Math 316 Section 2 MWF 12:00-12:30 MH 213 FALL 2008

Instructor: Irina Vasileva
Office Hours: Mon 11:00-11:50 and Tue 14:00-15:00 at the Calculus Table; Thu 14:00-15:00 in my office; or by appointment
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Required Text: "Differential Equations" by James R. Brannan and William E. Boyce ISBN 978-0-471-65141-3. Matlab tutorial and student solution manual (sold in our bookstore) are recommended.

Covered Topics: First order differential equations, second order linear and special non-linear differential equations, Laplace transforms, linear and nonlinear systems of differential equations including a study of eigenvalues and eigenvectors, phase plane analysis and stability of linear systems, modeling and applications. Integrated into the course are computer assignments covering numerical approximations to first order, second order, and linear systems of differential equations.

Prerequisite(s): Calculus I, Calculus II, Calculus III (recommended).

Grading:
Quizzes and computer assignments 20%
Two in-class exams 50%
Final exam 30%

Quizzes and Homework: ~10 quizzes. Most of them will be in-class but some will be take-home. In-class quizzes will be closed book. Notes and calculators are not allowed. Quizzes cannot be made up but one grade will be dropped in case you miss a quiz. In case of severe illness please contact me. Quizzes will be based on homework problems. I do not collect homework. Competing your homework is your responsibility. If you want to discuss your solutions with me, come to my office hours or set up an appointment. You are welcome to ask questions about the previous homework in class. Do your homework when it is assigned. Do not get behind! You are encouraged to work together with other students on your homework. Also you are encouraged to use the student solution manual available in the bookstore. Just make sure you understand! Remember, you will get no help on in-class quizzes and tests.

Exams: Make-up tests will only be given in appropriate circumstances (documented\university authorized absence: illness, family emergency, active participation in scholarly or athletic events). All exams are closed book. You may use a single 8.5''x11'' sheet of notes on both sides. Calculators are not allowed. I may include multiple-choice/true-false questions (no more than 30% of the test).

Computer Assignments: 2 or 3 computer assignments. You will need to use Matlab. Matlab is available in the University computer labs (DSH 141, DSH 143, ESC South, Lobo Lab) and can be purchased. No Matlab background is required. You can discuss your assignments with others but each student should turn in his/her own assignment. Your assignment should reflect your knowledge. You will receive step-by-step instructions on what to do when the assignment is given. Some supplementary material and instructions will be sent by email. Also Matlab has nice built-in tutorial and short Matlab tutorials are available online. **No late assignments will be accepted.** *Some M-files that you need for this course can be downloaded from the Rice University web site* ***math.rice.edu/dfield/***

Grading Guidelines: To get full credit on quizzes and exams, *you need to show your work*. All steps must be shown *neatly*, in *clear and correct* mathematical notation, so that your work I easy to follow. You will be graded based on the work shown, not on the answer. If you make a small mistake but your answer is

consistent with your work, you will receive almost full credit. If your answer is correct but does not follow from your work, you will receive little to no credit.

Please note: Attendance is mandatory. If you have to miss a class, please notify me. It is YOUR responsibility to drop the course if you decide to stop attending classes.

Qualified students with disabilities needing an appropriate academic adjustments should contact me as soon as possible to ensure your needs are met in a timely manner.

Syllabus (Tentative)

Weeks 1-4 Chapters 1 and 2: Introduction.1st order DEs and their solutions. Direction fields. Numerical methods. Linear equations, integrating factor. Separable equations. Autonomous equations, phase line and stability. Exact equations. Applications.

Week 4-6 Chapter 4: 2nd order DEs. General solution of homogeneous equations. Constant coefficient homogeneous equations. Nonhomogeneous equations. Undetermined coefficients. Variation of parameters. Applications (unforced and forced harmonic motion).

Week 7 Review and in-class exam 1.

Week 7-10 Chapter 5, 5.1-5.7: Laplace transforms.

Week 10-13 Selected topics from chapters 3, 6 and Appendix A: Systems of 1st order DEs. 2x2 case. Selected topics from linear algebra. Eigenvalues and eigenvectors. General solution. Phase plane. Fundamental solution matrix. Nonhomogeneous case and Variation of parameters. Numerical solutions. Some applications.

Week 14 Review and in-class exam 2.

Week 14-16 Selected topics from Chapter 7: 1st order nonlinear systems and stability. Review for the final.

Week 17 Final Cumulative Fri Dec 19 10:00-12:00