

Reedley College  
GEOL- 9: Introduction to Earth Science  
Fall, 2023

Instructor: John Kirk

E-mail: john.kirk@reedleycollege.edu

### COURSE INFORMATION

Credit: 4

Lecture Hours and Location: M, W 1:30PM - 2:45PM, PHY-76

Laboratory Hours and Location (split class, a portion will be assigned to either Monday or Wednesday): M or W 3:00PM - 4:45PM, PHY-75

Course Description: This course is an introduction to the earth sciences with an emphasis on basic topics and principles in geology. The major concepts of oceanography, hydrology, meteorology, and astronomy are also examined. This course may be used for the transfer degree in Liberal Studies. ADVISORIES: Eligibility for English 1A and Mathematics 201. (A, CSU-GE, UC, I).

### **Important Deadlines:**

Deadline to drop with refund – end of 2nd week (8/16/2023).

Deadline to drop without “W” and to add course – end of 3rd week (8/23/2023).

Deadline to drop with a “W” - end of 9th week (10/7/2023).

### **Course Objectives:**

1. Explain the scientific method and apply it to earth science studies.
2. Identify the major Earth systems, including plate tectonics, geologic structures, mountain building, seismic activity and volcanoes, and describe their significant interactions.
3. Identify common minerals and igneous, sedimentary and metamorphic rocks that make up the earth’s surface and know the importance of various minerals and rocks to humans.
4. Summarize the rock cycle and explain the major processes involved in rock formation.
5. Describe the major processes that create and modify the Earth's landforms, including erosion and soil formation.
6. Summarize the hydrologic cycle and explain the major processes involved in the movement of water, including surface water, groundwater, glaciers and deserts.

7. Identify the earth's resources and determine if each of the resources is renewable or nonrenewable.
8. Describe the theory of plate tectonics and the evidence for the theory.
9. Classify the major types of plate interactions and list examples of each type.
10. Describe how volcanoes and earthquakes are formed and identify where they occur relative to plate tectonics.
11. Use triangulation to explain how earthquake epicenters are located and use seismic waves to determine distance from an earthquake.
12. Summarize the major geological principles and be used to determine the geologic history of a landscape.
13. Describe the concept of geologic time and how the geologic time scale was developed.
14. Compare relative and absolute dating, fossils and fossilization.
15. Recognize and explain the topography of the sea floor and describe ocean currents, tides and shorelines
16. Describe the chemistry of seawater.
17. Recognize and explain coastal erosional and depositional processes and the landforms they produce.
18. Summarize the causes of tidal fluctuations.
19. Describe the role of the ocean in the creation and modification of weather and climate.
20. Summarize the difference between weather and climate.
21. Describe the causes of the seasonal weather cycle.
22. Describe the composition of the atmosphere and earth's atmospheric circulation patterns.
23. List and describe the major types of climate.
24. Compare current theories and evidence for the origin of the universe and the solar system.
25. Identify the major planets and explain their motion relative to the sun.
26. Describe the systematic trends in planetary composition, density, size, orbital speed, etc. within our solar system.
27. Describe stars and interstellar matter.

## **Student Learning Outcomes:**

1. Explain and apply the scientific method to problem solving across numerous disciplines.
2. Differentiate among the major Earth systems and describe how the systems are interconnected. Earth's systems include the hydrologic cycle, rock cycle, plate tectonics cycle, solar system, geologic time, weather and climate.
3. Describe basic physical properties of minerals and rocks and use appropriate methods to identify common minerals and rocks.
4. Utilize the plate tectonics theory to explain the distribution of Earth's major topographic features and the distribution of volcanoes and seismic activity.
5. Describe the forces and processes that shape the earth's surface and their affects over geologic time.
6. Describe and explain the controls of Earth's weather and climate.
7. Demonstrate a fundamental understanding of the significant role played by oceans in controlling Earth's weather, climate, and biological systems.
8. Be able to explain and critique theories for the origin of the solar system and the universe.
9. Communicate complex course concepts effectively in writing and diagrams.

