GEOL 102 Historical Geology:

The History of Earth and Life

Spring Semester 2021

Instructor

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Texts

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

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

Asynchronous lectures: 3 per week, available on Panopto video on ELMS (and subdivided into multiple segments)

Synchronous lab on Zoom: Wed. 2-5 pm Eastern. The beginning of lab time will also be used as weekly discussion section

Additionally, there will be a synchronous Zoom meeting the first lecture day and time of class (Monday Jan. 25 9 am Eastern) and the last lecture day and time of class (Monday May 10 9 am Eastern)

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%
Pre-Course Knowledge Survey	2%
Quizzes	13%

Midterm Exams (20% each): Two online exams on March 1-3 and April 12-14, respectively. For each of these there will be a section comprised of true/false, matching, multiple choice, and similar type questions, as well as a few short answer questions and an essay. These exams are open note but timed (60 minutes) and are subject to the University's Honor Pledge; you may not seek help from students or other people in doing these. If you encounter a technical problem, please contact ELMS@umd.edu for help (and Dr. Holtz so that he is aware of your situation.

Final Exam (20%): The online final exam during the regularly scheduled exam season. It is cumulative for the entire course, although it focuses on material from the second exam onward. Format is similar to the mid-term exams, but will be timed for 120 minutes. The exam will be available **SUNDAY to TUESDAY MAY 16-18**: please plan your end-of-semester travel (if any…) accordingly!! (It that means informing your parents about this now, please do so!).

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. There is no separate lab manual for this course: lab materials (pdfs and videos) are provided on ELMS. Labs are turned in on ELMS: either as entries or uploads in an ELMS "quiz". There will be a video to watch ***PRIOR*** to each lab: you are responsible for watching this in advance.

Pre-Course Knowledge Survey (2%): In order to assess your current knowledge and memory of the pre-requisite knowledge for this course, an ELMS survey is assigned covering issues of basic physical geology. This must be completed by the end of the first Friday of classes (**Jan. 29**). The goal here is to see what you know and remember: you are graded for having completed the survey, not your answers on the survey. DO NOT PANIC!

But do not use outside sources: the task here is to see what you remember of previous geology courses.

Quizzes (13%): Weekly quizzes will be given on ELMS, starting in the second Friday of classes (except for weeks in which there is an also a mid-term exam). The quizzes might include information from the labs but 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.

EXPECTATIONS & POLICIES

Expectations & Attendance

Historical Geology is a foundational course for the major. 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 at the Zoom meetings is required.

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. Even given its online nature, there is the possibility that due to 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 day.

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

Given the reliance on technology this semester, please make certain that you have access to appropriate hardware, software, and Internet connections. If you are concerned about your ability to connect remotely for this course, please consult the following information about solutions provided by the Division of Information Technology:

- General Technology Information, including laptop loaner requests: https://it.umd.edu/tech-resources
- Network Resources: https://it.umd.edu/tech-resources#network

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.

Lecture Schedule

DATE	**TOPIC**
Week of Jan. 25	**1/25 Zoom**: Introduction to the Course **1/27 Zoom LAB:** Introduction to Lab **1/29: Pre-Course Knowledge Survey due on ELMS** **Lecture:** Introduction: It's About Time **Lecture:** Every Rock is a Record of History: Historical Approaches to Lithology **Lecture:** Terrestrial Sedimentary Environments **Readings:** Chaps. 1, 2, 5
Week of Feb. 1	**2/3 Zoom Lab:** Sedimentary Rock Classification **2/5: Quiz 1 due** **Lecture:** Fluvial & Deltaic Environments & Walther's Law **Lecture:** Coastal & Marine Environments; Transgressions & Regressions **Lecture:** Physical Stratigraphy **Readings**: Chaps. 5, 6
Week of Feb. 8	**2/10 Zoom Lab:** Sedimentary Structures & Depositional Environments **2/12: Quiz 2 due** **Lecture:** Index Fossils, Correlations & Radiometric Dating **Lecture:** Lithostratigraphy **Lecture:** Biostratigraphy & the Geologic Timescale **Readings**: Chap. 6
Week of Feb. 15	**2/17 Zoom Lab:** The Ordering of Geological Events **2/19: Quiz 3 due** **Lecture:** Another Geography: Plate Tectonics **Lecture:** Every Valley Shall Be Exalted…: Orogenesis I **Lecture:** …And Every Mountain & Hill Made Low: Orogenesis II & Geochemical Cycles

