

Math 347: Introduction to Partial Differential Equations
Winter Semester 2008

Professor: Vianey Villamizar
Office: 366 TMCB

Class: 11:00 - 11:50 p.m. MWF 135 TMCB
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Office Hours: Mon 5:00-6:30 pm (office), Wed 5-6:30 pm Problem Session (),
 Fr 3:00-4:30 pm (office) or by appointment.

Grader: Blake Barker ([bharker@byu.edu](mailto:bhbarker@byu.edu))

Text: Applied Partial Differential Equations with Fourier Series and Boundary Value Problems.
 Fourth Edition (2004) by Richard Haberman.

Week #	Date	Sections	Comments
1	Jan 7 – Jan 11	1.1 - 1.4	
2	Jan 14 – Jan 18	1.5, 2.1- 2.3	Fri Jan 18 Add/Drop Deadline.
3	Jan 21 – Jan 25	2.3 - 2.4	Monday, Jan 21: Martin Luther King Holiday
4	Jan 28 – Feb 1	2.5, 3.1 – 3.2	Midterm 1 Testing Center Feb 1-Feb 4. Late fee on Mon Jan 4 Review Session Wed Jan 30 5-7 pm
5	Feb 4 – Feb 8	3.3 – 3.4	
6	Feb 11 – Feb 15	3.5 - 3.6, 4.2, 4.4	Monday Feb 11 Withdraw Deadline
7	Feb 18 – Feb 22	12.1 - 12.4	
8	Feb 25 – Feb 29	12.5, 5.1 – 5.3	Midterm 2 Testing Center Feb 29 –Mar 3. Late fee on Mon Mar 3 Review Session Wed Feb 27 5-7 pm
9	Mar 3 – Mar 7	5.4 – 5.6	
10	Mar 10 – Mar 14	5.10, 7.1 – 7.3	
11	Mar 17 - Mar 21	7.4 – 7.7	
12	Mar 24 – Mar 28	7.7 – 7.9, 10.1-10.2	Midterm 3 Testing Center Mar 28–Mar 31. Late fee on Mar 31 Review Session Wed Mar 26 5-7 pm
13	Mar 31 – Apr 4	10.3 – 10.5	
14	Apr 7 – Apr 11	10.6, 8.1 – 8.3	
15	Apr 14 – Apr 18	Review on Mon Wed, Thu Reading	Final Exam Friday Apr 18 11:00-2:00 p.m. at our regular classroom 135 TMCB

Objectives: To provide the students with a sound and accurate knowledge of the elementary theory, applications, and techniques of partial differential equations. Physical problems have motivated the development of much of mathematics, and this is especially true of differential equations. The development of this course is well described in our Haberman’s textbook: “simple physical models (heat flow, vibrating strings, and membranes) are emphasized. Equations are formulated carefully from physical principles...Solution techniques are developed patiently and mathematical results frequently are given physical interpretations.” Many fundamental problems in science, engineering, and other areas as economics

are described by differential equations and more and more problems of new and emerging technologies are also described by differential equations. I am especially enthusiastic about this topic. My research is based on this material. I believe that my role as your instructor is to help and to assist you in the process of learning and enjoying mathematics. I will do my best to fulfill this role. I am confident that we will enjoy this class as we go along by making a consistent effort throughout the semester.

Homework:

Homework corresponding to Wednesday and Friday of the previous week and Monday of the current week will be collected each week on Friday by 6 pm. Please place completed homework in the manila folder entitled "Math 347 Homework" on the plastic basket by my office door. You are strongly encouraged to work on homework problems everyday. You should be willing to put in at least three to four hours outside the classroom for each hour of class (The PDE problems normally require a dedicated work. In most cases each problem is different from others). **I expect that you do not work on your homework during the class period.** A discussion of the solutions of homework problems will be held during a **weekly problem session on Wednesday evenings**. Late homework won't be accepted. To make up for this, your two lowest weekly homework scores will be dropped. Discussion of homework assignments is allowed, but you should keep in mind that homework is an individual work. If you can reach the point where you can do fresh problems without help in all sections, I can anticipate that you will be able to successfully solve all problems on the midterms and final exam.

Homework Format (PLEASE ADHERE TO THE FOLLOWING HOMEWORK FORMAT): Use one side only of standard letter-sized paper. Put your name at the top of each sheet. Keep problems in order, and label each problem with its number and page. Place only one problem in any horizontal space; visually separate consecutive problems by drawing a line between them entirely across the page. If the problem has a numerical answer, highlight it in some way. If the answer to a problem involves a sequence of logical steps, set them clearly. Use correct grammar and complete sentences.

To submit homework, stack the sheets in order and fold the stack lengthwise to form a "book" with the back of the last sheet on the outside. On the front of the "book," write your name, and the section of the text from which these problems are taken. Homework set should contain problems from only one section of the text. Homework problems to be graded will be chosen among the whole set of problems. Incomplete homework will receive partial credit according to the amount of problems worked out.

