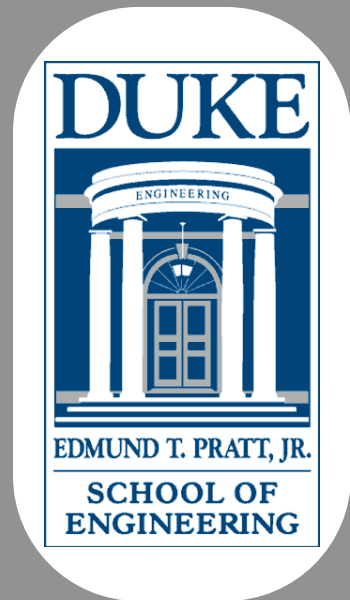


EGR 53L

Computational Methods in Engineering



M. R. Gustafson II

Assistant Professor of the Practice
(until next Tuesday)

Edmund T. Pratt, Jr.
School of Engineering



Introduction to Dr. G

❖ Education

- Duke BSE (MEMS & EE); MS, and PhD (MEMS)
- Assistant Professor of the Practice of Electrical and Computer Engineering since 2005
- Associate Professor of the Practice of Electrical and Computer Engineering (starting next Tuesday)

❖ Military

- Duke NROTC 1989-1993
- Honorable Discharge as Lieutenant Commander in 2007



Goals for EGR 53L

- ❖ Students completing this class will be able to:
 - Interpret engineering problem statements and solve them using basic MATLAB programs
 - Model physical systems and optimize parameters using iterative structures
 - Solve engineering design problems using numerical integration, roots of equations, simultaneous equation solving, finite difference methods, matrix analysis, linear programming, dynamic programming, and heuristic solutions
 - Prepare documentation of engineering design solutions using a document preparation system
- ❖ Meet other people in Engineering



Grand Challenges

- ❖ The National Academy of Engineering has published a list of 14 “Grand Challenges for Engineering” and Duke co-hosted a Summit on the NAE’s Grand Challenges in Spring of 2009
- ❖ When possible, assignments for EGR 53 will be linked to the relevant Grand Challenge(s)
- ❖ Intro video available at:

<http://www.engineeringchallenges.org/>



Assignments and Grading

❖ Breakdown:

- 20% Quiz 1
- 20% Quiz 2
- 20% Quiz 3
- 40% Lab assignments

❖ What's missing?

NO FINAL!!

Quizzes



- ❖ Three quizzes will be given throughout the semester. Each will include program interpretation and creation assignments as well as questions about various computational methods.
- ❖ Samples are available on the class web page.



Laboratories

- ❖ Lab periods will be used to give an introduction (and occasionally hints) to the assignment(s) that are coming due. For five of the lab periods, you will also be conducting hands-on data acquisition (DAQ) and analysis experiments.
- ❖ Labs will be held in B209 Fitzpatrick; directions were provided via e-mail and are posted on the courses page in the announcements.



Individual and Group Work

- ❖ All work done for Laboratory Assignments must be done individually – you are not allowed to work with others on these assignments.
- ❖ Some of the work done in lab for DAQ labs will be done individually, and some will be done in groups. The assignments will clearly indicate which is which, and you are responsible for knowing when you can work with another person and when you must work alone.



Recitations

- ❖ Recitations this semester as simply office hours with TAs; regardless of which recitation section you are in, you can attend any, all, or none of the recitations.
- ❖ The early Tuesday recitations will be held in the Hudson Hall computer lab (Hudson 117); all others will be in the Teer Building computer lab (Teer 106)



Resources (Books)

- ❖ **Applied Numerical Methods with MATLAB for Engineers and Scientists, 2nd Ed.,** Steven C. Chapra
- ❖ **Introduction to Matlab 7 for Engineers,** William J. Palm III
- ❖ **A Guide to LaTeX - Document Preparation for Beginners and Advanced Users,** Helmut Kopka and Patrick W. Daly



Resources (Web)

❖ OIT

- <http://www.oit.duke.edu>

❖ Other

- <http://classes.pratt.duke.edu/EGR53F09>
“The classes page”
 - Syllabus, grading, assignment information, policies
- <http://courses.duke.edu>
“The courses page”
 - Discussion board, grades
- <http://pundit.pratt.duke.edu>
“Pundit”
 - Wiki resource; will have both general and specific information



Resources (Public Clusters)

- ❖ MATLAB will run on all public machines and should run over X-Win 32 (and PuTTY) for PCs and X11R6 (for Macs).
 - More on X-Win in lab and in later classes
- ❖ Public UNIX machines are in various locations
 - <http://oit.duke.edu/comp-print/labs/locations/index.php>
- ❖ Check the OIT schedule to make sure there is no lab before entering - respect other people's lab times.



Announcements

- ❖ There **will be** lab this week
- ❖ There **will not** be TAs at the recitations this week
- ❖ Food is not allowed in either the auditorium or the lab; please throw food items away using trash cans outside of the auditorium/lab
- ❖ Drinks are allowed only in spill-proof containers, and only during non-DAQ labs



Assignments

❖ For lab:

- Print and skim through the lab handouts and appropriate appendices; skim through the related Pundit pages

❖ For class Friday:

- Check out the class web page.
- Check out the class discussion board.
- Post a message to the discussion board (in the appropriate forum) telling people who you are, where you are from, what dorm you are in, and how much computer experience you have. Add other info at will.
- Read Chapter 1 in Palm and Chapters 1-3 in Chapra