

ERTH 2105 [0.5 credit] for Fall 2026

Geodynamics: The structure, composition, and rheological properties of the Earth: lithosphere, mantle and core. Plate tectonics and its relation to geophysical fields, driving mechanisms, and processes at plate boundaries and in plate interiors.

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes, including information about the *Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances*, are outlined on the Academic Accommodations website (students.carleton.ca/course-outline).

Course Instructor: Dariush Motazedian

Email: dariush.motazedian@carleton.ca

Student Hours: Mondays 11:30-12:30, my office

Office Location: Room 2169 HP Building

Class Location: Please check Carleton Central for the room location.

Class Times: Mondays, 9:35-11:25

Lab Times: Tuesdays, 11:35-14:25

Lab Times: Fridays 11:35-14:25

Prerequisites: EARTH 1006 or permission of the Department

Preclusions: None

Department/Unit: Earth Sciences

Important Notes:

- Students must pass the lab component of the course in order to pass the course and to be eligible to write the final exam.
- Students must pass the final exam in order to pass the course.
- Reading assignments are mandatory.
- Students are responsible for regularly reviewing the course outline for lecture topics, reading assignments, laboratory topics, pre-lab review material, and homework.
- Students should regularly check the Brightspace course website for announcements, course information, laboratory assignments, and lecture materials.
- All lectures, labs, quizzes, and exams are held in person unless otherwise announced.
- Short quizzes will be held during lectures.
- The first lab will take place after the second lecture. Students must bring a laptop with wireless internet access to the first lab.
- Lab exercises will be posted on Brightspace.

Topics to Be Covered:

The following topics will be covered in a tentative order. The pace of instruction may be adjusted based on students' background, progress, and learning needs.

- Seismology and the internal structure of the Earth
- Gravity, isostasy, lithospheric flexure, and post-glacial rebound
- Plate tectonics: geometry, kinematics, and plate-boundary processes
- Geomagnetic field and paleomagnetism
- Seafloor spreading and oceanic lithosphere
- Continental lithosphere
- Heat flow, thermal parameters, and temperature in Earth's interior

Important dates and deadlines: Important academic dates, including class suspensions, fall and winter breaks, and statutory holidays, are available at <https://carleton.ca/registrar/registration/dates/academic-dates/>.

Course-Level Learning Outcomes:

- Explain the physical characteristics of Earth's internal structure using evidence from seismology. [Understanding, Applying, Analyzing, Evaluating]
- Analyze past and present plate kinematics using paleomagnetism and seafloor-spreading evidence. [Understanding, Applying, Analyzing]
- Analyze regional variations in Earth's gravitational field to explain isostasy, lithospheric flexure, and post-glacial rebound. [Understanding, Applying, Analyzing]
- Relate Earth's magnetic field to processes and structures within Earth's interior. [Understanding, Applying, Analyzing]
- Explain heat-flow models and their implications for Earth's internal structure. [Understanding, Applying, Analyzing, Evaluating]

Assessments: Grade Breakdown

Component	Grade value	Date
Labs	25%	Every week
Quizzes	10%	During lectures
Midterm	25%	TBA
Final	40%	TBA

Late and Missed Work Policies

Late Work

It is the student's responsibility to attend classes and labs prepared. Labs must be handed in on time. Late labs will be accepted in the instance of illness, or the instance of emergencies, by consultation with your TAs and instructor.

Missed Work

Students must contact their TAs and instructor immediately if they are ill and will miss an exam or the deadline for an assignment. Students must agree with the instructor and/or TAs on how to

make up the missed components. If the student is ill for a while and misses an exam, then their TA or instructor will arrange for some accommodation in the future – make a midterm exam added to the final, etc.

Learning Material(s) and Other Course/Lab-Related Resources

Course Textbook; Fowler, C.M.R., 2005, The Solid Earth, 2nd edn. Cambridge Univ. Press. Around \$100

Note: Books were ordered at the bookstore. You may also buy a used one from Haven Books, 43 Seneca St, Ottawa (613) 730-9888.

Academic Accommodations and Regulations

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AI Use Policy

Students may use AI tools only for basic word-processing support, such as grammar and spell checking (e.g., Grammarly, Microsoft Word Editor, Copilot). Documentation is not required for these permitted uses. For any other AI use, consult your instructor first.

This policy keeps students' own voices and ideas central to their work while supporting clarity, correctness, layout, and flow.

AI may not be used for:

- Completing lab assignments during scheduled lab time. If a student misses a lab and the TA agrees to provide support, the student should complete the lab during the next session while the TA is present.
- Quizzes
- Exams

Statement on Academic Integrity

Students are expected to uphold the values of academic integrity, which include fairness, honesty, trust, and responsibility. Examples of actions that compromise these values include but are not limited to plagiarism, accessing unauthorized sites for assignments or tests, unauthorized collaboration on assignments or exams, and using artificial intelligence tools such as ChatGPT when your assessment instructions say it is not permitted.

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of Science can be found [here](#).

Additional details about this process can be found on [the Faculty of Science Academic Integrity website](#).

Students are expected to familiarize themselves with and abide by [Carleton University's Academic Integrity Policy](#).

Student Rights & Responsibilities

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the [7 Rights and Responsibilities Policy](#) for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

Student Concerns

If a concern arises regarding this course, **your first point of contact is me**: Email or drop in during student hours and I will do my best to address your concern. If I am unable to address your concern, the next points of contact are (in this order):

Note: You can also bring your concerns to [Ombuds services](#).

