Texas Tech University, Department of Mathematics and Statistics
MATH 3350, HIGHER MATHEMATICS FOR ENGINEERS AND SCIENTISTS I
COURSE SYLLABUS, Spring 2013
Sections #014 (CRN: 27117) and #015 (CRN: 46593)

Instructor

Giorgio Bornia, Visiting Assistant Professor
Office: MATH 224 Office phone: (806) 742-2580 ext. 228
E-mail: giorgio.bornia@ttu.edu
Office hours: TR 10:50am-12:00pm, W 10:00am-12:00pm, or by appointment.
Website: `http://www.math.ttu.edu/~gbornia`

Weekly meeting

Section #014: TR 08:00am-09:20am, room MATH 110
Section #015: TR 09:30am-10:50am, room MATH 110

Textbook

Advanced Engineering Mathematics, Fourth Edition, by Zill, Wright. Chapters 1, 2, 3, 4 and 5.

Course general description

Math 3350 covers topics in ordinary differential equations. Topics to be covered include: first-order differential equations; modeling with first-order differential equations; higher-order differential equations; modeling with higher-order differential equations; Laplace transform; series solutions of linear equations.

Prerequisite for Math 3350: Math 2450 or consent of department.

Expected Student Learning Outcomes

Students will study topics of differential equations, their solutions, and applications to physical sciences and engineering. In particular the students will learn to:
- recognize a differential equation and its solution;
- compute solutions of first order differential equations;
- compute solutions of higher order differential equations;
- use Laplace transforms;
- the fundamental properties of power series, and how to use them to solve linear differential equations.

Course outline

Introduction to Differential Equations (Chap. 1) [~2 days]
(1.1) Definitions and Terminology (1.2) Initial Value Problem
First-Order Differential Equations (Chap. 2) [~9 days]
(2.1) Solution Curves (2.2) Separable Variables (2.3) Linear Equations (2.4) Exact Equations (2.5) Solution by Substitution (2.6) A Numerical Method (2.7) Linear Models (2.8) Nonlinear Models
Higher-Order Differential Equations (Chap. 3) [~8 days]
(3.1) Introduction, Homogeneous and Nonhomogeneous Equations. (3.2) Reduction of Order (3.3) Homogeneous Constant Coefficient Equations (second and higher order) (3.4) Undetermined Coefficients (3.5) Variation of Parameters (3.6) Cauchy-Euler Equations (3.8) Spring/Mass systems
Laplace Transforms (Chap. 4) [~7 days]
(4.1) Definition of Laplace Transform (4.2) Inverse Laplace Transforms and Transforms of Derivatives (4.3) The Shift Theorems and Heaviside function (4.4) Convolutions and Integral Equations (4.5) Dirac Delta Function
Series Solutions of Linear Equations (Chap. 5) [~2 days]
(5.1) Power Series Solutions about Ordinary Points (5.3) Special Functions (briefly)

Optional topics may be covered depending on the instructor's preference or expertise, as well as the students' majors and interests.

Assessment of Learning Outcomes

Homework

It will be given regularly through the WebWork system:
`http://webwork.math.ttu.edu/webwork2/spr13gborniam3350s014s015`.

Students will be informed by the instructor and via email (on the @ttu.edu address) about the homework, which must be completed before the given deadline (generally not more than 10 days). Many of the homework problems will be discussed in class at a later time. Homework is worth 20% of the final grade.

Examinations

- Exam #1: **February 19, Tuesday**, worth 20% of the final grade
- Exam #2: **April 4, Thursday**, worth 20% of the final grade
- Exam #3: **April 30, Tuesday**, worth 20% of the final grade
- Final Exam: worth 25% of the final grade
  Section 014: **Monday, May 13, 7:30 am-10:00 am, room MATH 110**
  Section 015: **Thursday, May 9, 7:30 am-10:00 am, room MATH 110**

Use of calculators in all the exams is not permitted. Electronic devices which can store formulas, including cell phones, must be turned off and stored during the exams. The instructor will specify what sections must be studied for each exam.

Grading Policy

Less than or equal to 55% F, 56-65% D, 66-75% C, 76-87% B, 88-99% A, 100% or more A+

The grading policy may be subject to slight adjustments depending on the achievements of the students.

Make-ups

There are usually no make-ups for the examinations, except for reasons of illness, stated in writing by a medical doctor, or observance of a religious holiday, or other very reasonable motivations.

Attendance and Class Policies

Attendance is mandatory. Students with less than/equal to 4 missed classes for the entire semester will receive an additional bonus of 3% on the final grade. If students miss a class, it is their responsibility to find out what they missed (announcements, assignments, notes ...). Also, it is their responsibility to frequently check their e-mail for announcements made by the instructor. Students are strongly encouraged to read each section of the textbook in advance of the lecture.

Classes start and end always on time. Students are not allowed to leave the class before the end of the hour without authorization. During class time it is not allowed to text, chat and sleep. All electronic devices must be put in silent mode.

TTU Operating Policies

Americans with Disabilities Act (TTU OP 34.22)

Any student who, because of a disability, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services, during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or 806-742-2405.

Absence for observance of a religious holy day (TTU OP 34.19)

1. "Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code 11.20. 2. A student who intends to observe a religious holy day should make that intention known to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. 3. A student who is excused under Section 2 may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

Academic Honesty (TTU OP 34.12)

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension. "Scholastic dishonesty" includes, but it not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

The grade of "I" (TTU OP 34.12)

The grade of "I" is given only when a student's work is satisfactory but, due to reasons beyond his or her control, cannot not be completed. It is not given in lieu of an "F" or "W". The instructor assigning the grade will stipulate in writing at the time the grade is given the conditions under which the "I" may be removed. The assigned work and a change of grade must be recorded within one calendar year from the date of the "I". Failure to do so results in an "F" for that course.

Important dates

- **January 16, Wednesday**: classes begin.
- **January 21, Monday**: Martin Luther King Jr. Day. University holiday.
- **January 22, Tuesday**: last day to add a course.
- **February 1, Friday**: last day for student-initiated drop on MyTech without penalty.
- **March 9-17, Saturday-Sunday**: Spring vacation.
- **March 27, Wednesday**: last day for student-initiated drop on MyTech with penalty.
- **April 1, Monday**: no classes.
- **May 1 - May 7, Wednesday - Tuesday**. Period of no examinations except for makeup exams.
- **May 9 - 14, Thursday - Saturday / Monday - Tuesday**. Final examinations.
- Check these dates on the 2012-2013 TTU official calendar webpage:

http://www.depts.ttu.edu/officialpublications/calendar/12-13calendar/12-13detailed.php