

## GEOS 251 Physical Geology Spring 2021

Lecture: Live Online Tuesday and Thursday, 11 – 12:15

Lab 1: Monday	12 – 2:50	Gould-Simpson Rm 201
Lab 2: Tuesday	12:30 – 3:20	Gould-Simpson Rm 201
Lab 3: Wednesday	12 – 2:50	Gould-Simpson Rm 201
Lab 4: Thursday	12:30 – 3:20	Gould-Simpson Rm 201
Lab 5: Friday	12 – 2:50	Gould-Simpson Rm 201

### Description of Course

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.

### Instructor and Contact Information

#### Instructor:

Dr. Paul Kapp; Office: Gould-Simpson 310; [pkapp@arizona.edu](mailto:pkapp@arizona.edu); Zoom office hours by email appointment

#### Graduate TAs:

Anca Barla	<a href="mailto:ancabar194@gmail.com">ancabar194@gmail.com</a>
Dan Collins	<a href="mailto:dtc1@email.arizona.edu">dtc1@email.arizona.edu</a>
Tshering Lama Sherpa	<a href="mailto:tsheringzls@email.arizona.edu">tsheringzls@email.arizona.edu</a>
Alec Martin	<a href="mailto:alecjmartin@email.arizona.edu">alecjmartin@email.arizona.edu</a>

#### Undergraduate Preceptors:

Joshua Alvarado	<a href="mailto:jalvarado13@email.arizona.edu">jalvarado13@email.arizona.edu</a>	
Jehad Al Barak	<a href="mailto:albarak@email.arizona.edu">albarak@email.arizona.edu</a>	
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Sami Almomtán	<a href="mailto:samialmomtan@email.arizona.edu">samialmomtan@email.arizona.edu</a>	
Khaled Al Zahrani	<a href="mailto:khaledalzahrani@email.arizona.edu">khaledalzahrani@email.arizona.edu</a>	Chat monitor during lectures

Course web page: [d2l.arizona.edu](https://d2l.arizona.edu)

### Course Format and Teaching Methods

Lectures will be offered live online through D2L. Live participation is strongly recommended to maintain routine, stay on schedule, and participate in class discussions. Lectures will also be recorded and posted on D2L for review and for those students who are unable to participate live. There is a graded assignment associated with each lecture which is to be completed and uploaded to D2L **WITHIN 7 DAYS OF THE LECTURE**. For example, a Tuesday lecture assignment must be uploaded to D2L PRIOR TO the beginning (11 AM) of the following Tuesday lecture. These deadlines will be enforced automatically in D2L. No exceptions without advanced notice and approval of the instructor prior to the deadline.

Labs will be offered live online through D2L and also recorded and provided on D2L like the lectures. The labs will generally consist of 1-1.5 hours of instruction and activities guided by TAs. Additional individual homework will be necessary to complete the lab assignments. TA's and preceptors will be available for consultation during their scheduled Zoom office hours (or by appointment). A lab assessment or "quiz" will be associated with each lab. In-person opportunities to do lab work may be arranged pending COVID restrictions and TA availability. Lab assignments are to be completed and uploaded to D2L **by MONDAY 11 AM of the following week**, regardless of which lab section you are enrolled in. These deadlines will be enforced automatically in D2L. **No exceptions** will be made without advanced notice and approval of your TA **prior** to the deadline.

Please refer to the syllabus in this document to keep track of lecture + lab schedule and all assignment due dates. We will also be using the Calendar feature in D2L.

Given that all lecture, lab, and field trip activities will be available on-line, it will be possible for students to complete this course entirely on-line without any grade penalty. We encourage participation in synchronous (live online) lectures and labs, but realize that this may not be possible for some students.

### 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, & virtual 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.

### Required Texts or Readings

Lecture textbook (REQUIRED): Understanding Earth (8<sup>th</sup> edition preferred; 7<sup>th</sup> or 6<sup>th</sup> is OK) by Grotzinger and Jordan. The 8<sup>th</sup> edition should be available to you in E-format on D2L as part of the Inclusive Access program. If you do not want to pay for this resource (cost I was quoted was ~\$55), you must opt out on D2L by 01/26/2021.

Lab textbook: None, but you will need to print out / have available lab materials before each lab. They will be available on D2L on Friday prior to the following week of labs.

### Required or Special Materials

Protractor, ruler, calculator, geologic time scale (PDF available to print on D2L)

### Required Extracurricular Activities

Virtual field trips will be provided via videos and Google Earth, along with assignments to be completed.

### Final Examination or Project

There is no final examination in this course.

### Honors Students

Honors students will meet separately with the instructor weekly to semi-weekly at a time when we are all available (TBD). We will investigate and map the geomorphology of the Saharan Desert in Africa using Google Earth. We'll see where our curiosity takes us, but my hunch is that the "The answer is blowin' in the wind."

## Assignments, Grading Scale and Policies

Following is the distribution of points for each of the course activities. You will be able to monitor your grade in D2L during the semester.

