

Fall 2024 | GEOL 0200 | Geodynamics

Professor: Ryan Kerrigan

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Class time: Monday, Wednesday and Friday, 11:00-11:50 AM

Lab time: Tuesday 2:00-4:50 PM

Office Hours: Thursdays 9:00-11:00 AM or by appointment

Office Phone: (814) 269-2942

Class Room: Krebs 220

Lab Room: Krebs B52

Welcome to Geodynamics!

The Earth operates as a system on long time scales and millennia of scientific investigation has revealed the processes at work. This course is designed to build on topics introduced in introductory geology and strengthen their understanding of the scientific principles that form the basis of our understanding of the Earth. Throughout the semester the course will provide the history, data, and empirical derivation of the principles of earth science as we know them today.

Goals

Upon successful completion of this course, students will be able to:

- Talk intelligently about the fundamental nature of science, the role of science in developing an objective understanding of the natural world, and be able to apply the scientific method to investigate geologic problems.
- Apply a range of intellectual abilities, including critical thinking, logical argument, and appropriate uses of evidence and interpretation to solve geologic problems.
- Apply basic principles from physics, mathematics and chemistry to solve geologic problems.
- Effectively communicate details about Earth's internal structure and the techniques employed to probe Earth's interior.
- A fundamental understanding of geologic materials (atoms, molecules, minerals, rocks)
- Fully understand the plate tectonic paradigm and the data that support it.
- Apply basic methods of geochronology to age date rocks and to use these methods to solve geologic problems
- Understand the importance of geologic materials (minerals, rocks) as a data source for geologic research.

The supporting skills you will acquire in this course include:

- Dimensional analysis as a quantitative problem solving approach.
- An ability to use spreadsheets as a tool to display and analyze scientific data.
- Graphical methods in the geosciences.
- An understanding of basic statistics/data analysis applicable to the geosciences.
- The ability to write cogent, professionally-crafted laboratory reports.
- Scientific research skills.

To accomplish these goals there will be a variety of instructional activities: lecture-discussion sessions, group problem solving, laboratory work, and individual readings and investigations.

COURSE RESOURCES

Text (required): Harold Levin (2013 [10th edition]), The Earth through Time. ISBN-10: 1118254678
ISBN-13: 978-1118254677. There is a new addition (the 11th), do not get this, it more expensive and my page numbers will not correspond. Get the 10th edition! The bookstore has it at ~\$?. Amazon has new

copies at ~\$75 and used copies at ~\$45. Additionally, I have asked the library to have a copy on reserve. It is imperative that you have a version of this book in some manner. You will complete assignments using it and I will refer to its contents in lecture frequently. There is no lab text; I will provide all necessary lab materials.

Web-material: Most class materials (schedule, power points, reading guides, etc.) will be posted on Canvas for your convenience.

Clean-up: Please don't make a mess, but if you choose to make a mess, please clean up after yourself.

Safety: The only cautionary material we will work with is very dilute hydrochloric acid. We will take the necessary precautions when handling the dilute HCl. You should also be careful handling the rocks, minerals, and tools, for their safety, as well as yours. Don't abuse the lab materials; specimens, supplies, tools. Use brain.

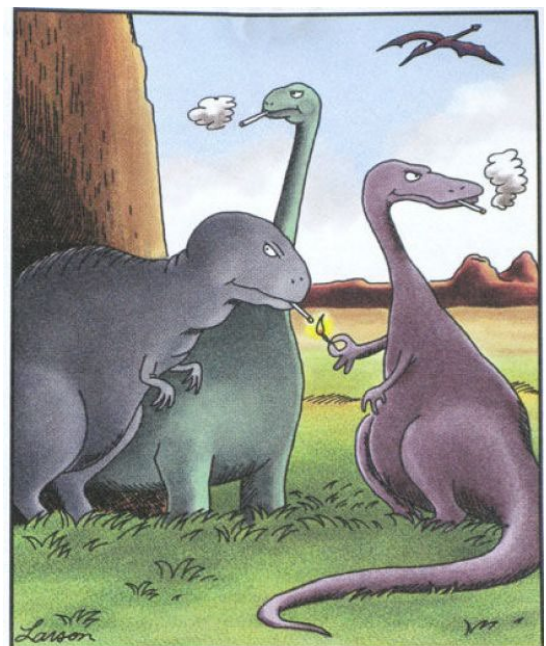
Students Accommodations: Students with documented disabilities who need course adaptations or accommodations, have emergency medical information to share with me, or require special arrangements for building evacuation, should contact me after class within the first two weeks of class. I'm here to help.

