Math. 489, Sec. 500 Spring, 2010

Linear Algebra and Its Applications to Partial Differential Equations

Prerequisites: Math 308; Phys 332 [currently offered as Phys 489] or comparable exposure to Fourier methods (Math 401, 412, or 414); junior or senior classification.

Class time and place: TBA [probably MWF 9:10 or TR 11:10]

Web page: `http://calclab.math.tamu.edu/~fulling/m489LP`

Instructor: S. A. Fulling
620H Blocker Bldg.
845-2237
`fulling@math.tamu.edu`

If I am not in my office, you can leave a note in my mailbox (in the room opposite the Math Department office, 6th floor of Blocker) or in the plastic pouch beside my office door.

Tentative office hours: xxx
Permanent office hours will be announced later.

Course description: Linear algebra definitions and techniques (6 weeks; less if students' backgrounds permit); superposition principles, Green functions, reduction of PDEs to integral equations (2 weeks); Hilbert spaces, orthonormal bases, self-adjointness, review of separation of variables and Sturm-Liouville theory (3 weeks); continuous spectrum (1 week); resolvents, integral equations, Neumann series, introduction to Fredholm and Hilbert–Schmidt theory; completeness of eigenfunctions (3 weeks)

Textbooks:

1. S. A. Fulling, *Linearity*, World Scientific, 1999
2. B. L. Moiseiwitsch, *Integral Equations*, Dover, 2005
3. Instructor's notes

Learning objectives: The course supplements the Theoretical Methods course sequence, Phys 331–332. (1) The student will master the abstract vocabulary and calculational techniques of elementary linear algebra. (2) The principles of linear algebra will be applied as the foundation of the method of separation of variables and other aspects of the detailed solution of linear differential equations; this will make the student's problem-solving skills deeper and more generalizable. Some advanced material will be presented, but proficiency in it at the level of graduate mathematics courses is not expected.

Grading scheme:

Hour test:	100
Final exam:	150
Homework:	150
Total	400

The "curve" will be at least as generous as the "standard" scale [i.e., 90% (= 360 pts) will guarantee an **A**, 80% **B**, 70% **C**, 60% **D**].

Date of hour test: xxx
Date of final exam: xxx
Please bring your own paper for tests.

Make-up tests: Make-up tests are very hard to grade fairly, and they absorb a large amount of my time which would be better spent for the benefit of the whole class. Please cooperate in making these incidents as rare as possible. If you miss (or foresee that you will miss) a test, it is *your* responsibility to contact me as soon as possible to request, justify, and schedule a make-up test. (If you can't reach me directly, you can leave a message at the Math Department office, (979) 845–3261.) If the absence is not clearly excused under the Attendance section of Student Rules, the request may be denied.

An Aggie does not lie, cheat, or steal or tolerate those who do. See Honor Council Rules and Procedures, `http://www.tamu.edu/aggiehonor` .

Plagiarism: Finding information in books or on the Internet is praiseworthy; *lying* (even by silence) about where it came from is academic dishonesty. Whenever you copy from, or "find the answer" in, some other source, *give a footnote or reference*. Otherwise, you are certifying that it is your own work.

Joint work: On a homework assignment (*not* a take-home test!) discussion with other students is permitted, even encouraged. However, you will not get homework credit for "work" that is parasitical (and your test scores will suffer, too!). To forestall problems, please follow these policies: (1) When two or more students work together on an assignment, they should all indicate so on their papers. (2) If the cooperation is of the divide-and-conquer variety, you are certifying that you *have studied and understand* every problem solution on your paper. Mindless copying is dishonest and academically worthless.

Copyright: Course materials (on paper or the Web) should be assumed to be copyrighted by the instructor who wrote them or by the University.

Disabilities: 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 the Disability Services Office in Cain Hall, Room B118, or call 845–1637.