

## Welcome to Math 565 Applied Numerical Methods I – Fall 2014

12:00 - 12:50 M-F in Bouillon 101, Thursdays in Bouillon 103

**Instructor:** Dr. Jean Marie Linhart

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**Office Hours:** M-Th 2:00 - 2:50  
and by appointment.

**Course Goals:** Math 565 is a first course in numerical methods and analysis for Computational Science Master's Degree students. Our focus will be on how computers make mathematical errors, and what we can do about this. The main topics I expect to cover this quarter are

1. Binary floating point format and the IEEE 754 floating point standard.
2. Numerical solutions to linear systems of equations via Gaussian Elimination.
3. Numerical solutions to nonlinear equations via bisection, Newton's Method, and the secant method.
4. Interpolation via polynomials and estimating derivatives.
5. Numerical integration and quadrature rules, including the trapezoid method, Simpson's Rule, and Gaussian Quadrature.
6. Spline functions which are local (low order) polynomial approximations to curves.

Additionally, it is my hope that this course is a step in your preparation for a successful career. The behavior and standards expected of a professional in the work place are what you should aim for in all aspects of work, attendance, and preparation for this course.

We will be using the computer lab in Bouillon 103 weekly.

**Required Text:** *Numerical Mathematics and Computing*, by Ward Cheney and David Kincaid, 7<sup>th</sup> ed.; Brooks-Cole/Cengage.

## Grades/Exams/Homework

### Grades

Grades will be calculated using the following weighting system:

Assignments: 25%;

Projects: 25%

Attendance and Participation: 10%;

Exams: 40% total; 20% midterm and 20% final exam.

and the following scale:

	87 – 89.9 : B+	77 – 79.9 : C+	67 – 69.9 : D+	below 60 : F
93 – 100 : A	83 – 86.9 : B	73 – 76.9 : C	63 – 66.9 : D	
90 – 92.9 : A–	80 – 82.9 : B–	70 – 72.9 : C–	60 – 62.9 : D–	

### Assignments

Assignments will take the form of approximately weekly homework, written, programming, and possibly short writing assignments. They will not be weighted equally, but by points, and are essential for your understanding of the material in the course.

For take-home assignments, please attempt the problems on your own, without using outside resources. If you are stuck, you are welcome to work with other students, use the web or books to gain additional insight. However, you must put these other resources away, and write up your own understanding of the solutions in your own words, and you must do your own programming. More information on my policy on working with others and using outside resources is available at

<http://www.cwu.edu/math/group-work-and-using-outside-resources>. Copying will result at minimum with a zero on the assignment, and will be reported to student conduct.

These assignments alone may not be sufficient to insure you have a thorough understanding of the material from the course. Homework problems from the book will be suggested regularly, although not collected, and my recommendation is that you do them.

## Projects

Projects are longer typewritten assignments (the expectation is that you will use L<sup>A</sup>T<sub>E</sub>X for these) that may also have a research and/or programming component to them. They may not all be weighted equally. I expect to have approximately 4 projects assigned over the course of the semester. You are expected to conform to academic standards in citing work summarized, paraphrased or quoted in a written assignment you hand in; failure to do so is considered plagiarism, and will result in at minimum reduced credit for the assignment, and possibly more severe sanctions as merited by the offense. All instances of plagiarism will be reported to the student conduct office. This is your opportunity to show that you can produce professional-level written and programming work; make these shine.

## Exams

There will be two exams: a mid-term and a final. Each will be worth 20% of the final grade. The mid-term will be on Wednesday, October 29, Final Exam will be on **Thursday, December 11 at 12 pm**. The Final Exam will be cumulative, and **cannot** be taken early. If you miss an exam, you may be allowed to take a make-up. To get a make-up, you must notify me before the exam (if possible) or within 24 hours after the exam. In addition, a make-up is only allowed if you have proof of a compelling reason for having missed the exam. When a make-up exam cannot be taken before I return the corrected exam, I may instead replace that portion of your course grade with your final exam grade. You will be allowed to bring in a 4 × 6 inch notecard filled out front and back for use with exams. You must fill out your own individual notecard.

