GEOS 197: HUMANITY'S GEOLOGIC LEGACY

Professor: Dr. Tim Cope — MWF 8:00-9:00
Office: JSC 210 — JSC 223
Office hours: by appointment (please use my calendar, link on Moodle)
Best way to contact me: email. *Please use your DPU email account for correspondence*.

THE SCIENCE OF GEOLOGY

Rocks are the Earth's memory. The Earth has forgotten more than it remembers; it is the job of a geologist to work out the story of Earth history from what the Earth's rocks tell us. We read this story from the physical characteristics of rocks, their mineralogy and chemistry, and the fossils they contain. In this class, you will learn a little bit about how to "read the rocks" for yourself, and a lot more about how the rocks across the world have been interpreted by geologists. More importantly, you'll learn much about *how we came to know* about important events that have occurred through Earth history, and therefore be better able to separate truth from fiction in matters involving Earth science.

Humanity didn't always regard Earth as having a history. Rocks were once viewed as static, immobile objects that were created with the rest of the Earth. Even the great Sir Isaac Newton (1642-1726) regarded rocks in this way. Only during the past three hundred years or so were rocks even recognized as the archives of historical information, and the most basic question—how old the Earth actually *is*—was only discovered in the last century. A full recognition of human impacts on the environment, and of the environment on us, is still in the making.

Why study Earth History? It is one of the best ways for us to more fully understand how the Earth works. The Earth is our home; like any home, we should know how all its parts work so that we can properly care for it. Unlike home appliances, however, the Earth has no instruction manual. Furthermore, it is too large, too complex, and changes too slowly to be "experimented upon" in any controlled fashion. If we want to find out more about how the Earth works, we must turn to natural "experiments" that have already been performed for us during Earth's long and eventful history. By examining past events and determining their causes, we learn more about how the Earth system functions.

The philosopher George Satayana once famously said that "those who cannot remember the past are condemned to repeat it." Earth history is an important field of study for this very reason. Indeed, humanity currently occupies a point in time during which the pace of global change rivals some of the most rapid shifts in Earth's lifetime. By considering the present in the context of past events, we place the present in the broader context of Earth history—which, depending upon your state of mind, can be either comforting or terrifying.

PURPOSE OF THE COURSE

The main purpose of this class is to introduce you to college-level reading, writing and discussion by critically assessing what we know about Earth's history and what the value of that knowledge is. It may seem strange to you that writing is featured so prominently in a science course. Scientists do science. They don't write, do they? Here are two big reasons why writing is important in the sciences:

1) Scientific ideas are worthless unless they can be clearly communicated to others. The primary method by which scientific results are communicated—and archived—is through writing. In science, as in many other disciplines, written work is vetted through a process called *peer review*, in which books, articles, and other published materials are subjected to rigorous review by other professionals in the field prior to being accepted for publication. Reviewers of scientific manuscripts often have as much to say about the clarity of the writing as they do about the scientific work itself. We will experiment with peer review in this class.

2) Writing helps to organize one's thoughts more clearly. Often *the writing process itself* helps to clarify the best answer to a scientific problem. Science is complicated. Not all of the answers to complex questions are selfevident. In many cases there are several possible solutions to a problem that need to be critically assessed

before an investigator can root out the most probable answer. The ideas and arguments in a scientific paper, and even the conclusions, often evolve significantly during the course of writing, editing, and revision.

STUDENT OUTCOMES

Students will be able to:

- **Clearly express their ideas and the ideas of others** to varied audiences, both in writing and orally (DePauw University learning goal #9).
- Read more carefully and thoughtfully.
- Engage in thoughtful discussion with professors and peers.
- Use writing and outlining to organize and clarify thoughts.
- Hone written work and ideas through editing and revision.
- Find and appropriately use reference materials. - Communicate science to a general audience.

STRUCTURE OF THE SEMINAR

The Oxford English Dictionary defines *seminar* as "a class at a college or university in which a topic is discussed by a teacher and a small group of students." That's basically what we will be doing in this class—discussing the topics that we read about. On some days, I will be leading a discussion on questions that arise from the reading. In others, I will lead the class on activities (such as field trips). But some of our class meetings will be led by you. Participation in discussions, particularly those that you are leading, is essential.

