



COURSE OUTLINE

1. **Course:** GOPH 547, Global and Mineral Exploration Applications of Geophysics - Winter 2022

Lecture 01 : MW 15:30 - 16:45 in SS 008

Instructor	Email	Phone	Office	Hours
Dr Hersh Gilbert	hersh.gilbert@ucalgary.ca	403 220-6446	ES 150	By Appointment

Synchronous lab and discussion sections are scheduled weekly during the lab time on Friday mornings from 8 to 10:50. The discussion sections will occur through Zoom. Each lab section will include a quiz to be completed on D2L. The start of the lab section at 8:00 is intended to provide time to complete the weekly quiz at the start of the lab section. These sessions will not be recorded.

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:

During remote online instruction, synchronous course delivery will be weekly through Zoom on Wednesday afternoons from 3:30 to 4:45. These sessions will be recorded and posted to D2L. Recorded sessions can be viewed at any time once they are posted.

Once returning to in person learning, the class will meet on campus at the regular course times of MW 3:30 to 4:45.

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](#). **Online Delivery Details:**

This course is being offered online in real-time via scheduled meeting times, you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

Synchronous course delivery will be weekly through Zoom on Wednesday afternoons from 3:30 to 4:45. These sessions will be recorded and posted to D2L. Recorded sessions can be viewed at any time once they are posted.

Short videos, exercises, and readings going over fundamentals of course topics will be posted to D2L weekly. These materials will be devoted to primers on data analysis, reviewing basic concepts, delving into details about topics introduced during the synchronous portion of the class, and professional skill development.

Course Site:

D2L: GOPH 547 L01-(Winter 2021)-Gravity and Magnetism

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):

Geophysics 457; and Mathematics 211; and Mathematics 267 or 277.

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
Individual and team assessments and quizzes ¹	20%	Ongoing		
Weekly Lab Assignments ²	35%	Ongoing		
Midterm Exam	30%	Feb 28 2022 at 12:00 am (7 Days)	online	Take home assignment
Take Home Final Exercise	15%	Apr 22 2022 at 05:00 pm (7 Days)	online	TBD

¹ These quizzes will be available on D2L at the beginning of the lab periods every week at 8AM. The assessment is designed to take you 15 minutes of writing time with another 15 minutes of buffer time. Upon returning to in-person learning, weekly quizzes will take place during the lab at the beginning of the period.

² Lab assignments are due periodically during the semester and will be submitted on specified dates 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 %	87 %	82%	77%	72 %	67 %	62%	60%	55 %	50 %

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):

W.J. Hinze, R.R.B. von Frese, A.H. Saad, *Gravity and Magnetic Exploration: Principles, Practices and Applications*: Cambridge University Press.

W.M. Telford, L.P. Geldart, R.E. Sheriff, *Applied Geophysics*: Cambridge University Press.

Burger, Robert, E., Sheehan, Anne F., and Jones, Craig, H., *Introduction to Applied Geophysics: Exploring the Shallow Subsurface*: W. W. Norton Company.

Any of the texts listed here will provide a good reference for most of the course content. It is highly recommended, but not absolutely required, to have at least one of these texts. You may already have Telford et al. (1990) from a previous geophysics course. Note that this text is over 30 years old, and the theory is still up-to-date, but the references to global geophysical models for the gravitational and magnetic fields may be out-of-date. The instructor will also post supplemental notes or links to other resources on D2L (<https://d2l.ucalgary.ca/login.asp>).

For in-class quizzes and term tests, you may use course notes, online reference and any calculator (including Matlab or Excel). You can obtain a student license for Matlab for your personal computer by visiting the University of Calgary IT Software Distribution website (<https://iac01.ucalgary.ca/SDSWeb/>) and following the instructions provided.

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:

All exams and quizzes are "open book". During an exam or quiz, you may consult any course materials including notes and previous exams or quizzes which you have made yourself. You may not consult exams or quizzes from previous years. You may access the internet during an examination, but may not use email or other forms of communication (written, verbal, electronic) except to communicate with the course instructor or TAs. The use of calculators or computers for computation is encouraged. Students should also read the Calendar, Section G, on Examinations.

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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.

In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports.

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 (FOIP). 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.

Calendar Description: The nature of the magnetic and gravitational fields of the earth. Theory and applications of the gravity and magnetic methods of geophysical exploration.

Learning Objectives: By the end of this course, students should be able to:

1. Explain the nature of Earth's gravity and magnetic fields.
2. Identify the main points in the history of the development of our current models of these fields and explain the relevance of the scientists that contributed to this development.
3. Apply the mathematical theory of potential fields to solve problems relevant to geophysical surveying (e.g. determine the expected gravitational and/or magnetic field of bodies with simple and complex shapes).
4. Calculate typical corrections to survey data to plot and interpret a gravitational or magnetic anomaly map.
5. Perform the analysis using modern computational tools (e.g. Matlab, Excel).
6. Communicate the results of a gravitational or magnetic survey to peers in the geophysics/scientific community and critically evaluate the work of peers.

Course Outcomes:

- Explain the nature of Earth's gravity and magnetic fields.
- Identify the main points in the history of the development of our current models of these fields and explain the relevance of the scientists that contributed to this development.
- Apply the mathematical theory of potential fields to solve problems relevant to geophysical surveying (e.g. determine the expected gravitational and/or magnetic field of bodies with simple and complex shapes).
- Calculate typical corrections to survey data to plot and interpret a gravitational or magnetic anomaly map.
- Perform the analysis in CLO #3 and #4 using modern computational tools (e.g. Matlab, Excel).
- Communicate the results of a gravitational or magnetic survey to peers in the geophysics/scientific community and critically evaluate the work of peers.

Electronically Approved - Jan 23 2022 22:36

Department Approval

Electronically Approved - Jan 24 2022 10:49

Associate Dean's Approval