Math 2403 – Differential Equations

Lectures: MWF 9:05 – 9:55 in Howey (Physics), room L3

Instructor: Plamen Iliev
E-mail: iliev@math.gatech.edu (I can answer only if you use your GT account!)
Office hours: MW 10:05-11:00am in Skiles 243B

Teaching assistants & Recitations:

Section:	TA	Recitations: TuTh 9:05-9:55	Office hours
N1	Albert Bush E-mail: abush9@math.gatech.edu	Skiles 202	Th 10-11am Skiles 151
N2	Romeo Awi E-mail: rawi3@math.gatech.edu	Skiles 271	Tu 10-11am, W 2-3pm Skiles 146B
N3	Huijun Feng E-mail: hfeng9@math.gatech.edu	Skiles 170	W 3-5pm Skiles 144

Textbook: *Differential Equations with boundary value problems: An Introduction to Modern Methods & Applications*, by James R. Brannan and William E. Boyce (second edition); John Wiley and Sons, Inc.

Prerequisite: Calculus II

Syllabus: We will cover the material in chapters 1 through 7 from the textbook:

- Introduction (Chapter 1)
- First order differential equations (Chapter 2)
- Systems of two first order equations (Chapter 3)
- Second order linear equations (Chapter 4)
- Systems of first order linear equations (Chapter 6)

- Systems of first order linear equations (Chapter 6)
- Nonlinear differential equations and stability (Chapter 7)
- The Laplace transform (Chapter 5)

Grading policy: There will be two tests, quizzes and a comprehensive final exam. Any missed exam results in a "0" score. The lowest quiz score will be dropped. Grades will be computed by the following distribution:

Quizzes	20%
Test 1	20%
Test 2	20%
Final exam	40%

No make-up exams. If you have to miss an hour test for a valid reason (illness or emergency) please let me know as soon as possible. Contact also the Office of Dean of Students immediately and let them send me a notice. In that case the final exam will be given a higher weight.

Test dates:

- Test 1 - Tuesday, February 7, 2012
- Test 2 - Tuesday, March 13, 2012
- Final exam – Friday, May 4, 2012, 8:00am-10:50am

Please let me know of any conflicts with the test dates immediately.

Policy on exams: Notes, books, calculators, laptops, cell phones, ipods etc. cannot be used! **Bring an ID for all exams!**

Useful links:

- **Tutoring at the School of Mathematics**
- **Tutoring offered by the Center for Academic Success**
- **Official School Calendar**

Math 2403 L1∼3 & PLP TTh 15:05 - 16:25, Room: Howey L4

Instructor: Fangxu "Frank" Jing

Contact: jing at math.gatech.edu (preferred), Skiles 017, 404-894-9426

Office Hours: TTh 17:00 - 18:00, Skiles 017

Course website: T-Square

TA:

Arash Asadi (L1 & PLP), aasadi at math.gatech.edu, Skiles 139

Recitation: MW 15:05 - 15:55, Skiles 168
Office hour: T 16:30 - 17:30, Skiles 139

Dawei He (L2), dhe9 at math.gatech.edu, Skiles 149

Recitation: MW 15:05 - 15:55, Skiles 246
Office hour: M 16:00 - 17:00, Skiles 149

Tianjun Ye (L3), maolilan at math.gatech.edu, Skiles 225A

Recitation: MW 15:05 - 15:55, Skiles 249
Office hour: MW 14:00 - 15:00, Skiles 225A

Textbook: Differential Equations - An Introduction to Modern Methods & Applications, 2nd ed., by Brannan & Boyce, Wiley Press.

Topics:

Introduction ..... ∼ 1 classes
First order differential equations ..... ∼ 3 classes
Systems of two first order differential equations ..... ∼ 9 classes
Second order differential equations ..... ∼ 8 classes
Laplace transform ..... ∼ 7 classes

Homework: All homework will be assigned at the end of lectures and then the problems with solution will be put on website. Homework will NOT be collected (hence NOT required), though some problems in the quizzes or exams will be chosen from assigned homework with possible tweaks. You may discuss the homework problems with other students, but you are encouraged to complete the homework independently. Some of the problems will be discussed in the recitation sessions.

Quiz: The quizzes will be given and collected in recitation sessions. Each quiz will have 2 to 3 problems, and require roughly 30 minutes to complete. Quizzes are open-book and open-notes. They may not be announced in advance.

