensive coverage of the principles of parallel processing. Integration of parallel architectures and parallel algorithms, which is the key in gaining both the breadth and the depth of knowledge and expertise needed in designing and developing successful parallel applications, is the main point addressed by the course. The uniqueness of the course is that it treats fundamental concepts rather than a collection of the latest trends. Course is self-contained.

# Weekly Schedule

1. Introduction to parallel processing. Flynn’s taxonomy.
2. Principles of pipelining and vector processing: principles of linear pipelining, clock period, speed-up, efficiency and throughput measures.
3. Classification of pipelines: arithmetic pipelining, instruction pipelining, processor pipelining, unifunctional vs. multifunctional pipelines, static vs. dynamic pipelines, scalar vs. vector pipelines.
4. General pipelines and reservation tables.
5. Structures for array processors: centralized and distributed SIMD computer organization, introduction to interconnection networks.
8. 1st term exam.
10. Introduction to parallel algorithms: run time, speed-up, efficiency and redundancy measures.
11. Parallel algorithms: Brent’s parallel addition algorithm, Grade School parallel multiplication algorithm.
13. Parallel sorting and merge algorithms.
15. PRAM models: list ranking, merging two sorted lists, graph coloring.

# Textbook(s)/Required Reading


# Recommended Reading

| Grading Criteria | 1st midterm exam – 35%  
|                 | Homework – 20%  
|                 | Final exam – 45%  |
| Academic Honesty | Individual accountability for all individual work, written or oral. Copying from others or providing answers or information, written or oral, to others is cheating. Providing proper acknowledgment of original author. Copying from another student’s paper or from another text without written acknowledgement is plagiarism. According to University’s bylaws cheating and plagiarism are serious offences resulting in a failure from exam or project and disciplinary action (which includes an official warning may appear in student’s transcript or/and suspension from University for up to one semester). |
| Additional Remarks |  
|                 | • Students are strongly encouraged to attend exams on exam date. One general make-up exam will be given at the end of the semester after the finals. Any student not attended exam on time and provided reasonable excuse within three days following the exam will be able to attend make-up exam.  
|                 | • Assignments and homeworks are essential part of the course. Problem description, algorithm, program code, simulation results and references are the main parts of an assignment report. A report should be prepared nightly and submitted before the deadline considered for current assignment. A report submitted after the deadline will not contribute to the student’s total score. |