

Term Information

Effective Term Autumn 2018
[Previous Value](#) [Summer 2012](#)

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

Add the option to offer the course in the hybrid format. We will continue to offer the in-person course as well.

What is the rationale for the proposed change(s)?

To offer flexibility for students while maintaining in-person, hands-on experience in laboratory for all students. All students will have access to the same lecture content whether taken in person or through the hybrid model, and all students are assessed on the same standards.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

None.

Is approval of the request contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area Earth Sciences
Fiscal Unit/Academic Org School of Earth Sciences - D0656
College/Academic Group Arts and Sciences
Level/Career Undergraduate
Course Number/Catalog 1100
Course Title Planet Earth: How It Works
Transcript Abbreviation Planet Earth
Course Description The materials of the Earth's crust, the processes that produce and modify them, the development of the Earth and its life forms through time, and responsible stewardship of the earth's resources. Not intended for ASC B.S. students.
Semester Credit Hours/Units Fixed: 4

Offering Information

Length Of Course 14 Week, 12 Week, 8 Week, 7 Week, 6 Week, 4 Week
Flexibly Scheduled Course Sometimes
Does any section of this course have a distance education component? Yes
Is any section of the course offered Greater or equal to 50% at a distance
[Previous Value](#) [No, Greater or equal to 50% at a distance](#)
Grading Basis Letter Grade
Repeatable No
Course Components Laboratory, Lecture
Grade Roster Component Lecture
Credit Available by Exam Yes
Exam Type EM Tests via Office of Testing
Admission Condition Course Yes
Admission Condition Natural Science

Off Campus Never
Campus of Offering Columbus, Lima, Mansfield, Marion, Newark

Prerequisites and Exclusions

Prerequisites/Corequisites

Exclusions Not open to students with credit for EarthSci 100 or GeolSci 100.

Electronically Enforced No

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code 40.0601
Subsidy Level General Studies Course
Intended Rank Freshman, Sophomore, Junior, Senior

Requirement/Elective Designation

General Education course:
Physical Science

Course Details

Course goals or learning objectives/outcomes

- This course provides a basic introduction to the principles and methods of Earth Science, and its relevance to daily life and the problems of the contemporary world.

Previous Value

Content Topic List

- Origins of universe, solar system, and Earth
- Atoms and minerals
- Igneous, sedimentary, and metamorphic rocks
- Composition and structure of Earth
- Plate tectonics
- Volcanoes
- Earthquakes
- Weathering, soils
- Deep time, relative and absolute age
- Origin of life, history of life, evolution
- Streams and groundwater
- Oceans and atmospheres
- Glaciers, global climate change
- Petroleum and mineral deposits and exploration

Sought Concurrence No

Attachments

- Earth Sciences 1100 Costa.pdf: ASC Tech approval
(Other Supporting Documentation. Owner: Panero,Wendy R)
- ES1100_syllabus_Sp2018Lower.pdf: in-person syllabus
(Syllabus. Owner: Panero,Wendy R)
- es1100_lab_syllabus.pdf: in-person lab syllabus
(Syllabus. Owner: Panero,Wendy R)
- EarthSci1100_GEC_Learning_Assessment_Report.pdf: GEC Assessment, revised
(GEC Course Assessment Plan. Owner: Panero,Wendy R)
- ES1100_syllabus_updated2018-03-28.pdf: hybrid syllabus, revised
(Syllabus. Owner: Panero,Wendy R)

Comments

- The GE assessment plan is unaffected by the format of the lecture instruction; assessment is performed through embedded questions in quizzes and exams equally in person and online.

