

231-22 INTRODUCTION TO EARTH SCIENCE 2011 FALL

Adjunct Professor: T.T. Vandergraaf, B.S., Ph.D., FCIC
Phone: 204. 753. 84.02
e-mail: ttveiv@mts.net, Tjalle.Vandergraaf@prov.ca

Introduction

This introductory course is intended to look at the Earth as a system and at some of its geological, geochemical, hydrological, geophysical and atmospheric processes. We will look at these aspects not only from a scientific viewpoint but also consider environmental and social perspectives, where appropriate. This course also forms a foundation for a course in Environmental Science [231-23], although it is not a prerequisite for that course.

Textbook

Tarbuck, Edward J., Frederick K. Lutgens and Dennis Tasa. 2008. *Earth Science*, 12th Edition, Pearson / Prentice Hall. Upper Saddle River, NJ, USA. ISBN-10: 0-13-602007-0

Although there is a more recent edition of this textbook available, the College Bookstore has secured a number of used 12th edition at a substantial saving over the more recent edition. In addition to the textbook, I will use some additional resources that will be made available at the appropriate time. It is up to you, though, to ensure that you have all additional handouts and supplementary material.

There may be previous editions of the textbook floating around. Note that there may be subtle and not so subtle differences between various editions. If you choose to buy a used copy of the 10th or 11th edition or a more recent edition, you're on your own!

Reference Texts

There are a few books in the Providence University College library that offer a Christian perspective on Creation.

Miller, Keith (ed). 2003. *Perspectives on an Evolving Creation*. Eerdmans. ISBN 0-8028-0512-4. [231.7652 P467m]

van Till, Howard. 1986. *The fourth day: what the Bible and the heavens are telling us about the creation*. Eerdmans. ISBN 0-8028-0178-1 [231.765 V282f]

Young, Davis. 1995. *The Biblical Flood: A Case Study of the Church's Response to Extrabiblical Evidence*. Eerdmans. ISBN 0-8028-0719-8. [222.110609 V69b]

Young, Davis, and Ralph Stearley. 2008. *The Bible, Rocks and Time: geological evidence for the age of the Earth*. IVP Academic Press. ISBN-10: 0830828761 [231.7652 Y69b]

The book by Young and Stearley is especially useful but is not an easy read. I have placed these books on the *Reserve List* in the Library. They can be taken out for a maximum of one week. Additional reading material may be added to this list during the course.

Lectures

The course will be given during two 75-minute time periods on Wednesdays, from 12:40 PM to 1:55 PM and from 3:20 PM to 4:35 PM. I intend to place copies of the overheads (Microsoft PowerPoint in Adobe Acrobat format) in the shared area of the Providence University College Student Portal prior to the lecture. There is therefore no need to copy every word on every overhead unless you like to do that sort of thing. Any supplementary material will also be placed in the shared area.

Important Note

I will be unable to meet with the class on two successive Wednesdays, September 28 and October 05. The timing for my absence is not very good because the Wednesday before the 28th has been designated as the annual Day of Prayer. This means that there will be a 3-week hiatus between classes. To accommodate my absence, I will give you reading assignments. I will also give you homework assignments that will be due by September 28 and October 5 and can be submitted either by e-mail or via the College receptionist who will date-stamp your assignment. These two homework assignments constitute 15% towards your final grade and should therefore not be taken lightly. I will spend some time on October 12 to go over some of the assigned material. If needed, I will try to arrange to schedule an additional lecture to make up for the ones that I have to cancel.

Another Important Note

A free workshop has been scheduled for **October 05, 09:50 - 12:15** on doing academic research and writing (hopefully) excellent papers. All students, and *especially* new students, should attend this helpful workshop. At various points during your time as a Providence University College student you will be expected to submit research and writing assignments. This workshop will help you to excel in these tasks.

Prerequisites

Although students should be familiar with basic Chemistry and Physics concepts, I plan to devote the second lecture on September 12 to review some of these concepts. If you feel you need some additional help, I have a few textbooks that you may borrow.

Course Description

I plan to start the lectures considering the Earth as a system and a brief review on basic chemistry and the current theories on the formation of the elements. We then move on to the earth itself (geosphere), including operational physical and chemical processes, surface and sub-surface waters, plate tectonics, orogenesis and volcanism. Somewhere in this section we will spend some time on geochronology. We then continue with a couple of lectures on oceans. We finish the semester with the atmosphere, the study of clouds, precipitation, and weather patterns, if time permits.