Exam: The final will be on May 3 from 11:30 AM - 2:20 PM. The two midterms will be 80 minutes, given in lecture time (tentatively on 2/14 and 3/26). All exams are close-book and close-notes. You will be allowed to bring an A4 crib sheet with any thing you want written on it (both sides). Exam solutions should be written in ink and final answers should be circled with no correction inside.

Grading policy: Homework (0%), roughly 10 quizzes with equal strengths, best 8 will be counted (3% each), 2 midterms (20% each), final (36%).

The letter grade will be based on the total score in a curved fashion with the following exception: total score 90/100 or above will always be an A; total score 60/100 or above will always be at least a C.

Any request of grading review must be submitted within 7 days of return of quiz/exam. There will be no make-up for a missed quiz. No make-up will be given for a missed exam, except under provable impossibility to attend the exam (will be verified by Dean of Students).

Academic honesty: Please review the Georgia Tech Honor Code:
http://www.honor.gatech.edu/plugins/content/index.php?id=9

Laptops: Laptops may not be used in lecture.

Calculators: Scientific calculators will be allowed throughout the semester. Graphic calculators are NOT allowed unless authorized by TA or instructor.

Participation: Attendance in class is mandatory. Please don't arrive late to classes.

Learning disabilities: Any students with learning disabilities should contact the instructor by email during the first week of classes.

Fall 2011, Math 2403
Differential Equations

Class information

- Class: Monday, Wednesday, Friday 10:05 - 10:55AM
- Classroom: Skiles 249
- Class homepage: **http://www.math.gatech.edu/~kang/2403C**

- Instructor : Sung Ha Kang
  - Email: kang at math.gatech.edu
  - Office: Skiles 247
  - Office hours: MF 10:55-11:10AM, W 11-noon, WF 2:20-3PM, or other times by appointment
- Recitations
  - Section C1: TR 10:05AM Skiles 268
    - TA: Feng, Huijun
    - email: hfeng9 at math.gatech.edu
  - Section C2: TR 10:05AM Skiles 256
    - TA: Yang, Suo
    - email: syang305 at math.gatech.edu

Course information

- **Textbook**: Differential Equations: An Introduction to Modern Methods & Application / 2nd ed. (new) by Brennan and Boyce, John Wiley & Sons 2007 (0-470-45824-0)

- Prerequisites: MATH 1502 Calculus II
- Course Description: Methods for obtaining numerical and analytic solutions of elementary differential equations. Applications are also discussed with an emphasis on modeling.
- Tentative outline
  - Introduction and Euler's method
  - First Order Differential equations
  - Systems of two first order equations
  - Second order linear equations
  - Laplace Transform Methods
  - Systems of first order equations
  - Nonlinear Differential Equations and Stability

Course Grade

- Homework: Students are strongly encouraged to solve all the homework right after each classes.

- Quiz and Attendance (25%): There will be quizzes during the recitation sections which will be based on the homework materials. No make up quizzes are allowed, but lowest one score will be dropped. All quizzes are closed book and closed notes. Attendance will be checked during the lectures.

- Exams (75%): There will be two one-hour exams (20% each) and a final (35%). All exams are closed book and closed notes.
  No Make-up exams: in general there will be no make-up exams. In case of serious illness, doctor's note is required, and for student organization excused absences, your adviser's notice is required no later than two weeks prior to the date of the event.

note is required, and for student organization excused absences, your adviser's notice is required no later than two weeks prior to the date of the event.

- Extra (upto 8%): You may decide to solve the following project for more credit towards the grade. You must explain the project in details, and solve all the problems associated with the project. Interesting questions are encouraged. Subtantial effort needs to show to get full credit.
  - chapter 2, page 115, project 4
  - chapter 3, page 203, project 1, project 2, project 3, project 4
  - chapter 4, page 297, project 1, project 2, project 3, project 4, project 5
  - chapter 5, page 386, project 2, project 3
  - chapter 6, page 463, project 1, project 2, project 3
  - chapter 7, page 536, project 1, project 2, project 3

  One student may hand-in only upto 5 projects and I will only allow maximum of 8% to be added towards your grade. One excellent project can earn upto 2% of extra points. (If you work together, points will be divided among the number of students, and you may hand-in more projects: also 8% per student applies. If there are copies of the same projects submitted by different students it will be considered as "worked together".)
  First due date is November 11th and the second due date is December 2nd to my office Skiles 247. The projects will not be returned. The points will only added up at the end of the semester.

- **HONOR CODE:** All students are expected to comply with the Georgia Tech Honor code. Please review the student code of conduct.

