

## Physical Geology (GEOS 251) Spring 2020

Lecture: Tues-Thurs	11 – 12:15	Chavez Rm 110
Lab 1: Mon	12 – 2:50	Gould-Simpson Rm 201
Lab 2: Tues	12:30 – 3:20	Gould-Simpson Rm 201
Lab 3: Wed	12 – 2:50	Gould-Simpson Rm 201
Lab 4: Thurs	12:30 – 3:20	Gould-Simpson Rm 201
Lab 5: Fri	12 – 2:50	Gould-Simpson Rm 201

**Instructor:** Paul Kapp, [pkapp@email.arizona.edu](mailto:pkapp@email.arizona.edu)

G-S 310, Office hours: "open-door" policy (email to set up an appointment)

<b>Graduate TAs:</b>	Brendan Fenerty	Mon	<a href="mailto:bfenerty@email.arizona.edu">bfenerty@email.arizona.edu</a>
	Ken Gourley	Tues + Thur	<a href="mailto:kengourley@email.arizona.edu">kengourley@email.arizona.edu</a>
	Emilia Caylor	Wed	<a href="mailto:caylor.emilia@gmail.com">caylor.emilia@gmail.com</a>
	Nina Kolodij	Fri	<a href="mailto:kolodnin@email.arizona.edu">kolodnin@email.arizona.edu</a>
<b>Preceptors:</b>	Abdullah Alfayez	Mon	<a href="mailto:afalfayez@email.arizona.edu">afalfayez@email.arizona.edu</a>
	Abdulrahman Aldulaim	Tues	<a href="mailto:dhoom73@email.arizona.edu">dhoom73@email.arizona.edu</a>
	Ryan Eden	Tues	<a href="mailto:reden1@email.arizona.edu">reden1@email.arizona.edu</a>
	Darin Al Abbas	Thurs	<a href="mailto:alabbasd@email.arizona.edu">alabbasd@email.arizona.edu</a>

**Course Description:** Introduction to Earth's materials; surface & internal geologic processes; plate tectonics; & geologic time. Includes practical experience in rock & mineral identification, topographic maps, & applied problems in geoscience.

### Course objectives:

- (1) Identify characteristics & origins of common rocks & minerals
- (2) Understand how rocks are deformed & identify structures that rock deformation produces
- (3) Be able to relate Earth processes to plate tectonics.
- (4) Understand important processes operating in the atmosphere, in the oceans, & on the land surface, & how these processes impact humans & are impacted by human activities.
- (5) Understand how mineral & energy resources form, are extracted, & used.
- (6) Gain appreciation of the geological history of Earth, North America, & Arizona.
- (7) Interpret topographic & geological maps.

The above will be taught through a combination of lecture, lab exercises, & field trips.

### Expected learning outcomes:

On completion of this course, students will:

- (1) Have a working knowledge of common Earth materials including their composition, origin, & uses.
- (2) Understand Earth surface processes & how humans affect & are affected by these processes.
- (3) Understand processes operating in the Earth's interior.
- (4) Know the geologic time scale & major Earth events.
- (5) Acquire specific skills required for the study & interpretation of geological materials, history, & features.
- (6) Understand the scientific process, including being able to critically evaluate primary Earth science data, & effectively communicate geologic information.

**Lecture Textbook (Required):** Understanding Earth (6<sup>th</sup> or 7<sup>th</sup> ed.) by Grotzinger & Jordan

**Lab Text:** None, but you will need to print out lab materials before each meeting. They will be available on D2L on Friday before the next week of labs.

**Required materials:** Protractor, ruler, fine ink pens for drafting (recommend Micron brand), calculator, clipboard, field book, geologic time scale (to be provided)

**Class home page on D2L:** <http://d2l.arizona.edu/> All course materials will be posted here.

**Lecture Participation (16%) & Absence Policy:** Lecture participation is required & will be graded by turning in notes/handouts/quizzes at the end of each lecture. There are 28 lectures worth 0.64% of your total grade each. This allows you to miss 3 without a grade penalty & provides extra credit if you attend >25. The UA's policy concerning Class Attendance, Participation, & Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-&-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated when reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>. Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

**Lecture reading assignments** are given in the schedule. These are required & should be finished before the subject is covered in lecture.

