Textbook: Partially selected from:

- Scheduling; Theory, Algorithms, and Systems, M. Pinedo, 1995
- Planning and Scheduling in Manufacturing and Services, M. Pinedo, 2005
- Automata-based Scheduling and control of FMC's, Hamid Reza Golmakani, Mechanical and industrial Engineering Department, University of Toronto, 2004.

Course Outline:

Planning and Scheduling in Manufacturing and Services

Introduction

Planning and Scheduling: Role and Impact Planning and Scheduling: Functions in an Enterprise Scheduling: Definition, Elements, Applications area, Scope Relations with other management area General Solution Techniques Important characteristics of optimization techniques Complexity Theory

Manufacturing Models

Jobs & Operations Characteristics & notation Resources/machines Setup/transition cost Objective functions Deterministic Manufacturing Models, Manufacturing Environments

Single Machine Models

The Total Weighted Flow Time The Total Flow Time The Total Weighted Flow Time with chain Mean Lateness Maximum Cost Maximum Lateness and Tardiness Total Number of Tardy Jobs Branch and Bound/ Dynamic Programming Beam Search and Apparent Tardiness Cost (ATC) Dispatching Rule The Total Weighted Tardiness Tabu Search Simulated Annealing Genetic Algorithms

Parallel Machine Models Problem formulation/ Makespan Total Flow time

Flow Shop Models Two-Machine Flow Shop and The Makespan

Three-Machine Flow Shop and The Makespan Integer Programming Formulation

Job Shop Models

Graph Representation Integer Programming Formulation Type of Schedules/ Feasible, Non-delay, and active schedules Active and Non-delay Schedule Generation Algorithms Branch and Bound Approach (A* Search Algorithm) Dispatching Rule-Based Procedures Shifting Bottleneck Heuristic

Automata and Petri Nets in Flexible Manufacturing Systems

Multiple route job shop

Review of several related papers

Scheduling of Flexible Assembly Systems - Part 1

Scheduling of Flexible Assembly Systems - Part 2

Interval Scheduling Reservations and Timetabling

Automata-based scheduling and control for flexible manufacturing cells