OPRE 6385 Scheduling R.Chandrasekaran

Text: Computer & Job Shop Scheduling Theory, Edward G. Coffman (Ed), J. Wiley, 1976.

Topics:

1. Introduction to Deterministic Scheduling Theory
   (a) Performance Measures
   (b) Preemptive vs. Nonpreemptive Schedules
   (c) Taxonomy of Problems
   (d) Sequencing vs. Scheduling Problems
   (e) Flow Shops, Open Shops, Job Shops
2. Single Machine Problems
   (a) Makespan
   (b) Average Flow Time
   (c) Maximum Tardiness Minimization
   (d) Moore Problem
3. Parallel Machines
   (a) Divisibility Issues
   (b) Makespan
   (c) Average Flow Time
   (d) Uniform Machines
   (e) Unrelated Machines
4. Precedence Constrained Systems
   (a) Makespan
      i. T.C. Hu's Algorithm for UET with Tree Structured Precedences
      ii. Coffman-Graham Algorithm for UET with Two Machines
      iii. FKN's Matching Formulation
   (b) Mean Flow Time
      i. Decomposition Algorithm
5. Complexity of Scheduling Problems

(a) NP-Completeness

(b) Fully Polynomial Approximation Schemes

(c) Bin Packing, Dual Bin Packing and Polynomial Algorithms

(d) Barany's Algorithm For Flowshop Problems

(e) Tardiness Problem

(f) Traveling Salesperson Problems and their Relationship to Scheduling

(g) Branch and Bound, Neighborhood Search and other Enumerative Techniques

(h) Dynamic Programming and its use in Scheduling

6. On-line Algorithms