



COURSE OUTLINE

1. **Course:** GOPH 419, Computational Methods for Geophysicists - Winter 2022

Lecture 01 : MWF 16:00 - 16:50 in SS 209

Instructor	Email	Phone	Office	Hours
Dr David Eaton	eatond@ucalgary.ca	403 220-4233	ES 214	TBA

To account for any necessary transition to remote learning in the winter 2022 semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

In Person Delivery Details:

Lectures: The course will involve three (3) weekly lecture periods (3 hours), where the instructor will lead the students through a discussion of the topic for that week. The instructor will post the material for that week at least one week prior. Students are expected to review this content prior to the lectures.

Labs: There will be one (1) weekly lab period (3 hours). In the computer labs, you will complete assignments in which you will implement a numerical solution to a geophysics application problem in Python or Matlab. There will be a total of four (4) lab assignments and you will have 2-3 lab periods to complete each assignment. Your submission of these assignments will include both the code that you used to generate your solution and a brief scientific report summarizing the background theory, methods, results and conclusions of the assignment.

Quizzes: There will be 4 quizzes throughout the term. These are available on D2L for one week, during which up to three attempts are allowed. The highest mark achieved in your 3 attempts will be used.

Topics: The course is divided into at least 8 modules or topics (see course schedule on D2L). Each module will consist of 2-6 class periods introducing the module content and completing practice problems/examples. There will also be additional opportunity to see examples during TA office hours for the labs. This modular format is designed to give students appropriate background and practice with each of the course topics. The topics will be covered in four (4) lab assignments (approx. every 2-3 modules), which will include significant computation and a written report. There will be regularly scheduled TA office hours for the labs and you are encouraged to seek guidance from the course instructor, TA, and/or your peers while working through the lab assignments. Discussion boards will be available on D2L to encourage appropriate collaboration with your peers on the labs and quizzes. Please be mindful of the academic code of conduct with regard to collaboration on coursework. Discussion of theory and methods with your peers is encouraged, but all calculations, code, and report writing should be completed independently to ensure that each individual achieves the best learning outcomes from the course.

Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

Course Site:

D2L: GOPH 419 L01-(Winter 2022)-Computational Methods for Geophysicists

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

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

2. **Requisites:**

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

Prerequisite(s):

Mathematics 211; and Geophysics 351 or 355; and 3 units from Computer Science 217, 231, 235 or Data Science 211; and 3 units from Mathematics 331, 367 or 377.

Antirequisite(s):

Credit for Geophysics 419 and any of 619, 599.09 or 699.09 will not be allowed.

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:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Quizzes ¹	30%	Ongoing		
Lab Assignments/Reports ²	35%	Ongoing		
Registrar Scheduled Final Exam	35%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

¹ See Schedule, posted on D2L

² See Schedule, posted on D2L

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 %	85 %	80%	75%	70 %	65 %	62%	60%	55 %	50 %

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

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, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

5. **Scheduled Out-of-Class Activities:**

There are no scheduled out of class activities for this course.

6. Course Materials:

Recommended Textbook(s):

Chapra, S. and Canale, R., 2021, Numerical Methods for Engineers (8th Edition): McGraw Hill.

Downey, A.B., 2015, Think Python 2e: Green Tea Press. (free to download)

These textbooks will be used as the references for the content of this course. They are recommended, but not required. The instructor will post supplemental notes on D2L (<https://d2l.ualgary.ca/login.asp>). You will be expected to stay up-to-date with the online content of the course on a weekly basis.

For in-class quizzes and term tests, you may use course notes, online reference and any calculator (including Matlab, Python, or Excel). You can obtain a license for a current version of Matlab through the UofC IT Software page (<https://iac01.ualgary.ca/SDSWeb/>). Python 3 (and matplotlib, NumPy, SciPy, and other packages) are free, open-source, and available from a variety of sources. A recommended distribution is the Anaconda Individual Edition (<https://www.anaconda.com/products/individual>), which includes Python 3 with many useful packages for scientific computing pre-loaded and a package manager built-in for installing other Python packages. The Anaconda distribution also includes multiple development environment (IDE) options. We will mostly use Jupyter notebooks for in-class demonstrations and you are welcome to submit your assignments as Jupyter notebook (.ipynb) files. Anaconda also includes the Spyder development environment, which has a similar "look-and-feel" to the Matlab environment and you can submit your assignments as .py files developed using Spyder (or any other IDE of your choice) if you prefer.

Information, examples, and tutorials for both Matlab and Python will be provided in-class and during TA office hours. You should already have some background with Python 3 from your introductory computer science course (CPSC 217 or equivalent), but if you need a refresher the text *Think Python 2e* by A.B. Downey provides a concise and clear overview of Python for general scientific computing. This is a "recommended" text and is not strictly required for the course, but it provides additional descriptions, examples, and exercises to help you develop greater proficiency with Python and numerical methods.

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:

The midterm and final exams will be open book, open notes and you will be allowed to use any calculator including software such as Matlab, Python, and Excel.

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 Services:** 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 (syva@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/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>)
- d. **Misconduct:** 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. Research integrity, ethics, and principles of conduct are key to academic 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. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)
Student Academic Misconduct [Policy](#) and [Procedure](#)
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

e. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Jennifer Cuthbertson by email cuthberj@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

- 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](#) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [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.

Electronically Approved - Jan 14 2022 09:33

Department Approval

Electronically Approved - Jan 17 2022 17:32

Associate Dean's Approval