Math 308 (Differential Equations), Section 519
Spring 2011

Instructor: Dr. Mariya Vorobets

Class hours : MWF 12:40 – 1:30, BLOC 122

Web page: `http://math.tamu.edu/~mvorobet/Math308/S11/`

Office: Milner 004 (phone: 845-0849, e-mail: `mvorobet@math.tamu.edu`)

Office hours: TR 11:15 AM–12:45 PM, or by appointment

Course Web Page: The course web page will be my main source of communication to you aside from class and office hours. Check the course page regularly for announcements, exam information and the course schedule.

The Mathematics Department has a web-page for Math 308
http://www.math.tamu.edu/courses/math308/

Email Policy: Check your official TAMU email account EVERY day. You are responsible for any information I send via email. Because of the privacy rights, I cannot discuss grades via email or over the phone. Please include your name and the section number in the subject line.

Text: J. R. Brannan and W. E. Boyce, Differential Equations: An Introduction to Modern Methods & Applications John Wiley & Sons, Inc, ISBN-13 978-0-471-65141-3.

I will provide handouts with introduction to MatLab. The following book might be helpful:
J. C. Polking, D. Arnold Ordinary Differential Equations using MATLAB, Pearson, ISBN 0-13-145679-2.

A personal copy of MatLab is useful, but not necessary, since you will be able to work remotely on Calclab computers.

Topics covered: This is a course in differential equations. Topics include linear ordinary differential equations and systems of linear differential equations, second order linear equations, solutions using Laplace transforms, numerical methods.

Homework: Homework problems will be assigned every week. The homework problems and the due date will be posted on my web page. You are expected to do all the assigned homework problems. Late homework will not be accepted. If for some reason you can not be in class and turn in your HW in due day, you may drop it off before the class on due day in my mailbox in Milner 130 (please, do not slide them under the door of my office). Collaboration on homework is allowed, but you have to write your ENTIRE solution by yourself. Similarly written homeworks will receive no credit. **When you turn in your homework do not forget to put your name on it, homework number and staple all the sheets.** All work must be shown. No credit would be given for the answer that is not supported by any work.

It is very important for your success in class that you do your homework regularly, completing all of the suggested problems and practicing working with MatLab. Visit me to discuss these problems and seek my help if needed.

Examinations: Your grade will be determined by homeworks, three midterms, and a cumulative final exam.

The *tentative* midterms dates are: Exam I – Feb. 11 , Exam II – March 11, Exam III – Apr. 15.

The *final* exam is scheduled for Monday, May 9, 10:30 – 12:30.

No collaboration on the midterms and on the final is allowed. The use of books, cell phones, calculators or notes of any sort during exams is not permitted.

Grading Policy:

EXAM I = 20%, EXAM II = 20%, EXAM III = 20%, HWs = 15%, FINAL EXAM = 25%, TOTAL = 100%.

I may curve any grade and will then compute the course grade by the following rule: A for 90 – 100%, B for 80 – 89%, C for 70 – 79%, D for 60 – 69%, and F for 0 – 59%.

Plan of lectures:

1/19 Section 1.1. Some Basic Mathematical Models; Direction Fields

1/21 Section 1.2. Solutions of Some Differential Equations

1/24 Section 2.1. Linear Equations; Method of Integrating Factors

1/26 Section 2.2. Separable Equations

1/28 Section 2.3. Modeling with First Order Equations

1/31 Basic commands of MATLAB. Section 2.4. Differences Between Linear and Nonlinear Equations

2/2 Section 2.5. Autonomous Equations and Population Dynamics, Section 2.6. Exact Equations and Integrating Factors

2/4 Section 3.1. Systems of Two Linear Algebraic Equations

2/7 Section 3.2. Systems of Two First Order Linear Differential Equations

2/9 Exam Review

2/11 Exam I

2/14 Section 3.3. Homogeneous Linear Systems with Constant Coefficients

2/16 Section 3.4. Complex Eigenvalues

2/18 Section 3.6. A Brief Introduction to Nonlinear Systems; Solving equations with MATLAB

2/21 Section 7.1. Autonomous Systems and Stability

2/23 Section 7.2. Almost Linear Systems

2/25 Section 7.3. Competing Species, Section 7.4. Predator-Prey Equations

2/28 Section 4.1. Definitions and Examples, Section 4.2. Theory of Second Order Linear Homogeneous Equations

3/2 Section 4.3. Linear Homogeneous Equations with Constant Coefficients

3/4 Section 4.4. Characteristic Equations with Complex Roots

3/7 Section 4.6. Nonhomogeneous Equations: Method of Undetermined Coefficients

3/9 Exam Review

3/11 Exam II

3/21 Section 4.7. Forced Vibrations, Frequency Response, and Resonance

3/23 Section 4.8. Variation of Parameters

3/25 Section 5.1. Definition of the Laplace Transform

3/28 Section 5.2. Properties of the Laplace Transform

3/30 Section 5.3. The Inverse Laplace Transform

4/1 Section 5.4. Solving Differential Equations with Laplace Transforms

4/4 Section 5.5. Discontinuous Functions with Laplace Transforms

4/6 Section 5.6. Differential Equations with Discontinuous Forcing Functions

4/8 Section 5.7. Impulse Functions

4/11 Section 5.8. Convolution Integrals and Their Applications

4/13 Exam Review

4/15 Exam III

4/18 Section A.1. Matrices; Section A.2. Systems of Linear Algebraic Equations, Linear Independence, and Rank

4/20 Section A.3. Determinants and Inverses ; Section A.4. The Eigenvalue Problem

4/25 Section 6.1. Definitions and Examples

4/27 Section 6.2. Basic Theory of First order Linear Systems

4/29 Section 6.3. Homogeneous Linear systems with Constant Coefficients

5/2 Section 6.4. Complex Eigenvalues

5/3 Exam Review

Help Sessions: The Mathematics Department offers help sessions for Math 308 students. See http://www.math.tamu.edu/courses/helpsessions.html for schedule and more information.

Make-up Policy: No make-ups will be given without written evidence of an official University excused absence (see *University Student Rules*). In addition, you must notify me **NO LATER** than the end of the second working day after the missed assignment:

> ... the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class. (Section 7.3 of the *University Student Rules*)

***If no such notice is given, the rights to a make-up are forfeited. Specifically, in the case of injury or illness, students are required to obtain a confirmation note from a health care professional affirming date and time of a medical office visit regarding the injury or illness. I will NOT accept the "Explanatory Statement for Absence from Class" form as sufficient written documentation of an excused absence.

Late Work Policy: Late work (for which you do not have a University approved excused absence) will NOT be accepted. This includes all written and online assignments.

Scholastic Dishonesty: Copying work done by others, either in-class or out-of-class, is an act of scholastic dishonesty and will be prosecuted to the full extent allowed by University policy. Collaboration on assignments, either in-class or out-of-class, is forbidden unless I grant permission.If you cheat on an assignment, you will receive a zero. Also, you will be reported to the University.

Remember the Aggie Code of Honor: **"An Aggie does not lie, cheat, or steal or tolerate those who do."**

For more information about the Honor Council Rules and Procedures visit the web site: http://www.tamu.edu/aggiehonor

Copyright notice: All course materials (both printed and web-based) are protected by U.S. Copyright Laws. No multiple copies can be made without written permission by the instructor.

Students with 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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu