ENVR 202, Sections 01: The Evolving Earth
Bieler School of the Environment
Winter semester 2025 (January 7-April 10)

Class Time: Tues/Thurs: 10:05-11:25
Section 01 (Downtown campus): Macdonald Harrington MDHAR G-10

Instructors:
Brian Leung (course coordinator), Biology & BSE, brian.leung2@mcgill.ca
Raja Sengupta, Geography & BSE, raja.sengupta@mcgill.ca
Fiona Soper, Biology & BSE, fiona.soper@mcgill.ca

Teaching Assistants:
Micah Pavlidis, micah.pavlidis@mail.mcgill.ca
Wendy Ampuero-Reyes, wendy.ampueroreyes@mail.mcgill.ca

*Communication by email is preferred as it provides a written record of the exchange.

Office Hours: TAs will specify office hours before major assignments or exams (exact time to be determined). Instructors do not have fixed office hours, but can meet with students via appointment (contact us via e-mail to set up a meeting). Additionally, you can use the main bulletin board on myCourses for questions about course material so that everyone can share in the exchange.

Course overview: The Evolving Earth explores the key processes of geological and biological evolution that underlie historical and modern-day patterns of variation among landscapes and biota. We seek to balance geological, evolutionary, and ecological perspectives and emphasize their fruitful interplay. We pay special attention to the nature of the interactions between species and their environment that govern biodiversity over time. We touch on the impacts of human activities on natural landscapes and the associated threats to biodiversity, and well as the interactions between evolutionary processes and anthropogenic change. The course is centered at the spatial and temporal scales at which organisms interact with one another and with their abiotic environment. Spatial scales range from the space used by individuals up to the global extent of species distributions, and temporal scales range from generations up to time periods typical of continental movements.

The Evolving Earth will impart a body of basic knowledge about biotic and abiotic aspects of the environment, but also teach ways of thinking about interactions between organisms and their environment. We wish to develop a student's ability to evaluate lines of scientific evidence in a holistic and balanced fashion, both to understand how the patterns of life on Earth came to be over the last 4.6 billion years, and to consider current environmental issues in a broader context.

The course is broken broadly into sections: Origins (that follows the physical formation of the planet, the beginning of life and its subsequent development through geological eras), Mechanisms of Diversification (that dives more deeply into specific evolutionary processes), Human Impacts (that explores the interaction between evolutionary processes and anthropogenic change, and the effect of humans on patterns of biodiversity), and final three Case Studies that tie together topics from throughout the course.

Text books
There are two optional text books if students are interested (they are not mandatory): Richard Martin's Earth's Evolving Systems: The History of Planet Earth (2013/2018, Jones and Barlett Learning) that covers many of the topics mentioned in the class in more detail, as well as Andrew H. Knoll's A brief history of Earth: four billion years in eight chapters (2021, Custom House). As these are optional, we have not requested them from the bookstore. Also, they are relatively affordable used (e.g., see www.abebooks.com). However, the lecture material should be viewed as your primary source of information for learning and assessment.

Evaluation

Assignments (45%). There will be two assignments related to lectures and class discussion. The purpose of these assignments is to help develop your critical thinking skills and your written expression of ideas. Further, they will provide practice and feedback on the type of integrative questions that will be asked during the final. Late assignments will incur a 20% penalty within the first 24 hrs late (e.g., a grade of 80% would result in late grade of 80% - 20%=60%), 5% each additional day, up to a maximum of 7 days, after which the assignment will no longer be accepted.

Class Quizzes (10%). We will have short in-class pop quizzes to assess whether you are understanding the material, and to allow discussion to clarify topics. We will be using "Slido" to give the quizzes. Please see http://www.mcgill.ca/polling/ and the FAQs for students. Note that using any device other than your own or giving yours to someone else so they can vote for you in your absence is cheating. You will need a smart phone, tablet or a laptop. If you do not have either in class, please let one of the instructors know. There will be six quizzes, with the lowest mark dropped, to accommodate for any of life's unexpected events. Thus, if you miss one quiz for any reason, you DO NOT need to contact the professors or TAs (you will need a note from your doctor for subsequent missed quizzes). If you know you will be missing more than one class, contact a professor or TA beforehand to get permission.