Course Schedule and Homework

- [Sec 1.1 page 14] 1-6, 11-14, 21-22, 32-34, 36
- [Sec 1.2 page 25] 1-16, 27-31
- [Sec 1.3 page 36] 1-4, 16-17
- [Sec 2.1 page 50] 1-20, 23, 24, 27, 28
- Sep 1: Quiz 1

- [Sec 2.2 page 61] 1-5, 7-10, 13, 16, 23
- [Sec 2.3 page 75] 1-16, 21, 22, 24, 25
- [Sec 2.4 page 87] 1-4, 7, 8-13, 14, 15, 17, 24-25
- [Sec 2.5 page 98] 1-7 (a and b), 13-16, 18, 19-23, 25-26
- [Sec 2.6 page 105] 1-6, 15, [Sec 2.7 page 113] 1-6
- Sep 15: Quiz 2

- [Sec 3.1 page 136] 13-32, 33-36
- [Sec 3.2 page 149] 1-8, 9, 11, 15-20, 21-24, 30-31
- Sep 27: EXAM 1

- [Sec 3.3 page 167] 1-12, 13-14, 19-22, 26-27
- [Sec 3.4 page 178] 1-8, 11-15, 21
- [Sec 3.5 page 189] 1-10, 13, 15
- [Sec 3.6 page 196] 1-6, 7-9, 13-17, 23
- [Sec 3.7 page 201] 1a-2a
- Oct 11: Quiz 3

- [Sec 4.1 page 225] 1-3, 8-15, 18-19, 26
- [Sec 4.2 page 237] 1-6, 7-13, 14,15, 18, 20-24, 27-29
- [Sec 4.3 page 251] 1-18, 27-39, 44-46, 47-49, 52,54
- [Sec 4.4 page 262] 1-4, 5-8, 13-14, 17-19, 24,30
- [Sec 4.5 page 273] 1-8, 13-18, 19-26 (just (a)), 27, 28-30, 32

- [Sec 4.5 page 273] 1-8, 13-18, 19-26 (just (a)), 27, 28-30, 32
- Oct 25: Quiz 4

- [Sec 4.6 page 283] 5-7ac,8ac, 9-12, 16, 17
- [Sec 4.7 page 291] 2-9, 11-12, 14-17, 22-25
- [Sec 5.1 page 317] 1-4, 5-12, 13, 14-17, 22-26, 28, 36-37
- Nov 3: EXAM 2

- [Sec 5.2 page 324] 1-10, 11, 12-2126-27
- [Sec 5.3 page 334] 1-5, 9-24
- [Sec 5.4 page 342] 1-19
- [Sec 6.1 page 405] 2-3, 4-9, 10-13
- [Sec 6.2 page 415] 1-6, 7-9, 11-16
- [Sec 6.3 page 425] 1-8, 16-17
- Nov 17: Quiz 5

- [Sec 6.4 page 435] 1-8, 9, 10
- [Sec 6.5 page 447] 1-16, 23
- [Sec 6.6 page 453] 2-3, 5-6, 8
- [Sec 6.7 page 461] 1-8
- [Sec 7.1 page 484] 1-18 (just (a))
- [Sec 7.2 page 495] 1-20, 21-22, 24-26
- [Sec 7.3 page 506] 1-6, 10, 15-17

- Dec 16: FINAL 11:30- 2:20PM

Differential Equations, Math 2403 J1-3
Course Syllabus
Spring Semester 2012

Instructor: Andrzej Swiech
Lectures: MWF 2:05-2:55 pm, Howey Physics L2
Office: Skiles 235B
Office Hours: M 11-12 am, T 2-3 pm, F 3-4 pm, and by appointment
Phone: (404) 894-2705
E-mail: swiech@math.gatech.edu

Course web page: http://www.math.gatech.edu/∼swiech/2403s12.html

Recitations:
J1, Daniel Bernucci, TR 4:05-4:55, Skiles 202, dbernucci3@math.gatech.edu
J2, Melissa Hopkins, TR 4:05-4:55, Skiles 270, mhopkins8@math.gatech.edu
J3, Xia Dong, TR 4:05-4:55, Skiles 256, dxia7@math.gatech.edu

Textbook: J. R. Brannan and W. E. Boyce, *Differential Equations: An Introduction to Modern Methods and Applications*, 2nd edition.

