



COURSE OUTLINE

1. **Course:** MATH 391, Numerical Analysis I - Fall 2020

Lecture 01: TR 15:30 - 16:45 - Online

Instructor	Email	Phone	Office	Hours
Dr Mohammed Aiffa	aiffam@ucalgary.ca	403 220-6313	MS 432	Tue & Thu 15:30-17:00

Online Delivery Details:

Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

The core content of this course will be delivered via course notes and pre-recorded videos posted on D2L. Students will be able to work through this material at their own pace.

Office hours, where students questions about the course material are answered, will be held live via Zoom on Tuesdays and Thursdays from 3:30pm to 4:30pm. You are encouraged to attend.

Course Site:

D2L: MATH 391 L01-(Fall 2020)-Numerical Analysis I

Note: Students must use their U of C account for all course correspondence.

2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Prerequisite(s):

Mathematics 211 or 213; and Mathematics 267 or 277; and 3 units from Computer Science 217, 231, 235 or Data Science 211.

Antirequisite(s):

Credit for Mathematics 391 and Computer Science 491 will not be allowed. Also known as: (formerly Applied Mathematics 491)

3. **Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Component(s)	Weighting %	Date
Assignments (4)	28	
Midterm Exam	30	Tue, Nov 03, 3:30 - 6:00 p.m. *
Final Exam	42	To be scheduled by the registrar**

* **The midterm is designed to take 90 minutes** to complete. It will become available at **3:30 p.m.** and is due via D2L DropBox, as a single PDF file, at **6:00 p.m.**. The 150 minutes window is given in case of any technical issue.

** The final exam will be scheduled by the registrar. It is designed to take **2 hours** to complete. If say, the exam is scheduled from 3:00 to 5:00 p.m., then it will become available at 3:00 p.m. and must be submitted via D2L Dropbox as a single PDF file no later than 6:00 p.m.

Additional time will be granted to SAS students. Other accommodations such as time conflict, etc ..., will be done on a case by case basis.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course

letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	88 %	82 %	77 %	72 %	67 %	62 %	57 %	52 %	49 %

This course has a registrar scheduled final exam.

Bear in mind that a grade **D** or **lower** will result if the student's score in the final exam is **less than 40%**.

4. Missed Components Of Term Work:

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, then the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course.

5. Scheduled Out-of-Class Activities:

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Midterm	Web-Based	Tuesday, November 3, 2020 at 3:30 pm	2.5 Hours

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

The midterm is designed to take 90 minutes to complete. It will become available at **3:30 p.m.** and is due via D2L DropBox, as a single PDF file, at **6:00 p.m.** The 150 minutes window is given in case of any technical issue.

6. Course Materials:

Recommended Textbook(s):

- James F. Epperson, *An Introduction to Numerical Methods and Analysis, 2nd Edition* Wiley.
- R.L. Burden & J.D. Faires, *Numerical Analysis, 10th Edition*: Brooks/Cole.
- E. Suli & D. Mayers, *An Introduction to Numerical Analysis*: Cambridge.
- A. Quarteroni, F. Saleri, P. Gervasio, *Scientific Computing with MATLAB and OCTAVE, 4th Edition*: Springer, available at the University Library.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

7. Examination Policy:

Students are expected to complete all assignments, midterm and final examinations independently. Consulting your classmates or any other person concerning the content of the midterm or the final is strictly prohibited.

Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Members of our campus community are required to abide by our institutional code of conduct and promote academic integrity in upholding the University of Calgary's reputation of excellence.

Students must submit each Assignment, Midterm and Final as a single PDF file. This may be done by:

1. Using LateX to typeset your solutions
2. Printing a copy of the exam booklet, writing your solutions and scanning the booklet
3. Using a tablet to write your solutions and saving it as a PDF file
4. Completing the exam on 8.5" by 11" papers and scanning your solutions

Students should also read the Calendar, [Section G](#), on Examinations.

8. Approved Mandatory And Optional Course Supplemental Fees:

There are no mandatory or optional course supplemental fees for this course.

9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

10. Human Studies Statement:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Center:** For more information, see www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual

violence can be viewed at (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>)

- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples.**
- e. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).
- Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Mathematics & Statistics, Mark Bauer by email bauerm@ucalgary.ca or phone 403-220-4189. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.
- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- g. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. [Student Ombudsman](#), Email: ombuds@ucalgary.ca.
- h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

Course Outcomes:

- Understand the principles of digital arithmetic and numerical approximations, , including number representations, accuracy, stability, convergence and error propagation.
- Identify stable and accurate algorithms that solve general nonlinear scalar equations. This includes their derivation, error analysis and limitations.
- Understand the concept of polynomial interpolation, appreciate its role in the approximation of functions, numerical integration, and recognize its sensitivity to nodes location.
- Derive the basic numerical integration methods both interpolatory and Gaussian, and appraise their accuracy.
- Describe and apply the basic methods for solving systems of linear equations, both direct, such as Gauss elimination and factorization, and iterative methods, such as Jacobi, Gauss-Seidel and Relaxation. This includes the ability to analyze the stability and conditioning of a linear system of equations.
- Outline the basic Power and the QR methods for solving the algebraic eigenvalue problem, with emphasis on the symmetric case.
- Demonstrate skills in basic programming of simple numerical algorithms.

Electronically Approved - Sep 04 2020 17:00

Department Approval

Electronically Approved - Sep 05 2020 12:43

Associate Dean's Approval