## **Textbooks:**

- Earth Science, 2<sup>nd</sup> Edition, 2020 edition, by Marshak, S., and Rauber, R., W.W. Norton Company.
- Laboratory Manual in Physical Geology, 2015 edition, edited by Busch, R.M., and illustrated by Tasa, Pearson Book Company.

These books or eTextbooks are available at the campus bookstore and may be bought or rented at: [www.amazon.com](http://www.amazon.com), [www.ecampus.com](http://www.ecampus.com), [www.vitalsource.com](http://www.vitalsource.com), or [www.chegg.com](http://www.chegg.com) as well as others not listed.

## **Classroom Credit and Classroom Participation Expectations:**

Credit may be given for exceptional class participation or in presentations of class materials by the students. Portions of lecture PowerPoint presentations will be made available prior to class. Students who participate in this will be expected to present portions of the PowerPoint presentation to the class. "Get out of Question Free" cards will be given to the students who perform these presentations. The cards must be used at the next examination and may not be accumulated. During the examinations, the student can select any question to be replaced by the "Get out of Question Free" cards by letting the instructor know which question is to be replaced by the card.

**Basis for Course Grade:**

80% Unit Exams

20% Comprehensive Final

100% Total

Scores from all of the exams will be tallied and percentages of correct answers will be converted to percentage of total using the following grading system:

90-100 A

80-89.9 B

70-79.9 C

60-69.9 D

0-59.9 F

**Attendance Policy:**

Attendance at lectures and lab sessions is required and counted for every session. Students who have the perfect attendance will get 2% extra points to total grade. If you are absent from class, it is your responsibility to check on announcements made while you were away. Students who are truly interested in learning will read the chapter and come to class ON TIME and ask questions, and those who have truly learned will be able to answer questions put to them during class and exams. Furthermore, any student who misses the first two days of class or misses 3 consecutive days without contacting the instructor will be dropped from the class.

**Labs:**

Laboratory sessions are designed to help students evolve from memorized information to actual understanding of the concepts, theory, and practice. Labs will focus on field aspects of geology, oceanography, meteorology, astronomy, experimentation, and questions sets designed to broaden the understanding of Earth Science. Contents of labs will follow the lecture. The lab sessions will be divided into two groups with approximately one-half of the students attending the Monday sessions and the remainder during the Wednesday sessions.

**Night Lab Class for Astronomy:**

Important: Weather permitting there will be an evening class will be held on campus on November 20<sup>th</sup>. Additional information about location and time will be provided prior to the meetings.

### **Teaching and Exams Methods:**

Lectures and laboratory classes are the major means of teaching. The examination will be composed of short questions and major questions with the emphasis on the concepts, theory, and practice. Late work is NOT accepted and tests and exams cannot be taken at a later date!

### **Recommended Materials:**

For this course you will need a scientific calculator (such as a TI 30), #2 pencil or HB lead for mechanical pencils, eraser, ruler, and protractor. Most of these can be purchased at the Bookstore or ordered online through providers such as Amazon. If there is a problem getting these materials, please speak to your instructor to make special arrangements.

### **Canceled Classes:**

If class is canceled, it will be announced to the students through Canvas.

Please make sure to check for announcements before you leave for class. I will make my best effort to contact everyone promptly if class is canceled.

### **Tentative Schedule:**

Note that the classroom and lab sessions are not given in book order but emphasize first how the earth was formed: plate tectonics and the dynamics of the planet in terms of volcanoes and earthquakes. Followed by how rocks were formed as a consequence of this dynamic action, then how minerals formed within the rocks. Pay attention to the schedule below for the order of sections in the textbooks to be studied.

