INTRODUCTION TO DIFFERENTIAL EQUATIONS
MATH 2280-2 SYLLABUS, SPRING 2008

1. CLASS INFORMATION

When: 4:35pm-6:30pm
Where: LCB 222
Instructor: Fernando Guevara Vasquez
    Office: LCB 212
    Phone: 581-7467
    Email: fguevara@math.utah.edu
    Office hours: MWF 10am-11am and by appointment.
    (Please see course website for any changes.)
Course webpage:
`http://www.math.utah.edu/~fguevara/math2280_s08`
Textbook: *Differential Equations and Boundary Value Problems, Computing and Modeling*, Edwards and Penney, fourth edition, ISBN 0-13-156107-3. **Note:** Working with this edition is recommended since exercises may change from edition to edition and homework will be taken from this particular edition.
Prerequisites: Math 2270 (linear algebra) and either of Math 1260 or Math 2210 (multivariate calculus)

2. HOMEWORK AND PROJECTS

Homework and projects together count for 30% of your grade. I cannot overemphasize that homeworks and projects are essential to properly understand and assimilate the material in this class.

    Homework: Expect a weekly assignment with exercises from the book (usually due on Thursdays). It is a good idea to work in groups, however you should hand in your own individual solution. Homework is usually due in class, but if you have problems coming to class when the homework is due you can: (a) leave it under the door of my office (LCB 212), (b) leave it in my mailbox (located in JWB 228 and open M–F 8am–4:30pm) or (c) scan it and submit it by email to myself. Please let me know as soon as possible (e.g. by email) if you plan to use (or have used) any of these alternative methods.

Homework solutions will be given when your homeworks are returned graded. Solutions will also be posted on the course website. If you have a good reason and let me know in advance, late homework can be accepted. However, homeworks submitted after the solutions are given will have a grade of zero. If you did not get your homework back, please let me know as soon as possible.

Projects: These are computer projects to be done using the math software MAPLE (or Matlab or Mathematica if you prefer). You are encouraged to work in groups of 2–3 students. For projects you may hand in a single solution.

Tutoring: The Mathematics tutoring center offers *free*, drop-in tutoring for students enrolled in this class. Hours are M-Th 8am-8pm, and F 8am-6pm (closed on weekends and university holidays). Group tutoring and group study rooms are available. More information at `http://www.math.utah.edu/ugrad/tutoring.html`.

3. Exams

The material covered by an exam and the conditions of the exam will be announced no later than a week before the exam. I will only accept well-documented reasons (such as medical) for missing an exam, and you must contact me *within 24 hours* of the exam to make arrangements for a retake.

- **Midterm Exam 1**, Thursday February 14 (in LCB 222 during class), tentatively covering Chapters 1–3.
- **Midterm Exam 2**, Thursday April 3 (in LCB 222 during class), tentatively covering Chapters 4–7.
- **Final Exam**, Tuesday April 29, **6pm-8pm** in LCB 222. This is fixed by the university. **Note the special time.**

4. Grading

Your final grade will be computed as follows

Homeworks and projects	30%
Midterm exam 1	20%
Midterm exam 2	20%
Final exam	30%
Total	100%

5. Tentative course calendar

Exam dates are fixed. The day to day material is subject to change.

T	01/08	1.1	Differential equations and mathematical model
		1.2	Integrals as general and particular solutions
Th	01/10	1.3	Slope fields and solution curves
		1.4	Separable differential equations
T	01/15	1.5	Linear first order equations
		2.1	Population models
Th	01/17	2.2	Equilibrium solutions and stability
T	01/22	2.3	Acceleration-velocity models
Th	01/24	2.4–2.6	Numerical solutions (The Euler and Runge-Kutta methods)
T	01/29	3.1–3.2	Introduction to linear differential equations
		3.3	Homogeneous equations with constant coefficients
Th	01/31	3.4	Mechanical vibrations
T	02/05	3.5	Particular solutions to nonhomogeneous equations
		3.6	Forced oscillations and resonance
Th	02/07	3.6	Forced oscillations and resonance
		3.7	Electrical circuits
T	02/12	Review	Chapters 1–3
Th	**02/14**	**Exam 1**	**Chapters 1–3**
T	02/19	4.1	First-order systems of differential equations
		4.3	Numerical methods for systems
Th	02/21	5.1–5.2	Eigenvalue/vector method for solving first-order systems
		5.3	Second order systems of DE and mechanical applications
T	02/26	5.4	Multiple eigenvalue solutions
		5.5	Matrix exponentials and linear systems of DE
Th	02/28	5.5	Matrix exponentials and linear systems of DE
		5.6	Nonhomogeneous linear systems
T	03/04	6.1	Nonlinear systems and phase plane analysis
		6.2	Linear and almost linear systems
Th	03/06	6.3	Predator-prey systems
T	03/11	6.4	Nonlinear mechanical systems
		6.5	Chaos in dynamical systems
Th	03/13	6.5	Chaos in dynamical systems
		7.1	Laplace transform

T	03/18	—	Spring break
Th	03/20	—	Spring break
T	03/25	7.2	Transformation of initial value problems
		7.3	Translation and partial fractions
Th	03/27	7.4	Derivatives, integrals and products of transforms
		7.6	Impulses and delta functions
T	04/01	Review	Chapters 4–7
Th	**04/03**	**Exam 2**	**Chapters 4–7**
T	04/08	9.1	Periodic functions and trigonometric series
		9.2	General Fourier series and convergence
Th	04/10	9.3	Fourier Sine and Cosine series
T	04/15	9.4	Applications of Fourier series
Th	04/17	9.5	Heat equation and separation of variables
T	04/22	9.6	Vibrating strings and the one-dimensional wave equation
Th	04/24	9.7	Steady state temperature and Laplace's equation
T	**04/29**	**Final**	**comprehensive, 6pm–8pm in LCB 222**

6. Students with Disabilities

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.