Some aspects of geochronology become a lot clearer with a basic understanding of nuclear physics and nuclear chemistry. Since these disciplines are usually not covered in high school or in introductory college-level science courses, I have included a lecture to cover this material.

Class Attendance

Because classes only meet one day each week, skipping lectures one day is tantamount to missing ~8% of the course. This is not the best way to get the most out of the course! I don't have a firm attendance policy but I do take attendance at the beginning of each class, if for no other reason than I have found from experience that it helps me match names to faces and vice versa. Your absence will be noted and, like it or not, will have a direct bearing on my judgment when it comes to assigning letter grades to "border line cases." To that extent, I have assigned 5% of your final grade to attendance. If you are absent for two or more weeks in a row, I may ask you for an explanation of your absence. You are, of course, responsible for obtaining any information and handouts distributed during your absence.

Use of Laptops and Cell Phones in the Classroom

Past experience has shown me that not all students use laptops exclusively to take notes. Playing computer games, surfing the Internet or e-mailing can be distracting to other students. I don't want to ban laptops but if you insist on using your laptop or smart phone for extracurricular activities, I am asking you to sit in the back of the class to avoid any potential distraction. Make sure that you have set any communication device to *stun* during the lectures. Don't even think of using smart phones or other devices during exam!

Consultation

Since I have to travel a fair distance to the campus, I will generally only be available for face-to-face consultations on Wednesdays between 2:00 PM and 3:00 PM, or "by request" prior to 12:40 PM. You can usually find me in my temporary office (Room 2H26) or in the Faculty lounge.

You can contact me by phone or e-mail. Phoning requires long-distance calls, and I will not accept collect calls. The most economical way to reach me is by e-mail (ttveiv@mts.net). Unless "the system is down," I will be able to access my e-mail at any time. Try to avoid Sundays, if possible, as that's my day of rest (I come from a pietistic stream of Christianity).

Assignments

You are expected to prepare yourself for the lectures by reading the chapter prior to it being discussed in class. That way, you will have some familiarity with the subject. As one of my philosophy professors, H. Evan Runner, used to say, "*The first time you hear something, you forget it. Therefore, the next time you hear it, you think it's the first time.*" By reading ahead, we may be able to spend some time each week pondering some of the more interesting discussion aspects and questions at the end of each chapter.

There are a number of Review Questions at the end of each chapter. They are an excellent tool to gauge your understanding of the material covered in those chapters. I expect you to do these exercises. With the exception of the September 28 and October 5 sessions, I am not asking you to submit your answers to me but I will be quite happy to discuss the questions during the second lecture period of each Wednesday. Some of the questions may show up on quizzes or may resurface on the exams.

Exams

- There will be two exams during the course of the semester. The first exam will cover material from the start of the course; the second exam will only cover the material presented since the first exam
- The final exam will cover the entire semester but will concentrate on the material covered after the second exam
- There will be NO multiple-choice questions
- Most questions on the exams will require sentence or essay-type answers

Missed Exams

Preparing fair exams is a difficult task; preparing make up exams that match the original exam in degree of difficulty is even more difficult. The exam dates are set well in advance and you are expected to be present for the exams. However, in case of a genuine emergency (certified illness, bereavement), I will be willing to make alternate arrangements. Note that there are special rules for final exams. All requests to have a final exam rescheduled must be approved by the Academic Committee in accordance with the Examination General Regulations. See http://www.providencecollege.ca/college/programs/registrar_office/calendar/.

Grading

Your final grade in the course will be determined as follows:

- 5% Class Attendance
- 15% September 28 and October 5 assignments
- 25% First Exam
- 25% Second Exam
- 30% Final Exam

The conversion of the numerical mark to a letter grade will follow the scale adopted by the Division of Arts and Sciences and is shown in the following Table:

numerical grade	letter grade	numerical grade	letter grade	numerical grade	letter grade
91 - 100	A+	70 - 72	B-	53 - 56	D
85 - 90	A	67 - 69	C+	50 - 52	D-
80 - 84	A-	63 - 66	C	<50	F
77 - 79	B+	60 - 62	C-		
73 - 76	B	57 - 59	D+		

Plagiarism

The Concise Oxford Dictionary defines plagiarism as taking and using “another person’s (thoughts, writings, inventions ...) as one’s own”. To plagiarize is to tell a lie, to convey the impression that a person knows more than he/she really does. Plagiarism is dealt with rather harshly in secular institutions of learning and is no more acceptable in the courses I teach at Providence University College and Seminary.

