

# INTRODUCTION TO DIFFERENTIAL EQUATIONS (MATH 20D)

FALL 2009

MWF 4:00 - 4:50 PEPPER CANYON HALL 106

## 1. IMPORTANT INFORMATION

**Instructor:** Stephen J. Young

**Office:** AP&M5210

**Office Hours:** MWF 1 – 2 or by appointment

**E-mail:** s7young@math.ucsd.edu (**Please** include “Math20D” in the subject)

**Office Phone:** (760)-534-3983

**Course Webpage** [www.math.ucsd.edu/~s7young/teaching/math20D/fall09/](http://www.math.ucsd.edu/~s7young/teaching/math20D/fall09/)

**Textbook** *Elementary Differential Equations, 9<sup>th</sup> edition*

You may use the 8<sup>th</sup> edition of the textbook as long as you accept that **you** are responsible for all discrepancies between the two editions.

## 2. GRADING BREAKDOWN

Final grades in this course will be determined according to most beneficial of the two following rubrics, with the proviso that in order to pass the class you must pass the final exam. At the judgement of the instructor and on an individual basis, course grades may be higher than the numerical calculation would yield.

- (10%) **Homework** Homework will generally be due each Tuesday of the quarter, covering material up to the previous Friday. Homework should be turned in to the homework drop box on the 6th floor of AP&M by 5:00 pm the day it is due.
- (10%) **MATLAB Grade** 1% per MATLAB assignment, 6% for the final MATLAB quiz. MATLAB work should be turned into the MATLAB drop box on the 6th floor of AP&M by 5:00 pm the day it is due.
- (40%) **Exams** There will be two exams in this course, tentatively scheduled for Monday October 19 and Wednesday November 25. Each exam is worth 20% of your final grade. Alternatively, the lesser of the two grades may be replaced with your grade on the final exam if this improves your overall grade.
- (40%) **Final Exam** The final exam is scheduled December 8, 3:00 - 5:59 pm. In order to pass the class, you **must** take and pass the final.

## GRADE DISTRIBUTION

A+	A	A-	B+	B	B-	C+	C	C-	D	F
97	93	90	87	83	80	77	73	70	60	50

## 3. COURSE POLICIES

- ◆ Unless otherwise specified in writing, all tests are closed book, closed notes, and without the aid of any computation devices such as calculators, abacuses, sliderules, cell phones, PDAs, etc.
- ◆ Please silence all cell phones and noise making devices during class. Note that some models of cell phone when put on vibrate make a significant amount of noise.
- ◆ All homework and MATLAB assignments are to be turned in to the appropriate drop box by 5:00 pm on the day it is due. Late work *will not* be accepted. You may work together on your homework assignments, but each person must turn in their own work. In order to ensure that your homework is graded, please use clean paper not torn from a spiral notebook, with your name, section, and ID number on the front page. Write your solutions neatly, legibly, and labelled in numerical order. If multiple pages are necessary be sure to staple the pages together. At the sole discretion of the grader, homework not following these guidelines may not be graded and will receive a 0.

- ◆ If you believe an exam has been graded incorrectly do not mark the quiz or exam in any way. Submit in writing to the TA, along with your exam or quiz, a short statement of why you think a *particular* problem, or set of problems was graded incorrectly. Regrade requests will not be accepted later than the end of the class period after they are returned. I reserve the right to photocopy any or all of your exams and quizzes in order to prevent regrade abuse.
- ◆ In order to receive full credit on exams and homework you must show all work in a clear and coherent manner. In particular, correct answers not fully supported by explanations using complete sentences, where appropriate, will not receive full credit. It is your responsibility to present your solutions in an easily understood manner.
- ◆ If you need help outside of normal office hours, please feel free to stop by my office. I may not be able to help at that moment, but we will at least be able to arrange another time to meet.
- ◆ Please keep all your exams and homeworks; if you believe there has been an error in the recording of your grades they are the only way to validate your claim. Also, grades will be placed on WebCT, so please periodically check the grades posted there so we can resolve any issues quickly.

#### 4. CLASS SCHEDULE

Date	Sections Covered	Notes
Sept. 25	1.1, 1.2, 1.3: Introduction; Classification and Modeling	
Sept. 28	2.1: Linear Equations; Method of Integrating Factors	
Sept. 30	2.2: Separable Equations	
Oct. 2	2.3, 2.4: First Order Modeling, Linear vs. Nonlinear	Homework 1: Due Oct. 6
Oct. 5	2.5: Autonomous Equations and Population Dynamics	
Oct. 7	2.6: Exact Equations and Integrating Factors	MATLAB 1: Due Oct. 8
Oct. 9	3.1: Homogeneous Constant Coefficient Equations	Homework 2: Due Oct. 13
Oct. 12	3.2: Linear Homogeneous Equations; Wronskian	
Oct. 14	3.3: Complex Roots of Characteristic Equation	
Oct. 16	3.4: Repeated Roots; Reduction of Order	
Oct. 19	<b>Exam 1</b>	Homework 3: Due Oct. 20
Oct. 21	3.5: Nonhomogeneous Equations; Undetermined Coefficients	MATLAB 2: Due Oct. 22
Oct. 23	3.6: Variation of Parameters	
Oct. 26	7.1, 7.2: Systems of First Order Equations; Matrix Review	Homework 4: Due Oct. 27
Oct. 28	7.3: Linear Algebraic Equations; Eigenvalues and Eigenvectors	
Oct. 30	7.4: Theory of Systems of First Order Linear Equations	
Nov. 2	7.5: Homogeneous Linear Systems with Constant Coefficients	Homework 5: Due Nov. 3
Nov. 4	7.6: Complex Eigenvalues	MATLAB 3: Due Nov. 5
Nov. 6	7.7, 7.8: Fundamental Matrices, Repeated Eigenvalues	
Nov. 9	7.9: Nonhomogeneous Linear Systems	Homework 6: Due Nov. 10
Nov. 11	No Class (Veterans Day Holiday)	<i>Read Section 5.1</i>
Nov. 13	5.1, 5.2, 5.3: Series Solutions Near an Ordinary Point	
Nov. 16	6.1: The Laplace Transform	Homework 7: Due Nov. 17
Nov. 18	6.2: Solutions of Initial Value Problems	MATLAB 4: Due Nov. 19
Nov. 20	6.3, 6.4: The Step Functions; Discontinuous Forcing Functions	
Nov. 23	6.5: Impulse Functions	
Nov. 25	<b>Exam 2</b>	Homework 8: Due Dec. 1
Nov. 27	No Class (Thanksgiving Holiday)	
Nov. 30	Review	
Dec. 2	Review	
Dec. 4	Review	
Dec. 8	Final Exam 3:00 pm - 5:59 pm	