IE 661
Scheduling Theory
Course Introduction

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About the course

This graduate level course covers topics from:

(i) *Deterministic Scheduling Theory* that provide the fundamentals and algorithms from single machine, parallel machine, flow and job shop environments,

(ii) *Project and Network Scheduling* that are more prevalent in assembly products (BOMs), workflows, and project management, and

(iii) *Scheduling Practice* that covers dispatching rules, local search methods, stochastic search, and mathematical programming based solutions.

About the course

- The objective is to expose participants to basic scheduling theory results, and in a participatory setting, enable them to discuss and creatively synthesize these ideas to research projects of choice.
- It blends quantitative and qualitative material, from multiple disciplines of industrial and management engineering.
- The course will be conducted in a beneficial cooperative learning setting. Lectures, group discussions, research projects and participant presentations will constitute this course.

About the course

- Doctoral level, research focused course
- Meets OR as well as PS elective requirements

Course Topics

- Deterministic Scheduling
  - Single Machine
  - Parallel Machine
  - Flow Shop and Flexible Flow Shop
  - Job Shop
  - Open Shop
- Project and Network Scheduling
  - JIT scheduling of Assemblies
- Scheduling in Practice
  - Dispatching Rules
  - Filtered Beam Search
  - Local Search: SA, Tabu Seach, GA
- Several Research Articles and Case Studies

Course prerequisites

- IE 505 Production Planning and Control or similar course
- Advanced Graduate standing in engineering or management
- Optimization (linear IE 572, discrete IE 573 are highly recommended)

Course Elements

- Homework - 4-5 assignments 15%
- Class presentations - 2 lectures 10%
- Research project - progress report, final report, presentation 50%
- Programming project - High level languages (C/C++, Java or VB) 10%
- Exam - one midterm 15%

(+/- Grading scheme will be employed)