GEOL 9: Introduction to Earth Science, Tentative Schedule

Week	Unit	Date	Lecture Content	Ch	Lab Content	Ch	
1	Unit 1: Forces Within	M Aug 7	Instruction Begins: Welcome and Introduction to Earth Science	1	Basic Skills and the Scientific Method	1	
		W Aug 9	Geology - Plate Tectonics and Volcanism	2, 4	Plate Tectonics, Volcanism, and Volcanic Hazards	2, 5	
2		M Aug 14	Geology - Mountain Building and Geologic Structures	7	Geologic Structures, Maps, and Cross Sections	6	
		W Aug 16	Geology - Earthquakes	8	Earthquakes and Seismology	7	
3		M Aug 21	Review/Tentative Schedule	8	Review/Tentative Schedule	7	
		W Aug 23	<b>EXAM 1 - Dynamic Earth</b>		skip		
4		Unit 2: Rocks and Minerals	M Aug 28	Geology - Igneous Rocks	4	Igneous Rocks and Identification	
			W Aug 30	Geology - Sedimentary Rocks	5	Sedimentary Rocks and Identification	
5			M Sep 4	<b>Labor Day Holiday</b>			
			W Sep 6	Geology - Metamorphism and the Rock Cycle	6	Metamorphic Rocks and Identification	4
6	M Sep 11		Minerals and Rocks	3	Mineral Identification	3	
	W Sep 13		Energy and Mineral Resources	11	Topographic Maps and Air Photos	9	
7	M Sep 18		Review/Tentative Schedule		Review/Tentative Schedule		
	W Sep 20		<b>EXAM 2 - Earth Materials</b>		skip		
8	Unit 3: Earth's Surface and History		M Sep 25	Geology - Earth History part 1	9	Interpreting Geologic History	8
			W Sep 27	Geology - Earth History part 2	10	Interpreting Geologic History	8
9		M Oct 2	Geology - the Hydrologic Cycle and Mass Wasting	12	Mass Wasting and Landscape Evolution	10	
		W Oct 4	Geology - Streams and Lakes	13	Streams and Landscapes	11, 12	
10		M Oct 9	Geology - Groundwater	13	Groundwater		
		W Oct 11	Geology - Arid and Glacial Landscapes	14	Arid and Glacial Landscapes	13	
11		M Oct 16	<b>EXAM 3 - Earth's Surface, History, and Groundwater</b>		skip		
		12	W Oct 18	Oceanography part 1	15	Oceanography	14
M Oct 23			Oceanography part 2	16	Coasts and Energy	15	
W Oct 25			<b>EXAM 4 - Oceanography</b>		skip		
13	Unit 5: Meteorology	M Oct 30	Climate and Meteorology - Earth's Atmosphere	17	Earth's Atmosphere and Heat	16	
		W Nov 1	Climate and Meteorology - Wind systems	18	Humidity, Air Pressure, and Wind	17	
14		M Nov 6	Climate and Meteorology - Storms	19	Weather Patterns	18	
		W Nov 8	Climate and Meteorology - Climate	20	Climate	19	
15		M Nov 13	<b>EXAM 5 - Meteorology and Weather</b>		skip		
	16	W Nov 15	Astronomy: The Cosmos, Galaxies, and Stars	21	Night class: The moon, planets, stars, constellations	20	
M Nov 20		Astronomy: our Solar System	22	Night class: The moon, planets, stars, constellations	21		
W Nov 22		<b>EXAM 6 - Astronomy</b>	23	skip	22		
17	M Nov 27	<b>Thanksgiving Holiday</b>					
	W Nov 29	Tentative Schedule/Comprehensive Review		Tentative Schedule/Comprehensive Review			
18	M Dec 4	<b>Comprehensive Final Exam 50% Weighted on Geology: Chapters 1 through 14</b>		skip			
	W Dec 6						

## **ADMINISTRATION:**

**Disability Notice:** If you have special needs as addressed by the American with Disabilities Act (ADA) and need course materials in alternative formats, notify your course instructor immediately. Reasonable efforts will be made to accommodate your special needs.

**Cheating and Plagiarism Notice:** Please refer to the Reedley College Catalog section titled Administrative Policies for Policy on Cheating and Plagiarism. All work must be completed independently. Copying work from others without putting in any substantial individual effort constitutes plagiarism, which will be subject to disciplinary actions in accordance with policy.

**Classroom etiquette:** Please set your cell phones vibrate or silent during classes. Please use them for emergency purposes only. If you must talk or text on your phone, please first leave the classroom quietly without causing any disruption.

**Subject-to-change notice:** This syllabus and the class schedule are subject to change in the events of extenuating circumstances. If you are absent from class, it is your responsibility to check on announcements made while you were absent. Any substantive changes to this syllabus will be accompanied by the distribution of a revised or annotated syllabus.