

**University of Toronto at Scarborough
Department of Physical and Environmental Sciences**

EES A06: Introduction to Planet Earth

Winter 2023

Dr. Kirsten Kennedy

Teaching Assistants and their general roles:

Course Administration: **Siobhan Bonisteel**

Course Material: **Syed Bukhari**

Contact Information:

Most questions can be directed to the discussion boards but pressing personal matters can be directed to the instructor or any TA as appropriate through the Quercus Inbox.

Please read this document carefully. By answering the quiz which is worth 2 bonus marks you are agreeing to having read and accepted the conditions on submitting module assignments.

Structure of the course

This course consists of weekly 2 hour lectures with an online mid-term and final exam (worth 34% and 34% respectively) and 10 approximately weekly online module assignments of which 8 will be included in your final grade ($8 \times 4 = 32\%$). Weekly lectures are open to attend synchronously for all students Mondays from 10:00 to 12:00 and recordings will be made available after class time and will remain available for the remainder of the term. Attendance during the synchronous session is not required, nor recorded.

Quercus

This course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. The site is dynamic and new information and resources will be posted regularly as we move through the term, so please make it a habit to log in to the site on a regular, even daily, basis. To access the course website, go to the U of T Quercus log-in page at <https://q.utoronto.ca>. Once you have logged in to Quercus using your UTORid and password, you should see the link or "card" for [EESA06H3 S 20231:Introduction to Planet Earth](#). You may need to scroll through other cards to find this. Click on the [EESA06H3 S 20231:Introduction to Planet Earth](#) link to open our course area, view the latest announcements and access your course resources. There are Quercus help guides for students that you can access by clicking on the "?" icon in the left side column. SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

Introduction

In this course, you will learn how our planet 'works' by virtual visits to countries in very different geologic settings and by examining the often destructive nature of geologic processes like earthquakes, tsunamis, glaciers, and volcanic eruptions.

We will examine how the landmasses that occupy the surface of the planet are being continually moved and reshaped by the immense forces of 'Plate Tectonics' over its long 4.5-billion-year history. At one time, geologists thought that continents and oceans were immovable, fixed in position and had formed where they are now found. Better knowledge of the Earth's interior and realization that the mantle is hot and is slowly moving by convection which when combined with improved knowledge of the ocean floors resulted in the development of Plate Tectonic theory in 1968 by the University of Toronto geologist, Jock Tuzo Wilson. The hard rocky outer skin of the planet (the crust) is thick (up to 100 km or more), brittle and broken into large pieces called '*lithospheric plates*.' Continents are carried like passengers in the plates that move over the weak hot mantle rocks below at rates up to 25 cm a year. By sliding around the surface of the planet, plates move continents around, opening and closing ocean basins as continents collide or break apart and it has been in operation for at least 3.5 Ga. This process is ongoing: Toronto is moving 3.7 cm every year. *In the 50 years that UTSC has been in existing it has moved almost 2 m westward from its original position.* Your home is not where it was last night and will be in a different place tomorrow. Don't get lost.

The entire plate tectonic process can be likened to a conveyor belt where new crust is created at spreading centers and eventually destroyed by subduction. In this way, the Earth is neither expanding nor shrinking in size. In some cases, orogenic events result in the fusing together of plates (a process called 'obduction') and the creation of even larger plates (called *supercontinents*). Geologists recognize a cycle of supercontinent formation and breakup (*the Wilson cycle* named after Tuzo Wilson) which is the basic rhythm of Earth history and divides the history of the planet into distinct chapters of supercontinental growth and decay.

The course concludes by looking at the 4 billion years long geological history of Canada and Ontario including reference to modern environmental problems facing Canadians. We will look at the complex causes and impacts of climate change, mineral exploration and mining, the impact of urban development, disposal of a wide variety of wastes, the clean-up of contaminated sites and waters, and the key role those environmental geoscientists play in our society. Some have argued that the influence of mankind on our environment is now so profound that we are now living in a different geological era referred to as the *Anthropocene*.

Learning outcomes

At the end of this course, you will know how planet Earth 'works' regardless of your course of study. This knowledge is the key to protecting our complex human world from risks and natural disasters, the need to protect the environment and to find ever scarcer resources, especially the minerals needed for a green economy and water, and extract them in an environmentally-sustainable fashion. This is a field called 'Environmental Geoscience' which is the focus of a Specialist Undergraduate Program within the Department of Physical and Environmental

Sciences (DPES) and a 12-month all-course professional Master of Environmental Science (M. Env.Sc) program.

There is a shortage of suitably qualified environmental geoscientists in Canada and abroad. The profession requires well-trained individuals and offers many diverse opportunities for a career. If you are interested in a career in geoscience see the web site of the Association of Professional Geoscientists of Ontario (pgo.ca) and how to become a P.Geo.

By the end of this course, you should be able to

- 1) Compare and contrast the characteristics, hazards, and mechanics at plate tectonic settings globally.
- 2) Outline the influences in the building of the Plate Tectonic theorem.
- 3) Describe how the Province of Ontario was shaped over 3 billion years of Earth's History.
- 4) Identify ongoing environmental concerns related to Urban Geology in and around Toronto

Recommended Resources

A number of accompanying resources are recommended for this course, particularly for those of you who develop an interest in the material or prefer to explore other learning styles. They are not examinable, and should be considered supplementary.

