Applied Numerical Methods I (Math 565) — Fall, 2012

Location and Time: 8:00-8:50 am, MTWThF, Bouillon 210

Instructor: Dr. Dan Curtis

Office: 107a Bouillon

Office Hours: MTWThF 11:00-11:50 am. Actually, you can come by my office at any time and, unless I am occupied, I will be happy to talk with you.

CWU e-mail: curtiswd@cwu.edu

Web Page: www.cwu.edu/~curtiswd

Final Exam: Friday, December 7, 8:00-10:00 am

Textbook: *Numerical Mathematics and Computing* (Seventh edition) by W. Cheney and D. Kincaid**; The textbook is required.**

Computer Usage: Writing programs and executing them on computers will be a big part of this course. You *must* be able to write programs in some language, debug your programs and execute the program on some computer.

Course Content: We will cover material corresponding to Chapters 1-6 of the text.

Class Attendance: You are expected to attend class daily, but your attendance does not count toward your grade. If you miss class, you must consult classmates to find out what you missed.

Homework: Homework problems from the book will be assigned, but will **not** be handed in or graded. They will serve as material for discussion in class.

Course Prerequisites: The formal prerequisites are Math 173, Math 265, and Math 330. But ability to write programs to implement algorithms and solve problems will be essential.

Learner Outcomes: Upon successful completion of this course, the student will be able to:

- Describe how calculations with finite-precision arithmetic differ from those with exact arithmetic and how to deal with problems caused by finite-precision arithmetic.
- Use Taylor polynomials to approximate functions.
- Use Gaussian elimination to solve linear systems and understand the role of pivoting.
- Use the condition number to estimate accuracy of solutions of linear systems.
- Use iterative methods for solving nonlinear equations; discuss convergence rates of various iterative methods.
- Construct interpolating polynomials, both in Lagrange form and in Newton form.
- Find numerical approximations to derivatives using both interpolating polynomials and Taylor polynomials.
- Use a variety of numerical integration methods to compute approximate values for integrals.
- Construct splines of various orders as approximations to data values.

Students with disabilities: If you require accommodation based on a documented disability, have emergency medical information to share, or need special arrangements in case of emergency evacuation, please make an appointment with me as soon as possible.

Grading: Your course grade will be determined by the following:

1. **Two 100-point** in-class exams will be given. The **dates** of these are given in the Schedule portion of this syllabus.
   The in-class exams are therefore worth up to **200 points** toward your course grade.

2. **Two 100-point** take-home problem sets. The (tentative) dates of these are given in the Schedule portion of this syllabus. These will involve writing computer code to solve problems. These problem sets are therefore worth up to **200 points** toward your course grade.

3. A **100-point final exam**.

A perfect score on each of the above categories would result in a **total of 500 points**. Your course grade will be determined by the percentage p of these points you earn, according the following scale.

$90 \le p$	A	$65 \le p < 77.5$	C
$89 \le p < 90$	A-	$64 \le p < 65$	C-
$87.5 \le p < 89$	B+	$62.5 \le p < 64$	D+
$80 \le p < 87.5$	B	$50 \le p < 62.5$	D
$79 \le p < 80$	B-	$p < 50$	F
$77.5 \le p < 79$	C+		

Class Schedule (49 class days)

Date	**Class Activity**	**Date**	**Class Activity**
09/17		10/29	
09/18		10/30	
09/19	Classes begin	10/31	
09/20		11/01	
09/21		11/02	
09/24		11/05	In-class **exam 2**
09/25		11/06	
09/26		11/07	
09/27		11/08	
09/28		11/09	
10/01		11/12	HOLIDAY: Veteran's Day
10/02	In-class **exam 1**	11/13	
10/03		11/14	
10/04		11/15	
10/05		11/16	Second Take-home set **given**
10/08		11/19	
10/09		11/20	Second Take-home set **due**
10/10		11/21	HOLIDAY: Thanksgiving
10/11		11/22	HOLIDAY: Thanksgiving
10/12	First Take-home set **given**	11/23	HOLIDAY: Thanksgiving
10/15		11/26	
10/16	First Take-home set **due**	11/27	
10/17		11/28	
10/18		11/29	
10/19		11/30	Last day of classes
10/22		12/03	Prof. Dev./ Student Study Day
10/23		12/04	
10/24		12/05	
10/25		12/06	
10/26		12/07	Final Exam (8:00-10:00 am)