

## Course Syllabus

344 MATH 277 - 01  
Ordinary Differential Equations  
Dr. Goutziers  
Spring 2007

**Room:** Physical Science 106  
**Time:** MWF 08:00 am - 08:50 am  
**Office:** Physical Science 112  
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**Office Hours:** M 09:00 am W 12:00 pm  
R 11:00 am F 11:00 am  
**Textbook:** Differential Equations

- *Authors:* Paul Blanchard, Robert L. Devaney, Glen R. Hall
- *Edition:* Third
- *Publisher:* Thomson Brooks/Cole
- *Copyright:* 2006
- *ISBN:* 0-495-01265-3

**Symbolic Software:** Maple, Release 10  
**Numerical Software:** The CD included with the textbook

### **College Catalog Description:**

**MATH 277 Ordinary Differential Equations.** The course offers an overview of qualitative, quantitative, and numerical techniques for solving ordinary differential equations, with an emphasis on mathematical modeling. Topics include separation of variables, slope fields, the phase line and equilibrium solutions, bifurcations, linear systems and phase plane analysis, the harmonic oscillator - forcing and resonance, Laplace transforms. (LA) *Prerequisite:* 8 s.h. calculus.

### **Course Goals and Objectives:**

MATH 277 provides a working knowledge of ordinary differential equations. The goal of the course is to familiarize the student with the qualitative, numeric and analytic techniques required to obtain an understanding of the solutions. The objective is to engage the students through collaboration in small groups on the solution of problems designed to illustrate the material. A computer algebra system will be used to support the computational processes involved.

To achieve these goals, students will, upon completion of homework assignments, quizzes, and exams:

1. use a problem-solving approach to investigate and understand mathematical content;
2. use mathematical modeling to solve problems from the natural sciences, and engineering;

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3. understand and apply qualitative, numeric and analytic techniques and interpret and compare the results;
4. use computer software to explore and solve problems involving differential equations.

***Course content:***

First-order differential equations: population models, separation of variables, slope fields, Euler’s method, equilibrium solutions, the phase line, bifurcations, linear equations. Modeling with first-order systems. First-order linear systems: eigenvalues, eigenvectors, phase plane analysis, second-order linear equations. Harmonic oscillators: damping, forcing, resonance. Laplace transforms: definition and properties, discontinuous and periodic functions, Delta functions and impulse forcing, convolution.

***Methods of Evaluation and Grading Policies:***

There will be three tests and three quizzes during the course of the semester. Tests and quizzes will be announced on my web site at least four days in advance. A comprehensive final exam is scheduled for Wednesday, May 16, 08:00 am – 10:30 am, in Physical Science 106. Homework will be assigned daily and is due at the beginning of the next class meeting. Quizzes may be completed by groups of at most three students; homework, tests and final exams are an individual responsibility. All submitted homework should include a coversheet indicating the course, the date, the assignment number and the student’s name. Homework assignments, quiz and test announcements, and coversheets are published on my web site and updated daily. Homework grades depend on the percentage of assignments submitted.

00 - 50%	<b>no homework credit</b>
51 - 80%	<b>half homework credit</b>
81 - 100%	<b>full homework credit</b>

Submitted homework does not have to be perfect, but should show “reasonable attempt”. Merely copying the problems does of course not constitute reasonable attempt.

Course grades are computed according to the following:

<b>Tests:</b>	40%	90 - 100 A	77 - 80 B-	64 - 67 D+
<b>Quizzes:</b>	20%	87 - 90 A-	74 - 77 C+	60 - 64 D
<b>Final Exam:</b>	20%	84 - 87 B+	70 - 74 C	57 - 60 D-
<b>Homework:</b>	20%	80 - 84 B	67 - 60 C-	0 - 57 E

***Attendance Policy:***

It is the student's obligation to take the quizzes, tests and the final exam at the scheduled times.

***Make-up Test/Quiz Policy:***

Make-ups will not be given. If a student misses a test/quiz, her/his grade for that test/quiz will be considered equal to her/his grade on the final exam.