	Readings: Chaps. 8, 9, 10
Week of Feb. 22	**2/24 Zoom Lab:** Biostratigraphy, Geochronology, Magnetostratigraphy **2/26: Quiz 4 due** **Lecture:** Fossils & Fossilization **Lecture:** Evolution I: On the Origin of Species by Means of Natural Selection **Lecture:** Evolution II: Patterns, Processes & Phylogeny **Readings**: Chaps. 3, 4, 7
Week of March 1	**MIDTERM EXAM 1: Available online 3/1-3** **3/3 Zoom Lab:** Physical Stratigraphy **Lecture:** Strange Eons: Introduction to the Precambrian & the Hadean Eon **Lecture:** The Archean Eon I **Lecture:** The Archean Eon II **Readings**: Chap. 11
Week of March 8	**3/10 Zoom Lab:** Introduction to Paleontology: Fossils and Fossilization **3/12: Quiz 5 due** **Lecture:** The Proterozoic Eon I **Lecture:** The Proterozoic Eon II **Lecture:** The Proterozoic Eon III **Readings**: Chap. 12
Week of March 15	**SPRING BREAK**
Week of March 22	**3/24 Zoom Lab:** Common Fossilizing Organisms **3/26: Quiz 6 due** **Lecture:** The Early Paleozoic Era I **Lecture:** The Early Paleozoic Era II

	Lecture: The Middle Paleozoic Era I **Readings**: Chaps. 13, 14
Week of March 29	**3/31 Zoom Lab:** Geologic Map Interpretation **4/2: Quiz 7 due** **Lecture:** The Middle Paleozoic Era II **Lecture:** The Middle Paleozoic Era III **Lecture:** The Late Paleozoic Era I **Readings**: Chaps. 14, 15
Week of April 5	**4/7 Zoom Lab:** Precambrian Geology **4/9: Quiz 8 due** **Lecture:** The Late Paleozoic Era II **Lecture:** The Late Paleozoic Era III **Lecture:** The Late Paleozoic Era IV **Readings**: Chap. 15
Week of April 12	**MIDTERM EXAM 2: Available online 4/12-14** **4/14 Zoom Lab:** Appalachian & Other Paleozoic Geology **Lecture:** The Early Mesozoic Era I **Lecture:** The Early Mesozoic Era II **Lecture:** The Early Mesozoic Era III **Readings**: Chap. 16
Week of April 19	**4/21 Zoom Lab:** Cordilleran Geology **4/23: Quiz 9 due** **Lecture:** The Cretaceous Period I **Lecture:** The Cretaceous Period II **Lecture:** The Cretaceous Period III **Readings**: Chap. 17

Week of April 26	**4/28 Zoom Lab:** Post-Paleozoic Geology **4/30: Quiz 10 due** **Lecture:** The Paleogene Period I **Lecture:** The Paleogene Period II **Lecture:** The Neogene Period I **Readings**: Chaps, 18, 19
Week of May 3	**5/5 Zoom Lab:** Quaternary Geology and Climate Change **5/7: Quiz 11 due** **Lecture:** The Neogene Period II **Lecture:** The Quaternary Period I **Lecture:** The Quaternary Period II: To the Anthropocene and Beyond! **Readings**: Chaps. 19, 20
Week of May 10	**5/10 Zoom Meeting:** Course Summary **Lecture:** Historical Geologic Tour of North America
Week of May 17	**FINAL EXAM: Available online 5/16-18**

GEOL102 Laboratory Information: By Zoom 2:00-5:00 pm Eastern

Lab Supplies

- **Lab Manual:** There is actually no separate lab manual to buy this semester. You will be provided with background readings and videos on ELMS, as well as a packet of questions to answer. The answers for the lab are due online on ELMS; some will be entered as online quiz questions; others will require you to scan and upload charts, maps, etc.
- **(Optional) 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 https://www.amazon.com/dp/B07KLPJ1PG/ref=dp_prsubs_2, but you can find them at other sources, too. (Since the lab will be virtual this semester, you won't need this to do the lab assignments! But every geologist should have their own handlens, and normally you would get them about the semester you take Historical Geology.)
- **(Recommended) Drawing Tools:** A colored pencil set, and a ruler/straight edge will be helpful in some of the labs.
- **Recommended:** Access to a scanner to make uploadable versions of your maps and charts.

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 watch the introductory video and read the introductory material on ELMS by the time we meet in lab.

- Labs are due the next lab meeting (1 week later). If they are turned in by 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.)

- 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.

- If you are having problems, don't be shy; ask for help!