

This is a SouthArk Master Syllabus. The course syllabus distributed by the instructor may include additional requirements, must be followed by the student in the given term, and is considered to supersede the Master Syllabus.

Course Number

GEOL 1014/L

Course Title

Historical Geology and Lab

Course Description

A survey of the natural history of the earth including origin and evolution of life as recorded in rocks. Also includes basic stratigraphic interpretations using fossils and sedimentary rocks.
Lecture: three hours per week. Laboratory required: two hours per week.

College Mission

South Arkansas Community College promotes excellence in learning, teaching, and service; provides lifelong educational opportunities; and serves as a cultural, intellectual, and economic resource for the community.

College Wide Student Learner Outcomes

Critical Thinking

Responsibility

Communication

ACTS Course

Program Course

ACTS Outcomes

The student will be able to explain, describe, discuss, recognize, and/or apply knowledge and understanding of the following topics:

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1. Theories of the origin of the earth
2. Evolutionary change of the earth
3. Fossil record and evolution of life
4. Sedimentary Rocks
5. Stratigraphy
6. Orogenies
7. Plate tectonics
8. Geologic time
9. Darwin's theory of Natural Selection
10. Scientific Method and Inquiry

Program Outcomes

If this is not a program course, leave this space blank.

Course Learner Outcomes

CLO #	Learner Outcomes (CLO)	Unit Outcomes/Competencies	ACTS outcomes	Program outcomes	Critical Thinking	Communication	Responsibility	Assessment
	The student will be able to explain, describe, discuss, recognize, and/or apply knowledge and understanding of the following topics:							

CLO 1	Theories of the origin of the earth	1,7,8,9	1		CT1 CT4	C1		Comprehensive final exam
CLO 2	Evolutionary change of the earth	49,50,51,52,53,54	2		CT1 CT4	C1		Comprehensive final exam
CLO 3	Fossil record and evolution of life	59,60,61,	3		CT4	C1		Comprehensive final exam
CLO 4	Sedimentary Rocks	11,12,13,	4			C1	R2	Comprehensive final exam and lab
CLO 5	Stratigraphy	4,5	5		CT1 CT4			Comprehensive final exam
CLO 6	Orogenies	3,4,5,70,71	6			C1		Comprehensive final exam
CLO 7	Plate tectonics	3,70	7			C1		Comprehensive final exam
CLO 8	Geologic time	14,15,16,17,18.20	8		CT1 CT4	C1		Comprehensive final exam
CLO 9	Darwin's theory of natural selection	62,63,64	9		CT1 CT4	C1	R2	Comprehensive final exam And lab
CLO 10	Scientific Method and Inquiry	2	10		CT1			Comprehensive final exam and lab

Unit Outcomes/ Competencies/ Objectives

1. Show how fossil correlation was used by Smith and Cuvier to connect strata from one location to the next.
2. The different parts of scientific inquiry are the hypothesis, theory, and observation.
3. Relate the study of Plate tectonics and scientific inquiry.
4. Use Steno's three principles to correlate stratigraphic sections.
5. Define and identify an unconformity, angular unconformity, disconformity and nonconformity.
6. Tell who the following "Giants" of geology are and identify each by his contribution to Historical Geology. Examples are Buffon, Lyell, Darwin, Ruskin, and Werner.
7. Define Neptunism.
8. Define Plutonism.
9. Define Uniformitarianism.
10. Make distinction between relative time divisions and rock divisions.
11. Define and give examples of depositional environments.
12. Define sedimentary facies.
13. Define and diagram transgression and regression by the sea.
14. Name and describe Steno's principles.
15. Describe two alternatives to relative time scales as either worldwide sea-level curve, polarity reversal scale or geochemical time scale (isotopic studies).
16. Describe how radioactive dating of minerals can be used date rock formation.
17. Define parent isotope, daughter isotope, emissions.
18. Define half-life.
19. Define how fission track dating can be used to date rocks.
20. Name one other element that can be used to date rocks by knowing its half-life and the amount of each isotope present.
21. Name the four most abundant elements found in Earth and in meteorites.
22. Name the four most abundant elements in Earth's crust.
23. Name and label the four layers of the earth including the Mohorovicic and Gutenberg discontinuities.
24. Tell what a solar nebula is and how it is related to the probable origin of earth.
25. Define accretion and tell how it relates to the development of the planets

