



Geology 1403: Physical Geology

Contact information:

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- I. **Texas Core Curriculum Statement of Purpose:** Through the Texas Core Curriculum, students will gain a foundation of knowledge of human foundation of knowledge of human cultures and the physical and natural world, develop principles and social responsibility for living in a diverse world, and advance intellectual and practical skills that are essential for all learning.
- II. **Course Description:** Introduction to the study of materials and processes that have modified and shaped the surface and interior of Earth over time. These processes are described by theories based on experimental data and geologic data gathered from field observations
- III. **Required Background:** There are no stated prerequisites.
- IV. **Required Course Materials:** Geology 2 (2013) by Reed Wicander and James. S. Moor, Brooks/Cole, Cengage Learning, 20 Davis Dr., Belmont, CA, 94002-3098
- V. **Course Purpose:** This course focuses on describing, explaining and predicting natural phenomena, using the scientific method. The course involves understanding of interactions among natural phenomenal and the implications of scientific principles on the physical world and on human experiences.
- VI. **Learning Outcomes:**

Upon successful completion of this course, students will:

- Describe how the scientific method has led to our current understanding of Earth's structure and processes.
- Interpret the origin and distribution of minerals, rocks and geologic resources.

- Describe the theory of plate tectonics and its relationship to the formation and distribution of Earth's crustal features.
- Quantify the rates of physical and chemical processes acting on Earth and how these processes fit into the context of geologic time.
- Communicate how surface processes are driven by interactions among Earth's system (e.g. the geosphere, hydrosphere, biosphere, and atmosphere).
- Identify and describe the internal structure and dynamics of Earth.
- Describe the interaction of humans with Earth (e.g. resource development or hazard assessment).

VII. Core Objectives: This course directly meets the following of the six Core Objectives (bold).

- 1. Critical Thinking Skills: to include creative thinking, innovations, inquiry, and analysis, evaluation, and synthesis of information.**
- 2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral, and visual communication.**
- 3. Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.**
- 4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.**
5. Personal Responsibility: to include the ability to connect choices, actions, and consequences to ethical decision-making.
6. Social Responsibility: to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.

VIII. Methods of instruction: Class notes, class discussion, lab experiences, videos.

IX. Methods of Assessment:

- A. Grading: This course will accumulate @600 points. The following scale will then be applied to calculate individual grades:

A= 90-100; B=80-89; C=70-79; D=60-69; F=59 or less

B. Division of Points:

A. Class work= @ 20% (@90 points)

1. Daily Focus Work

- a. A review question will be distributed at the beginning of each class. You will have 5 minutes before class begins. You may turn this into the appropriate location up to 10 minutes after the official beginning of class. It will not be accepted after that..
- b. This activity is intended to discourage tardiness and review previous class material.

B. Assessments= @50% (@240 points)

1. One every week; these will be short-answer, discussion questions.
2. There will be 12 assessments, each worth 20 points.
3. These will be take-home assessments. Group work is not discouraged but your submission should be in your own handwriting and your own words. This will be due the first day of the following week AT THE BEGINNING OF CLASS. Do not work on these during any class time.
4. Late submissions will be docked 5 points. Assessments will not be accepted after 10 days of issuance. Excused absences must be noted on the submission. Attach a sport schedule or doctor's note.
5. During Weeks 13 and 14, an assessment will be available to make-up for a missing assessment, regardless of reason for missing assessment.

C. Lab=@25% (120 points)

1. Lab will meet twice a week for 1.5 hour each session. There will be a five-point assignment for each lab session for a total of 10 points per week.
2. Twelve lab grades are required at 10 points each.

D. Final Exam=@10% (@50 points)

1. This will consist of multiple-choice vocabulary terms/concepts from the entire semester.
2. I will give a review list of possible terms one week before the final.

X. Classroom Policies:

- A. **Academic Dishonesty:** Any assignment reflecting cheating, plagiarism, or any other form of academic dishonesty will receive a grade of zero. A second instance will result in automatic failure of the class and a report being submitted to Ranger College's Vice President of Instruction.
- B. Class attendance and participation are strongly encouraged for optimal learning.
- C. Use of cell phones is discouraged unless researching class information or addressing an emergency. Other use is poor manners and disrespectful.
- D. **Attendance:** . If you are going to miss class, please notify me at alewis@rangercollege.edu prior to the class meeting if at all possible. Students missing more than three lectures or two labs may be dropped from the course by the instructor.
- E. **Non-discrimination Statement:** No person shall be excluded from participation in, denied the benefits of, or be subjected to discrimination under any program or activity sponsored by Range College on any basis prohibited by applicable law, including, but not limited to race, color, national origin, religion, gender, age or disability.
- F. **ADA Compliance:** Ranger College abides by Section 504 of the Rehabilitation Act of 1973, which stipulates that no otherwise qualified student shall be denied the benefits of an education “solely by reason of a handicap.” If you have a documented disability that may impact your performance in this class and for which you may be requesting accommodation, you must be registered with and provide documentation of your disability. Arrangements will be made for students needing special accommodations.

