Math 151AH: Honors Applied Numerical Methods

Winter 2023

(Note: all times Pacific standard time)

Instructor: Sean Carney
Email: spcarney@math.ucla.edu

Time: MWF 10am – 10:50am
Place: MS 5127

Every effort will be made to record and post each lecture to Canvas.

Instructor Office Hours: MW 10:50am – 11:50am; additional hours will be scheduled before and after exam days. Location: MS 5622.

Discussion Section: T 10am – 10:50am, GEOLOGY 6704

TA Information: Nicholas Hu, email: njhu@math.ucla.edu

TA Office Hours: T 1pm – 2pm, MS 2350

Course Information: The class is an introduction to numerical methods with an emphasis on algorithms, analysis of algorithms, and computer implementation issues. The primary goal is to provide students in pure and applied mathematics, physics, chemistry, biology, and engineering with foundational knowledge in quantitative analysis that will be useful for careers in academia, industry, and government labs. Students “who graduate and go into industry often find Math 151AB to be the most useful course for their work.” Topics covered include: solution of nonlinear equations; root-finding; numerical differentiation, integration, and interpolation; and numerical methods for solving linear systems and computing eigenvalues.

Prerequisites: Math 115A, Math 131A. Prior experience in a programming language is strongly recommended.

Textbook: Numerical Analysis by L. Ridgway Scott. Students will not need their own copy, but of course it is a useful reference.

Communication: Important information and announcements will be posted to the Canvas page. The class will utilize Piazza as a discussion forum to ask questions about the class. Email should generally only be used for administrative matters.

Grading Policy: The homework assignments will count for (45%) of the final grade. The grading scheme for the exams will be 25% for the midterm and 30% for the final.

Homework Assignments: All homework will be posted online on Canvas. Students must turn in their assignments in-person directly to our TA, Nicholas (i.e. not online) in discussion. If homework is not turned in on time, it can be turned in one week later for a 50% penalty. Typing up one’s homework with \LaTeX is encouraged, but certainly not required. Collaboration with classmates is allowed, however, everyone must write their own solutions in their own words. Copying a problem solution or computer program from another student or from an online resource is considered a serious violation and will be treated as such. Use of websites such as Chegg, Quizlet, or anything similar is expressly forbidden.

Computing Assignments: In addition to theoretical (“pencil and paper”) exercises, each homework will have computational problems. You are free to use C++, Python, Matlab, or Julia to complete these exercises.
Note that MATLAB is available for free for all UCLA students here: https://softwarecentral.ucla.edu/matlab-getmatlab. **Note:** when handing in your HWs, you must print off your code + the relevant output and attach it with your other work.

**Exam Information:**

Midterm . . . . . Wednesday, February 8th; Length = 50 minutes  
(in-class)  
Final Exam . . . Thursday, March 23rd; 3:00pm–6:00pm (TBD)

There will be one midterm and one final exam. Both exams will take place in-person. There will be no lecture during the day of the midterm.

No exams at a time other than the designated ones will be allowed. Exceptions for illnesses with documented proof or emergencies can be made, however. If the midterm is missed due to exceptional circumstances, the final exam will then count for 55% of the final grade. If the final exam is missed for an illness or emergency, the student will receive an Incomplete mark for the course.

**Important:** it is department policy that each exam must contain the statement: "I certify on my honor that I have neither given nor received any help, or used any non-permitted resources, while completing this evaluation." This statement must be signed by the student. If it is not signed, the evaluation must be given a failing grade.

**Students with Disabilities:** Students with disabilities who will need special arrangements during class and/or for the final exam/midterm should contact me as soon as possible. Please also contact the Center for Accessible Eduction: https://www.cae.ucla.edu.

**Mental Health Resources:** The importance of taking care of one’s mental health cannot be overstated. All registered UCLA students are eligible to use UCLA’s Counseling and Psychological Services (CAPS) (https://www.counseling.ucla.edu). 24/7 crisis support is always available by phone at (310) 825-0768.

**Title IX Responsible Employee Information:** Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the CARE Advocacy Office for Sexual and Gender-Based Violence, 1st Floor Wooden Center West, CAREadvo-cate@careprogram.ucla.edu, (310) 206-2465. In addition, Counseling and Psychological Services (CAPS) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768. You can also report sexual violence or sexual harassment directly to the University’s Title IX Coordinator, 2241 Murphy Hall, titleix@conet.ucla.edu, (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491.

Students should be aware that most employees, including myself as the instructor and our TA, Nicholas, are required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Coordinator should they become aware that you or any other student has experienced sexual violence or sexual harassment. The exceptions are the employees at the CARE Advocacy Office and CAPS, as well as the doctors at the Arthur Ashe Student Health and Wellness Center.

**Academic Integrity:** Students are encouraged to work together to study on homework problems, but all work one submits must be their own. The easiest way to ensure this is to write up one’s own solutions. Any violations of UCLA’s academic integrity code will be reported to the dean of students.