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# Differential Equations

Math 341 Fall 2009

MWF 2:30-3:25pm Fowler 110

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<http://faculty.oxy.edu/ron/math/341/09/>

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**INSTRUCTOR** Ron Buckmire ~ Fowler 313 ~ x2536 ~ [ron@oxy.edu](mailto:ron@oxy.edu) ~ MadProfessah

**SYLLABUS** The official syllabus for this course is on the web at  
<http://faculty.oxy.edu/ron/math/341/09/>.

**OFFICE HOURS** I am in my office (Fowler 313) every week day until at least 5pm. My official office hours in Fall 2009 are MTWRF from 1:30 to 2:30pm. I will also usually be in my office MWF 3:30-5:00pm.

I am readily accessible by electronic mail at [ron@oxy.edu](mailto:ron@oxy.edu) and by phone at 323-259-2536. My AOL Instant Messenger (AIM) name is **ProfBuckmire** or **MadProfessah**. If you need to see me at a time not specified here, do not hesitate to contact me and make an appointment and I'll be happy to meet with you. I think out-of-classroom student-faculty interactions are important. You are also strongly encouraged to visit me in office hours several times during the semester or chat with me whenever you have a question. If you don't interact with your professors individually you really aren't getting your money's worth at Occidental College! In addition, you should work together with your classmastes.

**CLASSROOM** We will meet in Fowler 110, MWF from 2:30pm-3:25pm.

**TEXTBOOK** *Differential Equations*, Third Edition by Paul Blanchard, Robert L. Devaney and Glen R. Hall, (Brooks-Cole, 2006).

**COURSE GOALS** By the end of the class you should be able to: Solve differential equations analytically; formulate mathematical models using differential equations; and analyze the behavior of differential equations qualitatively and quantitatively.

**COURSE DESCRIPTION AND EXPECTATIONS** This is a first course in the study of differential equations. I will expect familiarity and expertise with the concepts found in Differential and Integral Calculus as well as some recall of material from Multivariable Calculus and Linear Algebra. Differential Equations is a huge, varied and fascinating field of study. I will expect students to come to class prepared so that we can use class time as efficiently as possible to facilitate learning the course material. We will not be able to "cover" the entire subject, but I should be able to give you a significant introduction to some of the most important topics in the field. Since I am an applied mathematician and this is the first time I am teaching the course in quite awhile, the style of the course will be skewed towards practical application of the material, and not very theoretical in nature. However, this is a 300-level math class and I will expect a corresponding level of mathematical rigor and student responsibility. This class entails a lot of work, if you are not prepared for this, you should consider an alternative course.

**COURSE WORK** We will be making regular use of computers to help us visualize information that can be obtained from differential equations, which includes approximating their solution numerically and representing them graphically. We will primarily use Matlab, but occasionally we will also use the included textbook CD-rom, web-based Java applets and possibly computer algebra systems like Mathematica. I expect a

lot of participation in class from students and will facilitate this through the use of daily class formats (worksheets), group work, in-class computer exercises, abbreviated lectures and online communication.

**HOMEWORK** Homework should be completed **neatly**. Before the beginning of each week you will be given the homework problems for that week. Homework should be done after every class but will only be collected once a week. Homework should be written legibly and multiple pages should be stapled together with the student's name on each page. You are **strongly** encouraged to work on homework with your classmates. Whatever you hand in **must represent your own understanding of the material**. Copying homework is cheating and will be dealt with accordingly. Your ten highest homework scores will count towards your homework grade. (Aiming for 200 points total.)

**QUIZZES** There will be various kinds of quizzes in this class: take-home quizzes, in-class quizzes, reading quizzes, bonus quizzes. Your ten (or possibly 15) highest quiz scores will count towards your Quiz grade (200 points total).

**TESTS** There will be **two (2)** mid-term exams in this course. The mid-terms are currently scheduled for **Friday October 9** and **Friday November 16**. These dates are subject to change until 1 week before the scheduled date. You may not be excused from a test without notifying me at least 1 week before the scheduled test date.

**FINAL EXAM** The final exam is scheduled for **Friday December 18 from 1pm-4pm**.

**GRADES** Your course grade will be composed of the following:

- Homework **20%**
- Two (2) Tests **20% (10 % each)**
- Quizzes **20%**
- Course Project **20%**
- (Cumulative) Final Exam **20 %**

**PROJECT** There will be more information given to you about the Course Project within the first two weeks of the semester.

**COURSE POLICIES** This a (non-exhaustive) list of my course policies

- Make-up tests will not be given except for compelling reasons which have been communicated to me well-in advance (i.e. at least 7 days) of the test date.
- If you are late to a test, you will only be allowed the time remaining in which to complete your test.
- Late quizzes (or homework) will not be accepted under any condition since the solutions are made available on the same day that they are collected to be graded.

**COLLEGE POLICIES** Here are some official policies of the College which are in effect for this course:

**Disabilities:** Please let me know immediately if you have specific physical or learning disabilities and require accommodations. These discussions will remain confidential. You should also contact the Coordinator of Academic Services, Diana Linden, [linden@oxy.edu](mailto:linden@oxy.edu).

**Honest Academic Work:** No form of academic dishonesty will be tolerated in this course. Any instances of cheating and/or plagiarism will be reported on the first offense. Oxy has policies regarding intellectual honesty in the student handbook or see <http://departments.oxy.edu/studentlife/studenthandbook/academic.policies/academic.ethics.html>.

**Classroom Conduct:** The goals of this course can only be accomplished in a setting of respect. Although differential equations rarely lends itself to too much controversy, we must still provide a safe environment that is conducive to learning. All are welcomed and encouraged to actively participate in the learning of differential equations, regardless of gender, race, nationality, native language, sexuality, political ideology, and especially personal mathematical history. Any student who feels she or he is experiencing a hostile environment should speak to me. Also, remember common courtesy such as turning all electronics and cell phones off before coming to classthese are a distraction from the course and should not be in use during class time.

**EXTRA CREDIT** There will be a limited number of extra credit assignments: 6. These assignments will not replace any of your grades, but they will be used to round your grade up at the end of the semester. Items that will count for extra credit: Attendance at a math department seminar talk and writing up a summary of the talk as well as reflecting on any connections between the talk and your life will count as an extra credit assignment. Watching an episode of NUMB3RS and writing a 2-page summary and reflection on the mathematics (not the drama) of the episode will count as an extra credit. Finding an article in the *New York Times*, or *Nature*, or some other similar publication that includes discussion of the use or application of differential equations, providing a copy of the article, and writing the same kind of two-page summary will also count as an extra credit assignment. You may come up with your own idea as long as you clear it with me first. All extra credit assignments must be type written for credit and submitted by the last day of class. Getting credit for 6 extra credit assignments can increase your grade up to 1/3 of a letter grade (i.e. from A- to A).

**ABSENCES** We will not have class on Monday September 7 (Labor Day). Fall Break is October 19-20. I will let you know at least one week ahead of time if there may be other days on which class is cancelled. Attendance is not mandatory, but if you are going to be absent from a class common courtesy suggests you should dropyour professor a note by email or chat letting me know of absences in advance.

**ON-LINE MATERIALS** There is a class mailing list, to which all registered students are subscribed, at [math341-L@oxy.edu](mailto:math341-L@oxy.edu). I have produced a website for the course, where more detailed (and current) information about the class will be published. The URL is <http://faculty.oxy.edu/ron/math/341/09/> . Part of the website includes a link to a Blackboard course site, where students are able to check what scores I have recorded for graded work.