March 29: Syllabus revised according to Contingency 1 in Bernadette's 2/20/18 email, and the GEC assessment was revised according to Contingency 2 in 2/20/18 Bernadette's email, specifically wording of ELOs, format of the document, and replacement of questions 6&9. *(by Panero,Wendy R on 03/29/2018 10:53 AM)*

- See 2-20-18 feedback email. *(by Vankeerbergen,Bernadette Chantal on 02/20/2018 04:29 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Panero,Wendy R	01/29/2018 01:04 PM	Submitted for Approval
Approved	Panero,Wendy R	01/29/2018 01:04 PM	Unit Approval
Approved	Haddad,Deborah Moore	02/04/2018 01:33 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	02/20/2018 04:30 PM	ASCCAO Approval
Submitted	Panero,Wendy R	03/29/2018 10:53 AM	Submitted for Approval
Approved	Panero,Wendy R	03/29/2018 10:54 AM	Unit Approval
Approved	Haddad,Deborah Moore	03/29/2018 02:10 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Oldroyd,Shelby Quinn Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler	03/29/2018 02:10 PM	ASCCAO Approval

EARTH SCIENCES 1100 – PLANET EARTH: HOW IT WORKS
THE OHIO STATE UNIVERSITY, Spring Semester 2018

Lecture T, H 11:10-12:30; Mendenhall Lab (ML) Rm 100 / Lab **one time each week**; ML Rm 149 or 155



Professor

Dr. S. K. Lower
 Email: ProfessorSKLowerES1100@gmail.com
 Phone: 614-292-1571
 Office hrs: in ML100 before or after lecture

Grades

Midterm Exam = 25%
 Final Exam = 25%
 Reading Quiz = 22.5%
 Attendance Quiz = 7.5%
 Laboratory = 20%

Textbook and lab manual

(1) Throughout the semester, assigned readings will be posted on Carmen or distributed during lecture.
 (2) Earth Sciences 1100 Lab Manual by Bancroft (ISBN 9780738079554).

Week #	Week of...	Topics: lecture topics subject to change, exact dates of quizzes & exams will be announced during lecture, so come to class!	Lecture reading assignment
1	Jan 8	Introduction: syllabus, powers of 10; metric system, periodic table, scientific method, pseudoscience, origin of science (birth of astronomy)	See Canvas
2	Jan 15	Origin of Universe: Galileo, Newton, test of astrology, telescope, big bang, stars, electromagnetic radiation, light year.	See Carmen
3	Jan 22	Origins of planets: birth of solar system & Earth, comets, asteroids.	See Canvas
4	Jan 29	solar system, plate tectonics: periodic table, bonds, states of matter, minerals, rocks	See Carmen
5	Feb 5	Plate tectonics: structure of the Earth, movement of plates, volcanoes, earthquakes, hot spots	See Canvas
6	Feb 12	volcanoes, earthquakes, time (relative vs. absolute age), nucleus of atom, isotope,	See Carmen
7	Feb 19	Time: radioactive decay, half-life, determining age	See Canvas
8	Feb 26	Evolution: classification of life, biomolecules, genes, eukaryotes, prokaryotes Possible MIDTERM EXAM this week, exact date announced in lecture	See Carmen
9	Mar 5	natural selection, evolution vs. creationism, brief history of life on Earth, possibility of ET Possible MIDTERM EXAM this week, exact date announced in lecture	See Canvas
10	Mar 12	<i>OSU SPRING BREAK (no classes)</i>	See Carmen
11	<i>Mar 19</i>	finish evolution, if necessary; Energy: production of electricity, fossil fuels (coal, oil), energy reserves	See Canvas
12	<i>Mar 26</i>	peak oil, mining, fracking	See Carmen
13	Apr 2	Global climate change: weather vs. climate, atmosphere, water cycle	See Canvas
14	Apr 9	glaciers, sea level	See Carmen
15	Apr 16	greenhouse effect, CO ₂ , carbon sequestration	See Canvas
Finals Week	April 30	COMPREHENSIVE FINAL EXAM on Monday April 30; 10:00am-11:45am (this time is set by the Registrar)	
*Every attempt has been made to ensure that the information on the syllabus is complete and accurate. However, mistakes such as typographical errors may occur on occasion. Professor Lower will address any errors on this syllabus during lecture.			

