

Spring 2020 Math 377: Introduction to Numerical Methods

TR 9:00 am - 10:15 am @SH 114

Instructor: Xuemei Chen xchen@nmsu.edu - **Best way to reach me**

Office Hours: T 10:15 - 11:15, R 11:30 - 12:30, or by appointment @SH230

Course Descriptions and Objectives

Scientific computing and numerical analysis provide invaluable tools for the sciences and engineering. The subject of Numerical Methods deals with practical issues when implementing mathematical algorithms. This includes stability, accuracy, and efficiency. This course will start with floating point arithmetic, and cover topics like solving nonlinear equations of one variable, solving linear systems, interpolation and polynomial approximation, numerical integration, and optimization. There will be rigorous mathematical analysis, as well as practical algorithm implementation.

Textbook: There is no required textbook. The following texts are recommended:

-*Numerical Methods and Optimization: An Introduction*. Sergiy Butenko, Panos M. Pardalos, 1st edition

-*Numerical analysis*. Richard Burden, and J. Douglas Faires. Cengage Learning, 9th edition

-*Numerical methods*. Anne, Greenbaum, and Timothy P. Chartier. Princeton University Press, 2012.

Calculator: Any type of Calculators are strictly forbidden.

Grading

Attendance:	5%	
Homework:	20%	Lowest 2 dropped
Quiz:	15%	Lowest 2 dropped
Midterm Exam:	25%	3/12 Thursday in class
Final Exam	35%	5/14 Thursday 8:00 am - 10:00 am

Letter grade cutoffs: A 90-100 B 80-89 C 70-79 D 60-69 F: less than 60

- Attendance: When there is no quiz, a one-minute question will be given at the end of each lecture to account for attendance. You may be excused for legitimate reasons if notified at least 2 days in advance.

- Homework: Assignments will be posted a week in advance on Canvas. You will submit assignments **electronically**¹ on Canvas. There are two types of assignments: written problem sets or projects conducted in Matlab. To allow for unavoidable circumstances, 2 lowest homework will be dropped.

- Quizzes: Quiz problems are related to the assignments. **No make-up quizzes will be accepted for any reason.** This includes legitimate reasons. To allow for unavoidable circumstances, 2 lowest quizzes will be dropped.

- Midterm and Final Exam: No make-up exams are given. In the case that you miss the midterm exam with a valid excuse (a documented sudden medical emergency, documented family emergency, etc.), your final exam grade will replace the missing midterm grade. Notice that weddings, graduations, cheap flights, lack of sleep, and a busy schedule are not valid excuses for missing exams.

- Extra credit: There may be opportunities for extra credits, for example, answering certain questions in class, pointing out certain mistakes, making constructive suggestions, etc. One extra credit unit is worth 0.5% of the grade. Each person can earn up to 3% extra credits.

**Remark: Dropped assignment/quiz is for unavoidable circumstances, NOT for your low performance or missed work after parties. If you have to miss too many homework/quizzes or your midterm with a valid reason (with supporting documents), the weight can be carried over to your final exam. Notice that weddings, graduations, cheap flights, lack of sleep, and a busy schedule are not valid excuses.*

About Python and Jupyter Notebook

¹You may request to turn in physical copies.

- For people who don't have Python or Jupyter notebook, a very easy solution is to download Anaconda (Python 3.7 version): <https://www.anaconda.com/distribution/>. Once installed, you may launch Jupyter notebook (or JupyterLab) there. (<https://docs.anaconda.com/anaconda/user-guide/getting-started/>). Jupyter notebook will be opened on your browser such as Chrome.
- For people who already have Python but need to install Jupyter notebook, you may still install Anaconda as instructed previously, or install Jupyter notebook following <https://jupyter.org/install.html>.

Classroom etiquette

Arrive in class On time. You are not allowed to use any electronic devices in classroom, with the exception of note-taking. While in class, students are expected to refrain from listening to a portable device, talking on a cell phone, allowing cell phones to ring, messaging, doing homework, or reading newspapers and magazines.

Withdraws and Incomplete

Last day to drop a course without a "W" (100% refund) - Friday, February 7, 2020

Last day to withdraw from the course with "W" - Thursday, March 19, 2020

If you plan to withdraw from the course, it is your responsibility to complete the necessary paperwork by this date. An incomplete grade will be given only if you have a serious emergency, such as a medical condition, that prevents you from completing the course. You must produce proper documentation and must be passing the course with most of it complete. An incomplete grade will not be granted to avoid failing the course.

Academic and non-academic misconduct

The Student Code of Conduct defines academic misconduct, non-academic misconduct and the consequences or penalties for each. The Student Code of Conduct is available in the NMSU Student Handbook online: <http://studenthandbook.nmsu.edu/> Academic misconduct is explained here: <http://studenthandbook.nmsu.edu/student-code-of-conduct/academic-misconduct/>

Discrimination and Disability Accommodation

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act Amendments Act (ADA) covers issues relating to disability and accommodations. If a student has questions or needs an accommodation in the classroom (all medical information is treated confidentially), contact:

Student Accessibility Services (SAS)
Corbett Center Student Union Room 208
Trudy Luken, Director
575-646-6840
sas@nmsu.edu

New Mexico State University, in compliance with applicable laws and in furtherance of its commitment to fostering an environment that welcomes and embraces diversity, does not discriminate on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex (including pregnancy), sexual orientation, spousal affiliation, or protected veteran status in its programs and activities, including employment, admissions, and educational programs and activities. Title IX prohibits sex harassment, sexual assault, intimate partner violence, stalking and retaliation. For more information on discrimination or Title IX, or to file a complaint contact:

Laura Castille, Executive Director and Title IX Coordinator
Office of Institutional Equity (OIE) - O'Loughlin House, 1130 University Avenue
Phone: (575) 646-3635 E-mail: equity@nmsu.edu
Website: <http://equity.nmsu.edu/>

Other NMSU Resources

NMSU Police Department: (575) 646-3311 www.nmsupolice.com
NMSU Police Victim Services: (575) 646-3424
NMSU Counseling Center: (575) 646-2731
NMSU Dean of Students: (575) 646-1722
For Any On-campus Emergencies: 911

Tentative Schedule

Floating Point Arithmetic	Week 1-2
Solving Nonlinear Equations of One Variable	Week 3-4
Linear Algebra Basics	Week 4-5
Direct Methods for Solving Linear Systems, Least Squares, Condition Number	Week 6-9
Polynomial Interpolation	Week 10-12
Numerical Integration	Week 13
Optimization	Week 14
Review	Week 15