Exams: The Midterm exams will be based on the material (theory and homework problems) covered until the previous Monday and not covered by the previous exam. The final exam will be comprehensive. The Midterm exams (three in total) will be given in the testing center according to the above schedule. They won't have a time limit. The final exam will be in our regular classroom with a limit of three hours. **Only basic scientific calculators (no graphic or symbolic ones) will be allowed in all exams.** No books or notes will be allowed. The questions will be similar to those discussed in class, or those assigned as homework, but some of them will require a good understanding of the concepts and techniques. The best way to prepare for the exams is to go over the homework problems and the examples worked in class (they constitute your **best study guide**) and then try to solve related problems that you haven't seen before.

Honor Code: The honor code states that "inappropriately providing or receiving information ... so as to gain unfair advantage over others" is academic misconduct. It is inappropriate for any student to provide any information he have acquired by taking the exam to anyone who will be taking the exam in the future, and he should agree that it is inappropriate for him to receive any information that someone else acquired by taking the exam, if he have yet to take the exam.

Grading: Grades will be based on cumulative points earned as follows:

Homework 20 %, Midterms 15% / 20% / 20%, and Final exam 25 %.

At the end of the semester, I will make an average of each one of the above forms of evaluations with their corresponding weights. Then a Gaussian curve will help me to determine your final grade. In any event, the Gaussian curve will not hurt your grade. I will guarantee the following letter grades:

B+ = 89-87%, C+ = 79-77%, D+ = 69-67%,
 A = 100-93%, B = 86-83%, C = 76-73%, D = 66-63%, E = 59-0%
 A- = 92-90%, B- = 82-80%, C- = 72-70%, D- = 62-60%.

Keep in mind that a good grade is the end result of a good learning process. All of you can get a good grade by successfully experiencing this learning process.

Sexual harassment: BYU's policy against sexual harassment extends not only to employees of the university but to students as well. If you encounter sexual harassment, gender-based discrimination, or other inappropriate behavior, please talk to your professor, contact the Equal Employment Office at 378-5895, or contact the Honor Code Office at 378-2847.

Students with disabilities: BYU is committed to providing reasonable accommodation to qualified persons with disabilities. If you have any disability that may adversely affect your success in this course, please contact the Services for Students with Disabilities Office at 378-2767. Services deemed appropriate will be coordinated with the student and instructor by that office

HOMEWORK ASSIGNMENTS
Math 347 Introduction to Partial Differential Equations – Winter 2008
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Due Date	Sections	Problems	Due Date	Sections	Problems
Jan 11	1.2	1.2.1, 1.2.3, 1.2.5, 1.2.8, 1.2.9	Feb 29	12.3 / 12.4 12.5	12.3.1, 12.3.5-6/ 12.4.1-4 12.5.1, 12.5.3-4
Jan 18	1.3 / 1.4	1.3.1, 1.3.2 / 1.4.1(e,f), 1.4.2, 1.4.3, 1.4.6, 1.4.12	Mar 7	5.3 5.4 5.5	5.3.1-2, 5.3.5, 5.3.9 5.4.2-3 5.5.1(b,c,d,f,g), 2, 5.5.8-9, 5.5.11
Jan 25	1.5 2.2 / 2.3	1.5.1, 1.5.2, 1.5.3, 1.5.7, 1.5.12-13 2.2.2-5/ 2.3.1(a,b,c), 2.3.2(c,d), 2.3.3b, 2.3.4, 2.3.8	Mar 14	5.6 / 5.10 7.2	5.6.1(ac), 5.6.2 / 5.10.1, 5.10.2(b), 5.10.3, 5.10.6 7.2.3
Feb 1	2.4 / 2.5	2.4.1 (a,d), 2.4.2-2.4.4, 2.4.6 / 2.5.1(e), 2.5.2-2.5.4, 2.5.8(a), 2.5.9(a,b), 2.5.16(a,b), 2.5.17	Mar 21	7.3 7.4 / 7.5	7.3.1(a,d), 7.3.2 (b), 7.3.4(a), 7.3.6 7.4.1, 7.4.2/ 7.5.1(a,b), 7.5.2(a), 7.5.4, 7.5.8/
Feb 8	3.2 / 3.3	3.2.2(c,b,g), 3.2.4 / 3.3.1(ce), 3.3.2(c), 3.3.5a, 3.3.8, 3.3.11, 3.3.13, 3.3.18	Mar 28	7.6 / 7.7 7.8	7.6.1-2, 7.6.4 / 7.7.1, 7.7.3, 7.7.6, 7.7.10, 7.7.12(d,e) 7.8.2, 7.8.4, 7.8.7, 7.8.8
Feb 15	3.4 / 3.5 3.6	3.4.1-5, 3.4.7, 3.4.12/ 3.5.1, 3.5.4, 3.5.6 3.6.1-2	Apr 4	7.9 10.2 / 10.3	7.9.3(b,c), 7.9.4(b), 7.9.5 10.2.1-2 / 10.3.5, 10.3.7, 10.3.11
Feb 22	4.2 / 4.4 12.2	4.2.1-2/ 4.3.1/ 4.4.1-2, 4.4.6-7, 4.4.9, 4, 4.10(a), 4.4.12 12.2.1, 12.2.3-4, 12.2.5a,b	Apr 11	10.4 10.5 10.6	10.4.1, 10.4.3, 10.4.6, 10.4.9-10 10.5.1-2, 10.5.6-7, 10.5.11, 10.5.14 10.6.1(a), 10.6.3

Remark: To emphasize some PDE aspects not included in the above list of problems, I might make minor changes to this homework assignments during the semester.