

# HISTORICAL GEOLOGY

## Description

A geological history of the Earth with emphasis on fossils, evolution, depositional environments, and plate tectonics. A field trip will be required.

## Rationale

As the world's population grows and expands, humans are placing a greater demand on Earth resources, destroying habitats, contributing to the extinction of organisms, and causing rapid changes in our climate and oceans. To make educated decisions about these demands and changes, consumers, voters, and decision-makers must understand how the Earth and its life forms have evolved and how scientists have obtained this knowledge. Studying historical geology provides a valuable perspective for this understanding. Critical thinking, empirical reasoning, and interpersonal skills learned in this course can be applied to any career or pursuit.

## Objectives

- Learn the basic principles of geochronology, paleontology, plate tectonics, sediment, and stratigraphy
- Review and apply basic concepts of physical geology, geophysics, geochemistry, and biology to the study of Earth history
- Develop the ability to interpret the history of Earth materials, processes, and features
- Develop an understanding of the methods that geologists use to study Earth history
- Learn to make scientific observations and ask meaningful questions about the history of the Earth
- Conduct safe and productive lab and field investigations of the Earth

## Outcomes

Course-Level - upon successful completion of this course, students will be able to:

- identify common sedimentary rocks and structures, and describe and interpret their origin
- describe the sedimentological, paleoclimatic, tectonic and biological history of the Earth with a focus on North America
- explain and apply the basic principles of stratigraphy, paleoecology, and geochronology
- explain the theory of biological evolution and how it explains the diversity and extinction of organisms
- identify common fossil organisms and describe their habitat
- construct and interpret geologic and stratigraphic maps and cross-sections.

Program-Level - as a required course for an Associate of Science in Geology, students will be able to:

- describe the biological and geological history of the Earth
- identify common fossils

- interpret and construct geologic and stratigraphic maps and cross-sections

General Education - as a Core Curriculum course, students completing this course will demonstrate competence in:

- critical thinking in the gathering, analyzing, synthesizing, evaluating and applying information
- quantitative and empirical reasoning through the application of mathematical, logical and scientific principles and methods

## Instructional Methods

This course will be taught in illustrated lecture, discussion, lab exercise, and field investigation formats. Student learning will be assessed through examinations of lecture and field trip material, graded lab exercises, a graded well-core project, and through practical quizzes on lab material.

## Registration

**Section** 70611 - Lecture – 1:30-2:50 P.M. Tues. and Thurs. in HLC Rm. 2113

Lab – 3:00-4:20 P.M. Tues. and Thurs. in HLC Rm. 2213

**Prerequisite** - Completion of GEOL 1403 - Physical Geology, or an equivalent physical geology lecture and lab course at another college

## Textbooks and Materials

### Required Books

Stanley, Steven M. and John A. Luczaj, 2015. *Earth system history (fourth edition)*: New York, W.H. Freeman and Company, 587 p., ISBN 978-1-4292-5526-4

Ritter, Scott, and Petersen, Morris, 2015. *Interpreting Earth history; A manual in historical geology (eighth edition)*: Long Grove, IL, Waveland Press, 291 p., ISBN 978-1-4786-1145-5 (paper only)

### Supplies

<b>No. 2 pencils and eraser or a mechanical pencil (required)</b>	Protractor (optional)
3-ring notebook (optional)	Hand lens (10X pocket magnifier) (optional)
Colored pencils - set of at least 10 colors (optional)	Rock pick with metal handle (optional)
12" Metric/English ruler (optional)	Vented ANSI Z87.1 safety goggles (optional)

## Laboratory

It is very important for you to attend all lab sessions. You should read the assigned pages in your lab manual before you come to class so that you can complete the exercise in the allotted time. Completed exercises are due one week after they are assigned unless otherwise notified. Some exercises will be due on the day that they are assigned or by the end of the next class. Students who miss a lab, or who need extra time, should plan on attending an open-lab session in **HLC Room 2216.00**. You must bring your

own copy of the lab exercise to the open-lab session. Additional Friday open-lab sessions will be held at other ACC campuses (see <http://sites.austincc.edu/ees/about-geology/open-labs/>), however specimens for this course are not available for study at the other campuses.