**Lecture:** Each lecture has an associated assignment: 30 lecture assignments @ 20 points each (with four lowest scores dropped) = 520 points

**Lab:** Each of the 10 labs is associated with an assignment (20 points) and an assessment/quiz (10 points) = 300 points.

**Virtual field trip:** 60 points

**Total = 880 points**

Note that there are no lecture or lab exams in this course. **No opportunities for extra credit will be provided.**

Letter grades will be assigned **strictly** as:

89.5-100 % = A          79.5-89.4 % = B          69.5-79.4 % = C          59.5-69.4 % = D          <59.5% = F

Unless otherwise noted in the syllabus, lecture assignments are to be completed and uploaded to D2L within 7 days (prior to 11 AM lecture the following week). Lab assignments are to be completed and uploaded to D2L **by MONDAY 11 AM of the following week**, regardless of which lab section you are enrolled in. These deadlines will be enforced automatically in D2L. **No exceptions** will be made without advanced notice and approval of the instructor (for lecture assignments) or TA (for lab assignments) **prior** to the deadline.

## Makeup Policy for Students Who Register Late

Students who register after the first class meeting may make up missed assignments. The deadline to do so is within 7 days of registering for the course.

## Code of Academic Integrity:

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, all graded assignments 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>. DO NOT CHEAT! Specific to this course, all lecture and lab assignments should be submitted in your own writing, words, sketches, etc. The following constitutes cheating and will result in a failing grade on the assignment(s) and a formal record of cheating to the Dean of Students:

- If you copy or submit another student's assignment as your own. The assignments are designed in a way such that no student's responses should be identical to that of another.
- If you let another student copy your assignment or make your completed assignment available to others in any way.

## Dispute of Grade Policy

If you feel that an assigned grade on an assignment is incorrect or unfair, you have 7 days to dispute the grade with the instructor or TA from the time when the grade was assigned.

## SUBJECT TO CHANGE STATEMENT

Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with advanced notice, as deemed appropriate by the instructor.

Incomplete (I) or Withdrawal (W):

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> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

### Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

### COVID-19 Policies for all In-Person Activities (may include labs + office hours)

- If you feel sick, or have any symptoms of COVID-19, do not come to campus.
- If you have recently had close contact with a person with COVID-19, do not come to campus.

**Face Covering:** Face coverings are required in all UofA buildings and vehicles. Per UofA's Administrative Directive (<https://deanofstudents.arizona.edu/welcome/face-coverings>), face coverings that cover the nose, mouth, and chin are required to be worn in all learning spaces at the University of Arizona (e.g., in classrooms, laboratories and studios). Any student who violates this directive will be asked to immediately leave the learning space, and will be allowed to return only when they are wearing a face covering. Subsequent episodes of noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.

### UA Nondiscrimination and Anti-Harassment Policy

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

### Accessibility and Accommodations

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let your instructors or TA's know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations.

### Additional Resources for Students

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

#### **Campus Health**

<http://www.health.arizona.edu/>

Campus Health provides quality medical and mental health care services through virtual and in-person care.

Phone: 520-621-9202

#### **Counseling and Psych Services (CAPS)**

<https://health.arizona.edu/counseling-psych-services>

CAPS provides mental health care, including short-term counseling services.

Phone: 520-621-3334

#### **The Dean of Students Office's Student Assistance Program**

<http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

Student Assistance helps students manage crises, life traumas, and other barriers that impede success. The staff addresses the needs of students who experience issues related to social adjustment, academic challenges, psychological health, physical health, victimization, and relationship issues, through a variety of interventions, referrals, and follow up services.

Email: [DOS-deanofstudents@email.arizona.edu](mailto:DOS-deanofstudents@email.arizona.edu)

Phone: 520-621-7057

### **Survivor Advocacy Program**

<https://survivoradvocacy.arizona.edu/>

The Survivor Advocacy Program provides confidential support and advocacy services to student survivors of sexual and gender-based violence. The Program can also advise students about relevant non-UA resources available within the local community for support.

Email: [survivoradvocacy@email.arizona.edu](mailto:survivoradvocacy@email.arizona.edu)

