GEOL 102 Historical Geology:

The History of Earth and Life

Spring Semester 2019

Instructor

Dr. Thomas R. Holtz, Jr., Principal Lecturer, Department of Geology
Office: GEO 4106 Office Hours: W 10-11:30 am or by Appointment
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Classrooms

PLS 1113	9:00-9:50 am	MWF (Lecture)
GEO 2107	2:00-5:00 pm	W (Lab)

Texts

Lecture Text: *Earth System History 4th Edition* by Steven M. Stanley & John A. Luczaj (2015, W.H. Freeman & Co., ISBN-13 978-1429255264)

Lab Manual: *Insights: A Laboratory Manual for Historical Geology* by Clair Russell Ossian (2015, K/H, ISBN-13 978-1-465-25959-2)

Supplementary Text: *Maryland's Geology* by Martin F. Schmidt, Jr. (2010, Schiffer Publishers, ISBN-13 978-0764335938)

Website: https://www.geol.umd.edu/~tholtz/G102/

Learning Outcomes

By the end of the semester, every student should be able to:

- Identify the major techniques used by geologists to assess the paleoenvironments and sequence of events found in the rock record
- Recognize the sequence of and interrelationships between major events in the history of the Earth, its surface, and its life forms
- Properly classify different types of sedimentary rocks & structures and major groups of fossilizing organisms from hand samples
- Correctly interpret geological cross-sections, fence-diagrams & other stratigraphic charts, and geologic maps

Course Organization

3 lectures per week (Monday, Wednesday, Friday)

One non-mandatory day-long field trip to western Maryland: Saturday, April 13

Lectures lost due to University late openings or cancellations or instructor absence will be made up as Panopto video recordings on the ELMS page

COURSE GRADES

Grade Scale

The numbers given represent the thresholds that must be passed in order to reach that grade (for example, A+ is 97.000... and any number greater). There is no rounding for letter grades; the thresholds must be passed. F is any grade below D-. Thresholds: 97, A+; 93, A; 90, A-; 87, B+; 83, B; 80, B-; 77, C+; 73, C; 70, C-; 67, D+; 63, D; 60, D-; < 60, F.

The Final Grade is the algebraic sum based on the numerical grades.

Grade Components

ITEM	PERCENTAGE
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	20%
Labs	25%
Quizzes	15%

Midterm Exams (20% each): Two pen-and-paper exams on February 28 and April 13, respectively. Absence from the exams will not be excused except for those causes approved by University policy in the University of Maryland Undergraduate Catalog see http://www.ugst.umd.edu/courserelatedpolicies.html, under "Attendance, Absences, or Missed Assignments"). Only those students excused for these causes will be eligible for a make-up exam.

Final Exam (20%): A pen-and-paper final exam during the regularly scheduled exam season. It is cumulative for the entire course. Format is similar to the mid-term exams. The preliminary date is **MONDAY MAY 20, 8-10 am** (to be confirmed mid-semester): please plan your end-of-semester travel accordingly!! (It that means informing your parents about this now, please do so!) Again, absences from exams will not be excused except for those causes approved by University policy in the University of Maryland Undergraduate Catalog.

Quizzes (15%): Weekly quizzes will be given either in class or in lab (depending on time available that week), but which emphasizes the material from the lectures. These will typically be multiple choice, fill-in-the-blank, matching, or true/false. The lowest **two** (2) quizzes will automatically be dropped: this is how missed quizzes will be accommodated.

Labs (25%): Essentially every week there will be a lab. Labs are due the week after they are assigned, allowing students time to examine specimens over the course of the week if they wish. For more information, see the separate lab syllabus. The lowest lab grade will be automatically dropped. **NOTE**: Most labs are derived from the Ossian textbook (see above); it is vitally important that each student purchase a copy of this text.

EXPECTATIONS & POLICIES

Expectations & Attendance

Historical Geology is a foundational course for the field. Many of your later courses—Sedimentology & Stratigraphy, Structural Geology, Geochemistry, Field Geology, and perhaps even your Senior Thesis—will draw upon methods, concepts, and terms derived from this class.

If you hope to earn a good grade for the class, and to retain the information for future classes, make sure that you keep up with the readings (from the textbooks and the online lecture notes), and make sure you that you understand the concepts and information. If you are having problems, feel free to ask questions (in class, by email, or in Office Hours)

Attendance in class is expected. The PowerPoints will not be provided to students, although there are detailed lecture notes online. If you cannot make a certain lecture, try and find another student who might lend you their notes. (In fact, establishing a study group early in the course has proven useful for many students in the past).

NOTE: Attendance means more than mere presence: it means "paying attention". Please take out your ear buds and refrain from texting/web-browsing/doing homework/etc. in class and in lab.

