

# CU-Denver -- MATH 5660-001 -- Fall 2006

## Numerical Analysis I

<http://www.math.cudenver.edu/~langou>

Monday & Wednesday 10:00am- 11:15am. CU Building. Room CU626.

**Instructor:** Julien Langou

**Contact:**

**Office location:** CU Bldg, Room 646

(CU Building is on 14th Street at #1250 in Denver Downtown)

**Phone:** (303)-556-3919

**Fax:** (303)-556-8550 (Please put my names on all faxes)

**email:** [langou@math.cudenver.edu](mailto:langou@math.cudenver.edu)

**Dept. Associate Chair:** Lynn Bennethum, CU-Bldg, Room 638, Phone: (303)-556-4810, Email: [bennethm@math.cudenver.edu](mailto:bennethm@math.cudenver.edu)

**Email address:** this is your responsibility to read your email. This will be our default communication mode outside of the classroom so be sure I have an email address that you are checking frequently every week.

**Office Hours:** Office hours will be held from 9:00am to 10:00am on Mondays and Wednesdays in my office (before class). I will hold office hours from 2:45pm to 3:45pm on Tuesdays and Thursdays at the MERC lab (Science Building, Room 130-132); you can show up there as well. If a change of location or schedule must occur, I will let you know by email. Outside office hours, students are welcome to take appointments to come to my office (CU Bldg. Room 646).

**Prerequisites:** MATH-3191 (Applied Linear Algebra) and programming experience. This class is cross-listed with SC-5660.

**Required textbook:**

David Kincaid and Ward Cheney, *Numerical Analysis: Mathematics of Scientific Computing, 3rd Edition*. Brooks/Cole, Pacific Grove, CA, 2002, 817 pp., ISBN 0-534-38905-8.

<http://rene.ma.utexas.edu/CNA/NA3/index.html>

**Optional Materials:**

- Graphics Calculator is optional, but strongly recommended.

**Course Description:**

This course introduces students to numerical methods for solving mathematical problems. Numerical analysis involves the study of methods of computing numerical data. In many problems this implies producing a sequence of approximations; thus the questions involve the rate of convergence, the accuracy (or even validity) of the answer, and the completeness of the response. The intended syllabus includes: Computer Arithmetic, Solution of Nonlinear Equations, Numerical Linear Algebra, and Approximating Functions. Computer problems will be assigned as homework.

**Grading policy:** Your final grade will be determined as follows:

Graded assignments (lowest two scores dropped)	200
First exam	60
Second exam	60
Final exam	80
Total	400

Final grades are tentatively based on the following distribution:

372 – 400	A	292 – 307	C
360 – 371	A-	280 – 291	C-
348 – 359	B+	268 – 279	D+
332 – 347	B	252 – 267	D
320 – 331	B-	240 – 251	D-
308 – 319	C+	below 239	F

The scale may be curved down depending on the average performance of the class.

**Valid for Exam and Homework:** To have full credit to a question, you will need the correct answer with a detailed explanation. Enough details should be provided so that a classmate can understand your answer easily.

**Homework:** Homework are due on Wednesdays **before the beginning of class**. If you know that you will miss the class, you can email me your homework (same deadline) or give the responsibility of turning it in on time to a friend. Homework will include problems and computer problems as well. The accepted programming language for the solution will be specified with the problem. If this is Matlab, make sure it works with the Matlab version available at the MERC lab. If this is a compiler language (e.g. C) make sure, your code compiles on the MERC machines. Each homework is worth 20 points; there are 12 homework, but your two lowest scores will be dropped. This makes 200 points total for the homework, that is to say 50% of the 400 possible points. Homework will be given at least one week in advance (i.e. during the preceding Wednesday class).

**Late homework** will be accepted up to the next class period with a 50% penalty (deadline is then the next Monday before class), after that time, no late homework will be accepted or it is assumed that circumstances causing late homework will result in the homework grade being one of two lowest scores dropped.

**Cheating:** Cheating of any kind will result in a course grade of F and possible expulsion from the University. So don't do it. Although working on homework with other classmates is encouraged, you must write up your homework, programs, and exams yourself. Duplicate homework solutions, or even part of a solution, will be considered as violating the academic honesty code; this is valid for homework, programs, and for exams. Please write your solutions in your own terms.

