

Santa Clara University
MECH 151, Finite Element Analysis, Class 56581
Spring Quarter, 2010

Class meets: T-Th 8:00-9:40, A&S 129

Instructor: Warren C. Gibson, Ph.D, lecturer.
email: warren@gibson2.com. No phone.

Prerequisite: COEN 45, MATLAB Programming, or instructor approval.

Office hours: Tues. 2-4 PM outside the Design Center or by appointment.

Class web site: www.gibson2.com/mech151

Text: Logan, "A First Course in the Finite Element Method," 4th ed., 2011(?), Cengage, ISBN 978-0-495-66791-9. A hardcover 4th ed. was issued in 2004 and is identical. You might be able to find one used.

Software: Optional: MATLAB, student version. It may be in the bookstore or you can get it online (www.mathworks.com). We will use MATLAB as our main platform for solving problems. You can use it in the Design Center but I recommend you install it on your own computer. It's a great bargain and a necessity for most engineers these days.

Homework: Homework will be due one Tuesdays of most weeks. Homework assignments will be announced in class and will be posted on the class web site. Solutions will be available for examination but may not be copied, per department policy.

Midterm: One mid-term exam.

Final: The final exam will be comprehensive.

Project: There will be a modeling project which will be modest in scale, more like an extended homework problem. You will present your model and results in class. You may use commercial software to do your modeling project – details to be announced. Students may work in teams of two or alone.

Grading: Your final grade will consist of homework (25%), mid-term (30%), project (10%) and final exam (35%). I reserve the right to vary these percentages slightly and I will tell you if I do so.

Objectives:

- Gain appreciation for the great power of the finite element method and other computer simulation methods for real-world engineering problems.
- Learn the basic mathematics behind the finite element method.
- Learn how finite element models are created, solved, and interpreted.
- Strengthen your understanding of basic mechanics.

- Enhance your MATLAB programming skills for engineering analysis.

My approach: I believe the university is the best place to learn about the theory behind the finite element method, so that will be the emphasis of this class. With that foundation, one can always learn how to use a commercial FE software package by self-study or attendance at a short course. But because Santa Clara is a project-oriented school, I have included a project which you may complete using NASTRAN or ANSYS in the Design Center.

I may occasionally talk about real-world problems from my engineering career.

- How to succeed:
- Do the readings before class.
 - Attend all classes.
 - Review your notes as soon as possible after class.
 - Submit homework on time.
 - Ask questions in class or by email.
 - Observe the engineering honor code. (You may collaborate on homework and labs but you must prepare your own work for submission.)

To request academic accommodations for a disability, contact Disability Resources located in the Drahnann Center in Benson, Room 214, (408) 554-5445. You must provide documentation of a disability to Disability Resources prior to receiving accommodations.