The seminar is divided into three parts. Each are associated with weekly writing assignments, discussions, and presentations that reflect on the reading. Each concludes with a major paper. Due dates for these are on the attached schedule.

In Part 1, we will read Andrew Knoll's *A Brief History of Earth*, which, as the name implies, is a summary of some of the big events in Earth history and how we know about them. In teams of two, each of you will teach a class on a chapter from this book. As you read, make note of particular things you come across that you find fascinating. Part 1 will culminate in a research paper on a significant event in geologic history, articulating why we should study it.

In Part 2, we will read Alan Weisman's *The World Without Us*, which is a thought experiment about what would happen to the planet if humanity were to suddenly vanish. What would our legacy be? What would we leave behind? Part 2 will culminate in a research paper that addresses a modern scientific question: are we currently living in a time interval geologically significant enough to merit its own name in the geologic timescale?

In Part 3, we will read John Green's *The Anthropocene, Reviewed*. "Anthropocene" is the name for the proposed geologic epoch you wrote about in Part 2. This is a playful book on that theme that consists of several short chapters written as 4-star reviews of all things Anthropocene. Your paper for Part 3 will be a playful review of something from your experience that you find particularly representative of the Anthropocene.

Components of the course:

Reading: All of the assigned reading for this class will be done using *Perusall*, a social e-reader. Book purchases must be made within the through the *Perusall* platform (linked to the Moodle page for the class). Thereafter, you'll be reading and annotating the text using the *Perusall* e-reader. This allows every student to comment and ask questions about the reading, and gives me an idea of student comprehension before every class. You ***must complete all reading on time***, because without having read each chapter carefully beforehand you will not be prepared to participate in the class. Your participation grade in the class will be mostly based on the degree to which you participate in the conversation on *Perusall*.

Student Presentations: During the first part of the class, you and a partner will be responsible for a short (15-20 min.) presentation on the week's topic, followed by a discussion that you and your partner will lead with the entire class. The format of these presentations is flexible—you are essentially team-teaching the course for a day with

your partner. You will need to work carefully with your partner to prepare your presentations and discussions for the day that you are assigned.

Short writing assignments: Most weeks we will engage with what we've read by completing a short writing assignment that tackles a particular theme in the reading. These short assignments are meant as a way for you to practice some of the main aspects of writing you'll need for the major writing assignments—summarizing, synthesizing, and framing arguments—as well as a way for me to assess your individual understanding of the reading material. You may find that much of the writing you turn in for these assignments will be useful for subsequent major papers (see below).

Major papers: As outlined above, there are three major papers (5-10 pages) for this class that tackle important modern questions that arise from the assigned reading. Each of these will require independent research using sources beyond the assigned reading. The due dates for drafts and final papers are listed on the attached schedule, and on written handouts I will provide for each. To ensure that first drafts are of good quality, your final grades on these assignments will be an *average* of the first draft and the final. Drafts must be completed on time to receive feedback from me and to participate in peer review sessions. Outstanding papers may be nominated for inclusion in the "Best Required First-Year Seminar Writing" volume compiled by the Writing Curriculum Committee each year. I've had a student entry every year, don't let me down!

Quizzes: Quizzes will be given as needed to assess your understanding of the material. The dates of quizzes will be given in advance. Expect that *anything* you are asked to know or understand in our seminar discussions and from the reading might show up on a quiz.

Other activities: We will reserve several seminar sessions for discussion of assigned readings, peer review of student papers, and one-on-one student conferences. Tentative dates are shown on the attached schedule. Advance notice will be given. Please come prepared to participate in these sessions (i.e., having carefully completed the reading, or with a draft of your paper for peer review).

Time outside of class: According to the Student Handbook (p. 59), a full-time DPU student should spend 40-50 hours a week on coursework (the equivalent of a full-time job). Accordingly, you should plan on spending a minimum of 7 hours per week outside of our regular class meetings working on the writing and reading assignments and conducting outside research for this course. If you find yourself struggling in the class, please be honest with me if the reason is that you are not spending the amount of time that you should be outside class meetings.