Course Description: The course introduces the students to the basic theory of differential equations. The main emphasis is put on analytical methods for obtaining solutions of elementary equations. We will also discuss applications, modeling of physical phenomena by differential equations and we will learn the basics of the qualitative analysis of equations. The following topics will be covered:

1. Introduction to differential equations, Sections 1.1-1.4, 2 lectures.
2. First order differential equations, Sections 2.1-2.6, 6 lectures.
3. Systems of two first order equations, Sections 3.1-3.6, 6 lectures.
4. Second order linear equations, Sections 4.1-4.8, 8 lectures.
5. The Laplace transform, Sections 5.1-5.8, 8 lectures.
6. Systems of first order linear equations, Sections 6.1-6.7, 7 lectures.
7. Nonlinear differential equations and stability, Sections 7.1-7.5, 5 lectures.

Grading: There will be three tests (February 8, March 7, and April 11), quizzes, and the final exam. You can have a one-page (one side only) formula sheet during the tests and the final exam and you can use calculators to perform basic operations. Your final score will be scaled to 100% and calculated according to the following rule: quizzes will count for 18% of the final score, each test for 15%, the project for 7%, and the final exam for 30%. You will get an A, respectively B, C, and D if your final score is greater than 85%, respectively 70%, 55%, and 40%. These requirements may be lowered if the overall average score of the class is low (i.e. your grade may get curved up).

Homework, quizzes and project: The recommended homework problems are posted at http://people.math.gatech.edu/ swiech/2403hw.html. They will not be collected. Instead, short 15-20 min quizzes will be given in recitations on Thursdays every other week. Each quiz will consist of two problems similar to the homework problems assigned in the previous two weeks. Quizzes will be graded by the TA. Please check the news and announcements section of the course web page for the detailed information about the next quiz date and the sections covered by it. This information will be updated as the course progresses. There will be no make up quizzes, however the worst quiz score will be dropped. The projects will be done in groups of 4-5 people. Each group will be required to do a project from a collection of projects given in the textbook. The details about the project will be given later.

Please be aware of the Georgia Tech Honor Code and follow it carefully. In particular please make sure that all the work you submit is your own.

Math 2403 Differential Equations (H Sections) Fall 2011

Schedule: 12:05 pm - 1:25 pm TR	Classroom: College of Computing, 16
Office: Skiles 102A	Phone: 404-894-4750
Email: zengch@math.gatech.edu	Webpage: www.math.gatech.edu/~zengch
Office hours: 9:35 - 10:55 am Tue. & 3:05 - 4:25 pm Thu.	Final Schedule (tentative): Dec. 15th (Thu.), 11:30 --2:20.

Syllabus

Instructor: Chongchun Zeng

Participation: Attendence in classes is mandatory. Students are expected to read the material before each lecture. It is suggested that you start to work on homework problems right after they are assigned although they are not required.

Textbook: Differential Equations: An Introduction to Modern Methods & Applications/2nd edition, by J. R. Brannan and W. E. Boyce, published by Wiley.

Material: In this semester, the topics we will cover include: Euler's method, first order equations, second order linear equations, systems of first order linear equations, nonlinear systems, and methods of Laplace transform. We will cover most parts of Chapter 1 through Chapter 7 if time allows. Roughly, the schedule will be

Introduction and Euler's method	1.1-1.4	2
First Order Differential equations; Systems of two first order equations	2.1-2.7; 3.1-3.7	7+7
Second order linear equations; Systems of first order equations; Nonlinear Differential Equations and Stability	4.1-4.7; 6.1-6.7; 7.1-7.6	8+7+6
Laplace Transform Methods	5.1-5.9	8

Calculators: Scientific calculators are allowed throughout the semester. Graphic calculators are NOT allowed unless authorized by the TA or the instructor.

Grades: 1 final exam 40%, 2 midterm 18% each, 8 quizzes 3% each. (More quizzes might be given but only the best 8 scores will be counted.)

- Exams: The final will be 2 hours and 50 minutes. The 2 midterms of 50 minutes each will be given during recitation sessions in in the second half of Sept. and late Oct., respectively. They will be announced at least 8 days in advance. All the exams are "closed book" and "closed notes". You will be allowed to bring with you a one page (8.5 X 11, both sides) "cheat sheet" with anything you want written on it. Please write your exam solutions in ink and circle the final answer of each problem in a box with no corections inside. Writing exams in pencil would automatically forfeit your right to argue for credits after the exam is given back to you. There will be no make-up for a missed exam, except under provable impossibility to attend the exam.
- Quizzes: The quizzes of roughly 15--20 minutes each will take place in the recitation sessions. They may not be announced in advance. The quizzes are open-book and open-notes.
- Homework (not required): Although homework will not be collected, the importance of exercises can never be over-emphasized. Some problems in the exams or quizzes will be chosen from the assigned exercises. Homework will be assigned at the end of each lecture and then put on this

assigned exercises. Homework will be assigned at the end of each lecture and then put on this webpage in the below. You may discuss the homework problems with other students in this class, but you are encouraged to complete the homework independently. These problems will be discussed in the recitation sessions.