Textbook, assigned readings, and laboratory manual

- (1) There is no required textbook. However, many students find it useful to read a textbook that complements the lecture. A good “companion textbook” is Earth: Portrait of a Planet by Marshak. This text, or other suitable, introductory Earth Science textbooks, are available in the OSU library for free!
- (2) While there is no required textbook, **required readings** will be posted on Carmen or distributed during lecture. **Read these articles** as exam & quiz questions will come from the assigned reading material.
- (3) *Earth Sciences 1100 Lab Manual* by Bancroft (ISBN 9780738079554). All sections use the same lab manual. Purchase from the campus bookstore (<http://ohiostate.bncollege.com>). You may also be able to buy from the Student Book Exchange (<http://www.sbx-osu.com/>). You **must buy a NEW** lab manual.

Laboratory (see above for % of final grade; lab syllabus & guidelines will be provided by your lab TA)

Go to lab EACH WEEK! The lab is an important part of this course. If you fail the lab then Dr. Lower reserves the right to give you a failing grade for this course. A lab Teaching Assistant (TA) will oversee your progress in the lab and assign your lab grade. You must attend your assigned laboratory and work on the problems during the lab. **Read the lab exercise before coming to the lab.** *The lab exercise for a given week will not always correlate to the lecture material for the same week*

Midterm exam and final exam (see above for % of final grade)

Exam questions include true/false, multiple choice, fill in the blank, ordering, and/or short answer. **Exams will be taken on-line through CARMEN.** You will NOT come to the classroom to take the exam. Rather, you take the exam from a location that you choose. This location must have a **RELIABLE** internet connection. A significant number of exam questions will come from material presented in lecture. Additional questions will be drawn from the assigned readings. Each exam will consist of about **50-60 questions**. Each student must complete the exam on her or his own. **You are NOT permitted to receive assistance from anyone else during the exam. You are NOT permitted to take the exams as part of a group.** You ARE permitted to use **your own** lecture notes and slides during the exam. Dr. Lower will provide more details about each exam in class. We will NOT meet for lecture on the days of the midterm exam and final exam. There are **NO** make-up exams **even if your internet goes down!** *If you are sick, you MUST have a note signed by a medical doctor (i.e. a licensed physician) and dated the same day as the exam,* otherwise you will receive a zero.

Quizzes (see above for % of final grade)

Quizzes will be announced during lecture. Quizzes may include (i) attendance or pop quizzes during lecture and (ii) quizzes over assigned readings that will be taken on Carmen. One attendance quiz will be dropped from your final grade calculation (e.g., if you miss class due to illness). There are **NO** make-ups for the assigned reading quizzes. For reference, past ES1100 classes have had between 10 and 15 quizzes (pop quiz + reading quiz), or about one quiz per week.

Final grades follow the University grading scale:

A 93.00 to 100.00	A- 90.00 to 92.99	
B+ 87.00 to 89.99	B 83.00 to 86.99	B- 80.00 to 82.99
C+ 77.00 to 79.99	C 73.00 to 76.99	C- 70.00 to 72.99
D+ 67.00 to 69.99	D 60.00 to 66.99	

An overall score of 59.99 or lower is a failing grade

***Calculate your final grade using the information provided on this syllabus. Do NOT rely on Carmen Canvas as the grade displayed on Carmen may not conform to the guidelines presented in this syllabus.**

GEC Category and Expected learning outcomes

This course fulfills GEC Category 2, Breadth, Natural Science, and provides a laboratory experience for students. Natural Science coursework fosters students' understanding of the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students learn key events in the history of science.
3. Students provide examples of the inter-dependence of scientific and technological developments.
4. Students discuss social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (<http://studentlife.osu.edu/csc/>).