26. Tell how the inner planets and outer planets differ
27. Describe the origin of the earth's crust (continental and oceanic) while complex and not completely understood, as the chemical differentiation of light elements from the mantle including silicon, oxygen, aluminum, potassium, sodium, calcium, carbon, nitrogen, hydrogen, helium, other light elements, sea water, and the gases that form the present day atmosphere.
28. Describe the origin of the atmosphere and the oceans as being included in the chemical differentiation of the cooling earth.
29. Relate what we know of the atmosphere of the other planets with earth's atmosphere and the gases emitted by volcanoes.
30. Recognize the following important exchanges between life and the atmosphere: bacteria release nitrogen or fix it into compounds; plant photosynthesis extracts carbon dioxide and releases oxygen, respiration of animals consumes oxygen and releases carbon dioxide; oxidation of minerals; and carbon stored in coal and in carbonate rocks.
31. Name two of the following as being related to the earth's average global temperature: solar output, orbital variation, reflectivity of the earth (albedo), location of poles and landmasses, and transparency of the atmosphere.
32. Tell what geologic indicators of climate are.
33. Define continental drift.
34. Define the theory of isostasy.
35. Define and give examples of structural features of earth including: craton, arches, basins, abyssal plains, ocean ridges, orogenic belts,
36. Define plate tectonics.
37. Name six indicators for continental drift including: parallelism of continental margins, paleoclimatic indicators such as glacial deposits, desert, and tropical rain-forest deposits, presence of fossils, land and sea-dwelling on once adjoining continents.
38. Describe the mid-ocean ridge as being made up of basaltic lava, islands along their crests, have a greater than average heat flow through the crust along their axes, have a narrow depression that extends along their axes for thousands of kilometers.
39. Define a triple junction and tell how an aulacogen is related to the triple junction.
40. Describe a hot mantle plume tell where one is located.
41. Describe how coral-reef formations are related to sea-floor spreading.
42. Define fringing reef, barrier reef, atolls, and seamount.
43. Define transform fault.
44. Identify on a map in lab and describe how parallel linear magnetic anomalies found in the sea-floor provide evidence for sea-floor spreading.
45. Define lithospheric plates and identify six plates.
46. Define divergent plate boundary, and convergent plate boundary and give the location of each with regards to the American plate.
47. Tell that seismology can be used to give information about the interior of the earth by the changing speed of the seismic wave as it passes through materials of different densities.
48. Use a diagram to illustrate the layers of the earth, continental plates, oceanic plates, three types of plate margins, and three of the sedimentary basins.
49. Tell that Pre-phanerozoic (PreCambrian) includes 80% of the Earth's history, from 3.8 to .7 billion years ago and that the primary difference in Prephanerozoic rocks and Phanerozoic rocks is the presence of fossils.
50. Name economic resources found in PreCambrian rocks including the following: copper in Michigan, iron from the banded iron formations, gold, silver, nickel, chromium, and uranium.
51. Name the oldest rock formation in the Shield is Keewatin - pillow lavas that have been metamorphosed (and are subsequently called greenstones).
52. Tell that Early Proterozoic sediment can reflect its origin by its texture and composition; include mature terrigenous clastic strata, nonterrigenous chemical carbonate and evaporite strata, stromatolites, and sedimentary features like ripple marks, dunes, graded bedding, and turbidity currents.
53. Tell that Late Proterozoic rocks are characterized by flood basalts in the central U. S. and ended after the Grenville orogeny in south-eastern margin of the continent.
54. Describe conditions that required Earth's early atmosphere to be anaerobic and conditions that required Earth's atmosphere to be aerobic.
55. Define amino acid and tell how it can form.
56. Describe the Ediacarian fauna found in Ediacaria, Australian and the Burgess Shale Fauna in British Columbia.
57. Label diagrams of Cambrian trilobites, archaeocyathids, brachiopod, and molluscs and use the species to determine the relative dating of a rock formation such as the Burgess shale.