**Lecture exams (37%):** There is a mid-term exam (15% of total grade) & a cumulative final exam (22% of total grade).

**Lab exercises & exams (40%):** Weekly lab sessions are taught by graduate teaching assistants (TAs) & undergraduate assistants (preceptors). The TAs are in charge of grading the labs, setting penalties for late assignments, & arranging make-ups for legitimately excused absences. **THE FIRST LAB WILL START THE WEEK OF January 27.** Bring pencil, eraser, protractor, ruler. **YOU MUST ATTEND THE LAB THAT YOU ARE ENROLLED IN UNLESS YOU ARE AN HONORS STUDENT!** If you are unable to for a significant reason, contact your TA ASAP.;

**Field trip (7%):** One day-long field trip to the Santa Catalina Mountains is required, worth 7% of your total grade. The field trip will be offered on four different days to increase instructor to student ratio & to provide scheduling flexibility. Sign up in advance using "Groups" tool on D2L (first-come, first served!) as there is a 24 student maximum for each day. The trips will depart from Gould-Simpson loading dock at 9 AM & return by 5 PM. Minimal hiking is required, as all stops are at or near the roadside. If you are unable to participate for a significant reason, please contact me in advance to arrange for an alternative assignment.

**Grading:** Your final grade will be calculated with a standard breakdown: 89.5-100 = A, 79.5-89.5 = B, 69.5-79.5 = C, etc. **NO EXCEPTIONS OR END-OF-SEMESTER EXTRA CREDIT.** e.g., if you earn an 89.4%, you will get a B!

**Make-ups:** If for a legitimate & documented reason, you are unable to attend the scheduled exams, contact me ASAP to schedule a make-up exam **within 2 days** of the scheduled exam (before or after). For example, if you get sick & miss an exam, but do not tell me until 3 days later, it is too late for a make-up = zero! Labs can be made up ONLY during the week that they are scheduled, as materials are removed on Friday afternoons. Consult with your TA if you must miss a scheduled lab session.

**Honors Students:** Honors students are enrolled in the Monday lab section (for logistical reasons), but can attend any of the lab sections. Honors students will meet separately with myself & my graduate student (Jordan Wang; [jordanww@email.arizona.edu](mailto:jordanww@email.arizona.edu)) weekly to semi-weekly at a time when all of us are available (TBD). Honors students will participate in a research project funded by

the National Science Foundation. It involves determining the ages of rocks & deformation associated with an ancient but very large & significant fault/shear zone in coastal British Columbia. Honors students will be introduced to the scientific motivation for the project & get hands-on experience in multiple laboratories in which they will separate minerals from rocks, pick minerals for analysis, image minerals in high resolution, use a laser to determine the ages of minerals, & in interpreting the data & developing their own interpretations & hypotheses. It is anticipated that students will present their results in the form of a poster at our annual departmental research symposium (GeoDaze, Apr 9-10). A field trip will also be offered to investigate the Catalina fault/shear zone near Tucson. To receive Honors' credit, students will need to be engaged in all aspects of the project, which will likely involve lab work during evenings & weekends (exact times TBD & at relatively short notice, as it depends on lab availability).

**Requests for incomplete (I) or withdrawal (W)** must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> & <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal>.

**Dispute of Grade Policy:** The time period for disputing a grade on any assignment/exam is within 7 days of when the graded assignment/exam is returned to the student.

**Expected classroom behavior:** Notes should be taken by hand on paper if possible; this has proven to enhance learning better than typing notes. Questions & participation in class activities are encouraged. The use of personal electronic devices is not permitted.

**Threatening Behavior Policy:** The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

**Accessibility & Accommodations:** At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.

**Code of Academic Integrity:** Students are encouraged to share intellectual views & discuss freely the principles & applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>. **The Department of Geosciences has a zero tolerance policy about cheating & plagiarism.**

**UA Nondiscrimination & Anti-harassment Policy:** The University is committed to creating & maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

**Subject to Change Statement:** Information contained in this course syllabus, other than the grade policy, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