Academic Integrity: Although there will be opportunities for group work in this course, all students are responsible for understanding the material and should indicate with whom they collaborated on any assignment. Group work does not mean that one person does all the work and everyone else puts their name on it...this is considered cheating. Students **should not:** claim other's ideas as their own, turn in other's work as their own, copy sources without proper citation (plagiarism), allow others to take their work or ideas, or pass off past projects as original work. If you have questions about academic honesty, see the instructor or refer to the document "Academic Integrity at the University of Pittsburgh at Johnstown." (<http://www.upj.pitt.edu/en/academics/academic-affairs/academic-advising/academic-integrity/>). Anyone found to be in violation of the Pitt-Johnstown standards for academic integrity will fail the course. We will cover scientific ethics in this course, until then use your brain.

Diversity and Inclusion: Our classroom will be one of acceptance and inclusion. Any form of discrimination, bullying, etc. will not be tolerated. Please review the university's statement of Equity and Inclusion, if you are unfamiliar: <https://www.johnstown.pitt.edu/about/office-president/equity-and-inclusion>

Late Work: Contact me prior to any absence/missed: due dates, classes/labs, or quizzes/exam. If you can show me that respect and we will find an arrangement to allow you to make-up/hand-in the missed work. Without prior contact, any work not received by the due date will have points deducted, except for a documented exemption. For each day late 10% of the total possible points will be deducted (this includes weekends and holidays). The work will not be accepted for credit after 10 days.

Outside Resources: Perhaps there are questions that I cannot answer, or issues you feel you cannot discuss with me, UPJ has outlets these issues. I am new at UPJ so I am learning where this stuff is myself and I would most likely ask the division administrative assistant, Kara Bernard. Steve Stern is the Natural Science Division Chair; he is my boss.



The real reason dinosaurs became extinct

EVALUATION

1. Quizzes and Reading Guides / Participation:

Reading Guides will be posted to Canvas and you will be expected to complete them with the aid of your book. The questions will follow the sequence of the book. I will try not to make these too onerous.

2. Laboratory

In the lab you will be given problems to solve. Labs will generally be focused on the lecture topics being discussed that week. Labs are designed such that a student who is current with the class material and focuses should be able to complete the lab in the time allotted. However, some labs will at times be more difficult and require work outside of class time. Lab topics will parallel those covered in concurrent lectures as closely as possible, but there may not always be a perfect overlap. At times, materials will be made available for use. Out of courtesy to others, please do not remove any materials from the lab. If you ask questions during the lab, I will help you get to the correct answer; I will not let you hand in incorrect material, if you ask tons of questions you should do very well.

Please always bring a pencil to lab; you will make mistakes, erasers erase mistakes.

3. Term Project and Presentation:

Students will be asked to complete a semester-long research project that will culminate in the presentation of the independent investigation on a topic of their choosing. A separate sheet will be distributed discussing expectations, timelines, formats, and potential topics.

4. Exams

There will be three unit exams during the semester (including the final). The tentative dates of these exams are shown on the Course Schedule found below. The exams are generally 60% multiple choice and 40% of short answer/drawings/labeling/calculations/etc.

Exams will emphasize material presented in lecture; however, you will also be tested on material contained in the readings. Exams will not just test your factual knowledge of the material; you will also be expected to *apply* your knowledge and understanding of the course material. In this regard, it is of prime importance to understand geologic concepts, more so than facts. Some memorization will be necessary, but I consider this of secondary importance. Exams are closed-book. If you know you will be missing an exam, see me and we may be able to arrange to have you take the exam early.

