MFG 5321 - Modeling and Analysis of Manufacturing Processes *Fall 2017*

(Class meets on Tuesdays– 6:60 – 8:50 pm, Room CRBL204)

Professor: Dr. Jose F. Espiritu
Office hours, room A110: Mon (10:00 am -11:00)
Wed (10:00 am – 11:00)
And by appointment: jfespiritu@utep.edu

Description - Course Catalog -

This course is designed to be a capstone course for graduate students of manufacturing engineering. The student will be expected to use the appropriate analytical tools to formulate, model, and solve real-life manufacturing problems. At the end of course the student will give an open presentation of the results of the term project.

Prerequisite: *Permission of instructor*

Course Objectives:

- To prepare students to recognize different shop configurations, manufacturing scheduling problems, and performance measures.
- To help students identify basic algorithms and procedures to use in different shop configurations.
- To provide understanding of alternative solution methodologies available while solving manufacturing scheduling problems.
- To make students aware of all significant factors in manufacturing scheduling.

1. **Textbook:** Michael Pinedo. Planning and Scheduling in Manufacturing and Services (Springer Series in Operations Research and Financial Engineering). Springer; 2nd ed. 2009.

Other references:

2. Michael Pinedo. Operations Scheduling with Applications in Manufacturing and Services. Irwin McGraw-Hill, 1999.
3. Askin, Ronald G., and Charles R. Standridge. Modeling and Analysis of Manufacturing Systems, John Wiley & Sons, 1993.
4. Elsayed Elsayed and Thomas Boucher. Analysis and Control of Production Systems. Prentice Hall International Series in Industrial and Systems Engineering. Second edition. 1994.

PART I - DISCRETE SYSTEMS	
Brief description.- Manufacturing and service systems are characterized by many factors: the number of machines or resources, their configuration and characteristics, the level of automation, the type of material-handling system, and so on. The differences in all these characteristics give rise to a large number of scheduling models.	
1.	Types of Manufacturing Systems and Processes
2.	Project Scheduling Models
3.	Job shop models
4.	Flexible Manufacturing Systems
5.	Reservation Systems and Timetabling Models
PART II - STOCHASTIC SYSTEMS	
Brief description.- The manufacturing system is viewed as a system of service-providing workstations. Customers enter the system of servers, visit their required servers in turn, and then leave the system.	
6.	Differences Between Discrete and Stochastic Manufacturing Systems
7.	Queuing Theory

Project:

Each student will work on a project. Students will select a topic, or propose a project themselves or work on a real problem in an industrial setting (this will require integration/adaptation skills and creativity since many algorithms/models presented in the literature cannot be directly adapted to industrial setting). Group projects will be allowed if the project involves the development of algorithms and computer programs for a complex problem.

Evaluation Procedure and Criteria:

Midterm:	30% of total grade
Paper presentation:	10 %
Final exam:	30%
Project development and presentation:	20%
Homeworks:	10%

*Final Exam is cumulative (~75% of the questions will be taken from material covered after the midterm and ~25% from material covered in the first section)

Policy for grading work turned in late:

1) Don't turn your work in late;
2) 50% of your homework grade for being 1 day late; -100% for everything after 1 day.

Attendance Policy:

Attendance to all sessions is strongly recommended. Students are responsible for all of the material covered in the class.

Grade Percentage:

A	91-100
B	81-90
C	71-80
D	60-70
F	<60

Academic Misconduct:

No collaboration of any kind is permitted during any of the examinations, homework, or quizzes. All suspected cases will be treated according to the University Policy as stated in the Catalog and the Student Handbook. A spirit of pride, collegiality and service is expected in all what we do.