Math 401 Advanded Engineering Mathematics
Spring 2010 Section 502

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Office: Milner 119
Tentative office hours: Wednesday 10:30-11:45am, Thursday 3:45-5pm, other time by appointment.

Textbooks:

1. S. A. Fulling, Math. 401 lecture notes (see the class Web page)
2. J. G. Simmonds and J. E. Mann, A First Look at Perturbation Theory, 2nd ed. (Dover, 1998, 0-486-67551-3)
3. C. Constanda, Solution Techniques for Elementary Partial Differential Equations (Chapman & Hall/CRC, 2002 1-58488-257-3)

Some other useful books:

1. M. R. Spiegel (Schaums Outline Series), Fourier Analysis
2. E. J. Hinch, Perturbation Methods
3. D. L. Kreider et al., Introduction to Linear Analysis (Our library has this in both English and Spanish.)

Prerequisite: M308 Differential Equations.

Course Outline:

1. Perturbation theory and asymptotic approximations 6 weeks
   (a) Perturbation theory for algebraic equations
   (b) Regular perturbation theory (power series) and its shortcomings
   (c) Asymptotics and uniformity
   (d) Stretched-time and two-time methods
   (e) WKB (phase-integral, LiouvilleGreen) approximation
   (f) Boundary-layer problems
2. Partial differential equations and Fourier methods 8 weeks
   (a) Introduction to PDEs and boundary-value problems: The heat equation
   (b) Basic PDE concepts; linearity and homogeneity

(c) Separation of variables and Fourier series

(d) Fourier transforms

(e) SturmLiouville problems and special functions a quick survey

(f) The linear wave equation

(g) Types of PDEs (parabolic, hyperbolic, elliptic); well-posed problems

Course objectives: Your goal in this course, as in every course that you ever take, should be a complete mastery of the material. Anything less is aspiring to mediocrity and doing yourself a disservice. I expect you to read the section in the text that we will be covering before we meet. Come to class ready to ask questions about what you do not yet know. After class, re-read the text and your notes, and do exercises to complete your mastery of the material.

Grading policy: Your grade will be determined by three exams, a cumulative final exam and homework. The weights for each of these are as follows.

Exam1	Exam2	Exam3	Final	Homework
20%	20%	20%	20%	20%

Your final grade will be assigned as follows.
A(90–100%), B(80–89%), C(70–79%), D(60–69%), F(0–59%)

Exam Schedule:

Exam1	Exam2	Exam3	Final
Feb 18, Thursday	Mar 25, Thursday	Apr 27, Tuesday	May 7, Friday

Exams: Exam 1,2,3 will be given during the regular class time. Final will be held on May 7 from 3–5pm. Calculators will **NOT** be allowed on the exams and final. The final exam will be comprehensive. **Important:** Remember to bring your Texas A&M student ID with you for all exams!

Homework: Homeworks will be due every Tuesday at the start of class. No late homework will be accepted for **ANY** reason! However the two lowest homeworks will be dropped before computing the average.

Make-up Policy: There are no make-ups for homework for **ANY** reason. If you have a valid reason (medical or family emergency) for missing an exam, then I will give you an alternative exam, preferably *before* the scheduled exam. Missing an exam without a valid reason will result in a score of zero for that exam. To be excused you must notify me (acknowledged email or written) prior to date of absence if such notification is feasible. Consistent with Texas A&M Student Rules, students are required to notify their instructor by the end of the second working day after missing an examination or assignment. For injury or illness too severe or contagious to attend class, you must provide confirmation of a visit to a health care professional affirming date and time of visit. The Texas A&M University Explanatory

Statement for Absence from Class Form will **NOT** be accepted.

A.D.A. 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 the Department of Student Life, Disability Services, in Room B118 of Cain Hall or call 845-1637.

Copyright policy: The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, in-class materials, review sheets, and additional problems sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission.

Scholastic dishonesty: *An Aggie Does Not Lie, Cheat, or Steal or Tolerate Those Who Do.* The Aggie Code of Honor will be enforced in this course. For the purpose of this course, cheating will be defined as (but not limited to) access or use of unauthorized material during exams and quizzes, collaboration between students during exams, quizzes or assignments for which group work is not allowed, perusal of another student's work during exams and quizzes, copying other student's work or allowing other students to copy you work on any assignment, quiz or exam, and having unauthorized programs or other information stored on calculators when these calculators are accessible during an exam or quiz. For additional information about Aggie Honor System consult http://www.tamu.edu/aggiehonor/

Note: The instructor reserves the right to make any changes he considers academically advisable. It is your responsibility to attend classes and keep track of the proceedings.