

## **ERTH 2314: Sedimentation and Stratigraphy (0.5 credit) – Fall 2023**

Introduction to sedimentary rocks and the processes that form them. Focus is placed on linking physical observations to earth surface processes. Topics include origin of sediments and their transport, distribution, and primary structures; processes of sediment-to-rock transformation; spatial patterns; controls of stratigraphy; methods of correlation.

**Prerequisite(s):** ERTH 1006 and (ERTH 1009 or GEOG 2013).

Lectures three hours a week and laboratory three hours a week.

**Instructor:** Dr. Lyle Nelson, [LyleNelson@cunet.carleton.ca](mailto:LyleNelson@cunet.carleton.ca)

**TAs:** Anne Nguyen ([annenguyen4@cmail.carleton.ca](mailto:annenguyen4@cmail.carleton.ca)), Robin Stark ([robinstark@cmail.carleton.ca](mailto:robinstark@cmail.carleton.ca)), Mark Flesch ([markflesch@cmail.carleton.ca](mailto:markflesch@cmail.carleton.ca)); office hours: TBA

**Lecture Class:** M/W 10:05-11:25 am, 3120 HP

**Lab Class:** W 2:35-5:25 pm, 2130/2120 HP

**Office Hours:** by appointment, office location: 2201 HP

**Text:** Articles and textbook chapters from Principles of Sedimentology and Stratigraphy, Boggs (4th edition) to be posted to BrightSpace; weekly Lab Reference Manual to be posted to BrightSpace

**Course description and learning objectives:** The aim of this course is to learn how to interpret the sedimentary record. Subjects to be covered include weathering, transport, sedimentation, facies analysis, depositional environments, diagenesis, basin analysis, and techniques in field and laboratory studies of sedimentary geology. The first half of the course will discuss sedimentary rocks at the very small scale (grains and transport) and the second half of the course will focus in on stratigraphy and particular sedimentary environments. We will end the course with a section on basin analysis.

**Labwork:** the laboratory component is at the heart of this course. Lab assignments will be the way that you engage the material we cover. All laboratory exercises are due at the end of the lab period and there may not be an opportunity to make up missed labs. You should assemble the following for the lab: hand lens and grain-size comparator card (available from Science Stores in Steacie), coloured pencils, normal pencils, and a scale (in mm/cm).

**Attendance:** You are expected to attend all lectures and laboratories, in-person. Sustained or repeated unexcused absences will be reflected in your final grade primarily because there will be many lab and participatory activities. If you know that you will be absent from a class, please inform the instructor as soon as possible to make arrangements for you to make up the work.

**Assignments and late work policy:** Assignments should be submitted by the beginning of class on the due date. Assignments not turned in on time for any reason other than an excused absence will be accepted up to one week late, but there will be a 5% penalty per day. After one week, the grade becomes a zero. Computer or printer problems are inadequate excuses for late work. Always back up your work and print completed assignments early to avoid problems.

**Grading:** 50% laboratory exercises (4% each, 6% lab exam), 10% midterm, 15% written assignments, 20% final exam, 5% participation and attendance

### **Schedule - subject to change**

| <b>Class</b>          | <b>Lecture Topic(s)</b>  | <b>Lab</b>  | <b>Reading</b>  |
|-----------------------|--|---|---|
| Week 1 (9/6)          | Introduction, nature, description, and classification of sediments | Rock texture and stratigraphic logs                     | Fischer and Garrison, 2009 (optional); Leeder Chpt 10 |
| Week 2 (9/11-13)      | Weathering and physics of sedimentation                            | Sediment Texture  | Boggs 1-2   |
| Week 3 (9/25-27)      | Sedimentary structures   | Grain Size Analysis and Statistics                      | Boggs 3-4   |
| Week 4 (10/2-4)       | Siliciclastic rocks  | Siliciclastic and Organic-Rich Sediment and Rocks, Pt 1 | Boggs 5   |
| Week 5 (10/11)        | Carbonate sediments and rocks                                      | Siliciclastic and Organic-Rich Sediment and Rocks, Pt 2 | Boggs 6   |
| Week 6 (10/16-18)     | Chemical rocks (cont.) and diagenesis                              | Sedimentary Bedforms                                    | Boggs 7   |
| <b>Fall break</b>     | x  | x   | x   |
| Week 7 (10/30-11/1)   | Depositional environments/Facies models + Midterm                  | Carbonates and Other Chemical Rocks                     | Boggs 9   |
| Week 8 (11/6-8)       | Marine environments  | Carbonates and Other Chemical Rocks and Sediments       | Boggs 9, 10   |
| Week 9 (11/13-15)     | Carbonate environments + continental environments                  | Constructing and Interpreting Stratigraphic Sections    | Boggs 11, 8   |
| Week 10 (11/20-22)    | Stratigraphy + telling time  | Downstream Changes in Sediment                          | Boggs 14, 15  |
| Week 11 (11/27-29)    | Sequence stratigraphy  | Basin Analysis  | Boggs 13  |
| Week 12 (12/4-12/8)   | Basin analysis +economic sedimentary geology                       | Lab exam  | Boggs 12, 16  |
| Final Exam (Date TBA) |  |   |   |

