

Case Studies of Applied Mathematics—Fall 2007
(MATH 5580—Section 351)

Instructor: Dr. Jiahong Wu; Office: MS424;
Telephone: (405) 744-5788; E-mail: jiahong@math.okstate.edu

Hours of Class Meeting:

Tuesday 9:30 a.m.-10:20 a.m, Thursday 12:00 noon—1:15 p.m. @MSCS 428

Office Hours:

Thursday 9:30 a.m.-11:30 a.m.

Course Format:

This is a seminar-style course, not a lecture course. There are no exams in this course. During the semester you will solve four mathematical problems which arose in different industrial settings. Your assignments include working on these problems and presenting the progress you have made to the class. Your written work will consist of four reports describing each problem and its solution.

Texts:

- For each problem, a pamphlet containing the necessary background material and the statement of the problem will be photocopied and handed out to the class. These problems come from a collection entitled *Industry-Related Problems for Mathematics Students* compiled by Jeanne Agnew, Marvin Keener, James Choike, and others.

- You should also read the following short book on how to write a technical report.:

Bly and Blake, *Technical Writing: Structure, Standards, and Style*.

Syllabus:

The problems and the due dates for their reports are as follows:

| Problem | Due Dates |
|----------------------|--------------|
| Highway Slope Design | September 6 |
| Path of An Aircraft | September 25 |
| Water-hammer | October 30 |
| Statue of Liberty | December 10 |

Requirements for Reports:

- Your reports should contain the components specified in the Report Format (See the attached sheet).
- Your reports must be prepared on a computer with a document-preparing system such as TeX/LaTeX or MSFT Word.
- Even though you are encouraged to discuss your progress with your classmates, but you are not permitted to collaborate on the written reports.

Grading Policy:

- Problem #1: 20 points; Problem #2: 20 points; Problem #3: 30 points; Problem #4: 30 points
- For each problem, 70% of your grade is based on the mathematics of your problem solution, 20% is based on the writing of your report, and 10% is based on class participation.
- Cut-offs for letter grades: A (85-100); B (70-84); C (55-70); D (40-54); F (0-39).

Report Format

Your report should have the following components:

1. **Cover and title page.**
2. **Abstract:** a summary introducing the subject matter and describing what the report accomplishes.
3. **Table of contents.**
4. **Introduction.** This section should discuss the purpose of the report. It should include background information, it should state the problem and describe the method of solution, and it should explain why the problem is interesting.
5. **Sections.** The first section should contain preliminary material used to set up or solve the problem. Succeeding sections should discuss different aspects of the problem's solution. All notation and technical terms should be clearly defined, and assumptions should be clearly stated. Important facts or conclusions should be stated as Lemmas, Propositions, Theorems, etc.
6. **Summary and conclusions.** This section should summarize the results of the reports. Include comments on how realistic or optimal your solution is, other applications of the results of your report, directions for future research, etc.
7. **Acknowledgements.** This section, if necessary, consists of a few sentences thanking individuals who helped you solve the problem, if there is any.
8. **References.** This part lists all written sources cited, in the following format:
 1. Jeanne L. Agnew and Marvin S. Keener, eds., *Calculating Insurance Claim Reserves*, Industry-Related Problems for Mathematics Students No. C-33.4, Oklahoma State University, 1980.
 2. Stanley I. Grossman, "Calculus," 4th ed., Harcourt Brace Jovanovich, San Diego, 1988.
 3. G. Strang, *Patterns in Linear Algebra*, American Math. Monthly **96** (1989), 105-117.
9. **Appendices.** Any mathematical proofs, calculations, tables, etc., that are too long or would interrupt the flow of the report may be included in an appendix.