

AME 561—Mathematical Methods I
Fall 1995

Prof. Joseph M. Powers—Instructor
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Thursday Afternoons

Course time and location: MWF 11:15-12:05, 117 DeBartolo Hall

Help Session: W 4:30-5:30, 118 DeBartolo Hall

Prerequisites: formally none, knowledge of undergraduate calculus through differential equations

Catalog description

“Multidimensional calculus, linear analysis, linear operators, vector algebra, ordinary differential equations”

Instructor’s emphases

The course will consist of a survey of elements of advanced mathematics. Topics will be as listed in the catalog with some additional material interspersed. A primary source will be the course notes. Hildebrand’s text, will serve as a useful, but not complete supplement. This text is also required in the complement to this course, AME 562.

Text available in LaFortune Copy Shop

M. Sen and J. M. Powers, *Lecture Notes on Mathematical Methods*, 1995 (recommended).

Text available in Bookstore

F. B. Hildebrand, *Advanced Calculus for Applications, Second Edition*, Prentice-Hall, 1976 (recommended).

Text on Reserve in Engineering Library

- C. M. Bender and S. A. Orszag, *Advanced Mathematical Methods for Scientists and Engineers*, McGraw-Hill, 1978.
- J. A. Cochran, H. C. Wiser and B. J. Rice, *Advanced Engineering Mathematics*, 2nd Ed., Brooks/Cole, 1987
- M. D. Greenberg, *Foundations of Applied Mathematics*, Prentice-Hall, Englewood Cliffs, NJ, 1978.
- L. D. Kovach, *Advanced Engineering Mathematics*, Addison-Wesley, 1982
- E. Kreyszig, *Advanced Engineering Mathematics*, Wiley, 1962
- E. Kreyszig, *Introductory Functional Analysis with Applications*, Wiley, 1978
- P. V. O’Neil, *Advanced Engineering Mathematics*, Wadsworth, 1987.
- J. N. Reddy and M. L. Rasmussen, *Advanced Engineering Analysis*, Wiley, 1982
- C. R. Wylie and L. C. Barrett, *Advanced Engineering Mathematics, 5th Ed.*, McGraw-Hill, 1982

Required Work and Grading

Exams will be closed book, closed notes and held in class. The final exam will be comprehensive. You can bring one 8 1/2" x 11" sheet with notes on both sides to the first exam, two to the second, and three to the final.

Homework will be assigned regularly. All homework will be graded and returned. Homework must be done on *one side only* of 8 1/2" by 11" *engineering* paper with no frayed edges. Multiple pages must be stapled. You should briefly restate the problem, give a sketch if helpful, give all necessary analysis, and place a box around your final answer. Neatness and effective communication are considered in grading as well as the final answer itself.

Two short (one page maximum) critical reviews of works from the literature will be required. The first review will consider a topic of current interest in applied mathematics from the journal *SIAM Journal of Applied Mathematics*. The second must consider an article on mathematics which has stood the test of time. It must be over fifty years old, written by a well-known mathematician, and should have a proven lasting value. Your reviews should 1) summarize the article's major findings and 2) offer an argument why this paper is deserving of its recognition. The reviews are required to be written in a TeX format and will be checked primarily for style, format, grammar, and content.

Grades will be assigned based on students' performance on examinations, homework, and papers. The weights assigned to each are as follows:

Exam I	25	Friday, 29 September 1995
Exam II	25	Friday, 17 November 1995
Final Exam	35	Thursday, 14 December 1995, 8:00-10:00 AM
Homework	13	
Reviews	2	Friday, 22 September 1995; Friday, 10 November 1995
Total	100	

Honesty Policy

Academic honesty is expected. When confronted with an apparent violation, I will enforce the appropriate University regulations to the best of my ability. I will also try to make my expectations clear. By and large, though, these issues are out of my control and as such I do not seek out violations. Instead, I depend upon your basic integrity to prevent any problems.

In brief my expectations are as follows. I encourage you to freely discuss the homework amongst one another as you formulate your solutions *individually*. *Your* written work should represent *your* understanding of the problem. In practice this means copying (in whole or in part) another student's homework, exam, computer program, or paper is *not* permitted. If you choose to discuss your work with a colleague, it should be a discussion in which one teaches another or both work to a mutual understanding. As a counter-example, it is not acceptable to give a friend your homework five minutes before class so that friend can copy your work. I also consider it unacceptable to copy work from a student who was in the class in a previous year. In your written reports, be careful to correctly use quotation marks for words that did not originate with you. Also be sure to properly cite all sources you used. As is done in the scientific literature, you should *briefly* acknowledge in writing any significant discussions or interactions you had regarding the work you submit. As a general principle, I do not accept the justification that you were not sure of my intentions. If you feel you may be in an ethical grey area, then you should consult with me *before* acting.