## Attendance/Participation

If you are not in class when attendance is taken, you will likely be marked absent for the day. Participation will be evaluated on the basis of attendance, participation while in class, and participation in any discussion that takes place online for the course. When in class or the computer lab, you are given time to work, you are expected to work on material for this course unless you have explicit permission from me to do something else. Working on something other than our course work during work time will result in reduced credit for attendance and participation.

## Late and Make-up Policy for Assignments and Projects

I expect you to hold yourself to professional standards in this class. Because even professionals sometimes run into conflicts, I will accept at most **two** late assignments or projects for full credit, provided you ask permission to hand them in late at least half a day before the due date, thus showing me that you are planning ahead. To get credit for a late assignment or project, it must be turned either before I return the corrected assignments to the rest of class or within two days of instruction of the due date or by a date mutually agreed upon by student and instructor, whichever comes first. After two late assignments have been accepted, I will not accept any late work for credit.

## Academic Integrity

You are expected to do your own work. While you are welcome to use outside resources and consult with others on all work taken home, you are subject to the requirement that what they hand in should, in fact, represent your own understanding of the material and not work copied or memorized from another source.

All in-class exams are expected to be done without any resources except those explicitly authorized by the instructor. Exams and quizzes are not to be discussed with others who may not yet have taken the exam or quiz or within earshot of anyone who may be taking the exam or quiz at a later time.

If a paper or report is assigned, students are expected to conform to academic standards for citing summarized, paraphrased and quoted work used; if you are not sure what this means, please **ask**.

Cheating will result in at minimum a zero on the assignment, quiz or exam. Cheating will be reported to the office of student conduct. Egregious offenses may result in a failing grade for the course and/or more serious consequences as merited by the situation.

## Expectations

As I am preparing you for employment out there in the *real world*, I expect you to adhere to professional standards while taking my class. Daily attendance is expected. Be on time and prepared, take notes. Work should be neat and well-organized, and certainly should be handed in on-time.

Math classes are considered difficult largely because the material is hierarchical in nature; you must master the first step to be able to manage the next.

### Secrets for success:

1. You should budget a minimum of 10-15 hours per week for work outside of class.
2. Start on the assigned work as soon as you can.
3. Attempt to work on your math every day or at least every other day. The hardest part is usually getting started. Find a quiet place to work, get your book and notes together. Put away distractions such as your cell phone, TV, or laptop. Then, set a timer for 30 minutes (or 15 if you are having a bad day) and resolve to put your best effort in for at least that length of time.
4. Discussing problems and solutions with peers and using the internet is encouraged, with two caveats.
  - Before you go ask or look for a solution, make an honorable effort to solve the problem on your own. Spend time thinking and strategizing before asking or searching for help.
  - You must write up your understanding of a solution **on your own**. You may not copy anyone else's work. See my [guide to group work and using outside resources](http://www.cwu.edu/math/group-work-and-using-outside-resources), <http://www.cwu.edu/math/group-work-and-using-outside-resources>, on the web.
5. As you progress in your university studies and in your career, problems get more and more difficult to solve. You may have to start with easier (unassigned) problems before you are even ready to start to work on an assigned problem. Some problems may take more than an hour to solve. Persistence pays off.
6. Explain what you are doing. Use your words. This will help you to understand the concepts critical to success in the class, and will help you get a higher grade.
7. I am always happy to help you if you are stuck. You will get the most out of my help and the University Math Center if you attempt the problem on your own or with your peers before asking an expert.
8. Do your scratch work before you do a final write-up of your work. What you hand in should be neat and professional and all pages should be stapled together.

### Important Dates

September 30 – Last Day for Add/Drop

October 15 – faculty development day/study day for students

October 29 – mid-term exam

November 7 – uncontested withdrawal deadline

November 11 – Veteran's Day, no classes

November 26-28 – Thanksgiving Holiday, no classes

December 5 – last day of classes

December 11 - final exam (12 pm)

### Students with Disabilities

I am happy to work with students with disabilities. To set up academic adjustments in this class, you should give me a copy of your *Confirmation of Eligibility for Academic Adjustments* from the Disability Support Services Office and come see me in office hours or make an appointment to come see me as soon as possible so we can discuss how the approved adjustments will be implemented in this class. Students without this form should contact the Disability Support Services Office, Bouillon 140 or [dssrecept@cwu.edu](mailto:dssrecept@cwu.edu) or (509) 963-2171.