

**AME 500A – Advanced Engineering Analysis
Fall 2007**

Catalog Information: AME 500A (3 units) Physical vector calculus, linear algebra, ordinary differential equations (ODE), calculus of variations (the last topic will not be covered during fall 07).

Special Course Fee Required: Special fee may apply for web delivered sections. See the M.Eng Website (<http://triuniv.engr.arizona.edu/tuition.html>) for details. AME 500A is not available by Web from Dr. Balsa during Fall 07.

Prerequisites: Four (4) customary undergraduate mathematics courses and an additional one equivalent to AME 301, Engineering Analysis.

Suggested Text/Reference Books: There is no single textbook for the course. Some notes will be available at the EES Copy Center (Harvill 137). The books below are reasonable for parts of the course.

M. Greenberg, *Foundations of Applied Mathematics*, Prentice-Hall, 1978, (OUT OF PRINT); Chapters 8 and 9 (available at EES Copy Center.)

E. Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, Wiley, 2006

G. Strang, *Linear Algebra and Its Applications*, 4th Edition, Thomson- Brooks/Cole, 2006

We will cover parts of these books. The most important component of the course is the lectures. I have other books that you are welcome to borrow for 2-3 days.

Instructor: Thomas F. Balsa, Professor, AME N613, 621-2208
balsa@ame.arizona.edu

Office Hours: MW 10:00 – 1:00. *Make use of office hours in this and other courses!*

TA: Christoph Dribusch, dribusch@email.arizona.edu

Office Hours: Tuesday 11:00 – 12:00, Thursday 3:00 – 3:50 in Room 330

Course Web Site: TA will set up a simple web site where basic information about the course will be available. Some of the information will be password protected.

Class Requirements:

2 lectures per week. Attendance is highly recommended. The lectures are the most important component of this course. Also, we will be making some collective decisions and it is important that everyone participates.

Assigned homework (~ weekly, 4-5 problems on each homework set)

Two mid-term tests (dates TBD, but plan on early October and mid November)

Final exam (see schedule of classes on UA website)

Usually one of the homework problems per homework set will be graded by the TA. The solutions to the homework set will be posted in the EES Copy Center and on the web.

All homework is collected, in class, one week following the assignment. No late homework is accepted. If you are unable to turn in the homework during class, you can do so **earlier** (use my mailbox in AME N614, under my office door, etc.) Graded homework is returned within one week.

Grade Composition and Grading:

Assigned homework: (10%)

Two mid-term tests: (25% each)

Final exam: (40%)

Regular grades are awarded for this course: A, B, C, D, E.

All exams will be closed book, closed notes and comprehensive. Owing to the UA policy of keeping SID numbers confidential, grades will not be posted.

The generation of a make-up exam, reflecting the intent and difficulty of the original exam, is a very difficult task. The interpretation of the grade, vis-à-vis the class average on the original exam, is even more difficult. Fairness cuts both ways: to the student who takes the make-up as well as to the rest of the class who took the original. For these reasons, **no make-up exams will be available**, except possibly for the removal of "T" in accordance with University policy.

If you are unable to take a scheduled exam due to health reasons, you must notify the instructor prior to the exam (memo or email is best for the record). You will later have to present a written statement from a medical doctor. If you will be absent for other serious family reasons (e.g., death), similar advance notification and documentation are required. Students missing the final exam for one of the above reasons will receive the grade "I".

Students missing a mid-term exam for one of the above reasons will receive the "scaled grade" (relative to the class average) obtained on the *NEXT* exam. Students missing exams under conditions not discussed above will normally be awarded zero.

Additional Comments: I stress the fundamentals and look for your understanding of these. It is in this spirit that I will try to minimize algebraic tediousness on exams (at least if you approach the problem in a reasonable way).

Take good lecture notes and fill in the details/extensions when you study after each lecture. Use reference books to read and learn about a subject. If you have a neat, complete and reliable set of notes you can use them to study for exams. These notes also serve as a familiar reference in the future.

Ask questions and come to office hours. If you have difficulties see me immediately. I'm here to help you but you have to let me know when you need it. It is your job to learn the material. This has nothing to do with teaching. Keep in touch.

A helpful hint:

As you see from the attached list of topics, there is a lot of material to cover. I will try to present the “**big picture**” in the lectures and **outline** the key ideas and derivations. You should fill in the details and the fine print. It is important that to listen to what I say and jot down the main points so you can fill in the details at home (which you must do!) There is no time during lectures to present all the steps on the blackboard. When you study, you should always ask yourself: why? what if? and so what? You should always think about a subject and dig into it. The homework, by itself, will not provide much of an understanding. Think geometrically and think physically.

Prepared by Thomas F. Balsa, 15 August, 2007