Plagiarism usually takes one of two forms,

- cheating during an exam
- not giving due credit in term papers

Cheating during an exam may be premeditated when a student brings in notes to be used during the exam, or spontaneous, when one’s gaze wanders to the exam paper of a nearby student. Both can easily be prevented, but remember that Satan is a wily adversary.

Plagiarism in term papers and book reports is more difficult to avoid and can at times be inadvertent. When in doubt, use a reference. Just make sure you have actually read the reference! If a thought or idea in your term paper originated from discussions with friends or other students, indicate this, for example, by using the phrase, “in discussions with fellow students, the thought occurred to us that ...” or, “... suggested in an informal discussion of the topic of this paper that ...”

If I have reasonable grounds to suspect plagiarism, I will meet with the student and discuss the incident. If the student is unable to satisfy the instructor that plagiarism has not taken place, I will inform the Dean at Providence University College or Seminary, who will then take appropriate action, in accordance with the rules of the College. Additional information can be found at http://www.providencecollege.ca/college/student_life/.

Feedback

There are very few, if any, courses that cannot stand improvement and 231-22 is no exception. The College uses a formal evaluation process where students are invited to complete an evaluation form. However, that evaluation takes place at the end of the course and there may be

a need for a “mid course correction.” I welcome any suggestions you have on how to improve the course, including course contents, method of delivery, criteria used to assess your understanding (i.e. severity of the exams or lack of challenge) and invite you therefore, to discuss any concerns you have about the course with me. Remember, you or your benefactor(s) are paying your tuition and that it is important that the College provides value for money.

SCHEDULE FOR 231-22: INTRODUCTION TO EARTH SCIENCES
Fall 2011

Date	Time	Lect.	Topics	Chapters
Sep. 07	1240 – 1355	1	Introduction	1
	1520 – 1635	2	Review of Basic Chemistry Concepts	hand outs
Sep. 14	1240 – 1355	3	Earth Materials: Minerals	2
	1520 – 1635	4	Earth Materials: Rocks	3
Sep. 21	1240 – 1635		Day of Prayer: No Classes	
Sep. 28	1240 – 1635		Weathering, Soil, Mass Wasting	4
Oct. 05	09:15 - 12:15		Workshop on Academic Research	
	1240 – 1635		Glaciers, Deserts, Wind Erosion	6
Oct. 12	1240 – 1635	5	Summary Lecture of Chapters 4 and 6	
	1520 – 1635	6	Groundwater and Running Water	5
Oct. 19	1240 – 1355		Exam #1	
	1520 – 1635	7	Earthquakes	7
Oct. 26	1240 – 1355	8	Plate Tectonics	8
	1520 – 1635	9	Volcanism	9
Nov. 02	1240 – 1355	10	Orogenesis (Mountain building)	10
	1520 – 1635	11	Nuclear Physics and Nuclear Chemistry	11, hand outs
Nov. 09	1240 – 1355	12	Geochronology; Oklo phenomenon	11; hand outs
	1520 – 1635	13	Earth's Evolution through Geologic Time	12
Nov 14			LAST DATE FOR VOLUNTARY WITHDRAWAL	
Nov. 16	1240 – 1355		Exam #2	
	1520 – 1635	14	The Oceans - I	13, 14
Nov. 23	1240 – 1355	15	The Oceans - II	14, 15
	1520 – 1635	16	The Atmosphere	16
Nov. 30	1240 – 1355	17	The Hydrologic Cycle - I: Moisture, Clouds	5, 17
	1520 – 1635	18	The Hydrologic Cycle - II: Clouds, Precipitation	5, 17
Dec. 07	1240 – 1355	19	Air pressure; Wind	18
	1520 – 1635	20	Weather Patterns and Severe Storms; Climate	19, 20
Dec. 14	1400 - 1600		Final Exam (time tentative)	