I. INTRODUCTION

A. Physical Geology is an introductory one-semester course about the materials and processes of the Earth. Topics included are: minerals, rocks, plate tectonics, continental evolution, earthquakes, volcanoes, weathering and erosion, running water, ground water, mass wasting, and others. The study of regional rocks and minerals, and the opportunity for field observation and collection are provided.

B. This fulfills a Science requirement for completing the core requirements for AA/AS degrees and transfers to other Texas public colleges and universities for BA/BS degrees. This course is required for degrees in geology, environmental sciences, and hydrology/water resources. The course can be occupationally related, serving as preparation for careers in teaching, the earth sciences, military service, engineering, hydrological science, urban planning, and perhaps other fields as well.

C. In support of the objectives of the Texas core curriculum, this course provides significant exercise of students' critical thinking, communication skills, teamwork, and empirical and quantitative skills. These objectives form a foundation of intellectual and practical skills that are essential for all learning.

A. Critical thinking skills include creative thinking, innovation inquiry, and analysis, evaluation and synthesis of information.

B. Communication skills include effective development, interpretation, and expression of ideas through written, oral, and visual media.

C. Teamwork includes the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

D. Empirical and quantitative skills include the ability to manipulate and analyze numerical data or observable facts to reach informed conclusions.

D. Prerequisite: None.

II. LEARNING OUTCOMES

Upon successful completion of GEOL 1403, Physical Geology, the student will:

A. Describe how the scientific method has led to our current understanding of Earth's structure and processes.
B. Interpret the origin and distribution of minerals, rocks and geologic resources.
C. Describe the theory of plate tectonics and its relationship to the formation and
distribution of Earth's crustal features.
D. Quantify the rates of physical and chemical processes acting on Earth and how these
processes fit into the context of geologic time.
E. Communicate how surface processes are driven by interactions among Earth's systems
(e.g. the geosphere, hydrosphere, biosphere, and atmosphere).
F. Identify and describe the internal structure and dynamics of Earth.
G. Describe the interaction of humans with Earth (e.g. resource development or hazard
assessment).
H. Classify rocks and minerals based on chemical composition, physical properties, and
origin.
I. Apply knowledge of topographic maps to quantify geometrical aspects of topography.
J. Identify landforms on maps, diagrams, and/or photographs and explain the processes
that created them.
K. Differentiate the types of plate boundaries and their associated features on maps and
profiles and explain the processes that occur at each type of boundary.
L. Identify basic structural features on maps, block diagrams, and cross sections and infer
how they were created.
M. Demonstrate the collection, analysis, and reporting of data.

III. INSTRUCTIONAL MATERIALS

The instructional materials identified for this course are viewable
through www.ctcd.edu/books
Students will be required to have a copy of The Changing Earth: exploring geology and

IV. COURSE REQUIREMENTS

After studying the material presented in Physical Geology, the student will be able to do the following:

A. Explain what geology is and describe its subparts. (A)
B. Summarize the methods of science. (A)
C. Summarize the various systems that are the principal agents of change in and on the Earth. (A, D)
D. Demonstrate the ability to identify minerals. (A, B, C, D)
E. Demonstrate the ability to identify rocks. (A, B, C, D)
F. Demonstrate the ability to read and interpret geological photos, diagrams, graphs, tables, and
models. (A, D)
G. Demonstrate the ability to read and interpret topographic maps. (A, C, D)
H. Compare relative and absolute time, stating how each is determined and used. (A, D)
I. Summarize the modern ideas concerning the forces responsible for large-scale fundamental changes
of the Earth's inner and outer regions, and how they relate to catastrophic events that affect
humanity. (A, B, D)
J. Describe the subdivisions and significance of the major subdivisions of the Earth's interior. (A, D)
K. Describe the processes and results of mountain building. (A, B, D)
L. Describe the processes of crustal deformation, and the formation of geologic structures. (A, B,
D)

V. EXAMINATIONS

Lecture: 2-6 in class lecture exams and a final exam are given during the semester. The exams given may include any or all of the following types of questions: multiple choice, fill-in-the-blank, matching, true/false, discussion, and identification. The final exam will be comprehensive. Please be advised that your instructor gives challenging exams which involve many levels of question difficulty, including questions which require analysis, synthesis, and other higher-order thinking skills. Point values for exams are determined by your instructor.

Laboratory: 2-4 in class laboratory exams will be given during the semester. These exams may include, but are not limited to, short answer, essay, and identification questions. Please be advised that your instructor gives challenging exams which involve many levels of question difficulty, including questions which require analysis, synthesis, and other higher-order thinking skills. Point values for exams are determined by your instructor.

VI. SEMESTER GRADE COMPUTATION

The final grade in GEOL 1403 is attained by adding together all points on exams, quizzes, and additional items, including writing assignments. The grade distribution scale is as follows:

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90-100%</td>
<td>A</td>
</tr>
<tr>
<td>80-89%</td>
<td>B</td>
</tr>
<tr>
<td>70-75%</td>
<td>C</td>
</tr>
<tr>
<td>50-69%</td>
<td>D</td>
</tr>
<tr>
<td>0-59%</td>
<td>F</td>
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</tbody>
</table>
VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. **Course Withdrawal**: It is the student's responsibility to officially withdraw from a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file a Central Texas College Application for Withdrawal (CTC Form 59). The withdrawal form must be signed by the student.