Comprehensive Final Exam (45%). There will be a formal final examination covering all material from lectures. The examination will be multiple choice, short question and essay format.

> N.B. We will give a supplemental or deferred final examination to eligible students if necessary, but the supplemental or deferred examination will count only 45% toward the final course grade. In other words, the grades obtained for the

assignments stand as they are at the end of the semester. There is no provision for extra work in this course.

Cardinal Dates
January 7: First class
Feb 6: First class assignment due (20%)
March 20: Second class assignment due (25%)
April 10: Last class & Review session
Comprehensive Final Examination: TBA (45%)

Lecture	Title	Lecturer
1	Introduction: Current biodiversity and course themes	Brian
2	Scientific Method: chance necessity history	Brian
3	Origins: Planet formation (plus stuff from a young earth fit for early life)	Raja
4	Origins: Plate tectonics (plus rock dating)	Raja
5	Origins: Geomorphology	Raja
6	Origins: What is life	Fiona
7	Origins: Natural selection & early life (eukaryotes and sex)	Brian
8	Origins: Early diversification of life – in the seas	Brian
9	Origins: Moving onto Land	Fiona
10	Origins: Paleozoic landscapes and plant evolution	Raja
11	Origins: Human evolution and expansion	Fiona
12	Mechanisms of diversification: Origin of Species	Fiona
13	Mechanisms of diversification: Rates and patterns of evolution	Fiona
14	Mechanisms of diversification: Adaptive radiation	Fiona
15	Mechanisms of diversification: Sexual selection and co-evolution	Fiona
16	Mechanisms of diversification: Mass extinction events	Raja
17	Mechanisms of diversification: Extinction and extirpation	Brian
18	Human impact: Holocene	Raja
19	Human impact: Agriculture	Fiona
20	Human impact: Biodiversity loss and it consequences	Brian
21	Human impact: Invasive species	Brian
22	Case Study: Panama	Brian
23	Case Study: Hawaii	Fiona
24	Case Study: India	Raja
25	The Evolving Earth - Past, Present and Future	Brian

Right to submit in English or French work that is to be graded

In accord with McGill University's Charter of Student Rights, students in this course have the right to submit in English or in French, any written work that is to be graded

Guidelines for Scholarship

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (For more information: www.mcgill.ca/students/srr/honest).

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest*).*

We expect all students to make good use of published resources, material on the Web, and interactions with other students. On the other hand, we also expect every student to give proper credit for ideas they have taken from others. We remind you of Article 15(a) in the Student Code of Conduct and Disciplinary Procedures: ***"No student shall, with intent to deceive, represent the work of another person as his or her own in any academic writing, essay, thesis, research report, project or assignment submitted in a course or program of study or represent as his or her own an entire essay or work of another, whether the material so represented constitutes a part or the entirety of the work submitted."*** Any case of plagiarism will immediately be referred to the Associate Dean for disciplinary action.

Feigned ignorance is not a defense for plagiarism. It is your scholarly responsibility to know what plagiarism is in all its forms and to not fall prey to this serious academic offense. We strongly suggest that you visit and read the McGill's Student Guide to Avoid Plagiarism at http://www.mcgill.ca/integrity/studentguide/. The site includes a number of links that will help you understand and avoid plagiarism. You must go to and read the site, "How Not to Plagiarize" at http://www.utoronto.ca/writing/plagsep.html . We also encourage you to consult one or more of the other web sites that are linked to McGill's Guide.

Expectations for Workload.

The official university norm for the workload in this 3-credit course is 9 hours per week over the 13 weeks attributed to a semester: 3 hours per week of class contact time with the professors (for a total of 39 contact hours per semester), and 6 hours per week of self-study.