Phone: 520-621-5767

### Confidentiality of Student Records

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

## Detailed Schedule of Activities and Deadlines

<u>Date</u>	<u>Topic</u>	<u>Required Reading</u>
Jan 14	Lecture 1. Introduction & the birth of Earth	Chapter 1 and p. 600-609
<u>WEEK OF Jan 18</u> <b>NO LAB</b>		
19	Lecture 2. Earth's interior & plate tectonics	Chapter 2
21	Lecture 3. Minerals: the building blocks of rocks	Chapter 3
<b>Lecture 1 assignment due by 11 AM</b>		
<u>WEEK OF Jan 25</u> <u>LAB 1: Minerals part 1 (30 pts)</u>		
26	Lecture 4. Rocks: records of geologic processes	Chapter 3
<b>Lecture 2 assignment due by 11 AM</b>		
28	Lecture 5. Igneous rocks	Chapter 4
<b>Lecture 3 assignment due by 11 AM</b>		
<u>WEEK OF Feb 1</u> <u>LAB 2: Minerals part 2 (30 pts)</u>		
Feb 2	Lecture 6. Igneous processes	Chapter 4
<b>Lab 1 due by 11 AM</b>		
<b>Lecture 4 assignment due by 11 AM</b>		
4	Lecture 7. Volcanism	Chapter 5
<b>Lecture 5 assignment due by 11 AM</b>		
<u>WEEK OF Feb 8</u> <u>LAB 3: Igneous rocks (30 pts)</u>		
9	Lecture 8. Weathering & Erosion	Chapter 6 and 16
<b>Lab 2 due by 11 AM</b>		
<b>Lecture 6 assignment due by 11 AM</b>		
11	Lecture 9. Sedimentary rocks	Chapter 9
<b>Lecture 7 assignment due by 11 AM</b>		
<u>WEEK OF Feb 15</u> <u>LAB 4: Sedimentary rocks (30 pts)</u>		
16	Lecture 10. Metamorphic rocks	Chapter 7
<b>Lab 3 due by 11 AM</b>		
<b>Lecture 8 assignment due by 11 AM</b>		
18	Lecture 11. Sedimentary rocks & geologic time	Chapter 9
<b>Lecture 9 assignment due by 11 AM</b>		
<u>WEEK OF Feb 22</u> <b>NO LAB</b>		
23	Lecture 12. Geologic time	Chapter 9
<b>Lab 4 due by 11 AM</b>		
<b>Lecture 10 assignment due by 11 AM</b>		
25	<b>READING DAY NO LECTURE</b>	
<u>WEEK OF Mar 1</u> <u>LAB 5: Metamorphic rocks (30 pts)</u>		
Mar 2	Lecture 13. Rock deformation	Chapter 8
<b>Lecture 11 assignment due by 11 AM</b>		
4	Lecture 14. Faults & earthquakes	Chapters 8 and 10
<b>Lecture 12 assignment due by 11 AM</b>		
<u>WEEK OF Mar 8:</u> <b>NO LAB</b>		
9	<b>READING DAY NO LECTURE</b>	
11	Lecture 15. Faults & Earthquakes	Chapters 8 and 10
<b>Lab 5 due by 11 AM</b>		
<b>Lecture 13 assignment due by 11 AM</b>		
<u>WEEK OF Mar 15:</u> <u>LAB 6: Topographic maps (30 pts)</u>		
16	Lecture 16. Review of Lectures 1-15	
<b>Lecture 14 assignment due by 11 AM</b>		

	18	Lecture 17. Earth's interior <b>Lecture 15 assignment due by 11 AM</b>	Chapter 11
<u>WEEK OF Mar 22: LAB 7: Structural Geology (30 pts)</u>			
	23	Lecture 18. Plate Tectonics <b>Lab 6 due by 11 AM</b> <b>Lecture 16 assignment due by 11 AM</b>	Chapters 2 and 11
	25	Lecture 19. Climate system I <b>Lecture 17 assignment due by 11 AM</b>	Chapters 12 and 14
<u>WEEK OF Mar 29 NO LAB</u>			
	30	Lecture 20. Climate system II <b>Lab 7 due by 11 AM</b> <b>Lecture 18 assignment due by 11 AM</b>	Chapters 12 and 14
Apr	1	Lecture 21. Hydrologic cycle <b>Lecture 19 assignment due by 11 AM</b>	Chapter 17
<u>WEEK OF Apr 5 LAB 8: Earthquakes/Seismology (30 pts)</u>			
	6	Lecture 22. Streams <b>Lecture 20 assignment due by 11 AM</b>	Chapter 18
	8	Lecture 23. Shallow ocean <b>Lecture 21 assignment due by 11 AM</b>	Chapter 19
<u>WEEK OF Apr 12 LAB 9: Plate Tectonics (30 pts)</u>			
	13	Lecture 24. Deep ocean <b>Lab 8 due by 11 AM</b> <b>Lecture 22 assignment due by 11 AM</b>	Chapter 19
	15	Lecture 25. Cryosphere <b>Lecture 23 assignment due by 11 AM</b>	Chapter 15
<u>WEEK OF Apr 19 NO LAB</u>			
	20	Lecture 26. Deserts <b>Lab 9 due by 11 AM</b> <b>Lecture 24 assignment due by 11 AM</b>	Chapter 19
	22	Lecture 27. Linkages among tectonics, surface processes, & climate <b>Lecture 25 assignment due by 11 AM</b> <b>Virtual Field trip due by 11 AM</b>	
<u>WEEK OF Apr 26 LAB 10: Paleoclimate (30 pts)</u>			
	27	Lecture 28. Energy <b>Lecture 26 assignment due by 11 AM</b>	Chapter 13
	29	Lecture 29. Mineral Resources <b>Lecture 27 assignment due by 11 AM</b>	Chapter 13
May	4	Lecture 30. Review of Lectures 17-29 <b>Lab 10 due by 11 AM</b> <b>Lecture 28 assignment due by 11 AM</b>	
May	11	<b>Lecture 29 and 30 assignments due by 11 AM</b>	