CTC Form 59 will be accepted at any time prior to Friday of the 12 week of classes during the 16 week fall and spring semesters. The deadline for sessions of other lengths is:

- 10 week session | Friday of the 8th week
- 9 week session  | Friday of the 6th week
- 5 week session  | Friday of the 4th week

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

A student who officially withdraws will be awarded the grade of "W" provided the student's attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of "F" or "FN" for non-attendance.

B. **Administrative Withdrawal**: An administrative withdrawal will be initiated when the student fails to meet college attendance requirements. The instructor will assign the appropriate grade on CTC Form 59 for submission to the registrar.

C. **Incomplete Grade**: The college catalog states, "An incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course...." Prior approval from the instructor is required before the grade of "I" is recorded. A student who merely fails to show for the final examination will receive a zero for the final exam and an "F" for the course.

D. **Cellular Phones and Electronic Devices**: Cellular phones and other electronic devices will be turned off while the student is in the classroom, laboratory, or in any other learning situation unless the student receives permission from the instructor to use the device. Failure to turn off these devices may result in point...
deductions at the instructor's discretion.

E. **American's with Disabilities Act (ADA):** Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at [www.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

F. **Instructor Discretion:** The instructor reserves the right to final decision in course requirements.

G. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is, be respectful, and show civility to those participating in a learning environment, including field trips and any other situation whose purpose is to promote or enhance learning. Failure to do so can result in disciplinary action up to and including expulsion. Minimal civility includes:

- Being in class on time;
- Staying in class for the entire class period;
- Informing the instructor prior to class that an unavoidable conflict requires your early departure from class, and thereafter positioning yourself to the exit so that your departure causes a minimum disruption or distraction.
- Avoiding such uncivil conduct as talking, sleeping, reading papers or magazines, or working on some assignment which is not directly pertinent to the learning situation at hand;
- Using socially acceptable language in classroom discussions and elsewhere in learning situations

Additionally your instructor requires you to take personal responsibility for your actions.

H. **The following specific rules apply to absences:** Each instructor shall keep a record of class attendance. An administrative withdrawal may be submitted when a student's absences exceed **four (4)** class meetings. The instructor will note administrative withdrawals as the grade of "F Non-attendance" on the roll and record book. As a matter of policy, administrative excuses from classes are not provided for any reason. Regardless of the nature of the absence, students are responsible for completing all course work covered during any absence.

I. **For complete information consult the college catalog and Student Handbook.**
VIII. COURSE OUTLINE

Unit 1: Earth Materials.

A. Unit Objective: Upon successful completion of this unit the student will:
   1. Discuss our planetary environment, physical and human.
   2. Describe the Earth's materials (such as minerals, rocks, fossils, etc.).
   3. Explain the theory of plate tectonics.
   4. Describe and explain volcanoes, stating possible hazards and possible mitigation techniques.
   5. Identify and describe the many kinds of mineral resources, problems associated and possible mitigation techniques.
   6. Identify and describe the kinds of fossil fuels, problems associated and possible mitigation techniques.
   7. Discuss alternative energy sources and describe the pros and cons associated with each.

B. Learning Activities:
   1. Read the related text material prior to the lecture.
   2. Lecture and discussion on topics.
   3. Lab assignments covering some/all lecture topics

C. Unit Outline
   Chapter 1: General Geology and Science
   Chapter 2: Plate Tectonics
   Chapter 3: Minerals
   Chapter 4: Igneous Rocks
   Chapter 5: Volcanoes and Volcanism
   Chapter 6: Soils
   Chapter 7: Sedimentary Rocks
   Chapter 8: Metamorphic Rocks
   Chapter 12: Earth's Interior
   Chapter 13: Divergent Boundaries
   Chapter 14: Convergent Boundaries
   Chapter 23: Economic Geology

Unit 2: Earth Processes

A. Unit Objective: Upon successful completion of this unit the student will:
   1. Describe stream and groundwater processes and hazards associated with each.
   2. Describe mass movements and discuss mitigation techniques.
   3. Discuss the relationship of geology and climate.
   4. Discuss the significance of water as a resource, explain problems and possible solutions.
   5. Discuss geologic time and techniques for determining the age of geologic events and materials.
   6. Utilize maps and aerial photographs to identify landforms and other geologic phenomena.
7. Describe and explain earthquakes, stating possible hazards and possible mitigation techniques.
8. Describe various structural features created through rock deformation.
9. Describe various environments commonly found on Earth (ex. Glaciers, Deserts, Coastlines, etc.).

B. Learning Activities:
   1. Read the related text material prior to the lecture.
   2. Lecture and discussion on topics.
   3. Lab exercises covering some/all of the lecture topics.

C. General Unit Outline
   Chapter 9: Geologic Time
   Chapter 10: Structural Geology
   Chapter 11: Earthquakes
   Chapter 15: Mass Wasting
   Chapter 16: Streams and Surface Waters
   Chapter 17: Groundwater
   Chapter 18: Glaciers
   Chapter 19: Deserts
   Chapter 20: Shorelines
   Chapter 21: Climate