

AMATH 581: Scientific Computing
Autumn Quarter 2017
Time: MWF 08:30-09:20, LOW 216

Instructor: Ulrich Hetmaniuk (LEW 327)

Office Hours: MW 09h30-10h30 (PT)

Course webpage: <https://canvas.uw.edu/courses/1121837>

Course description: Survey of practical numerical solution techniques for ordinary and partial differential equations. Emphasis will be on the implementation of numerical schemes to practical problems of the engineering and physical sciences. Methods for partial differential equations will include finite difference, finite element and spectral techniques. Full use will be made of MATLAB and its built in programming and solving functionality.

Objectives: By the end of the class, you should become adept at using MATLAB for solving numerically basic practical problems which may arise in your research --- such as first-order ordinary differential equations, elliptic, parabolic, and hyperbolic partial differential equations. In particular, you should be comfortable

- to search MATLAB documentation for finding specific uses of built-in routines;
- to use MATLAB built-in ODE solvers;
- to solve numerically a few basic partial differential equations.

Prerequisites: Solid background in ODEs and familiarity with PDEs and MATLAB, or instructor permission.

Textbook: No textbook is required.

Workload: This class is a **five (5)** credit course. The average workload is **15 hours a week**, including class time (3 hours a week per credit hour). Class time amounts to 3 hours a week. Consequently, students are expected to spend, on average, **12 hours per week** of outside contact with the material.

Homeworks: Five homeworks will be assigned. Homeworks will be submitted and graded on-line. There will be a late penalty of 25% per day for homework handed in up to 48 hours late. **No homework assignments will be accepted more than 48 hours late.** Homeworks may be long. Students are **strongly** encouraged to start their homeworks as soon as possible and to use all office hours available.

Final online quizz: A final online quizz will be available during finals week. Its goal will be to **assess your understanding** of the material covered in class. No extensive coding will be asked for this final quizz. It will be composed of multiple choice questions. In preparation for this final quizz, four **non-graded** online surveys will be posted during the quarter.

Final grade: Your course grade will be determined from your five homeworks and the final online quizz. Your **average score among the six scores** will be mapped **linearly** to the 4.0 grade scale. For example, an average of

100% will result in 4.0, an average of 80% in 3.2, an average of 75% in 3.0, and an average of 50% in 2.0... The UW uses a numerical grading system. For the Correspondence with Letter Grades, please see: <https://grad.uw.edu/policies-procedures/graduate-school-memoranda/memo-19-grading-system-for-graduate-students/>

Emails: The primary communication electronic tool is the discussion board. Emails to the instructor will be addressed during office hours, if schedule allows it.

Students with disabilities: If you would like to request accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz, 206 543 8924 (V/TTY). If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to the instructor to discuss the accommodations you might need for the class.

Academic misconduct code: The University of Washington has a Student Conduct Code (WAC 478-120) available at <http://apps.leg.wa.gov/WAC/default.aspx?cite=478-120>

Academic misconduct includes plagiarism, cheating on examinations or other individual projects or assignments, and the theft or alteration of other person's work for the purpose of gaining academic credit or of enhancing grades. Cases of academic misconduct will receive severe sanctions and be reported to the Dean's representatives for disciplinary action.

The following rules complement the Student Conduct Code:

- You must indicate on your submission any assistance you received. If you make use of such assistance without giving proper credit, you may be guilty of plagiarism. For programs, proper citation takes the form of comments in the program.
- You must **not share** actual program code with other students. You should not ask anyone to give you a copy of their code or, conversely, give your code to another student who asks you for it; nor should you post your solutions on the web, in public repositories, or any other publicly accessible place. It is fine to discuss ideas and strategies but you should be careful **to write your programs on your own**.
- You must not look at solution sets or program codes from previous quarters, nor should you make your own solutions publicly available even after the due date.
- You must be prepared **to explain any program code you submit**. Whenever you seek help on an assignment, your goal should be improving your level of understanding and not simply getting your work completed correctly.
- Modifying code or other artifacts does not make it your own. Disguising the fact that the work is copied from someone else by rewriting comments, changing variable names, and so forth, does not make it your own work.

These rules, and the text in this page, are derived from the Academic Misconduct Code of the Department of Computer Science & Engineering at the University of Washington, available at

<http://www.cs.washington.edu/students/policies/misconduct>