

EESB15 Earth History Autumn 2010

Rationale:

This course will provide you with a systematic review of the evolution of environments on planet Earth over the last 4500 million years, and in particular, the geology and history of the North American continent and the Canadian landmass.

The latter part of the course touches on how knowledge of geology (now termed geoscience by many) is fundamental to environmental investigations relating to the disposal of wastes, managing contaminants, finding adequate water supplies, safeguarding natural habitat, dealing with urban development and flood waters, energy sources, earthquakes etc. We will touch on how geophysics is used in environmental geoscience investigations.

In this regard I have included lectures on applied real world use of geosciences. Many of you will wish to pursue a career in Ontario in environmental science perhaps working as part of a team for an environmental consulting company or in a government environmental agency. At the moment there is a great demand for geoscientists in western Canada dealing with the environmental consequences of energy extraction. These are good times for geoscientists and there are more jobs than people. If you like the outdoors and want to pursue a career where there are great opportunities for travel and fieldwork, geoscience could be for you.

Overview:

Planet Earth is at least 4500 million years old (4.5 billion or abbreviated to 4.5 Ga meaning giga annum) and a direct geological record (i.e., rocks!) exists for at least the last 3.8 billion years in the form of volcanic, metamorphic and sedimentary rocks. The oldest fossils of ancient life forms found on planet Earth (simple cyanobacteria) are thought to be 3.46 billion years old.

The changing dynamics of convection deep within the Earth's mantle and associated supercontinent assembly and breakup along with meteorite impacts, are now recognized as the major controls on development of the planet's atmosphere, oceans, biology, climate and geochemical cycles. This course reviews this long history and the methods and techniques used by geologists to identify ancient environments and the nature of the fossil record. We will trace the beginnings of plate tectonics on early Earth and the evolution of the modern continents. The effects of climate change on the Canadian landmass, especially glaciations of the last few million years will be reviewed.

Instructor: Ms. Lisa Tutty BSc (hon) MSc PhD candidate in Geology

Office Hours: Monday 10:30 – 11:30 and Wednesday 12:30 – 1:30 in portable #103 room 116 (this is a *shared* office; I am *only* there during my scheduled office hours). I am also available after lecture. Office hours beginning Sep 13, ending Nov 29.

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Contact information: please use the discussion board on Blackboard (BB) for all course related communication. You may discuss matters of a *personal* nature (e.g. illness) during the office hours or by email (tutty@utsc.utoronto.ca). I like being able to discuss course related questions/concerns with students on BB because it is interactive (we can have a back and forth discussion) and because your fellow students may have been wondering about the same things but were afraid to ask. I am here to help you do well in this class; please don't be shy about asking me questions.

Teaching assistant: Katherine (Kathy) Wallace

TA contact information: kwallace@utsc.utoronto.ca

TA office hours: Due-date driven, to be announced on Blackboard.

Course objectives:

1. **SKILLS:** All geoscientists must present their work to other geoscientists, to management and/or to the public. Much of the time this is done in the format of a written report. Through this course you will gain valuable experience in **presenting** your work in a report format. A further skill to be mastered during your undergraduate education is **time management**, with weekly in-class exercises and readings you will stop on top of the material. Vital to all geoscientists are **field observation skills**, you will learn to observe the world around you through a geologic lens.
2. **CONTENT:** You will demonstrate your **knowledge** of course content on brief weekly in-class assignments; an individual report and a group poster as well as on the midterm and final examination.

Expectations:

1. Students and the instructor will treat one another with *respect* at all times – this includes during lecture, on the discussion board, by email and during office hours.
2. Students will take the *initiative* to learn the material; in all university courses you must try to question and apply the material and not simply absorb it.
3. Students will continue to work on their time management and appropriate study *skills*.
4. Students will regularly check the Blackboard site (<http://portal.utoronto.ca>) for important updates, lecture notes, recorded lectures, discussion board, assignment information, etc.

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Required course text:

Eyles, N. and Miall, A.D., 2007. **Canada Rocks: The Geologic Journey**. Fitzhenry and Whiteside, Markham. 512 pp.