### **Feeling Sick?**

If you feel very sick (e.g., fever, chills, stomach upset) do not come to class or campus. Please contact your instructor and TA to inform them of your absence and arrange to make-up any missed materials.

### **Mental Health**

If you are struggling, please do not hesitate to reach out. I am happy to listen, and/or direct you to resources that might help. In terms of class, if you need extra help or missed a lesson, don't stress! Email me and we will set a time to meet. I'll work with you, I promise. Remember that Carleton also offers an array of mental health and well-being resources, which can be found [here](#).

### **University Policies**

In accordance with the Carleton University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

|                                 |            |            |            |
|---------------------------------|------------|------------|------------|
| A+ = 90-100                     | B+ = 77-79 | C+ = 67-69 | D+ = 57-59 |
| A = 85-89                       | B = 73-76  | C = 63-66  | D = 53-56  |
| A- = 80-84                      | B- = 70-72 | C- = 60-62 | D- = 50-52 |
| F = <50                         |            |            |            |
| WDN = Withdrawn from the course |            |            |            |
| DEF = Deferred                  |            |            |            |

### **Academic Accommodations, Regulations, Plagiarism, Etc.**

Carleton University is committed to providing access to the educational experience in order to promote academic accessibility for all individuals.

Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University. More information can be found at: <https://students.carleton.ca/course-outline/>

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

<https://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>

### **Academic Accommodations for Students with Disabilities**

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the [Paul Menton Centre website](#).

### **Addressing Human Rights Concerns**

The University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the [Department of Equity and Inclusive Communities](#) at [equity@carleton.ca](mailto:equity@carleton.ca).

### **Religious Obligations**

Please contact me with requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the [Student Guide to Academic Accommodation \(PDF, 2.1 MB\)](#).

## **Survivors of Sexual Violence**

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/sexual-violence-support/>

## **Accommodations for Missed Work**

Carleton recognizes that students may experience unexpected, temporary incapacitation (i.e., illness, injury, or extraordinary circumstances outside of a student's control). As a result, Carleton has put into place a protocol for students to apply for accommodations using a self-declaration form in the event of missed work. The form can be found at: <https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf> Note that these forms should be used for short-term concerns related to missed work; if you are experiencing chronic, ongoing challenges which necessitate a broader solution, I recommend reaching out to the Paul Menton Centre and/or the Care Support team.

## **For Pregnancy**

Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the [Student Guide to Academic Accommodation \(PDF, 2.1 MB\)](#).

## **Accommodation for Student Activities**

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the [Senate Policy on Accommodation for Student Activities \(PDF, 25KB\)](#).

## **Academic Integrity**

Academic Integrity is upholding the values of honesty, trust, respect, fairness, responsibility, and courage that are fundamental to the educational experience. Carleton University provides supports such as academic integrity workshops to ensure, as far as possible, that all students understand the norms and standards of academic integrity that we expect you to uphold. Your teaching team has a responsibility to ensure that their application of the Academic Integrity Policy upholds the university's collective commitments to fairness, equity, and integrity. (Adapted from [Carleton University's Academic Integrity Policy](#), 2021).

## **Examples of actions that do not adhere to Carleton's Academic Integrity Policy include:**

- Plagiarism
- Accessing unauthorized sites for assignments or tests

- Unauthorized collaboration on assignment and exams
- Using artificial intelligence tools such as ChatGPT when your assessment instructions say that it is not permitted

Please review the checklist [linked here](#) to ensure you understand your responsibilities as a student with respect to academic integrity and this course.

### Sanctions for Not Abiding by Carleton’s Academic Integrity Policy

A student who has not upheld their responsibilities under Carleton’s Academic Integrity Policy may be subject to one of several sanctions. A list of standard sanctions in 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 follow the Carleton University [Student Academic Integrity Policy](#). The Policy is strictly enforced and is binding on all students.

### 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](#).

### Assistance for Students

Academic and Career Development Services: <http://carleton.ca/sacds/>

Writing Services: <http://www.carleton.ca/csas/writing-services/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>