Students with Disabilities

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is in 150 Pomerene Hall, telephone 292-3307, TDD 292-0901; <http://slds.osu.edu>

Other: (i) Check Carmen several times a week: <https://carmen.osu.edu>. (ii) If you have a question, you should see Professor Lower before/after class. Alternatively, you may send an email to the Gmail account set up specifically for this class: ProfessorSKLowerES1100@gmail.com. **Questions that Professor Lower**

receives through the gmail account will typically be answered at the beginning of lecture (so come to lecture). If you have a private matter, see Dr. Lower in person either before/after class (or send an email to Lower.9@osu.edu). (iii) Dr. Lower may communicate with the entire class using email. He will use students' **OSU email addresses** for this purpose. Many of you have other email accounts through services such as Goggle, Yahoo, or Hotmail. Remember to check your OSU email account for important announcements, which may also be posted on Carmen (i.e. check Carmen too).

Earth Sciences 1100 Common Laboratory Syllabus

Labs do NOT meet during the first week of classes. Professor Lower will announce the date of the first labs during lecture (so come to lecture).

A lab syllabus will be distributed by a Lab Teaching Assistant (TA) at your first lab meeting.

See Carmen for a list of TAs for Professor Lower's ES1100 class. Take note of which TA is teaching your lab during your first lab meeting. The head TA for the lab is Max Wheeler (wheeler.1010@buckeyemail.osu.edu).

If you have a question or issue related to the lab, then you should first contact your lab TA. If your lab TA cannot answer your question or resolve a lab-related problem, then you may contact Professor Lower.

ES 1100 Lab
Dr. Alsdorf
Mendenhall Laboratory - Room 155
Monday - 1020 am

Instructor: Max Wheeler

Email: wheeler.1010@osu.edu

Office Hours: Before and after Class or by appointment

Lab Objectives

- To become familiar with the scientific process, geologic concepts and terminology, and the tools used by practicing earth scientists
- To become a “trained observer”
- To appreciate the interdisciplinary nature of earth science

Attendance

- You must attend lab every week
- A valid excuse and documentation are required to make-up an absence
- If you know you will be missing a lab, please let me know ASAP so we can arrange for you to attend another lab section (at the discretion of that TA)
- If you miss a lab without a valid excuse, you will receive a 0

Grading

- Lab is worth 20% of your total ES1100 grade
- Your lowest lab grade will be dropped
- Late assignments will not be accepted – labs must be turned in at the end of each lab period
- One self-guided make-up lab is available, to replace a 0 or a low grade

Expectations

- You must purchase Exercises for Earth Sciences 1100 [2016] and bring it with you to each lab.
- You must complete the lab using the sheets provided in the manual, not on a separate sheet of paper. Failure to turn in labs completed from the manual will result in a warning at the first occurrence, and the loss of 15% of your lab grade for that day for each subsequent occurrence.
- Along with your lab manual bring to each lab: a pencil with an eraser, and a calculator
- It is highly recommended that you read the introduction to each week’s lab prior to the lab period – this will enable you to complete the lab more quickly
- Come to lab on time – The beginning of each lab is spent discussing what you need to complete the lab effectively
- I highly recommend working in groups, but each student is responsible for contributing to the group’s completion of the lab, and must turn in their own assignment
- Silence cell phones during lab

If you have any type of disability that you think may hinder your ability to succeed in this lab, please come see me and we can discuss appropriate accommodations

Lab Schedule

Date	Lab #	Topic
January 22	1	Exercise 1: Intro to Geoscience & Field Trip 1
January 29	2	Exercise 4: Plate Boundaries
February 5	3	Exercise 2: Minerals
February 12	4	Exercise 3: Rock Identification
February 19	5	Exercise 7: Topographic Maps
February 26	6	Exercise 6: Absolute and Relative Dating
March 5	7	Exercise 5: Volcanoes and Hotspots
March 12	No Labs: Spring Break	
March 19	8	Exercise 8: Streams and Flooding
March 26	9	Exercise 9: Oceans and Waves
April 2	10	Exercise 10: Water History of the South Oval
April 9	11	Exercise 11: Paleoclimate
April 16	12	Exercise 12: Fossils of Ohio



EARTH SCIENCES 1100

PLANET EARTH: HOW IT WORKS *(hybrid offering – 50% online)*

School of Earth Sciences

Instructor: Ozeas S. Costa, Jr.

