

MEC 525 - ESE 542
Product Design, Concept Development and Optimization
COURSE OUTLINE
Fall 2018

Instructor: J. Rastegar
Office Hours: MW 10-12:00 am

Office: H.E. 108 (2-8314)
Lectures: M 7:00-9:50 pm – HUMANITIES 3018

Text: *Engineering Optimization - Methods and Applications*, By
Reklaitis, G. V., Ravindran, A., and Ragsdell, K. M., Wiley-Interscience.

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 week 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 paragraph proposal, describing the project and the expected results is due by the 6th class. The topic of the proposal has to be approved 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) for class discussion. 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)

Americans with Disabilities Act

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students requiring emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following web site <http://www.ehs.sunysb.edu/fire/disabilities/asp>.

Statement on Academic Dishonesty

Academic dishonesty is an extremely serious offense and will not be tolerated in any form. Academic dishonesty in general is the presentation of intellectual work that is not originally yours. Examples include, *but are not limited to*, copying or plagiarizing class assignments including homework, reports, designs, and other submitted materials; copying or otherwise communicating answers on exams with other students; bringing unapproved aids, either in physical (written) or electronic form to an exam; obtaining copies of an exam prior to its administration, etc. Academic dishonesty violates both the ethical and moral standards of the Engineering profession and all infractions related to academic dishonesty will be prosecuted to the fullest via the CEAS CASA committee. For you, the honest student, academic dishonesty results in lower class curves, hence a depression in your GPA and class standing, while cheapening the degree you earn.

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.