

MATH 647

Spring, 2009

Prof: Thomas Vogel

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Course homepage: <http://www.math.tamu.edu/~tvogel/647.html>

Office hours: T 10:30–11:30, W 3:30–4:30, Th 10:30–11:30, or by appointment.

Texts: Notes and reference materials will be provided. You will be downloading a lot of material from our web page.

Prerequisites: Ordinary differential equations, linear algebra, and some mathematical maturity. Any graduate student in mathematics should be able to take this course, along with most graduate students in engineering.

Course content:

This course is intended to

- teach the construction of mathematical models of various real-life situations.
- develop skills in the communication of mathematics to nonmathematical audiences.
- encourage teamwork and group participation.

Along the way, you may be introduced to some mathematics which is new to you, but the main thrust of the course is to learn how to apply mathematics to the real world, and the amount of new mathematics that you see will be rather small. The models we deal with in this course will involve optimization, and ordinary and partial differential equations.

Course format: I will begin the course with a few lectures on dimensional analysis, computational resources, and simple modeling case studies (possibly two weeks in all). After that, we get to the heart of the course: a sequence of in-depth modeling projects done in groups (my current plan is to have you do three such projects). One person in each group will be designated to give an oral presentation of the group's results. I will give a few lectures to provide appropriate background for projects. Besides those, a typical class period will consist of small groups working together, with me going between groups to facilitate discussion and provide guidance, and to monitor the progress of the groups. Because a student's absence will hurt the rest of his or her group, excessive unexcused absences will result in a lower grade.

Grading: 10% of the grade will be based on individual homework before we start the projects. The remainder will be based on performance and participation in the projects. Each student will make at least one oral presentation of project results during the semester. The student presenting the results will receive an individual grade on their presentation. Each *group* will receive a grade

based on the overall quality of their project. At the end of the semester, the individual presentation grades and the group project grades will be weighted equally in determining the final grade (if a student has excessive unexcused absences during a project, I will lower their share of the project grade). For example, suppose that a student gave one presentation during the semester. Then their final grade will be divided into 10% on individual homework, 22.5% on the individual presentation, and 22.5% for each of the three group project grades. There will be no exams. For the final grade, 90% guarantees an A, 80% a B and so on. If I feel it necessary, I may curve the grade cut-offs down.

Academic integrity: The Aggie Honor Code states that “An Aggie does not lie, cheat, or steal, or tolerate those who do.” I will refer any apparent violation of the Honor Code to the appropriate University office.

Attendance: I follow University rules on attendance, which may be found at <http://student-rules.tamu.edu>. For an absence due to illness or injury of fewer than three days, I will accept the Texas A&M University Explanatory Statement for Absence from Class form, available at <http://attendance.tamu.edu>. Quoting from the rule: “To be excused the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class.”

Americans with Disabilities Act (ADA) Policy Statement: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit <http://disability.tamu.edu>.