Communication

Communication in this course will primarily be by means of the ELMS Inbox email system. In cases of inclement weather or other unexpected emergencies, the University may close. Please consult the University main webpage (http://www.umd.edu) or call 301-405-7669 (SNOW) to confirm such cancellations. Dr. Holtz will contact students via ELMS in order to inform them concerning delays of due dates for projects to be handed in or for exams: typically, these will be shifted until the next available class date.

Memorization

As part of the nature of the course, there will be a lot of memorization (less than a foreign language class, but more than that found in more mathematically-oriented introductory science classes). This will include lots of anatomical, geological, and paleontological terms, as well as evolutionary and temporal relationships. If you have difficulty memorizing, this may not be the class for you. Also, if there are words or concepts with which you are not familiar, feel free to ask Dr. Holtz (in class, after class, over email, etc.) for an explanation or clarification.

General Policies

The University has provided a page on Academic policies at http://www.ugst.umd.edu/courserelatedpolicies.html. Each student is responsible for reviewing this page with regards to issues of Academic Integrity; the Code of Student Conduct; Sexual Misconduct; Discrimination; Accessibility; Attendance, Absences, or Missed Assignments; Student Rights Regarding Undergraduate Courses; Official UMD Communication; Mid-Term Grades; Complaints About Course Final Grades; Copyright and Intellectual Property; Final Exams and Course Evaluations; and Campus Resources.

Laptop/Smartphone/Tablet Use

Recent studies have shown that:

- People who take notes using pen/pencil and paper more effectively process and master the material, especially with regards to their ability to answer conceptual questions. (Also, taking notes by hand allows easier doodling, which has been shown to promote focus and memory).
- More importantly, people using laptops are likely to start multitasking (pulling up social media; watching videos; playing games; doing work for other classes; etc.) and that such multitasking is detrimental to the both the student doing it and all students within view of that screen.

Towards this end, I **very strongly encourage** you to take notes via pencil/pen and paper. It is in your academic benefit to do this.

If you choose to take notes using a computer, you are agreeing to the following conditions:

- Computer use is limited to following along with lecture notes, taking notes yourself, or searching for additional information (via Wikipedia, journal articles, and similar sites) concerning the lecture matter.
- You will refrain from using your computer from any or all of the following during classtime: doing class assignments for this or other classes; using social media, texting, email, or other electronic modes of

communication; viewing any websites or apps other than those listed in the first bullet point (i.e., no checking news, entertainment, sports, shopping, etc., sites).

- Failure to restrict your computer use will mean that laptop & smartphone use by **all students** in class will be prohibited for the rest of the semester. Apologies to those students who prefer to use this method to take notes, but this is the only effective way of dealing with the bad actors.

When not in use, smartphones, tablets, laptops, and all other modes of electronic communication must be **turned off** and **stowed away** during class time. (**NOTE**: using your smartphone between your legs underneath the desk is NOT "stowed away", and you aren't and have never fooled a teacher or instructor when you try that…) If you are using the device for recording lectures, please activate them then leave them untouched for the remainder of the lecture.

That said, there may be some group activities in which we will use individual laptops/tablets/smartphones in class. Dr. Holtz will make every effort to inform you about this in advance. However, in those situations you may only use these devices for the task at hand.

Course Evaluations

CourseEvalUM will be open for students to complete their evaluations during the last two weeks of the semester. Students can access CourseEvalUM through ELMS to complete their evaluations. You will be alerted about these dates and provided more information closer to that time, and students will be alerted via their official University e-mail account.

Students who complete evaluations for all of their courses in the previous semester (excluding summer), can access the posted results via Testudo's CourseEvalUM Reporting link for any course on campus that has at least a 70% response rate. You can find more information, including periodic updates, at the IRPA course evaluation website:

https://www.irpa.umd.edu/Assessment/CourseEval/fac_faq.shtml

The expectation is that all students will complete these. This is YOUR chance to anonymously evaluate this class: please use this opportunity!

Lecture Schedule

DATE	**TOPIC**	**CHAPTER**
Jan. 28	Introduction: It's About Time **[Online Panopto Recording: Do not meet for class]**	1
Jan. 30	Every Rock is a Record of History: Historical Approaches to Lithology **[Online Panopto Recording: Do not meet for class]**	2
Feb. 1	Terrestrial Sedimentary Environments	5
Feb. 4	Fluvial & Deltaic Environments & Walther's Law	5
Feb. 6	Coastal & Marine Environments; Transgressions & Regressions	5
Feb. 8	Physical Stratigraphy	6
Feb. 11	Index Fossils, Correlations & Radiometric Dating	6
Feb. 13	Lithostratigraphy	6
Feb. 15	Biostratigraphy & the Geologic Timescale	6
Feb. 18	Another Geography: Plate Tectonics	8
Feb. 20	Every Valley Shall Be Exalted…: Orogenesis I	9
Feb. 22	…And Every Mountain & Hill Made Low: Orogenesis II & Geochemical Cycles	9, 10
Feb. 25	Fossils & Fossilization	3, 4
Feb. 27	Evolution I: On the Origin of Species by Means of Natural Selection	7
March 1	Evolution II: Patterns, Processes & Phylogeny	7
March 4	Strange Eons: Introduction to the Precambrian & the Hadean Eon **[Online Panopto Recording: Do not meet for class]**	11
March 6	**Midterm Exam I**	
March 8	The Archean Eon I	11
March 11	The Archean Eon II	11
March 13	The Proterozoic Eon I	12
March 15	The Proterozoic Eon II	12
March 18-22	**SPRING BREAK**	12
March 25	The Proterozoic Eon III	13
March 27	The Early Paleozoic Era I	

