

## Math 411: Numerical Methods Winter Term 2009

Professor: [Vianey Villamizar](#)  
Office: 366 TMCB

Class: 9:00 - 9:50 a.m. MWF 1020 JKB  
Email/Phone: [vianey@math.byu.edu](mailto:vianey@math.byu.edu) / 422-1754  
Web page: [www.math.byu.edu/~vianey](http://www.math.byu.edu/~vianey)

Office Hours: Monday 4:00 - 5:30 p.m. (at my office)

Friday 1:00 - 2:30 p.m. (at my office) or by appointment.

Text: Numerical Analysis, Eighth Edition, R. Burden and J. Faires,  
Brooks/Cole 2005

### Tentative Class Schedule

**Weeks 1 – 3 (Jan 5 – Jan 23):** Sections 5.1 - 5.6

**Weeks 4 – 6 (Jan 26 – Feb 13):** Sections 5.7 – 5.11 and 10.1 – 10.2

**Weeks 7 – 9 (Feb 16 – Mar 6):** Sections 10.3 – 10.4, 11.1 – 11.5, and 12.1

**Weeks 10 – 12 (Mar 9 – Mar 27):** Sections 12.2 – 12.4 and 8.1 – 8.5 (except 8.4)

**Weeks 13 – 15 (Mar 30 – Apr 17):** Sections 8.6, 9.1 – 9.2, and Review

### Important Dates

- Fri Jan 16 Add/Drop Deadline.
- Monday, Jan 20: Martin Luther King Holiday
- Monday Feb 9 Withdraw Deadline
- **First Midterm Feb 6-7 (Fr - Sat) and Monday, Feb 9 (with late fee)**
- Monday, February 16: Presidents Day Holiday
- Tuesday, February 17: Monday Instruction
- **Second Midterm Mar 13-14 (Fr - Sat) and Monday, Mar 16 (with late fee)**
- Reading Days: Wed-Thur, Apr 15-16
- **Final Exam: Sat., April 18 7:00-10:00 a.m. in our regular classroom 1020 JKB**

**Objectives:** Learn about numerical methods for solving differential equations (initial and boundary value problems), including theoretical aspects so that students can recognize when is appropriate to use certain methods and understand the quality of the results produced. Method derivations and error analysis will be taught. It is strongly recommended that students have a previous programming experience with any programming language. All demonstrations in class will be done in MATLAB. Homework (projects) will include problems that require the use of computer codes to obtain their solutions.

I believe that my role as your instructor is to help and assist you in the process of learning mathematics. I will do my best to fulfill this role. I know that we will enjoy this class as we go along by making a consistent effort throughout the semester. **My best advice to you is found in D&C 4:2 replacing the first line by .... O ye that embark in Math 411, see that ye work with all ....**

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

**Midterm-1 15 %, Project-1 15%, Midterm-2 20%, Project-2 20%, Final 30 %.**

At the end of the semester, **I will make an average based on 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.

**Exams:** Midterm exams will be based on the material (theory and homework problems) covered until the previous Monday and not covered by the previous exam. Some questions will be similar to those discussed in class, or those assigned as homework. Other questions will be based on the subject matter discussed in class and in the text, but otherwise will be unlike any you have seen before. **If you are able only to do problems similar to those you have seen before, you are doing an average work. To earn a better grade, you need to understand the concepts and different techniques, and be able to solve new and interesting problems.** The final exam will be comprehensive. The Midterm exams will be given in the testing center, but the final will be in our regular classroom. Only basic scientific calculators (no graphic or symbolic ones) will be allowed in these exams. Make up exams cannot be arranged except in case of an emergency or absence due to official university business.

**Projects:** Projects will consist of some theoretical questions and applications of the numerical methods learned in class to some problems. You will need to use a computer to implement the algorithms needed. I expect that you have good programming skills. Programming is an important part of this class. I strongly recommend that you use MATLAB as your programming language, but you can also use FORTRAN, JAVA, or C++. You need to form a team of two students to work on the projects.

**Preventing 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 or department chair, or contact the BYU Equal Employment Opportunity Office at 422-5895, or contact the Honor Code Office at 422-2847.

**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 University Accessibility Center at 422-2767. Services deemed appropriate will be coordinated with the student and instructor by that office.

**HOMEWORK ASSIGNMENTS**  
**Math 411 Numerical Methods – Winter 2009**  
**Instructor: Vianey Villamizar**

Sects.	Problems	Sects.	Sects.	Problems
5.1	1c, 3ic,d, 3iic,d, 6, 8c, 9	10.1	12.4	
5.2	1d, 3d, 9, 11, 12	10.2	8.1	
		10.3	8.2	
5.3	1d, 9, 7,11	10.4	8.3	
5.4	1d, 5d,9d, 13d, 28,31	11.1	8.5	
5.5	1d, 3c, 4c	11.2	8.6	
5.6	1d, 3c, 8c, 10c, 12	11.3	9.1	
5.7	1d, 3c, 4c	11.4	9.2	
5.8	1d, 3c, 4	11.5		
5.9		12.1		
5.10		12.2		
5.11		12.3		