## Field Trip

You must participate in a mandatory class field trip at 8:30 A.M. on Saturday, April 13, 2019. Transportation for the field trip will be provided and the trip should return by 6:00 P.M. You must participate in an ACC GEOL 1404 field trip to pass this course. Department policy states that students who do not attend the required field trip will fail the class. If you are cannot attend the trip on April 13, 2018, you must make arrangements in advance to participate in another professor's GEOL 1404 field trip (<http://sites.austincc.edu/ees/about-geology/geology-field-trips/>). Do not assume that if you miss the field trip that you will be able to make it up.

## Communication

**Instructor:** Robert (Bob) H. Blodgett, Ph.D., P. G., Professor

**Office Hours:**

- 12:00 to 3 P.M. on Monday in NRG Room 2216
- 12:00 to 1:20 P.M. Tuesday in HLC Room 1431
- 4:30 to 5:10 P.M. Tuesday in HLC Room 1431
- By appointment 11:50 A.M. to 3 P.M. Wednesday in NRG Room 2216
- By appointment 12:00 to 1:20 P.M. Thursday in HLC Room 1431
- By appointment 4:30 to 5:10 P.M. Thursday in HLC Room 1431

**Telephone / voice mail:** 512-223-4276

**Electronic mail:** *rblodget* @ *austincc.edu* - checked at least daily Monday through Friday; students are expected to check their ACCmail accounts regularly during the work week.

**Web page:** <http://www.austincc.edu/rblodget/>

## Assessment and Grading

### Exams and Quizzes

Lecture exams will be graded, in-class, closed-book tests containing multiple-choice, matching, and short- and long-answer questions drawn from lectures, handouts, reading assignments, and the field trip. A final lecture exam will be given on the last day of class and will emphasize material covered since the last mid-term exam. Three graded, in-lab practical quizzes will contain questions about samples of Earth materials, maps and photographs, as well as short-answer questions about terminology and methodology. Four graded, in-lecture quizzes will contain questions about the geologic time scale. The lowest lecture quiz grade will be dropped and there will be no make-ups for lecture quizzes. No exams or quizzes will be given early. If a single exam is missed, the score on the final exam will be given for that missed exam. Scores of 70 or greater on the final exam will substitute for the lowest mid-term exam score. Review sheets will be distributed before each exam and quiz.

## **Grading**

Your final course score will be calculated as follows:

10% - Graded lab exercises	6% - Four lecture quizzes (lowest quiz grade dropped)
4% - Well core project	48% - Three mid-term lecture exams (16% each)
12% - Three lab quizzes (4% each)	20% - Final lecture exam

There is no "extra credit." You must notify your professor of any mistakes or disagreements in scoring within one week after a corrected exam, quiz, or assignment has been returned. The following scale will be used to determine your course grade: 90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D and below 60% = F. Students whose final course average is 59%, 69%, 79%, and 89% will be advanced to the next higher grade if their final lecture exam shows improvement over their mid-term lecture exam scores.

## **Course Policies**

### **Participation and Assignments**

You are expected to attend all lectures and lab sessions, participate in class discussion, and work with your professor and classmates to learn course content. This may include distributing and collecting course materials, setting up and storing computers, participating in demonstrations, and cleaning up after lab and field activities. You must turn in a paper copy of all assignments; electronic copies will not be accepted. Assignments turned in late will be penalized 4 points each calendar day; however, it is better to turn an assignment in late than to receive no points for the work. Late assignments must be submitted to the HLC Information Desk on the second floor of Building 1000 with instructions to place the assignment in Professor Blodgett's mailbox. The date will be stamped on the assignment by administrative assistant. Late work will not be accepted after an assignment has been returned to the class.

