## MEC 525 - ESE 542 Product Design, Concept Development and Optimization COURSE OUTLINE

Fall 2016

**Instructor:** J. Rastegar **Office:** H.E. 108 (2-8314)

Office Hours: M 3:30-6:30 pm Wed 3:00-4:00 pm Lectures: M 7:00-9:50 pm – Soc Beha Sci N436

**Text:** Engineering Optimization - Methods and Applications, By

Reklaitis, G. V., Ravindran, A., and Ragsdell, K. M., Wiley-Interscience.

Reference: Total Design. Integrated Methods for Successful Product

Engineering, By Stuart Pugh, Addison Wesley Publishing Company.

The following topics will be covered:

	<u>Topic</u>	<u>Text</u>
1	Introduction (1 week)	Lecture
2	The Total Design Approach (4 week)	Lecture
3	Introduction to Optimization (1/2 week)	Chap. 1
4	Functions of a Single Variable (1 1/2 weeks)	Chap. 2
	1st Midterm	
5	Functions of Several Variables (1 weeks)	Chap. 3
6	Introduction to Linear Programming (1 weeks)	Chap. 4
	2st Midterm	
7	Constrained Optimality Criteria (1 weeks)	Chap. 5
8	Transformation Methods (1/2 week)	Chap. 6
9	Constrained Direct Search (1 weeks)	Chap. 7
10	Direction-Generation Methods Based on Linearization (1/2 week)	Chap. 9

The remaining 2 weeks of the course consists of lectures on mathematical modeling and simulation techniques and discussion and presentation of the student projects.

Make sure that you are prepared to write computer programs for numerical methods and optimization using one of the programming languages.

During the semester, each student will select a design project. A short proposal, detailing the project and the expected results is due at the 6th class. The topic of the proposal <u>has to be approved</u> by the instructor before the proposal is handed in. A final (professional) report and a power point presentation are due on the last day of classes. During the semester, several students will be asked to present their project and the progress that has been made as examples of "design reviews" (no grade associated with these presentations). Final and formal oral presentations will be scheduled during the last week of classes for a randomly selected number of students. No late homework will be accepted.

## **GRADING**

- 1- Homework (20 points).
- 2- Two midterms (15 points each).
- 3- Final exam (40 points). Check university final exam schedule for time.
- 4- Project (proposal, presentation and final report) (10 points). (project proposal will be counted as a HW)