Assessment:

Your seminar grade will be calculated as follows:

Short writing assignments: 10%
Presentations: 10%
Paper #1 (average of draft and final): 20%
Paper #2 (average of draft and final): 20%
Paper #3 (no draft, just final): 20%
Participation (*Perusall*, discussion, quizzes): 20%

On a grading scale of:

A	93-100%	C	76-74%
A-	92-90%	C-	73-70%
B+	89-87%	D+	69-67%
B	86-84%	D	66-64%
B-	83-80%	D-	63-60%
C+	79-77%	F	<60%

GENERAL POLICIES

Below are policies for how we will conduct class that I expect every seminar participant to adhere to.

Electronic devices

Please bring your laptop to every class session, but do not allow it to become a distraction. While in class, use your laptop only for seminar work. Cell phone use is prohibited unless specifically requested by me. Do not use any electronic devices for frivolous purposes during class (Facebook, text messaging, etc.). This is a very good way to get on my infamous "bad side" (cf. ratemyprofessors.com).

Academic dishonesty

Cheating, plagiarism, or any other submission of the work of others as your own violates DePauw's policy on academic integrity. It also defeats the purpose of your education. If you are ever confused about what does or does not constitute academic dishonesty, just ask yourself whether your motivation is to help you better attain the learning outcomes for this class. If not, chances are you are in violation of the policy.

Violations of the academic integrity policy may result in penalties ranging from a lowered grade to course failure, suspension, or expulsion. The policy can be found in the Student Handbook, or here. If you have any questions about my expectations regarding academic integrity, including expectations regarding group work, it is your responsibility to ask me.

Generative AI Policy

Any use of AI in this class will be treated just like assistance from another person. Assistance of any kind is prohibited on items meant to assess *individual* learning, such as exams and quizzes. Likewise, it circumvents the learning goals of this class—and it is plagiarism—to turn in written work generated by AI in place of your own.

However, it is wholly appropriate for writers to incorporate ideas or information from outside sources into their writing, as long as the source is clearly identified. It is also appropriate to brainstorm, discuss, or get feedback on your written work from others, as long as the help is acknowledged. These *collaborative* uses, within limits, are appropriate uses of AI in this course.

Just like other sources, any substantial ideas or information obtained from AI should be vetted by you for accuracy (AI often misunderstands or is wrong). It must also be cited, following MLA guidelines. I may require you to produce a transcript of any conversations you have with AI for assignments in this class, so be sure to save these.

Finding and using reference material

Seek out and read the *primary* published sources of information whenever possible. For instance, Wikipedia is not a primary source, but the references listed at the end of a Wikipedia entry often are. You will usually find that references listed at the end of one article lead to other references, which lead to other references, etc. Drilling down through reference lists in this manner is often the best way to get a feel for the body of research that has been done on a particular topic.

You should look for authoritative, published, peer-reviewed material whenever possible. This includes textbooks, journal articles, and some magazine articles. For non-scientific material (i.e., opinion pieces, etc.), most public sources are okay, but be aware that the opinions expressed may not be accurate reflections of reality. Website URLs that end in .edu or .gov are usually fine as primary sources for general information or data. Commercial websites (.com) are usually not. Non-profit websites (ending in .org) are allowable, as long as they are from scientific organizations that feature the work of experts in the field (realclimate.org is a good example). The format for referencing sources in papers will be included with each formal writing assignment.

Seeking out appropriate references is a fundamental part of research and scholarly writing. I strongly encourage you to use the abundant resources in the library and (for some topics) on the internet to supplement the information given to you in class. The DPU library databases, Google (particularly Google Scholar), and reference lists from websites, textbooks, and research papers are all good places to start. Learn how to use them. There will be a quiz on this.

RESOURCES

Accommodations for those with disabilities

It is the policy and practice of DePauw University to provide reasonable accommodations for students with properly documented disabilities. Written notification from Student Accessibility Services is required. If you are eligible to receive an accommodation and would like to request it for this course, please contact Student Accessibility Services. Allow one-week advance notice to ensure enough time for reasonable accommodations to be made. Otherwise, it is not guaranteed that the accommodation can be provided on a timely basis. Accommodations are not retroactive. Students who have questions about Student Accessibility Services or who have, or think they may have, a disability (psychiatric, attentional, learning, vision, hearing, physical, medical, etc.) are invited to contact Student Accessibility Services for a confidential discussion in Union Building Suite 208 or by phone at 658-6267.