58. Give two examples of organisms that are associated with certain sediments; reflecting environmental or ecologic conditions.
59. Briefly define organic evolution as the cumulative change of organisms through time; changes are irreversible.
60. Define species as a group of interbreeding populations which are reproductively isolated from other such groups.
61. Define evolutionary theory as being based on the origin of new species by the development of new characters making the new species better adapted to its environment and give example.
62. State Darwin's 5 basic tenets on natural selection.
63. Name the eras, periods, and epochs of the geologic time scale. Describe "Golden Age of ..." for each geologic period including major extinction in geologic history.
64. Using a global map, identify present day continents during the Early Paleozoic, Mid-Paleozoic, Late Paleozoic, Mid-Mesozoic, Late Mesozoic, and Mid-Cenozoic.
65. Tell where a modern day reef and a fossil reef can be found.
66. Tell where a modern day evaporite deposit is forming and where ancient evaporite deposits are preserved.
67. Define cyclothem and label the parts of a cyclothem.
68. Tell where rocks deposited as Ediacarian and Cambrian strata are found and what types of fossils are found in each.
69. Be able to name and tell where to find fossils that lived during the Ordovician period and tell what their environment was like. Be able to tell the difference between a brachiopod and a cephalopod in a picture and in lab.
70. Tell the names of the supercontinents. Give at least 2 reasons scientists believe these continents were at one time together.
71. Discuss fossils found during the Mesozoic and the Cenozoic including glaciation. Tell when the dinosaurs became extinct and Mammals began to appear in abundance.
72. Choose two mammals that appears throughout the Cenozoic and tell how each have changed from Paleocene to the present. Name one mammalian fossil that appeared during part of the Cenozoic and became extinct.

Historical Geology lab schedule

Week 1	Scientific method	Chapter 1 exercises 1 – 5
Week 2 and 3	Fundamental concepts	Chapter 2 exercises 1, 2, 5, 6, 7, 8,9,10, and 11
Week 4 and 5		Chapter 3 exercises 1, 2,3,4, 5, 6, 7, 8,9, and 11
Week 6 and 7	Chapter 4 Paleontology	Use the Fossil Kit and identify each fossil Exercises 1, 2, 3, 4, 5, 6, 7
Week 8	Chapter 4 Paleontology	Exercise 8 investigating the Burgess Shale Vendian "animals" Exercise 9 solutions to flight Exercise 11
Week 9	Chapter 4 Paleontology and Stratigraphy	Exercise 13, 14, 15, 16
Week 10	Chapter 5 Geologic Map Interpretation	Page 216 Exercises 1, 2, 3, 4, 6, 7, and 8 through page 243
Week 11	Chapter 6 mapping	Exercises 1, 2, 3
Week 12	Final exam Historical Geology lab	

Assessment Description(s)

Comprehensive Final exam and Final lab exam

Materials and Technological Requirements

Textbook: Levin, H. L.; 11th edition; copyright 2016, The Earth through Time; ISBN9781118254677; John Wiley & Sons Publishing Company; 567 pages plus appendices.

Lab manual: Poort, J.; Carlson, R. J.; 6th edition, Historical Geology Interpretations and Applications, published 2005; Pearson Prentice Hall, ISBN 0-13-144786-6; 264 pages.

Class Attendance Policy

Students are expected to attend all classes in which they are enrolled. If a student is absent from a class session, it is the student's responsibility to make arrangements to complete or make up any work missed. No make-up work for missed classes will be allowed without the approval of the instructor. Students who enroll late must assume all responsibility for work missed. Classes not attended as a result of late enrollment may be counted toward excessive absences. Students not attending the entire class period may be counted absent for that period. An instructor may drop students with a grade of "WE" if students have been absent for an excessive number of days. Warning letters will be sent to the students advising them of the consequences of nonattendance and urging them to contact their instructors immediately. Excessive absences are defined as follows:

Regular Semester

Courses which meet once a week	2 absences
Courses that meet twice per week	3 absences
Courses that meet four times per week	5 absences

Summer Session

Courses that meet four times per week in a five week session	3 absences
Courses which meet two evenings per week in a 10 week session	3 absences

Students enrolled in special programs or individualized instruction should contact their program director/instructor regarding specific attendance requirements for the program/course. Some of the selective-admission, health-science programs have specific criteria regarding attendance. Students are encouraged to refer to program policies in these matters.

Jury Duty/Military/Official School Function

Scheduled absences are those that occur due to college-related activities or as a result of summons to jury duty or military duty. Classes missed as a result of scheduled absences will not be counted as excessive absences if the instructor is notified and provided documentation prior to the absence(s). Make-up work for scheduled absences will be at the discretion of the instructor.

In all instances, documentation must be provided to the instructor within 24 hours of receipt. Documentation should come from an appropriate party on letterhead or other official stationery with a signature and contact information. Documentation should list the corresponding dates of the leave.