Telephone: 419-755-4128

Office: 395 Ovalwood Hall

E-mail: costa.47@osu.edu

Office hours: Tue 10:00-11:00am, Wed 1:00-2:00pm, Thu 4:00-5:00pm

Class times: Wed 3:00-5:20 pm; Thu 1:30-3:50 pm

Location: Conard 239 (Geology Lab)

Online access: <http://carmen.osu.edu>

Carmen Connect: <https://carmenconnect.osu.edu/es1100/>

Course Description

GE Category: Natural Science – Physical Science

“Planet Earth: How it Works” is an introductory course describing the fundamental concepts of Geology for non-Science majors. The course content is divided into 39 essential concepts, grouped in 8 modules. Module I (Geology, the Scientific Method, and the Universe) explores the definition of geology, its many branches, the nature of science and the scientific method, and the formation of the universe and the solar system. Module II (Plate Tectonics and the Dynamic Earth) discusses Earth’s internal structure and introduces the theory of plate tectonics, a unifying idea that explains Earth’s major processes. Module III (Minerals, Magma, and Volcanoes) discusses the characteristics of minerals, their classification, the sources and uses of Earth’s mineral resources, the formation of magma, the development of volcanoes, volcanic features and volcanic hazards. Module IV (Igneous, Sedimentary, and Metamorphic Rocks) explores the processes in the rock cycle, and the characteristics and classification of Earth’s rocks. Module V (Structural Geology) describes how Earth’s internal and external processes interact to produce earthquakes, mountains, and geologic structures. Module VI (Geologic Time and the Age of Earth) deals with the geologic time and how geologists calculate the age of rocks and other Earth materials. It also discusses the evolution of life on the planet from a geological perspective. Module VII (Energy Resources) describes the energy resources that the Earth provides us and how they are produced and used. Module VIII (Hydrology and Landscape Geomorphology) discusses how water shapes the surface of our planet and help creates a multitude of erosional and depositional landforms.

GE Expected Learning Outcomes

This course provides a basic introduction to the principles, theories, and methods of Earth Science, the relationship between science and technology, the implications of scientific discoveries, and the potential of science and technology to address problems of the contemporary world. It fulfills the learning objectives of the **GE Natural Science: Physical Science** requirement and provides a laboratory experience for students.

Learning Outcome 1: Students explain and recall the basic facts, principles, theories and methods of modern earth science, including: the formation and structure of the Earth; principles of plate tectonics; composition and interrelationship among Earth materials; geologic time; natural hazards, such as earthquakes, volcanoes, landslides, and floods; and the relationships between the rock cycle, the tectonic cycle, and the hydrologic cycle. Students will also be able to describe how the Earth operates as a system, and apply the scientific method to understand Earth processes. **This fulfills the first objective of the GE Natural Science/Physical Science requirement: *Students understand the basic facts, principles, theories and methods of modern science.***

Learning Outcome 2: Students describe and explain the significance of key events in the history of Earth science, including: how our view of the universe has expanded with the development of new and more powerful telescopes; how geocentrism was replaced by heliocentrism; what developments led to the proposal of the expanding universe theory and the big bang theory; how the development of paleomagnetism supported the establishment of the plate tectonic theory; how the understanding of radioactivity provided a powerful tool for geochronology; and how the behavior of seismic waves traveling through different materials allowed geoscientists to understand and describe the different layers inside Earth. **This fulfills the second objective of the GE Natural Science/Physical Science requirement: *Students understand key events in the development of science and recognize that science is an evolving body of knowledge.***

Learning Outcome 3: Students will be able to discuss the inter-dependence of scientific and technological developments in measuring and modeling physical and chemical aspects of the Earth and the natural environment. They will also understand how scientific developments in fields such as physics, chemistry, and biology help explain the development of Earth's rocks, and its atmosphere, hydrosphere and surface features. **This fulfills the third objective of the GE Natural Science/Physical Science requirement: *Students describe the inter-dependence of scientific and technological developments.***