Marking Scheme:

Midterm test Oc 18 - **15%**

Field trip & individual report - trip (live **or** virtually) Oct 2nd-4th, report due Oct 25 at 12:10pm - **20%**
Participation (in-class activities during each lecture/trip) - **20%** (**activities online for weboption students**)

Poster assignment (group or individual) - due Nov 22 before 12:10pm - **10%**

Final exam - **35%**

Academic Integrity Statement:

Academic integrity is one of the cornerstones of the University of Toronto. It is critically important both to maintain our community which honours the values of honesty, trust, respect, fairness and responsibility and to protect you, the students within this community, and the value of the degree towards which you are all working so diligently. According to Section B of the University of Toronto's Code of Behaviour on Academic Matters 53 which all students are expected to know and respect, it is an offence for students:

- To use someone else's **ideas or words** in their own work without acknowledging that those ideas/words are not their own with a citation and quotation marks, i.e. to commit plagiarism.
- To include false, misleading or concocted **citations** in their work.
- To obtain **unauthorized assistance** on any assignment.
- To provide **unauthorized assistance** to another student. This includes showing another student completed work.
- To submit their own work for credit in **more than one course** without the permission of the instructor.
- To falsify or alter any **documentation** required by the University. This includes, but is not limited to, doctor's notes.
- To use or possess an **unauthorized aid** in any test or exam.

There are other offences covered under the Code, but these are by far the most common. Please respect these rules and the values which they protect. It is your responsibility to ensure that your work maintains academic integrity. If you have any concerns please see the instructor before a potential problem arises. Please familiarize yourself with the Code (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) and also with the handout "How not to plagiarize", available in the Course Documents section on BB. At the University of Toronto academic dishonesty can result in a *mark of zero, a reduction in final grades, denial of privileges, a monetary fine, failure in the course, suspension, permanent record, a recalling of degrees/diplomas and certificates, or expulsion.*

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Procedures to be followed for missed term work and/or midterm tests:

If you know that you will miss a deadline then please let me know in advance as we might be able to work something out. Should you miss a deadline for any term work you will automatically receive a grade of zero if you do not follow the following procedure. Within **one week** of the missed deadline you must submit a completed **University of Toronto medical certificate** (available on BB) as well as a **letter from you** describing when you fell ill, how it prevented you from making the deadline and when you returned to school as well as your name and student number and the course code. Submit the certificate and the letter to Ms. Pat Woodcock in SW 644; Mon-Fri 9-5 (lunch 1-2) woodcock@utsc.utoronto.ca. Carefully following this process will allow us to properly consider you for consideration regarding your late/missed work for EESB15.

Accessibility Needs: The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: UTSC campus AccessAbility <http://www.utsc.utoronto.ca/~ability/> or St. George Campus DisAbility disability.services@utoronto.ca or <http://studentlife.utoronto.ca/accessibility>.

Final Examination: The final examination is cumulative and will be scheduled by the University and held during the December examination period. The exam will contain multiple choice, true and false and essay type (short/long answer) questions. Figures, movies and animations are examinable, as are in-class participation exercises.

Course Schedule:

Sept 13 & 20 Course overview; expectations and objectives: Beginnings of Planet Earth, evolution of the lithosphere and plate tectonics. Readings: **1&2** in Canada Rocks.

Sept 27 Geological evolution of the Canadian Shield until 1000 million. Readings: **3&4** in Canada Rocks.

Oct 2-4 **Field trip! Live trip, virtual trip to be posted later**

Oct 11 University closed for Thanksgiving holiday, no lecture.

Oct 18 **MIDTERM TEST** Covers lectures (& readings for lectures) 1-3 plus field trip.

Oct 25 600 Ma to 200 Ma: Giant seas flood the Shield and the making of central and eastern Canada. Readings: **5&6** in Canada Rocks.

Nov 1 The making of western Canada (200-100 million years). Readings: **8** in Canada Rocks.

Nov 8 Cool times: the last 55 million years. The ice sheets appear over Canada and change the landscape. Readings: **9** in Canada Rocks.

Nov 15 Rocky resources and mining in Canada. Readings: **10** in Canada Rocks.

Nov 21 UTSC drop date

Nov 22 Environmental challenges for the future: climate, weather, waste, water and the role of geoscientists. Readings: **11&12** in Canada Rocks.

Nov 29 "Using geophysical techniques to map habitat in the Great Lakes" + grad prep