<u>Date</u>	<u>Topic</u>	<u>Required Reading</u>
Jan 16	1. Introduction & the birth of Earth	Chapter 1 (& 9)
21	2. Earth's interior & plate tectonics	Chapter 2
23	3. Minerals: the building blocks of rocks	Chapter 3
<u>WEEK OF Jan 27 LAB 1: Minerals part 1 (15 pts)</u>		
28	4. Rocks: records of geologic processes	Chapter 3
30	5. Igneous rocks	Chapter 4
<u>WEEK OF Feb 3 LAB 2: Minerals part 2 (15 pts)</u>		
Feb 4	6. Magmatic processes	Chapter 4
6	7. Volcanism	Chapter 12
<u>WEEK OF Feb 10 LAB 3: Igneous rocks (15 pts)</u>		
11	8. Weathering & Erosion; sedimentary rocks	Chapter 16
13	9. Sedimentary rocks	Chapter 5
<u>WEEK OF Feb 17 LAB 4: Sedimentary rocks (15 pts)</u>		
18	10. Metamorphic rocks	Chapter 6
20	11. Sedimentary rocks & geologic time	Chapter 8
<u>WEEK OF Feb 24 LAB 5: Metamorphic rocks (15 pts)</u>		
25	12. Geologic time <u>&amp; campus health survey</u>	Chapter 8
27	13. Rock deformation	Chapter 7
<u>WEEK OF Mar 2 LAB: Rock &amp; mineral exam (30 pts)</u>		
Mar 3	14. Faults & earthquakes	Chapter 13
5	15. Earthquakes	Chapter 13
<u>WEEK OF Mar 9: No lecture or lab = Spring Break</u>		
17	<b>Mid-Term Exam</b>	
19	16. Earth's interior	Chapter 14
<u>WEEK OF Mar 23: LAB 6: Topographic maps &amp; how to operate in the field (15 pts)</u>		
24	17. Plate Tectonics	Chapter 2
26	18. Climate system	Chapter 15
<b>Saturday March 28 Catalina Mtns field trip offering #1</b>		
<b>Sunday March 29 Catalina Mtns field trip offering #2</b>		
<u>WEEK OF Mar 30 LAB 7: Structural Geology (15 pts)</u>		
31	19. Hydrologic cycle	Chapter 17
Apr 2	20. Rivers	Chapter 18
<u>WEEK OF Apr 6 LAB 8: Earthquakes/Seismology (15 pts)</u>		
7	21. Shallow ocean	Chapter 20
9	<b>22. Attend Geodaze symposium</b>	
<u>WEEK OF Apr 13 LAB 9: Plate Tectonics (15 pts)</u>		
14	23. Deep ocean	Chapter 20
16	24. Glaciers & ice sheets	Chapter 21
<b>Saturday April 18 Catalina Mtns field trip offering #3</b>		
<b>Sunday April 19 Catalina Mtns field trip offering #4</b>		
<u>WEEK OF Apr 20 LAB 10: Paleoclimate (15 pts)</u>		
21	25. Deserts	Chapter 19
23	26. Linkages among tectonics, surface processes, & climate	
<u>WEEK OF Apr 27 FINAL LAB EXAM (45 pts)</u>		
28	27. Energy & mineral resources	Chapter 23
30	28. Human impacts	Chapter 23
May 5	29. Human impacts & wrap-up	
<b>Tuesday May 12 10:30 – 12:30: FINAL EXAM</b> <a href="https://www.registrar.arizona.edu/courses/final-examination-schedule-spring-2020">https://www.registrar.arizona.edu/courses/final-examination-schedule-spring-2020</a>		

## Where to go, who to call if you're in crisis:

**Located in Tucson?** Call the [Community-Wide Crisis Line](#) 24 hours a day, 7 days a week at 520-622-6000.

**Are you a University of Arizona student?** If it is not an emergency and you are a UA student, call or walk-in to Counseling and Psych Services at 520-621-3334 Monday - Friday. Walk-in triage is available between 9 am and 4 pm Monday - Friday.

**Are you a concerned friend?** Concerned friends can find out more about helping a friend who might be experiencing problems through our [Friend 2 Friend](#) website.

[Resources for sexual assault, relationship violence, and stalking.](#)

## 24-Hour Hotlines:

[The National Suicide Prevention Lifeline](#) is a 24-hour, toll-free, confidential suicide prevention hotline available to anyone in suicidal crisis or emotional distress. By dialing [1-800-273-TALK](#) (8255), the call is routed to the nearest crisis center in our national network of more than 150 crisis centers. The Lifeline's national network of local crisis centers provides crisis counseling and mental health referrals day and night.

[Crisis Text Line](#): Text HOME to 741741 from anywhere **in the United States**, anytime, about any type of crisis. A live, trained Crisis Counselor receives the text and responds, all from a secure online platform. Find out more about how it works at [crisistextline.org](#).

[Suicide Prevention for LGBTQ Youth through the Trevor Project](#):

**The Trevor Lifeline** is a 24/7 suicide hotline: 866-4-U-TREVOR (1-866-488-7386)

[TrevorChat](#): Online instant messaging available 7 days a week, 3 pm - 10 pm ET (12 pm -- 7 pm PT)

**TrevorText**: Confidential and secure resource that provides live help for LGBTQ youth with a trained specialist, over text messages. Text TREVOR to 1-202-304-1200 (available 7 days a week, 3 pm - 10 pm ET, 12 pm -- 7 pm PT)

[Veterans' Suicide Prevention Lifeline](#): 1-800-273-TALK (1-800-273-8255)

[SAMHSA Treatment Referral Hotline](#) (Substance Abuse): 1-800-662-HELP (1-800-662-4357)

[National Sexual Assault Hotline](#): 1-800-656-HOPE (1-800-656-4673)

[Loveisrespect \(National Dating Abuse Helpline\)](#): Call 1-866-331-9474 (TTY: 1-866-331-8453). Text LOVEIS to 22522 - you'll receive a response from a peer advocate prompting you for your question. Go ahead and text your comment or question and we will reply.