Math 23
Differential Equations
Winter 2013

	Section 01	Section 02
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Office Hours	Tues.. 2:30-3:30 PM Fri. 9:30-10:30 PM Also by Appointment	Mon. 3-4PM Thurs. 2-3PM Also by Appointment
TA	Tim Dwyer	Tim Dwyer
Course Web Page	www.math.dartmouth.edu/~m23w13	www.math.dartmouth.edu/~m23w13

1. **Course Description:** Differential equations are equations that relate functions and their higher order (partial) derivatives. They provide a natural language and set of tools through which we can describe and explore the world around us. For instance, in mathematics and physics differential equations can be used to describe the path that light will travel in exotic geometries. In engineering differential equations can be used to model how a bridge will twist under stress. And in finance, (stochastic) differential equations are used to help price financial derivatives (e.g, options, futures & credit derivatives).

   This course will focus primarily on methods for obtaining exact solutions to various types of differential equations, but (as time permits) we will also explore means of ferreting out qualitative information about solutions based on the form of the differential equation. Topics will include some of the following.

   - Techniques for solving first order differential equations
   - The Existence and Uniqueness Theorem
   - Second Order Linear Equations
   - Systems of First Order Linear Equations (with an introduction to matrices)
   - Power Series & Power Series Solutions to ODEs
   - Non-linear Systems
   - Fourier Series & Partial Differential Equations

2. **Textbook:** *Elementary Differential Equations and Boundary Value Problems* (9th Ed.), William Boyce & Richard DiPrima, John Wiley & Sons, 2009.

3. **Prerequisites:** Math 13 or the equivalent, plus a strong interest in mathematical ideas and their applications. If you are unsure about your preparation please speak with your instructor as soon as possible.

4. **Target Audience:** This course should be of interest/useful to students interested in mathematics, physics, engineering, medicine and the social sciences.

5. **Accessibility Services:** If you have a disability and require disability related accommodations please speak to your instructor *and* Ward Newmeyer, Director of Student Accessibility Services, in the Academic Skills Center as soon as possible, so we can find a remedy.

6. **Office Hours:** Office hours are a good time to flesh out material you're having trouble with or to go beyond the syllabus. Please don't hesitate to stop by in either case.

7. **Tutorial:** Starting Tuesday, January 8, Tim Dwyer will run a tutorial for this course on Su., Tu. & Th. 7-9PM. These tutorials will be held in 105 Kemeny.

8. **Exams**: The following dates and times have been set for our exams

   - Exam I: Wednesday, January 30, 6-8 PM, 008 Kemeny Hall
   - Exam II: Monday, February 25, 6-8 PM, 008 Kemeny Hall
   - Final Exam: Tuesday, March 12, 3-6PM, Location TBD by the registrar

   All exams will be closed book and the final will be ***cumulative***. If you have a ***legitimate*** conflict with one of our exams you *must* inform your instructor **verbally** *and* via **e-mail** at least one week beforehand. For example, if you have a conflict with Exam I, then you must inform your instructor by January 23.

9. **Homework**:

   A. **Reading:** Corresponding to each class topic there will be a reading assignment which should be completed before coming to class.

   B. **Weekly Homework:** There will be weekly homework assignments for this course which in general will be assigned on Wednesdays and collected the following Wednesday at the start of class. **No late homework will be accepted** (see "Personal Day" below). Each assignment will be divided into **two** parts and it is required that you hand in a *separate* write-up for each part.

10. **Personal Day:** During the course of the term things will come up. You might catch a cold, have a miserable day, or just have a sudden attack of lethargy. All of these things can temporarily impair your ability and desire to do your work. For this reason each of you will be granted *one* personal day. That is, we will drop your lowest homework score of the semester in order to smooth out a minor bump during the semester. Therefore, we will not accept late homework except in the event of a ***major*** crisis (e.g., family issues, protracted illness, etc.). In the event of a *major* crisis you should speak with your instructor so we can devise a plan to get you back on track.

11. **Honor Principle:**

   (a) **Homework:** We encourage you to form study groups to discuss course material and homework problems. However, the assignments you turn in should be in your own words and handwriting. Also, the names of others you consulted with must appear at the top of your assignment.

   (b) **Exams:** You should not give or receive help during exams. All exams are closed book unless otherwise stated.

12. **Tentative Grading Guide:** Your course grade will be based on the following scheme:

Homework:	15%
Exam I:	25%
Exam II:	25%
Final Exam:	35%