STRUCTURAL OPTIMIZATION
FALL 2007 SYLLABUS, (3 credits)

Prerequisites: CIV E 310 (course in strength of materials) and E510 (course in differential equations). Proficiency in some programming language is essential. Knowledge of MATLAB and EXCEL will be required for course assignments.

When: Mondays and Wednesdays, 7:00 – 8:15 p.m.
Where: Engineering Bldg, E 326

Instructor: Dr. Satchi Venkataraman, Associate Professor of Aerospace Engineering & Engineering Mechanics, Room 309 Engineering Building, (619) 594 6660, satchi@engineering.sdsu.edu


Other Optimization Books

Office hours: Monday and Wednesday 10:00 – 11:00 a.m.; Tuesday and Thursday 4:00 to 5:00 P.M.
At other times, by appointment only.

Course website: http://blackboard.sdsu.edu The university blackboard web site will be used for disseminating course announcements and supplementary materials. Blackboard accounts use the same information as the SDSU e-services Web Portal access.

Course objectives: The purpose of this course is to present modern concepts of optimal design of structures. Basic ideas from optimization theory are developed with simple design examples. Analytical and numerical methods are developed and their applications discussed. Use of numerical simulation methods in the design process is described. Concepts of structural design sensitivity analysis and approximation methods will be discussed. The emphasis is made on the application of modern optimization techniques linked to the numerical methods of structural analysis, particularly, the finite element method.
Course outline:

1. Review of numerical optimization methods
2. Structural applications of linear and discrete methods
3. Approximation techniques
4. Sensitivity analysis techniques
5. Decomposition and multidisciplinary optimization
6. Reliability based design optimization

Grading:

Grades will be determined using these weights:
- 30% homework & class projects
- 45% two in-semester exams.
- 25% final project

Grades are assigned on an absolute scale (A=91+, B=81+, C=71+, D=61+,) with minor adjustments to avoid grades being decided by a fraction of a point. The plusses and minus grades will be chosen at levels where there are large gaps in the grade distributions.

In-Term Exams:

In-class exam are closed book, except for one 8.5"x11" page, written in any density (you may bring a magnifier if you wish to write very small).

Final Project:

The final project will require you to apply optimization principles to design in real engineering context (industrial project) or develop and implement an optimization algorithm. This effort will start early and continue during the semester. You will write a report and make a presentation for the final grade in the project.

Academic honesty: All students admitted to SDSU have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a student at SDSU and to be honest in all work submitted and exams taken in this class and all others.

Miscellaneous:

Only University approved excuses for absences will be accepted. Each student will be responsible for knowledge of all scheduling and announcements made in class.

Enjoy. All feedback is welcomed. Do not hesitate to contact me with any problems.

If you have comments or suggestions email me at satchi@mail.sdsu.edu