**Exam:** There will be three exams. The first one will be around Monday 09/25 and will be worth 60 points. The second one will be around Monday 10/30 and will be worth 60 points. The final will be during the final week and will be worth 80 points. If circumstances arise that prevent you from attending an exam, please contact me **ahead of time** as I will be much more lenient. Unexplained absences will require hard evidence such as a death certificate, hospital paperwork, etc. The class is large enough that I may not know you all before the first, second or final exam, so I will require you to bring a photo ID to each of the three exams.

**Drops and incompletes:** You have until **October 30th** to drop the course with only the instructor's (but not a Dean's) signature.

The incomplete policy of the department and college is strictly enforced. Incompletes are given only in situations in which a student has: **(1)** *Successfully* completed 75 percent of the course (i.e. is passing the course) **(2)** Special circumstances (verification may be required) that preclude the student from attending class and completing graded assignments, and **(3)** Made arrangements to complete missing assignments with the original instructor. A CLAS Course Completion agreement is required.

**Blackboard:** I am going to give Blackboard a try, so you should be able to find your grades at: <https://blackboard.cudenver.edu/>. If you have problem login, contact CU-Denver Blackboard help: Tim McMahon Phone: 303.556.6527 Email: Tim.McMahon@cudenver.edu or Email: inquiry@cuonline.edu

**Computing requirement:** Homework will require access to a computer with a C compiler and Matlab. The MERC lab provides such facilities (Science Building Room 130-132). To get hours of operations and directions: <http://www.math.cudenver.edu/~mkawai/MERC/index.html>

**Code of conduct:** please refer to <http://carbon.cudenver.edu/public/studlife> for the code of conduct in the classroom.

## Important Responsibilities for CLAS Students

- CLAS students must always have an accurate mailing and e-mail address. Please go to: <http://www.cudenver.edu/registrar> to update.
- Students must complete and submit a drop/add form to make any schedule changes. Students are not automatically dropped from a class if they stop attending or do not make tuition payments. The student is ultimately responsible for verifying their schedule prior to officially published drop dates.
- Late adds will be approved *only* when circumstances surrounding the late add are beyond the student's control and can be documented. This will require a petition and documentation from the student.
- Late drops will be approved *only* when circumstances surrounding the late drop are beyond the student's control and can be documented. This will require a petition and documentation from the student.
- Students who wish to graduate in December of 2006 *must* meet with their academic advisor to obtain a graduation application. The application must be completed and submitted by September 6, 2006.
- Students are responsible for completing financial arrangements with financial aid, family, scholarships, etc. to pay their tuition. Students will be responsible for all tuition and fees for courses they do not officially drop using proper drop/add procedures and forms.

### Fall 2006 Registration and Academic Deadlines

- **August 24, 2006** (midnight) Last day to be added to the wait-list for a closed course.
- **August 24 – September 6, 2006** Students are responsible for verifying an accurate fall 2006 registration via SMART. Students are NOT notified of their wait-list status by the University. All students must check their schedules prior to September 6, 2006 for accuracy.
- **August 31, 2006** (midnight) Last day to add courses via the web SMART system.
- **September 6, 2006** (5:00 pm) Last day to add structured courses without a written petition for a late add. **This is an absolute deadline.** This deadline does not apply to independent study, internships, and late-starting modular courses.
- **September 6, 2006** (5:00 pm) Last day to drop a fall 2006 course for tuition refund and no transcript notation. **This is an absolute deadline.**
- **September 6, 2006** (5:00 pm) Last day for undergraduates and graduates to apply for December 2006 graduation. **This is an absolute deadline.**
- **September 6, 2006** (5:00 pm) Last day to request pass/fail or no credit option. **This is an absolute deadline.**
- **October 30, 2006** (5:00 pm) Last day for NON-CLAS students to drop a fall 2006 course without a petition to their home college and receiving their Dean's approval.
- **November 10, 2006** (5:00 pm) Last day for CLAS students to drop a fall 2006 course. Treated as an **absolute deadline. Dean's approval required.**
- **November 10, 2006** (5:00 pm) Last day to withdraw (drop all courses) without a written petition.