Medical leave

For medical-related absences, documentation must include written notice from the treating medical professional documenting time needed off related to medical reasons and time student may resume classes. The medical reason does not need to be listed on the documentation; the documentation must include only that there is a medical reason, the amount of time the student needs to be absent, and the time the student should be able to return to classes. Students who elect to work at home while on excused leave must meet with their instructors to make arrangements to do so. Working on coursework while on medical leave is not a requirement but can be requested by students. If students request that they be allowed to work at home while on an excused leave, the instructor will make every reasonable effort to ensure that the student is able to do so.

For students who have a medical condition necessitating time off or accommodation:

- 1) They may work at home on assignments if they choose to if on medical leave approved by a medical professional
- 2) Receive appropriate accommodations related to coursework (i.e., excused from labs with potentially harmful chemicals, have a larger desk, etc.)
- 3) Resume their studies where they left off once they return to classes
- 4) Be allowed to make up any missed work related to medical leave
- 5) Receive incompletes on their transcripts until coursework is completed, according to the incomplete grade contract.
- 6) Be given a reasonable time frame in which to complete missed coursework

Academic Honesty Policy

Students enrolled at South Arkansas Community College are expected at all times to uphold standards of integrity. Students are expected to perform honestly and to work in every way possible to eliminate academic dishonesty. Academic dishonesty includes cheating and plagiarism, which are defined as follows:

- Cheating is an attempt to deceive the instructor in his/her effort to evaluate fairly an academic exercise. Cheating includes copying another student's homework, class work, or required project (in whole or in part) and/or presenting another's work as the student's own. Cheating also includes giving, receiving, offering, and/or soliciting information on a quiz, test, or examination.
- Plagiarism is the copying of any published work such as books, magazines, audiovisual programs, electronic media, and films or copying the theme or manuscript of another student. It is plagiarism when one uses direct quotations without proper credit or when one uses the ideas of another without giving proper credit. When three or more consecutive words are borrowed, the borrowing should be recognized by the use of quotation marks and proper parenthetical and bibliographic notations.

If, upon investigation, the instructor determines that the student is guilty of cheating or plagiarism, the following penalties will apply:

- The student will receive a penalty of no less than a zero on the work in question.
- The instructor will submit a Student Academic Misconduct Form, written report of the incident, to the appropriate dean.
- The dean will submit form to Vice President for Learning to determine disciplinary action.
- The Vice President for Learning will determine whether further disciplinary action will be taken.
- All decisions may be appealed for review through the college's academic appeals procedure.

Equal Opportunity-Affirmative Action Statement

South Arkansas Community College does not discriminate on the basis of age, race, color, creed, gender, religion, marital status, veteran's status, national origin, disability, or sexual orientation in making decisions regarding employment, student admission, or other functions, operations, or activities.

Library Services

Library Homepage: <http://southark.libguides.com/homepage> Library Contact: LibraryStaff@southark.edu or 870.864.7115

Procedures to Accommodate Students with Disabilities:

If you need reasonable accommodations because of a disability, please report this to the Vice President of Student Services with proper documentation. . VPSS Contact: 870.875.7262

The Early Alert System

In an effort to ensure student retention and success, South Arkansas Community College employs an Early Alert System to identify and support at-risk students as soon as possible in a given semester. The intent of Early Alert is to provide this assistance while there is still time to address behaviors or issues that have the potential of preventing students from completing their courses and degree plans. Students referred through the Early Alert System will be required to work on a corrective action plan with their student advising coach and to include attendance accountability and mandatory academic tutoring either in the academic division or in the Testing and Learning Center (TLC).

Once the Student Advising Coach has met with the referred student, and again when the student has met the prescribed corrective actions, the coach will update the Early Alert System so that the instructor is kept informed of the progress in resolving issues.

Behavioral Review Team

At South Arkansas Community College (SouthArk), we are committed to proactive leadership in student wellbeing and campus safety. By focusing on prevention and early intervention with campus situations that involve any person experiencing distress or engaging in harmful or disruptive behaviors, the BRT will serve as the coordinating hub of existing resources to develop intervention and support strategies and offer case management. Students, faculty, staff, and campus guests are encouraged to report any person on campus who is a concern. BRT Contact: 870.875.7262 BRT@southark.edu

Date of Revision: 10/13/2016