### **Withdrawals**

If you decide to drop this class, you must protect your academic record by withdrawing no later than Monday, April 28, 2019. The professor reserves the right to withdraw a student for not complying with course/ACC policies or for not meeting course objectives. Departmental policy forbids the professor from withdrawing you after April 28, 2018. State law permits students to withdraw from no more than six courses during their entire undergraduate career at Texas public colleges or universities. With certain exceptions, all course withdrawals automatically count towards this limit. Students who enroll for the third or subsequent time in a course taken since Fall 2002, may be charged higher tuition for that course. Details on this policy can be found in the ACC Catalog: <http://www.austincc.edu/catalog>

### **Incomplete Grade**

An incomplete (grade of "I") will be given only if extenuating circumstances, such as illness or death of a loved one, prevent a student from completing the final exam. Incompletes must be requested in writing with documentation of the extenuating circumstances. If a grade of I is given, the final exam must be taken no later than July 10, 2019.

**See the attached "ACC Academic Policies and Services" for additional policies**

## **Studying**

Science courses, especially those with lab and field exercises, generally require a different approach to studying than other courses. In this course you will be asked to conceptualize things in three dimensions, understand complex concepts, conceptualize billions of years of geologic time, and learn a whole new vocabulary for describing your planet. You will improve your performance if you read each textbook chapter, review the chapter summary, take notes from both the textbook and the lecture, answer the review questions in each chapter, and learn the key terms shown with bold type in the text. Many students find it useful to make flash cards with the definitions and geologic significance of terms. You may also find it beneficial to study in groups with your classmates. Many students underestimate the amount of time needed to do pass this course. At a minimum, you should spend two hours outside of class studying for every hour you spend in class. Free geology tutoring may be available in one or more ACC Learning Labs; check <http://sites.austincc.edu/ees/tutoring-and-learning-labs/> for locations and hours after the first week of classes.

## **Etiquette**

You are expected to be seated and ready for class on time, and not leave your seat during lecture or lab introductions. Take a seat near the door if you arrive late or need to leave early. Please notify the professor if you have to arrive late or leave early on a regular basis. As a common courtesy, do not interrupt the professor or classmates when they are speaking, do not carry on conversations during lectures, and please turn off audible alarms on electronic equipment before class starts. Departmental policy prohibits the use of personal laptop computers in the classroom. Texting is only allowed during designated times in class - you are expected to focus on course content and not multi-task.