- Letter grade: in general, the letter grade will be given based on the total score (quizzes + midterms + final) in a curved fashion with the following exceptions:

1. Total score 90/100 or above will always be an A
2. Total score 60/100 or above will always be a C or higher.

Homework assignments:

- Assigned on Tue. 8/23: Sec. 1.1 2, 8, 13, 15--20, 38; Sec 1.3 3, 12; Sec.1.4 3, 11.
- Assigned on Thu. 8/25: Sec. 2.1 3, 4, 6, 9, 10, 21
- Assigned on Tue. 8/30: Sec. 1.2 2, 7, 11, 15, 18, 22, 32; Sec. 2.2 3, 6, 9, 10, 13, 17, 27;
- Assigned on Thu. 9/1: Sec. 2.3 2, 6, 9, 15, 21, 22, 23
- Assigned on Tue. 9/6: Sec. 2.4 5, 7, 8, 11, 13, 18; Sec. 2.5 4, 10, 11, 13, 25, 28
- Assigned on Thu. 9/8: Sec. 2.6 3; Sec. 2.7 3
- **Announcement: The first midterm: Mon. 9/19, covering Chapter 1 --2.**
- Assigned on Tue. 9/13: Sec. 3.1 4, 11, 15, 26, 31
- Assigned on Thu. 9/15: Sec. 3.2 5, 6, 7, 18, 24, 27
- Assigned on Tue. 9/20: Sec. 3.3 7, 8, 14, 15, 22, 24, 26; Sec. 3.4 2, 6, 7, 9, 15, 16
- Assigned on Tue. 9/27: Sec. 3.5 4, 5, 6, 10, 11, 13; Sec. 3.6 3, 4, 5, 9, 10, 16
- Assigned on Thu. 9/29: Sec. 4.1 10, 11, 14, 15, 17, 18; Sec. 4.2 5, 6, 9, 16, 19, 21, 24
- Assigned on Tue. 10/4: Sec. 4.3 2, 5, 13, 16, 21, 31, 32, 37; Sec. 4.4 6, 7, 9, 12, 13, 18, 19
- Assigned on Thu. 10/6: Sec. 4.5 3, 4, 7, 12, 15, 18, 19
- Assigned on Tue. 10/11: Sec. 4.6 7, 11, 14, 17, 20
- Assigned on Thu. 10/13: Sec. 4.7 4, 5, 8, 12, 17; Sec. 6.1 3, 6, 9, 12, 13.
- **Announcement: The 2nd midterm: Wed. 10/26, covering Chapter 1 --4.**
- Assigned on Thu. 10/20: Sec. 6.2 4, 5, 8, 10, 14, 15
- Assigned on Tue. 10/25: Sec. 6.3 3, 4, 7, 12, 14, 16, 21
- Assigned on Thu. 10/27: Sec. 6.4 3, 4, 6, 9, 12, 13, 16
- Assigned on Tue. 11/1: Sec. 6.5 4, 5, 13, 14, 16, 22
- Assigned on Thu. 11/3: Sec. 6.6 4, 6, 8, 9, 12, 14, 15, 16
- Assigned on Tue. 11/8: Sec. 6.7 4, 5, 7, 8, 11
- Assigned on Thu. 11/10: Sec. 5.1 3, 9, 13, 17, 18, 23, 28
- Assigned on Thu. 11/17: Sec. 5.2 5, 6, 14, 17, 21; Sec. 5.3 5, 8, 15, 16, 21, 24
- Assigned on Tue. 11/22: Sec. 5.4 9, 11, 12, 15, 22, 25
- Assigned on Tue. 11/29: Sec. 5.5 6, 8, 11, 16, 17, 20, 23;
- Assigned on Thu. 12/1: Sec. 5.6 2, 4, 9, 12, 17; Sec. 5.7 3, 6, 10, 13, 14, 18; Sec. 5.8 3, 9, 15, 16, 17