March 29	The Early Paleozoic Era II	13
April 1	The Middle Paleozoic Era I	14
April 3	The Middle Paleozoic Era II	14
April 5	The Middle Paleozoic Era III	14
April 8	The Late Paleozoic Era I	15
April 10	The Late Paleozoic Era II	15
April 12	The Late Paleozoic Era III	15
April 13 (SAT.)	**FIELD TRIP: western Maryland geology**	
April 15	The Late Paleozoic Era IV	15
April 17	**Midterm Exam II**	
April 19	The Early Mesozoic Era I	16
April 22	The Early Mesozoic Era II	16
April 24	The Cretaceous Period I	17
April 26	The Cretaceous Period II	17
April 29	The Cretaceous Period III	17
May 1	The Paleogene Period I	18
May 3	The Paleogene Period II	18
May 6	The Neogene Period I	19
May 8	The Neogene Period II	19
May 10	The Quaternary Period I	19
May 13	The Quaternary Period II: To the Anthropocene and Beyond!	20
May 20 (MON.)	**FINAL EXAM 8-10 am**	

GEOL102 Laboratory Information: GEO 2107 2:00-5:00 pm

Lab Supplies

Lab Manual: *Insights: A Laboratory Manual for Historical Geology* by Clair Russell Ossian (2015, K/H, ISBN-13 978-1-465-25959-2)
You will be expected to turn in stapled hardcopies of your labs.

Hand Lens: A 10x handlens for observing specimens is very useful, although you can go with higher magnification if you wish. There is a very reasonably-priced set of handlenses you can get on Amazon.com at http://www.amazon.com/3pcs-Jewelers-Loupe-Loupes-10X-20X/dp/B001C9LG60/, but you can find them at other sources, too.

Recommended: A colored pencil set and a ruler/straight edge will be helpful in some of the labs. Access to a scanner/photocopier (to make hardcopies of the labs to turn in) and a stapler.

Lab Policies

- The point of the lab is to hone your skills as an observer and to teach you the methods of the field. It is vital that you actually examine the specimens yourselves so that you can discern the various features and attributes of the rocks and fossils.
- Please read the introductory material in the lab manual by the time we meet in lab. In some cases, there may be pre-lab material to do in the lab manual: make certain you have done these in advance.
- Labs are due the next lab meeting (1 week later). If they are turned in on the next class time after that (Friday) there will be a 10% grade reduction; on the following Monday, a total of 30% grade reduction; and a full week late will garner a 50% grade penalty. Labs won't be accepted for a grade later than 1 week overdue (barring legitimate extenuating circumstances.)
- Lab specimens will remain out for your examination through the end of the week and on the following Monday. However, Dr. Holtz will typically replace lab specimens sometime on Monday afternoon.
- You are encouraged to collaborate and interact with each other and with Dr. Holtz while working on the labs. However, all work you turn in must be your own.
- DON'T be a specimen hog! Make sure that others get adequate access to the hand samples.
- ALWAYS return specimens to their appropriate boxes.
- We have limited samples, so please be careful with them. Doubly so with the fossils!!
- Use the dilute HCl wisely:
    - Use small drops, only leave it on long enough to validate whether there is effervescence or not; and wipe it up afterwards.

        - Leaving acid on the hand samples will allow the reaction to run its course and leave a reaction rind on the rock. This will mislead students in the future)
    - In general, only use acid on fresh surfaces
    - In general, don't drop acid on the fossils.
- If you are having problems, don't be shy; ask for help!

Lab Schedule

Date	**Lab Topic**	**Ossian Chapter or Handout (HO)**
Jan. 30	Introduction; Overview of Policies; Prior Knowledge Survey	
Feb. 6	Sedimentary Rocks	HO
Feb. 13	Sedimentary Structures	HO
Feb. 20	Measuring Geologic Time	1
Feb. 27	Stratigraphy and the Ordering of Geological Events	2
March 6	Physical Stratigraphy	3
March 13	Introduction to Paleontology	4
March 20	**SPRING BREAK**	
March 27	Paleontology and the Identification of Major Phyla I	5
April 3	Paleontology and the Identification of Major Phyla II	6
April 10	Applied Paleontology	7
April 17	Geologic Structures	8
April 24	Geologic Maps, Part I	11
May 1	Geologic Maps, Part II	12
May 8	Quaternary Geology and Climate Change	HO