

Math 340: Introduction to Ordinary Differential Equations

Course Website: * <http://www.math.colostate.edu/~strickla/M340/index.html> *

Instructor: Sarah Hamilton

Section 5: 8:00 - 8:50 AM - MTWF - Room: Engineering E105

Office Hours: TBA

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Course Coordinator:

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Prerequisite:

MATH 255 or MATH 261 or MATH CC 255. You should be familiar with everything on [this sheet](#) (pdf)

Textbook:

J. Polking, A. Boggess, and D. Arnold: [Differential Equations](#) (2nd edition). Prentice Hall, 2006, ISBN 0-13-143738-0. Available at the University Bookstore.

Supplementary Text:

J. Polking, D. Arnold: Ordinary Differential Equations using Matlab (available shrink-wrapped, with the textbook at no extra costs)

Course Description:

The construction of mathematical models to address real-world problems has been one of the most important aspects of each of the branches of science. It is often the case that these mathematical models are formulated in terms of equations involving functions as well as their derivatives. Such equations are called differential equations. If only one independent variable is involved, often time, the equations are called ordinary differential equations. The course will demonstrate the usefulness of ordinary differential equations for modeling physical and other phenomena. Complementary mathematical approaches for their solution will be presented, including analytical methods, graphical analysis and numerical techniques. The basic content of the course includes:

- first order equations
- mathematical models
- linear equations of second order
- the Laplace transform
- linear systems of arbitrary order and matrices
- nonlinear systems and phase plane analysis
- numerical methods

Schedule:

Chapter 1: Introduction to Differential Equations
Chapter 2: First-Order Equations
Chapter 3: Modeling and Applications
Chapter 4: Second-Order Equations
Chapter 5: The Laplace Transform
Chapter 6: Numerical Methods (Ch 6 may be covered later in the sequence.)
Chapter 7: Matrix Algebra
Chapter 8: An Introduction to Systems
Chapter 9: Linear Systems with Constant Coefficients
Chapter 10: Nonlinear Systems (If time allows)
Chapter 11: Series Solutions to Differential Equations (If time allows)

Homework:

Homework assignments will be posted on the webpage. One assignment per week. The due date will be the following MONDAY (or the next lecture day if Monday is holiday). **No late homework is accepted no matter what excuse, but 2 lowest homeworks are dropped.**

Exams:

Exam 1: 5:00 pm Thursday, March 3, 2011 (Room: TBA)

Exam 1: 5:00 pm Thursday Evening, April 14, 2011 (Room: TBA)

Final : TBA (Room: TBA)

Allowed: Exams 1 and 2: 2 handwritten pages of notes (= 1 sheet. No calculator, no books.) Final: 4 handwritten pages of notes (= 2 sheets. **No calculator, no books.**)

Please make sure that you will be able to attend the exams at the given dates and times. Exceptions can only be accepted in case of time conflicts with other courses, or serious illness with a physician's certification.

Lab:

- **Tuesday Lab usually meets as a normal lecture class.** Lab hours will be announced in the class. The announced lab class will meet in Weber 205 for computer lab.
- Lab Note: Introduction to MATLAB (click [here](#) on the website)

Computer Lab: The availability of computer packages such as Maple, Mathematica, Mathcad and Matlab provides an opportunity to easily conduct numerical experiments and to tackle realistic and more complicated problems. The lab classes will be used with two goals in mind: (a) demonstrate concepts seen in class, (b) allow you to become familiar with computer software to solve differential equations. In this course mainly Matlab will be used. In addition to the packages mentioned above, many illustrative examples can be found at Addison-Wesley's [Interactive Differential Equations website](#). You are encouraged to explore these examples as you proceed in the course.

The computer lab is in **Weber 205. The section instructors will inform you on which Tuesdays your class will be in WB205.** You have access to this lab at other times as well, as long as it is not in use by another course. In the first lab session you will be given a username and a password for the computers in the lab. Do not share this information with others. More lab information: click [here](#) on the website.

Grading Policy:

***Policy on Academic Honesty*:** The University Policy on Academic Integrity (see CSU General Catalog) is enforced in this course. Misrepresenting someone else's work as your own (plagiarism) and possessing unauthorized reference information in any form that could be helpful while taking an exam are examples of cheating. Instructor Solutions Manuals are not a permitted student resource! Submitting work from a Solutions Manual or an on-line homework web site as your own are examples of plagiarism. Students judged to have engaged in cheating may be assigned a reduced or failing grade for the assignment or the course and may be referred to the Office of Conflict Resolution & Student Conduct Services for additional disciplinary action.

Grades:

The grades in this course will be based on two common exams, the final common exam, and the homework.

The exam and homework scores are measured in percent (maximum=100%). A weighted average of the exam and homework scores gives your final score. The weights are as follows:

Homework: 20%

Two Common Exams: 25% each

Final Exam: 30%

The grades are determined from the final score according to the following scale:

90% and higher: A

80% and higher: B

70% and higher: C

60% and higher: D

below 60%: F

The exam and homework scores may be curved. If there are curves, the final score is evaluated from the curved scores.

Information about the exam curves will be posted here after each exam. Your instructor will inform you about the homework curve of your section.

!! Please be aware that turning in homework is essential to pass: if you skip homeworks, you would need a score of at least 88% in each exam to get a 'C'

Tutoring: Extra tutoring for M340 is available in TILT (courtesy of the College of Arts and Sciences).