American University of Beirut

Faculty of Engineering and Architecture

Department of Industrial Engineering and Management

INDE 534: Manufacturing Systems Analysis

Spring 2017-2018, Tuesday, Thursday 17:30 – 19:00

Instructor:

Walid Abillama, Ph.D.

Email: devmkt@mea.com.lb

Office Hours: Monday 17:30 – 18:30 or by appointment

Course Description:

Introduction which brings together useful models and modeling approaches that address a wide variety of manufacturing system design and operation issues: assembly line, transfer lines, job shops, flexible manufacturing systems, and group technology. Prerequisite: INDE 431 and 402.

Course Objectives:

- Be able to model and to analyze a manufacturing system;
- Be able to measure the steady-state performance and to assess the effectiveness of a manufacturing system;
- Be able to analyze the effect of processing time variability on workstation performance measures;
- Be able to properly connect several workstations by analyzing the merging of input streams into a single workstation and the separation of a workstation output stream into several streams;
- Be able to properly identify the workload on a workstation and to maintain the job flow needs by product type in multiple product factory models;
- Be able to develop models for various forms of batching and to quantify the benefits and costs of the batching process under consideration;
- To learn procedures that limit the work in process inventory in the system as a whole or at the level of each workstation;
- To be able to develop and analyze limited buffer capacity models for serial systems;

Course Textbook: Manufacturing Systems Modeling and Analysis by Curry and Feldman, 2nd edition, 2011, Springer

Other Reference Textbook: Factory Physics by Hopp and Spearman, 2nd edition, 2001, McGraw-Hill

Tentative schedule:

- Week 1: A sense of History, from a naïve experience to scientific management and marketing
- Week 2: Introduction to Factory Models
- Week 3: Single Workstation Factory Models
- Week 4: Single Workstation Factory Models
- Week 5: Processing Time Variability
  Test 1
- Week 6: Multiple-Stage Single-Product Factory Models
- Week 7: Multiple-Stage Single-Product Factory Models
- Week 8: Multiple Product Factory Models
- Week 9: Multiple Product Factory Models
  Test 2
- Week 10: Models of Various Forms of Batching
- Week 11: Models of Various Forms of Batching
- Week 12: WIP Limiting Control Strategies
- Week 13: WIP Limiting Control Strategies
- Week 14: Serial Limited Buffer Models
- Week 15: Serial Limited Buffer Models
  Final Exam Comprehensive

Homework:

Homework problems will be assigned and graded weekly. Students are encouraged to solve the homework problems and to discuss their solution with each other and the instructor. However, each student must independently write and submit one assignment.

Grading:

Test 1 – Tuesday March 06	25%
Test 2 – Thursday April 12	25%
Final exam	40%
Homework	10%

University Rules and Regulations:

Students are advised to review all relevant university rules and regulations including those related to attendance, cheating, plagiarism, misconduct, and academic integrity, among many others. It shall be expected that strict enforcement of these rules and regulations will be exercised.