XI. Time-Line for Physical Geology

Week 1: Syllabus, Fields of Geology, History of Geology

Week 2 Plate Tectonics

Week 3 Matter and Minerals

Week 4 Igneous Rock and Intrusive Activity

Week 5 Volcanoes

Week 6 Sedimentary Rock, Soil, and Weathering

Week 7 Metamorphic Rock

Week 8 Earthquakes and the Earth's Interior

Week 9 Mountain Building and Deformation

Week 10 Mass Wasting

Week 11 Surface Water

Week 12 Groundwater

Week 13 Glaciers

Week 14 Wind and Deserts

Week 15 Oceans and Shorelines

Core Objectives 1-4

Each item on this list of weekly assignments meets the corresponding numbered core objectives listed on page 1 above.

Week 1: Syllabus, Fields of Geology, History of Geology

1. Evaluate early scientific teachings of Aristotle, Ussher, Hutton, etc. as to their validity and reliability.
2. Orally interview classmates in introduction to establish similarities and differences in geologic background knowledge.
3. Analyze newspaper articles on geologic events to draw conclusions on frequency, location, and broad spectrum impact.

Week 2: Plate Tectonics

1. Evaluate evidence (past and present-day) of tectonic movement.
2. Construct VENN diagram, comparing and contrasting summaries of plate tectonics with class notes and video “Colliding Continents.”
3. Employing data (latitude and longitude) of 45 earthquakes and volcanoes, plot location of these on a world map.
4. Combine (teamwork) plotted locations with classmates as time does not permit individual work.

Week 3: Matter and Minerals

1. Classify all matter in a pyramid and display interrelationships between such.
- 2-4. As a team identify ten minerals using known characteristics of the representative minerals; use accepted tests such as color, hardness, streak, specific gravity, etc.

Week 4: Igneous Rock and Intrusive Activity

1. Review the deductive reasoning process employed by scientists to theorize the interior of the earth; formulate alternative explanations.
2. Visually study video: “Inside Planet Earth” and parallel information with class notes.
3. & 4. As a team identify 10 given rocks using grain size and mineral composition (data); research on-line other rocks illustrating similar characteristics; emphasize uses of each type.

Week 5: Volcanoes

1. Using lab on plate tectonics (week 2), relate plate boundaries to occurrence of volcanoes.

2. Present to class a 5-minute power point on chosen volcano.
4. Demonstrate understanding of selected volcanoes from oral presentations on Assessment 5.

Week 6: Sedimentary Rock, Soil, and Weathering

- 1-4. Using forensic kit, analyze soil samples to deduce location of contamination of soil; present observations in accepted scientific format.

Week 7: Metamorphic Rock

- 1, 3. After field trip to local cemetery to view various forms of tombstones, research the materials used in the past and present for these; compare findings to materials used on other parts of the country; evaluate reasons for differences.

Week 8: Earthquakes and Earth's Interior

1. Using VENN diagram, compare and contrast information from class notes with material presented in video "Earthquakes".
3. Using data on time of arrival of p and s waves at three different cities, formulate the location of the epicenter of a given earthquake; help each other as a team in using a compass.

Week 9: Mountain Building and Deformation

- 1, 2. Describe the formation of Himalayan Mtns, and Appalachian Mtns, on Assessment 9 Questions 10 and 11
3. Interpret data from a topographic map and build a 3-D contour model of such landform.

Week 10: Mass Wasting

- 1, 2. Present an oral power point on one of the six examples of mass movement or subsidence
- 3, 4. Using the USDA's soil texture triangle, classify soil samples; relate to soil quality and use; share your results with classmates

Week 11: Surface Water

2. Assessment 11, Question 15: Describe four types of flood control; evaluate pros and cons of each.
- 2, 4. Working as a team, investigate samples from a simulated sites to identify source of stream pollution by nitrates and phosphates (human impact on environment; record results in proper scientific form

Week 12: Groundwater

- 3, 4. Divide lab “Exploring Groundwater” into sections. Each subgroup completes one section and then class consolidates results
- 3, 4. After analyzing water samples from simulated polluted groundwater, project probable source of contamination.

Week 13: Glaciers

- 2, 4. Present a five-minute power point discussion to classmates of one of the chapter objectives; this needs to be in detail because no other class notes will be given before assessment.

Week 14: Wind and Desert

1. Analyze the process of desertification in several areas of the world and its impact on humans.
Assessment 14, Question 1
2. View video “Deserts” from Planet Earth series to visually encounter effects of wind and weather (drought).

Week 15: Oceans and Shorelines

- 3, 4. View “Japan's 2011 Tsunami” video to summarize course content. Combine summaries with classmates. These conclusions should involve plate tectonics, intrusive activity, volcanoes, earthquakes, ocean, shorelines, and possible other natural phenomena encountered this semester.