Religious Holy Days

DePauw University embraces the religious diversity of its students. Accordingly, faculty members are expected to excuse students from class and be flexible with respect to deadlines for required coursework in order to enable students to observe religious holy days. Faculty are also expected to make it possible for students observing holy days to make up any work they miss, provided arrangements are made in advance. Students are expected to notify their instructors of their intent to observe holy days at least one week in advance of these days. For the sake of this policy, "holy days" are defined as periods of time in which either activities required by normal class participation are prohibited by a religious tradition, or a special worship obligation is required by a religious tradition. ("Religious Holy Days," Section VII, Academic Policies, Academic Handbook)

Students with questions should contact Maureen Knudsen Langdoc, University Chaplain and Associate Dean or Jonathan Martin, Associate Chaplain and Director of the Center for Spiritual Life (spirituallife@depauw.edu; 765-658-6768).

Student Title IX Policy

DePauw University affirms its commitment to fairness and equity in all aspects of the educational experience. Harassment and discrimination based on gender or sexuality—including sexual harassment, sexual assault, dating violence, domestic violence, stalking, and Title IX retaliation—prevent students from accessing an equal education and violate university policy as well as the law. Find full information at www.depauw.edu/titleix. If you or someone you know experience behavior that is coercive, discriminatory, harassing, or sexually violent, you are encouraged to contact our Title IX Administrators, Rhyan Smith, JD or Dionne Jackson, Ed.D. at titleixcoordinator@depauw.edu or 765-658-4155.

The Learning Commons (TLC)

The DePauw Writing Center (aka "W Center") is located in TLC in Roy O. West Library. TLC also offers support in W (writing), S (speaking and listening), and Q (quantitative reasoning). USE THEM. Peer consultants can help with assignments at any stage of the process. You may schedule appointments online to meet with a writing specialist. Before you arrange an appointment, be sure to have a draft in hand!

Important Resources

Counseling Services - website or 765-658-4268 or email counselingservices@depauw.edu.

DePauw Health - website or (765) 658-4555

Bias Incident Response Team - website

Financial Aid Office - website or 765-658-4030

Payments/ Business Office - website or 765-658-4015

Internships, careers and off-campus study - Hubbard Center

Office of Student Affairs/Student Life - https://www.depauw.edu/studentaffairs/

Course Schedule

This is a general schedule for the seminar that we will try to follow. Adjustments may be made as necessary. Additional readings may be assigned. Those with an asterisk* will be provided.

Week of:	Activity	Reading (by Mon.)	Assignments
Aug 23	Introduction; course outline	Field trip to Nature Park	None.
Aug 27	Geologic time and zircons	Knoll, Ch. 1	Chapter 1 notes Library Tour
Sept 4	Labor Day (M) Plate tectonics	Knoll, Ch. 2	Short written assignment A Team 1 Presentation
Sept 11	The origin of life and a habitable Earth	Knoll, Ch. 3 & 4 Yong*, RL: Cellmates*	Short written assignment B Team 2 presentation Team 3 presentation
Sept 18	Stratigraphy, evolution, extinction	Knoll, Ch. 5 & 6	Short written assignment C Team 4 presentation Team 5 presentation
Sept 25	Obtaining and Reading Scientific Literature	Knoll, Ch. 7 & 8	Paper #1: History Lessons Team 6 presentation Team 7 presentation
Oct 2	Outlining, organizing, and writing	Weisman, Part I	Paper #1 draft due (Friday)
Oct 9	Conferences	Weisman, Part II	Paper #1 drafts returned
	FALL BREAK: Oct 14-22		
Oct 23	The Anthropocene, Limnal*	Weisman, Part III TAL Fermi's Paradox*	Paper #1 final due (Friday)
Oct 30	An Inconvenient Truth*	Weisman, Part IV	Paper #2: The Anthropocene
Nov 6	Merchants of Doubt*	Intro – Air Conditioning	Paper #2 drafts due
Nov 13	Conferences	Staphylococcus - Indianapolis	Paper #2 drafts returned
Nov 20	Conferences	Bluegrass - Wintry Mix	
	THANKSGIVING BREAK: November 22-26		
Nov 27	Workshop	Hot Dogs - Postscript	Paper #2 final due (Friday)
Dec 4	Workshop	Post-Postscript – Ginko	Paper #3 –Review

Paper #3 due Wednesday, December 13, by noon