This norm applies to the average student who has the proper preparation for the course. An average student might also be expected to get an average mark; depending on their preparation and abilities, students may have to work more than this to attain top marks.

Official McGill Policy on Email:

All students and staff have been assigned a Uniform Email Address (UEA). This is the only email address we will use in this course. All messages **to** students will be sent to their UEA and all messages **from** students **must** be sent from their UEA. We have no way of ensuring that messages to or from other accounts (Hotmail, Gmail, etc.) have been received.

McGill Policy on Exams and Assessment

(https://www.mcgill.ca/secretariat/files/secretariat/2016-04_student_assessment_policy.pdf)

"During the first week of class, Students shall be provided with a description of the means of evaluation to be used in the Course which shall include: (i) the number, nature and forms of Assessment to be used in the Course; (ii) the weighting of each Assessment; (iii) the Course pre-requisites; (iv) whether a form of Assessment to be used may be subjected to text-matching in accordance with the Policy on Text-Matching Software; and
(v) the University's academic integrity policy."

"It is the responsibility of Students to exercise due diligence in familiarizing themselves with: (i) requirements of the Assessments to which they will be subjected in their Courses; (ii) the due date of Assessments; (iii) the date, time and location of their examinations; (iv) the regulatory framework governing: (a) academic integrity; (b) the conduct of examinations; (c) the format and substance of written forms of Assessment; (v) circumstances that would permit Reasonable Accommodation

Religious Holy Days:

The Policy for the Accommodation of Religious Holy Days (https://www.mcgill.ca/secretariat/files/secretariat/religious_holy_days_policy_on_accomo dation_of.pdf) applies to these situations. "Students are not to be penalized if they cannot write examinations or be otherwise evaluated on their religious holy days where such activities conflict with their religious observances." A student seeking accommodation must contact the instructor at least 14 days in advance so that arrangements can be made.

McGill Policy on Academic integrity, Copyright and ZOOM Privacy

Academic Integrity: By submitting this work, I certify that the work represents solely my own efforts. I confirm that I understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures, and am aware of my responsibilities under the Student Assessment Policy. **Copyright**: Please note that the format for the delivery of this course is unusual. It is justified by our current extraordinary circumstances, and aims to allow you, as students, to start and complete this term with the requisite knowledge for this course, and to succeed in your assessments. I ask for everyone's collaboration and cooperation in

ensuring that course materials prepared explicitly for this course (lecture notes, PPTs, videos, etc.) are not reproduced or placed in the public domain. This means that each of you can use it for your own personal purposes, but you cannot allow others to use it, by putting it up on the internet or by giving it or selling it to others who will copy it and make it available. Thank you very much for your help with this.

Privacy on Zoom: Although Zoom publishes a privacy policy applicable to their individual customers, as an institutional account McGill uses an integrated solution to deliver Zoom services for remote teaching. As part of this integrated solution, the information shared with Zoom is limited to the following: first name, last name, full name, McGill user email address, participant's role (instructor or student), course name.
Recordings of online sessions are temporarily stored on Zoom infrastructure before they are automatically extracted and imported into McGill systems and deleted from the Zoom infrastructure once the transfer is complete. Information and privacy protections provided by Zoom have been reviewed and are monitored through the University's continuous improvement process.

McGill Policy on Deferred Final Exams

Students may apply via Minerva to defer a final exam that has been missed (http://www.mcgill.ca/students/exams/dates/supdefer).

The deferred fall-term exams are written during the March study break. Deferred winter-term exams are written in August. A missed deferred exam is considered to be course failure.

Exams are normally deferred for medical reasons. The Faculty recognizes a first-deferral for non-medical while all others must be justified with medical reasons. Some students elect to defer for non-medical reasons (e.g. undesirable exam schedule, travel conflict, etc.) but should be aware of the difficulties involved in getting a good grade in an exam written months after the course is finished.

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.