

**IENG 555**  
**SCHEDULING AND SEQUENCING METHODS**  
**SPRING 2009**

Meetings: TR 9:30-10:45 a.m.      Room ESB-G83  
Instructor: Dr. Wafik Iskander  
Office:      MRB-321

CATALOGUE DESCRIPTION: Theory and application of analytical methods used in the scheduling of operations. Topics include single machine scheduling models, flow shop, job shop, dynamic shop, parallel machine models, and assembly line balancing methods. 3 hr. Prerequisites: Introduction to operations research (IENG 350).

Text:      Scheduling: Theory, Algorithms, and Systems, by Michael Pinedo; Prentice Hall.

Additional References:

Introduction to Sequencing and Scheduling, by Kenneth R. Baker; John Wiley.

Sequencing and Scheduling: an Introduction to the Mathematics of the Job-shop, by Simon French; Halstead Press (a division of Wiley).

Theory of Scheduling, by R. W. Conway, W. L. Maxwell, and L. W. Miller; Addison Wesley.

Industrial Scheduling, by Muth and Thompson.

Production Inventory Systems: Planning and Control, by Elwood S. Buffa; R. D. Irwin.

Tentative Grading System:

2 Tests \* 100 points  
1 Project \* 30 points  
7-10 Homeworks (or quizzes) – 70 points total

NOTE: According to the department policy, no make-up tests are allowed.

## TOPIC OUTLINE:

1. Basic Concepts and Models
  - a. Definitions & classification of sequencing models.
  - b. Solution approaches (combinatorial, integer programming, branch & bound, simulation, ...etc.)
  - c. General assumptions.
2. Single Machine Sequencing
  - a. Definitions and characteristics of the problem
  - b. Measures of effectiveness
  - c. Problems without due dates
  - d. Sequencing with due dates
  - e. Sequencing of related jobs
  - f. Random scheduling
3. Flow Shop Sequencing
  - a. Definitions and characteristics of the problem
  - b. Measures of effectiveness
  - c. Two-machine flow shop
  - d. Three-machine flow shop
  - e. M-machine flow shop
  - f. Heuristic procedures
  - g. Flow Shops with no intermediate queues
  - h. Ordered flow shop problem
4. Job Shop Sequencing
  - a. Definitions and characteristics of the problem
  - b. Measures of effectiveness
  - c. Two-machine problem
  - d. Two-job problem
  - e. Heuristic procedures
5. Dynamic Job Shops
  - a. Definitions and characteristics of the problem
  - b. Measures of effectiveness
  - c. Simulation models
  - d. Priority dispatching rules
  - e. Combination of rules
  - f. Artificial intelligence approaches

6. Parallel Machines Models
  - a. Definitions and characteristics of the problem
  - b. Measures of effectiveness
  - c. Independent jobs
  - d. Dependent jobs
  
7. Assembly Line Balancing
  - a. Definitions and characteristics of the problem
  - b. Measures of effectiveness
  - c. Heuristic procedures

ASSIGNMENTS:

1. Reading assignments of pertinent articles
2. One or two projects that cover both theory and applications.