## GEOL 1404 COURSE SCHEDULE\*

Date	Lecture Topic	Text	Lab Exercise	Manual
Jan. 22	Introduction	1	Continuation of lecture	-
Jan. 24	Roots of Historical Geology	1	Continuation of lecture	-
Jan. 29	Minerals and Rocks	2	Geography/Chemistry Review	-
Jan. 31	Sediment and Sedimentary Rocks	2, 5	Lecture - Sedimentary Structures and Environments	-
Feb. 5	Diversity of Life and Fossilization	3	Sediment & Sedimentary Rocks	p. 24-35
Feb. 7	Oceans and Atmosphere	4	Depositional Environments	p. 41-47
Feb. 12	Relative Dating and Correlation	6	Relative Dating and Unconformities	p. 60-71
Feb. 14	Absolute Dating	6	Stratigraphy	p. 59-77
Feb. 19	<b>Exam 1</b> (Chap. 1-5)	-	Physical Correlation	p. 78-90
Feb. 21	Evolution and the Fossil Record	7	Facies Relationships	p. 91-117
Feb. 26	Plate Tectonics	8	Plate Tectonics	p. 155-269
Feb. 28	Plate Tectonics and Mountain Building	9	<b>Quiz 1</b>	-
Mar. 5	Major Geochemical Cycles	10	Fossils and Fossilization	p. 119-136
Mar. 7	Hadean World	11	Invertebrate Fossils	p. 127-135, 175-188
Mar. 12	Archean World	11	Invertebrate Fossils	p. 127-135, 175-188
Mar. 14	<b>Exam 2</b> (Chap. 6-10)	-	Microfossils and Plant Fossils	p. 126, 136, 174
Mar. 17-24	<b>Spring Break</b>	-	<b>No Classes</b>	-
Mar. 26	Proterozoic World	12	Index Fossils	p. 170-202
Mar. 28	Early Paleozoic Life	13	Paleoecology	-
Apr. 2	Early Paleozoic Environment	13	Geologic Structures	-
Apr. 4	Middle Paleozoic Life	14	<b>Quiz 2</b>	-
Apr. 9	Middle Paleozoic Environment	14	Geologic Map Interpretation	p. 203-216
Apr. 11	Late Paleozoic Life	15	Paleozoic Orogenies	p. 224-239
Apr. 13	<b>Field Trip</b>	-	<b>Field Trip</b>	-
Apr. 16	Late Paleozoic Environment	15	Cordilleran Orogeny	p. 240-268
Apr. 18	Early Mesozoic Life	16	Phanerozoic of North America	p. 269-273
Apr. 23	Early Mesozoic Environment	-	Continuation of lecture	-
Apr. 25	<b>Exam 3</b> (Chap. 11-15, field trip)	16	Subsurface Methods	-
Apr. 30	The Cretaceous World	17	<b>Quiz 3</b>	-
May 2	Cenozoic Life	18, 19	Well Core Project	-
May 7	Cenozoic Tectonics & Sedimentation	18, 19	Well Core Project	-
May 9	Cenozoic Climate	18, 19	Well Core Project Presentations	-
May 14	The Holocene Epoch	20	Review	-
May 16	<b>Final Exam</b> (Chap. 16-20, review)	-	Course Evaluation	-

\*Schedule changes may occur during the semester. Any changes will be announced in class.

## ACC POLICIES AND SERVICES

**Attendance/Class Participation:** Regular and punctual class attendance is expected of all students. If attendance or compliance with other course policies is unsatisfactory, the instructor may withdraw students from the class.

**Incompletes:** An instructor may award a grade of “I” (Incomplete) if a student was unable to complete all of the objectives for the passing grade in a course. An incomplete grade cannot be carried beyond the established date in the following semester. The completion date is determined by the instructor but may not be later than the final deadline for withdrawal in the subsequent semester.

**Scholastic Dishonesty:** A student attending ACC assumes responsibility for conduct compatible with the mission of the college as an educational institution. Students have the responsibility to submit coursework that is the result of their own thought, research, or self-expression. Students must follow all instructions given by faculty or designated college representatives when taking examinations, placement assessments, tests, quizzes, and evaluations. Actions constituting scholastic dishonesty include, but are not limited to, plagiarism, cheating, fabrication, collusion, and falsifying documents. Penalties for scholastic dishonesty will depend upon the nature of the violation and may range from lowering a grade on one assignment to an “F” in the course and/or expulsion from the college. See the Student Standards of Conduct and Disciplinary Process & other policies at <http://austincc.edu/current-students>.

**Student Rights and Responsibilities:** Students at the college have the rights accorded by the U.S. Constitution to freedom of speech, peaceful assembly, petition, and association. These rights carry the responsibility to accord the same rights to others and not to interfere with or disrupt the educational process. Opportunity for students to examine and question pertinent data and assumptions of a given discipline, guided by the evidence of scholarly research, is appropriate in a learning environment. This concept is accompanied by an equally demanding concept of responsibility on the part of the student. As willing partners in learning, students must comply with college rules and procedures.

