

## Math/CS 466/666 Numerical Methods — Fall 2008

The development of computers in the late 1940's and their great advances in power over the last fifty years has led to a revolution in the field of numerical analysis. This course is part one of a two semester sequence of courses in numerical methods. The goal of this course sequence is to provide the student with the numerical tools and methodology necessary to treat their own problems. The student will learn how to use standard numerical software such as MATLAB, Octave and Maple as part of this course. No prior programming experience is needed. However, familiarity with a traditional programming language such as C or FORTRAN may be helpful.

### Course Information

Section 466.001, 12:00–12:50pm, MWF, AB634.

### Instructor

Dr Eric Olson  
Ansari Business Building AB614  
ejolson at unr.edu

### Office Hours

MTW 2–3pm and by appointment. If I'm in my office and you don't have an appointment, I can almost always take 15 minutes to answer a question.

### Text

*Elementary Numerical Analysis*, Atkinson and Han, Wiley, 2004.

### Supplemental Text

*Numerical Analysis and Scientific Computation*, Jeffery Leader, Pearson, 2004.

### Topics Covered

Chapters 1–6 from the main text and/or chapters 1–5 from the supplemental text. Numerical Methods I will cover Taylor polynomials, error and computer arithmetic, root finding, interpolation and approximation, numerical integration and differentiation, and solution of systems of linear equations.

### Academic Conduct

Bring identification to all exams. Work independently on all exams and quizzes. Behaviors inappropriate to test taking may disturb other students and will be considered cheating. Don't talk or pass notes with other students during an exam. Homework may be discussed freely. Homework turned in for grading must be written by each individual student. If you are unclear as to what constitutes cheating, please consult with me.

### Equal Opportunity Statement

The Mathematics and Statistics Department supports providing equal access for students with disabilities. I am available to discuss appropriate academic accommodations that students may require. Please meet with me at your earliest convenience. For more information see <http://www.unr.edu/stsv/slservices/drc/> or contact the Disability Resource Center at Thompson Building, Suite 101, Phone (775) 784–6000.

## Grading

4 Quizzes (drop 1)	10 points each
2 Exams	50 points each
1 Final Exam	80 points
5 Homework Assignments	10 points each
3 Computer Labs	30 points each
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	290 points total

## Calendar

#	Date	Atkinson	Leader	Topic
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1	Aug 25	1.1		The Taylor Polynomial
3	Aug 27	1.2		Error in the Taylor's Polynomials
5	Aug 29	1.3		Polynomial Evaluation
	Sep 1			Holiday (Labor Day)
7	Sep 3	2.1		Floating Point Numbers
9	Sep 5	2.2		Types of Errors
10	Sep 8	2.3	1.7	Propagation of Error
12	Sep 10	2.4		Summation
14	Sep 12			Quiz I
15	Sep 15			discussion
17	Sep 17	3.1	1.1	The Bisection Method
19	Sep 19	3.2	1.2,1.4	Newton's Method
12	Sep 22	3.3		Secant Method
13	Sep 24	3.4	1.3	Fixed Point Iteration
14	Sep 26			Quiz II
15	Sep 29	3.5		Ill-Behaved Problems
16	Oct 1			review
17	Oct 3			Exam I
18	Oct 6	4.1.1-4.1.3	4.1	Polynomial Interpolation
20	Oct 8	4.1.4-4.1.6	4.2	Polynomial Interpolation
22	Oct 10	4.2		Errors in Interpolation
23	Oct 13	4.3	4.3-4.4	Splines
25	Oct 15	4.4	8.2-8.3	Optimal Approximation
27	Oct 17	4.5	8.4	Chebyshev Polynomials
	Oct 17			Final Date to Drop a Class
28	Oct 20	4.6		Near-Minmax Approximation
30	Oct 22	4.7	8.1	Least Squares Approximation
32	Oct 24			Quiz III
33	Oct 27			discussion
35	Oct 29	5.1	5.1	Trapezoid and Simpson Rules
	Oct 31			Holiday (Nevada Day)
37	Nov 3	5.2		Error Formulas
39	Nov 5	5.3	5.3	Gaussian Quadrature
41	Nov 7	5.3	5.4	Gaussian Quadrature
41	Nov 10	5.4	6.1	Numerical Differentiation

42	Nov 12	6.1		Systems of Linear Equations
44	Nov 14			Quiz IV
45	Nov 17	6.2		Matrix Arithmetic
47	Nov 19			review
49	Nov 21			Exam II
50	Nov 24	6.3	2.1	Guassian Elimination
52	Nov 26	6.4	2.3-2.3	The LU Factorization
	Nov 28			Holiday (Family Day)
53	Dec 1	6.5	2.5	Error in Solving Linear Systems
55	Dec 3	6.6.1	3.1	Iterative Methods
57	Dec 5	6.6.2-6.6.3	3.3	Iterative Methods
58	Dec 8			review
	Dec 10			Holiday (Prep Day)

### Final Exam

Friday, Dec 12 from 12 noon to 2pm in AB634.