ASSESSMENT

- 20% Reading Guide Quizzes [lowest quiz will be dropped]
- 20% Weekly Labs (11 labs) [lowest lab will be dropped]
- 15% Term Project
- 45% Exams (3 – 15% each)
- Standard grade cut-off apply (100-96.6 =A+, 96.6-93.3=A, 93.3-90=A-, etc)

Schedule of Events

*Chapters listed indicates a Reading Guide Quiz on that date

Week	Monday (Lec)	Monday (Lab)	Wednesday (Lec)	Friday (Lec)
1	<u>August 26, 2024</u> Introduction to Historical Geology	<u>August 27, 2024</u> Maps, Rates & Time	<u>August 28, 2024</u> Early Theories Chapt 1 (1-12)	<u>August 30, 2024</u> Early Theories Chapt 2 (13-28)
2	<u>September 2, 2024</u> NO CLASS LABOR DAY	<u>September 3, 2024</u> Dating	<u>September 4, 2024</u> Early Theories	<u>September 6, 2024</u> Geologic Time Chapt 3 (29-48)
3	<u>September 9, 2024</u> Geologic Time	<u>September 10, 2024</u> Minerals and Rocks	<u>September 11, 2024</u> Minerals and Rocks Chapt 4 (49-80)	<u>September 13, 2024</u> Minerals and Rocks
4	<u>September 16, 2024</u> Sedimentary Record Chapt. 5 (81-168)	<u>September 17, 2024</u> Sedimentary Environments and Structures	<u>September 18, 2024</u> Sedimentary Record Research Topics Due	<u>September 20, 2024</u> Fossils Chapt 6 (125-168)
5	<u>September 23, 2024</u> Plate Tectonics Chapt 7 (169-214)	<u>September 24, 2024</u> Facies Correlation	<u>September 25, 2024</u> Plate Tectonics	<u>September 27, 2024</u> EXAM I
6	<u>September 30, 2024</u> Early Earth Chapt 8 (215-250)	<u>October 1, 2024</u> Evolution	<u>October 2, 2024</u> Early Earth	<u>October 4, 2024</u> NO CLASS FCOPG
7	<u>October 7, 2024</u> Early Earth	<u>October 8, 2024</u> Paleontology I: Learning fossil taxa	<u>October 9, 2024</u> The Proterozoic Chapt 9 (251-274)	<u>October 11, 2024</u> The Proterozoic
8	<u>October 14, 2024</u> NO CLASS FALL BREAK	<u>October 15, 2024</u> NO LAB FALL BREAK	<u>October 16, 2024</u> Early Paleozoic Events Chapt 10 (275-302)	<u>October 18, 2024</u> Early Paleozoic Events Ciations Due

Schedule of Events *Chapters listed indicates a Reading Guide Quiz on that date				
Week	Monday (Lec)	Monday (Lab)	Wednesday (Lec)	Friday (Lec)
9	<u>October 21, 2024</u> Late Paleozoic Events Chapt 11 (303-334)	<u>October 22, 2024</u> Paleontology II: Unknown Fossils	<u>October 23, 2024</u> Late Paleozoic Events	<u>October 25, 2024</u> Life in the Paleozoic Chapt 12 (335-384)
10	<u>October 28, 2024</u> Life in the Paleozoic	<u>October 29, 2024</u> Paleontology III: Fossil Quiz	<u>October 30, 2024</u> EXAM II	<u>November 1, 2024</u> Mesozoic Events Chapt 13 (385-416)
11	<u>November 4, 2024</u> Mesozoic Events	<u>November 5, 2024</u> Geologic Maps I: Cross Sections	<u>November 6, 2024</u> Mesozoic Events	<u>November 8, 2024</u> Life in the Mesozoic Chapt 14 (385-416)
12	<u>November 11, 2024</u> Life in the Mesozoic	<u>November 12, 2024</u> Geologic Maps II: Basic Structures	<u>November 13, 2024</u> Life in the Mesozoic Outline Due	<u>November 15, 2024</u> Cenozoic Events Chapt 15 (469-504)
13	<u>November 18, 2024</u> Cenozoic Events	<u>November 19, 2024</u> Geologic Maps III: More Geologic Maps!	<u>November 20, 2024</u> Cenozoic Events	<u>November 22, 2024</u> Life in the Cenozoic Chapt 16 (505-542)
14	<u>November 25, 2024</u> NO CLASS	<u>November 26, 2024</u> NO CLASS	<u>November 27, 2024</u> NO CLASS	<u>November 29, 2024</u> NO CLASS
15	<u>December 2, 2024</u> Life in the Cenozoic	<u>December 3, 2024</u> TERM PROJECT PRESENTATIONS	<u>December 4, 2024</u> Life in the Cenozoic	<u>December 6, 2024</u> Human Origins Chapt 17 (543-567)
16	<u>December 9, 2024</u> Human Origins	Wednesday December 11th 10:30 AM - 12:30 PM FINAL EXAM		

*This schedule will be fluid at times to adjust for the pace and comprehension of the class...