

# MEC525 – Product Design, Concept Development and Optimization

The State University of New York, Korea

Spring 2018

**Instructor:** Prof. Achilles Vairis, B625 Academic Building  
achilles.vairis@stonybrook.edu

**Lectures:** Tuesday @ 9:00-11:50 (TBA)

**Textbook:** 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.

**Office Hours:** Tuesday and Thursday 1530 -1700 (or by appointment)

## Grading:

Homework	20%
Midterm exams (two)	30%
Final exam	40%
Project (proposal, presentation and final report) (project proposal will count as HW)	10%

## Policies:

- Homework assignments will be posted on the Blackboard.
- The Blackboard can be accessed at <https://blackboard.stonybrook.edu/>.
- The time and details about exams will be announced in the class (and also posted on the Blackboard).
- It is the responsibility of students to make sure that they can access the Blackboard and they have a working email registered with it. The Blackboard should be checked frequently for new materials.
- Exams will be closed book and note. Each person should have a calculator for the required computations.

## Topics:

- The Total Design Approach
- Introduction to Optimization
- Functions of a Single Variable
- Functions of Several Variables
- Introduction to Linear Programming
- Constrained Optimality Criteria

- Transformation Methods
- Constrained Direct Search
- Direction-Generation Methods Based on Linearization

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

During the semester, each student will select a design project for which they will write a short proposal. 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 at the end of the semester on a day to be announced. 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 two weeks of classes. No late homework will be accepted.

**Disability Support Services (DSS):**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact One-Stop Service Center, Academic Building A201, (82) 32-626-1117. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

**Academic Integrity Statement:**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person’s work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website: [http://www.stonybrook.edu/commcms/academic\\_integrity/index.html](http://www.stonybrook.edu/commcms/academic_integrity/index.html)

**Critical Incident Management Statement:**

The State University of New York, Korea expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students’ ability to learn.

**Attendance Policy of SUNY Korea:**

1. All students of SUNY Korea are required to attend every class.
2. Unexcused absences will affect seriously the student's final grade in the course.
3. If a student has over 20% unexcused absence, the student’s final course grade will be an 'F'.
4. Students should report the reason of absence to the instructor in advance, or immediately after the absence.
5. When a student excuses his/her absence, the student must provide documentation of the reason for the absence to the instructor.
6. The instructor of the course reserves the right to excuse absences.
7. The course instructor may excuse the absence if the submitted documentation fulfills the conditions below.
  - Extreme emergencies (e.g. death in the family)

- Severe medical reasons with doctor's note (Not a slight illness)
  - Very important events (e.g. national conference, official school event)
8. At the end of semester, the course instructor should submit a copy of the attendance sheet to the Academic Affairs Office.