

Math 313
Ordinary Differential Equations
Spring 2009

Professor: Pete Goetz
Office: BSS 358

CRN: 21476

Office Hours: Monday (4-5), Tuesday (1-2), Wednesday (9-10), Thursday (11-12), and by appointment.

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Time and Place: MTRF in Founders Hall 177

Textbook: A First Course in Differential Equations, classic 5th Edition, Dennis G. Zill.

Calculator: Although not required, I strongly encourage you to get a graphing calculator for this course. I recommend the Texas Instrument calculators and especially the TI-89 or TI-89 Titanium. Note that you will need a calculator for some homework assignments, but **calculator use will be limited on quizzes and exams.**

Course Topics: Systems and series solution methods, Laplace transform, applications, numerical and analytical techniques.

Homework: You should work very hard on the homework. It almost goes without saying that you **cannot** learn mathematics without doing lots and lots of problems. The homework assignments are on the schedule of topics below. I will not be grading every problem but will select a few from each assignment to grade. I will drop your lowest homework score. **No late homework will be accepted! Homework is due at the beginning of the class period.**

Quizzes: We will have a total of 6 quizzes this semester. Each quiz will cover concepts covered in lecture as well as problems similar to homework. The precise dates are on the schedule of topics listed below. **No make up quizzes allowed! Mark your calendar.** I will drop your lowest quiz score from your final grade.

Exams: Exam 1, Friday, February 27
Exam 2, Friday, April 17

No make up exams allowed! Mark your calendar.

Final Exam: The final exam will be comprehensive. It takes place on Friday, May 15th from 10:20-12:10. **Mark your calendar!**

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| <i>Grading:</i> HW | 15% | A | 90-100% |
| Quizzes | 10% | B | 80-89% |
| 2 Exams | 25% | C | 70-79% |
| Final Exam | 25% | D | 60-69% |
| | | F | 0%-59% |

Academic Integrity: Please see

http://studentaffairs.humboldt.edu/judicial/academic_honesty.php for HSU's policy on academic honesty.

Important Suggestions:

- 1.** Don't get behind in your work, homework, etc.. Come to class every day.
- 2.** Participate in class, ask questions, make use of my office hours.
- 3.** Work together on homework, form a study group, however make sure everyone is participating equally.
- 4.** Read the book! You must spend time reading each section carefully. The best way to read a math book is to first read the section like it's a novel, i.e. don't skip around and don't worry about verifying details. **Then** read it again with a pen and scratch paper handy and verify details.
- 5.** You are responsible for knowing the University policy, procedures, and schedule for dropping or adding classes. See <http://www.humboldt.edu/~reg/regulations/schedadjust.html> for more information.

Emergency Evacuation Procedures: The evacuation plan for the classroom is posted on the orange signs. Also review

http://studentaffairs.humboldt.edu/emergencyops/campus_emergency_preparedness.php for information on campus Emergency Procedures. During an emergency, information can be found on campus conditions at: 826-INFO or www.humboldt.edu/emergency.

The following list gives an approximate list of topics we will cover this semester. I will try my best to stick to this schedule. Make sure to read each section before the lecture.

Schedule of Topics and Assignments

| Week | Topics | Sections | Assignment |
|----------|--|------------------|---|
| 1 | Introduction to ODE's, Modeling | 1.1, 1.2, 2.1 | #1 1.1: 1-6, 11, 29, 52 1.2: 3, 11 2.1: 1, 2, 4, 16 due: Tuesday 1/27 |
| 2 | Separable, homogeneous, and exact equations, Quiz 1, Friday 1/30 | 2.2, 2.3, 2.4 | #2 2.2: 6, 12, 24, 50, 52 2.3: 4, 8, 16, 24, 40 2.4: 4, 12, 30, 36, 43 due: Tuesday 2/3 |
| 3 | Linear equations and applications, Bernoulli equations | 2.5, 3.2, 2.6 | #3 2.5: 5, 10, 20, 26, 44, 56 3.2: 3, 8, 12, 26, 29 2.6: 2, 3, 4 due: Tuesday 2/10 |
| 4 | Substitution methods, Applications of nonlinear equations Quiz 2, Friday 2/13 | 2.7, 3.3 | #4 2.7: 2, 3, 4, 8, 10, 16 3.3: 2, 3, 7, 14, 18 due: Tuesday 2/17 |
| 5 | Initial and boundary value problems, Linear independence, Solutions of linear equations | 4.1 | #5 4.1: 1, 2, 4, 6, 9, 15, 16, 18, 20, 24, 32, 36 due: Tuesday 2/24 |
| 6 | Homogenous equations constant coefficients, Differential operators Exam 1, Friday 2/27 | 4.2, 4.3, 4.5 | #6 4.2: 2, 4, 6, 16, 20, 30 4.3: 10, 16, 24, 40, 48 4.5: 4, 14, 18, 22, 28 due: Tuesday 3/3 |
| 7 | Undetermined coefficients, Variation of parameters, Simple harmonic motion | 4.6, 4.7, 5.1 | #7 4.6: 2, 4, 6, 16, 20, 30 4.7: 1, 4, 9, 10, 17, 18, 25, 26 5.1: 5, 6, 10, 19 due: Tuesday 3/10 |
| 8 | Damped motion, Forced motion, Quiz 3, Friday 3/13 | 5.2, 5.3 | #8 5.2: 7, 8, 12, 21 5.3: 1, 2, 10, 15, 17, 18 due: Tuesday 3/24 |

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| 9 | Spring Break | | |
| 10 | Introduction to Matrices, Systems of equations Quiz 4, Friday 3/27 | 8.4, 8.5 | #9 8.4: 2, 3, 11, 12, 19, 20, 30, 42, 43 8.5: 3, 4, 10, 12, 18, 19, 22, 28, 29 due: Tuesday 3/31 |
| 11 | Homogenous linear systems, Undetermined coefficients | 8.6, 8.7 | #10 8.6: 2, 17, 18, 33, 34 8.7: 3, 4, 7, 8, 11, 12, 17, 18, 21, 22 due: Tuesday 4/7 |
| 12 | Power series solutions, Solutions about ordinary points, Quiz 5, Friday 4/10 | 6.2, 6.3 | #11 6.2: 2, 6, 8, 12, 16, 22, 26, 30 6.3: 2, 6, 14, 16, 20, 24 due: Tuesday 4/14 |
| 13 | Solutions about singular points, Exam 2, Friday 4/17 | 6.4 | #12 6.4: 1, 3, 4, 9, 12, 16, 20, 24, 30, 36 due: Tuesday 4/21 |
| 14 | Laplace transform, Inverse transform | 7.1, 7.2 | #13 7.1: 1, 2, 5, 6, 19, 20, 37, 38 7.2: 3, 4, 17, 18, 29, 30 due: Tuesday 4/28 |
| 15 | Translation and derivatives of transforms, Transforms of derivatives, integrals, and periodic functions, Quiz 6, Friday 5/1 | 7.3, 7.4 | |
| 16 | Applications, Dirac Delta function | 7.5, 7.6 | #14 7.3: 5, 6, 15, 16, 23, 24, 35, 36, 45, 46, 51, 52 7.4: 5, 6, 9, 10, 16, 21, 22, 27, 30, 31 7.5: 7, 8, 11, 12 due: Friday 5/8 |