See Academic Calendar for details on registration/payment deadlines:

<http://www.cudenver.edu/registrar>

**Course Schedule:**

			Due HW
Week 01 – Mo 08/21	Ch. 2: Computer Arithmetic	2.00-01	
Week 01 – We 08/23		2.01-02	
Week 02 – Mo 08/28	Ch. 3: Solution of Nonlinear Equations	3.00-01	
Week 02 – We 08/30		3.01-02	H01
Week 03 – Mo 09/04	<b>Labor Day (no class)</b>	-	
Week 03 – We 09/06		3.03-04	H02
Week 04 – Mo 09/11		3.05	
Week 04 – We 09/13		3.06	H03
Week 05 – Mo 09/18	Ch. 4: Solving Systems of Linear Equations	4.00-01	
Week 05 – We 09/20		4.02-03	H04
Week 06 – Mo 09/25	<b>Exam on Chapters 2 and 3</b>	-	
Week 06 – We 09/27		4.04-05	H05
Week 07 – Mo 10/02		4.06-07	
Week 07 – We 10/04		4.08	H06
Week 08 – Mo 10/09	Ch. 5: Selected Topics in Numerical Linear Algebra	5.00-01	
Week 08 – We 10/11		5.02-03	H07
Week 09 – Mo 10/16		5.04-05	
Week 09 – We 10/18	Notes on eigenvalue method for symmetric	Notes	H08
Week 10 – Mo 10/23	Notes on stability of eigencalculation	Notes	
Week 10 – We 10/25	Ch. 6: Approximating Functions	6.00-01	H09
Week 11 – Mo 10/30	<b>Exam on Chapters 4 and 5</b>	-	
Week 11 – We 11/01		6.02-03	
Week 12 – Mo 11/06		6.04-05	
Week 12 – We 11/08		6.06-07	H10
Week 13 – Mo 11/13		6.08-09	
Week 13 – We 11/15		6.10-11	H11
Week 14 – Mo 11/20	<b>Fall Break (no class)</b>	-	
Week 14 – We 11/22	<b>Fall Break (no class)</b>	-	
Week 15 – Mo 11/27		6.12-13	
Week 15 – We 11/29		6.14	H12
Week 16 – Mo 12/04	Catching Up		
Week 16 – We 12/06	Catching Up		
Week 17 – 12/11-15	<b>Final (comprehensive) exam week</b>	-	

**Nondiscrimination policy:**

The University of Colorado at Denver and Health Sciences Center is committed to providing reasonable accommodations and access programs and services to persons with disabilities. Any student requiring accommodations is first encouraged to make an appointment with their course instructor during scheduled office hours. Next, student applications are handled by the Office of Disability Resource & Services (DRS) located in #177 Arts Building, phone: 303-556-3450, TTY: 303-556-4766. The DRS staff will assist in determining reasonable accommodations as well as coordinating the approved accommodations. This request should be made in a timely fashion to allow the DRS office adequate opportunity to provide reasonable accommodations.

**Other resources for this course:**

- **The Center for Learning Assistance:** The Center for Learning Assistance is where students go to get help or insight with class assignments, course-loads, and study skills. The Center also helps with arranging tutoring sessions, which take place in the days or evenings.

North Classroom Building (NC) Room 2006  
(303) 556-2802  
Monday - Thursday 8am-7pm  
Friday 8am-5pm

- **Program Access for Persons with Disabilities:** The University of Colorado at Denver is committed to providing reasonable accommodations and access to programs and services to persons with disabilities. Students should contact the Disabilities Services Offices.

Arts building 177; 303-556-3450, TTY 303-556-8484.

- **Academic Advising Center:** This office serves as the first point of contact for students who are pre-business, pre-engineering, or who have not declared a major in CLAS or CAM. In addition, the center provides general information and resource referral to all students.

North Classroom Building (NC) Room 1  
Phone # 303-352-3520

- **Career Center:** The Career Center offers a full array of services that prepare students for career success, such as resume help, internship and career counseling and they have a large career library.

Tivoli Student Union Room 260