**Students with Disabilities:** Each ACC campus has support services for students with documented disabilities. Students who need classroom, academic or other accommodations must request them through the Student Accessibility Services (SAS) office. Requests should be made during course registration or at least 3 weeks before the semester to avoid delaying accommodations. Students with SAS approval for accommodations must provide their professor with a ‘Notice of Approved Accommodations’ before the professor can make the accommodations. Students should give their Notice to the professor at the beginning of the semester because a reasonable amount of time may be needed to prepare and arrange for accommodations. For additional information see <http://austincc.edu/sas>.

**Safety:** ACC is committed to providing a safe and healthy environment for study and work. Students are expected to learn and comply with environmental, health and safety procedures and agree to follow ACC safety policies. Additional information is at <http://austincc.edu/ehs>. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the Emergency Procedures poster and Campus Safety Plan map in each classroom. Information about emergency procedures and how to sign up for ACC Emergency Alerts to be notified in the event of a serious emergency can be found at: <http://austincc.edu/emergency/>. You are expected to conduct yourself professionally with respect and courtesy to all. Anyone who thoughtlessly or intentionally jeopardizes the health or safety of another individual will be dismissed from an activity, may be withdrawn from the class, and/or barred from attending future activities.

**Concealed Handguns:** The ACC concealed handgun policy ensures compliance with Section 411.2031 of the Texas Government Code (also known as the Campus Carry Law), while maintaining ACC’s commitment to provide a safe environment for its students, faculty, staff, and visitors. Beginning August 1, 2017, individuals who are licensed to carry (LTC) may do so on campus premises except in locations and at activities prohibited by state or federal law, or the college’s concealed handgun policy. It is the responsibility of license holders to conceal their handguns at all times. In addition, concealed weapons are not allowed on ACC-sponsored field trips where the school owns or has chartered or leased vehicles for transportation. Persons who see a handgun on campus are asked to contact the ACC Police Department by dialing 222 from a campus phone or 512-223-7999. Refer to the concealed handgun policy online at <http://austincc.edu/campuscarry>.

**Use of ACC email:** All College e-mail communication to students will be sent solely to the student’s ACCmail account, with the expectation that such communications will be read in a timely fashion. ACC will send important information and will notify you of any college related emergencies using this account. Students should only expect to receive email communication from their professor using this account. Likewise, students should use their ACCmail account when communicating with professors and staff. Instructions for activating an ACCmail account can be found at <http://austincc.edu/accmail/>.

**Testing Center Policy:** Under certain circumstances, a professor may have students take an examination in an Academic Testing Center. Students using a Center must govern themselves according to the *Student Guide for Use of ACC Testing Centers* and should read the entire guide before going to take the exam. To take an exam, one must have: an ACC Photo ID, the Course Abbreviation & Number, the Course Synonym, the Course Section, and the Professor’s Name. Bringing a cell phone in a testing room, regardless of whether it is on or off, will revoke testing privileges for the remainder of the semester. ACC Testing Center policies are at <http://austincc.edu/testctr/>.

**Student and Instructional Services:** ACC strives to provide students with exemplary support and a variety of opportunities and services; these are listed at <http://austincc.edu/current/>. ACC Learning Labs provide free tutoring for many courses, help with setting up your ACCID and ACCmail, and assistance with ACC Blackboard. Tutor availability and schedules vary with campus and are at: <http://austincc.edu/tutor>.

**Student Support Services:** Free and confidential resources to support you are available at every campus. Here are just a few of them:

- Food pantries – at Student Life offices (<https://sites.austincc.edu/sl/programs/foodpantry/>)
- Assistance paying for childcare or utility bills – at the Support Center (<http://austincc.edu/students/support-center>)
- Help with budgeting for college and family life – at the Student Money Management Office (<http://sites.austincc.edu/money/>)
- Help with sudden, unexpected expenses which could cause you to withdraw from a course – apply to the Student Emergency Fund (<http://www.austincc.edu/SEF>)
- Help with a personal or mental health concern – see a Counselor at any campus (<http://austincc.edu/students/counseling>)