MATH 353: FALL 2012 SYLLABUS

Required Notes: ODE and PDE Overview (handout)


COURSE MATERIAL: The primary reading and study material for the course are the “overview” handout and notes that the students take in class. They correspond to chapters 1, 2, 3, 5, 6, 10, 11 of the textbook. Chapter 7 is assumed to be known to the student from the course of linear algebra. The textbook provides additional reading, with more detailed derivations, discussions and examples. It also provides homework and training problems. When the approach of the textbook deviates from the approach of the Overview (this occurs in the PDE sections), the approach of the handout will be followed in the course.

APPROACH TO LEARNING: Learning begins with the mastery of the vocabulary. This is the philosophy behind the handout. Students will be responsible for the definition and understanding of all boldface terms in the handout. Tests and quizzes will be split between solving problems and providing the definition, or examples, or a discussion of these terms and relations between them. Examples of the latter:

- What is an eigenvalue problem for a square matrix A?
- State the type of a set of given solvable first order ODE without solving them.
- What is a linear homogeneous ODE? prove the principle of linear superposition of solutions of such equations.
- Write the general form of a first order ODE and describe what is meant by “initial value problem” for this ODE.
- Write down an initial-boundary value problem for the forced heat equation.

STUDYING should aim at acquiring a thorough understanding of the Overview, and of notes taken in class. This should be achieved with the help of further readings from the textbook, working on problems in the “Textbook Homework Problems” list provided and preparing
for conceptual test questions. Use of the solution manual is not allowed at any time and constitutes a violation of the Duke honor code. Group study including working together on homework problems is encouraged. Homework will not be collected.

TESTS will consist of two midterms, the final exam and weekly or bi-weekly 15-20 minute, unannounced quizzes. The first midterm is given near the middle of the term, the second, close to the end of the term. There will be a balance between the two types of problems discussed above in all tests. All tests and quizzes are closed book exams. Students may use the formula sheet posted in the sakai website common to all sections.

FINAL EXAM is common to all sections (block final). It is prepared by the instructors working together. The grading of the final is uniformized, that is, each problem is graded by the same instructor for all sections.

GRADING POLICY: Generally, there will be no partial credit. A question or a part of one that stands out as a separate question itself (such as finding the eigenvalues when the problem is to solve an eigenvalue problem) receives either full credit or no credit. Partial credit is only given in the case of careless numerical or algebraic errors that have little impact on the answer. Incomplete answers to conceptual questions receive no credit. For example:

Question: What is an eigenvalue problem for a square matrix $A$?

- Answer 1 (full credit): Finding all pairs of scalars $\lambda$ and nonzero vectors $v$ for which $Av = \lambda v$.
- Answer 2 (full credit): Finding all pairs of scalars $\lambda$ and vectors $v$ for which $Av = \lambda v$ and $v \neq 0$.
- Answer 3 (no credit): $Av = \lambda v$.
- Answer 4 (no credit): $Av = \lambda v$ and $v \neq 0$.
- Answer 5 (no credit): Finding all pairs of scalars $\lambda$ and vectors $v$ for which $Av = \lambda v$

SAKAI WEBSITES exist for each section together with a common site for all sections. Please check for announcements with the instructor through these websites.