- 1) The following books are recommended (but not required)
 - **Canada Rocks – The Geologic Journey.** This course textbook frames the geological history of Canada against what is known of modern global plate tectonics. Relevant chapters for each lecture are shown on the attached weekly schedule. I don't expect you to know or be examined on every detail and term in the textbook it is designed to provide background for what we do in lectures.
 - **Tuzo: The Unlikely Revolutionary of Plate Tectonics.** This book is an account of the life and achievements of one of the giants of earth sciences, J. Tuzo Wilson. It is a chronicle of events surrounding the unfolding story of the plate tectonic theorem.
- 2) **Geologic Journey**- a 5-part *World TV* documentary series which aired on Canadian Broadcasting Corporation's 'The Nature of Things' in late 2010 with David Suzuki and Nick Eyles and which is available online on Quercus. It is based on the geology of various parts of the world.
- 3) Websites:
 - **Planet Rocks** - <https://planetrocks.utoronto.ca/> - a compilation of sites of geologic, environmental, and historic interest across Ontario
 - **USGS Earthquake map** - <https://earthquake.usgs.gov/earthquakes/map> - this United States Geological Survey product shows a livestream of ongoing earthquake activity. It is on display in the Environmental Science & Chemistry Building.

Academic Integrity

The University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil>).

utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

Potential offences in papers and assignments include *using someone else's ideas* or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, *obtaining or providing unauthorized assistance on any assignment*. For example, sharing answers or using shared answers constitutes a breach of academic integrity.

On tests and exams cheating includes using or possessing unauthorized aids, *looking at someone else's answers during an exam or test*, misrepresenting your identity, or falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

Evaluation and marks

The course will be evaluated by:

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| a) Mid-term exam (multiple-choice, online): | 34 marks |
| b) Completion of 10 online module assignments *: | 32 marks |
| c) Final exam (<i>non-cumulative</i> , multiple-choice, online): | 34 marks |

If you miss a midterm, you must submit relevant paperwork BOTH through ACORN and through the DPES self-declaration absence form. Please see the following link for further details: <https://www.utoronto.ca/physsci/self-declaration-absence-form-0>. For A-level courses such as this one, it's not permissible to transfer the value of a missed mid-term to the final exam.

Final exam absences must be declared to the Registrars office:
<https://www.utoronto.ca/registrar/missing-examination>

We do not accept any form of absence declaration or extension requests for missed module assignments, but note that your lowest two module grades will be removed for all students.

If you experience any technical issues during an exam, they must be thoroughly documented by capturing screenshots of the problem and contacting course staff.

Things to make your life easier (and ours)

There are over 1000 students in this course, and as such, students should be aware of the following.

1. I and the TAs will be available during regularly-scheduled office hours which will be posted on the course homepage.
2. We don't bell curve exam marks, nor do we round up marks close to a grade boundary.
3. We don't know the dates of the mid-term and final exams until we are informed of them by the Registrar's Office: we have no control over when they are scheduled. Their dates will be announced as soon as we know.
4. AccessAbility Services: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach the AccessAbility Services Office as soon as possible. They will work with you to ensure you can achieve your learning goals in this course. All enquiries are confidential. The UTSC AccessAbility Services staff members are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416-287-7560) or ability@utsc.utoronto.ca.
5. We have a well-trying system in place that deals with virtually every issue that may come up. Your first stop for any issue or question is the discussion boards. Many times, someone else may have already posted about the same problem, and if they haven't, you should post to help others! We monitor the discussion boards closely and try to answer promptly. If you need to discuss something privately, please attend either mine, or the TA's office hours, which will be hosted online (see the main Quercus page for upcoming office hours). There should be little reason to contact me directly, but if necessary, use the Quercus Inbox to do so (see posted instructions). I do not guarantee a response to messages sent directly to my email (which I have deliberately not given out).

Module assignments

Ten module assignments will be posted on-line on the Monday of the relevant lecture and you will generally have about *two weeks* to review and complete each one with **no extensions**. Note that some modules have longer or shorter availabilities which will be posted on Quercus on a page entitled "[Weekly Schedule](#)". During the latter part of the course, there is significant overlap in the availabilities of module assignments. Once you have completed the module assignment, the material will still be available thereafter for exam revision purposes, *but you will no longer have access to the questions/answers*.

It is your responsibility to check the Quercus module assignment schedule and announcements carefully for due dates or changes to availabilities.

The most common reasons for not completing the modules are illnesses, family emergencies, technical issues, and simply forgetting the deadline. Most issues can easily be avoided if you **start early**. In lieu of extensions, every student will have the lowest two of the ten module grades dropped from their final grade.

Technical issues may arise when completing quizzes online and prevent you from completing the module assignment. These issues can be reduced by completing the modules on desktop or laptop computers rather than on mobile devices or tablets, using computers with Ethernet connection rather than Wi-Fi, using Chrome or Firefox browsers, and not leaving the module open and idle for more than 5-10 minutes. In the event of a **technical issue** with completing the module you must email [Syed Bukhari](#) at least 24 hours before the module deadline otherwise it

will not be considered. If you have a grade-related query with respect to the modules, you must contact **Syed Bukhari** no more than one week following the due date.