Learning Outcome 4: Students will explain the ways in which aspects of earth science impact society. Students should be able to describe the relationship between science and societal decision-making pertaining to natural hazards, natural resources, global change and human sustainability. **This fulfills the fourth objective of the GE Natural Science/Physical Science requirement: *Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.***

Course Textbook (required)

Visualizing Geology, by Barbara Murck, Brian Skinner, and Dana Mackenzie, 2nd ed. (2009 - ISBN 9780470419472) or 3rd ed. (2012 - ISBN 9781118129869), John Wiley & Sons. For more information about the textbook, as well as access to an electronic version, visit: <http://www.wiley.com/WileyCDA/WileyTitle/productCd-EHEP000298.html>

Additional (not required) Textbooks

Essentials of Geology, by Stephen Marshak, 5th Ed. (2016), W. W. Norton & Company, 689 pp., ISBN 0393263398

GEOL 2, by Reed Wicander and James Monroe, 2nd Ed. (2013), Brooks/Cole – Cengage Learning, 422 pp., ISBN 1-133-10874-1

Exploring Geology, by Stephen Reynolds, Julia Johnson, Michael Kelly, Paul Morin, and Charles Carter, 1st Ed. (2008), McGraw-Hill, 575 pp., ISBN 0073135151

The Good Earth: Introduction to Earth Science, by D. McConnell, D Steer, C. Knight, K. Owens, and L. Park, 1st Ed. (2008), McGraw-Hill, 536 pp., ISBN 0073018473

The Earth System, by Lee Kump, James Kasting, and Robert Crane, 2nd Ed. (2003), Prentice Hall, 432 pp., ISBN 0131420593

Earth System Science, by Michael Jacobson, Robert Charlson, Henning Rodhe, and Gordon Orians, 1st Ed. (2000), Academic Press, 527 pp., ISBN 012379370X

Understanding Earth, by J. Grotzinger, T.H. Jordan, F. Press, and R. Siever, 5th Ed. (2007), W.H. Freeman & Company, 579 pp., ISBN 0716766825

Essentials of Geology, by Frederick Lutgens, Edward Tarbuck, and Dennis Tasa, 9th Ed. (2005), Prentice Hall, 504 pp., ISBN 0131497499

Earth Science, by Edward Tarbuck and Frederick Lutgens, 11th Ed. (2006), Prentice Hall, 726 pp., ISBN 0131497510

Technical Requirements

In order to be successful in this class, you will need access to a **reliable computer connected to the Internet**. Below are links to the technical requirements (including hardware and software) for the course. Additionally, we recommend your Internet connection be broadband or better (DSL, Road Runner, etc.). Dialup will NOT likely be adequate to meet your needs. If you do not have access to a computer at home, all of the campus computer labs meet these requirements. For information on campus computer labs: http://www.mansfield.osu.edu/HTML/computer_labs.html

For OSU's minimum hardware requirements, visit: <http://8help.osu.edu/918.html>

Software requirements for this course are:

- Web browser: We strongly recommend using Firefox as your web browser. For a free download (Mac or PC) go to <http://www.mozilla.com>. You may use Internet Explorer, but be aware that there may be some compatibility issues with certain content. Keep your plug-ins up to date to ensure compatibility.
- Free Adobe Acrobat Reader: http://www.adobe.com/go/EN_US-H-GET-READER
- Free Adobe Flash Player: http://www.adobe.com/go/EN_US-H-GET-FLASH
- Word processing software to type assignments: MS Office 365 Pro is now free to all OSU students and is available at: <http://office365.osu.edu/>.
- Anti-Virus software - free to OSU faculty, staff, and students for use on personally owned computers via the OSU Software Downloads page: <http://osusls.osu.edu/>

All course content will be delivered through **Carmen** (the OSU learning management system), including all short-lecture and feature-length videos. Carmen can be accessed from: <https://carmen.osu.edu/>

- Short-lecture videos (from YouTube) are embedded and can be watched directly from Carmen. For technical issues with YouTube videos, please visit the YouTube Help Center at <https://support.google.com/youtube/>. The Carmen support team will not be able to assist with YouTube technical issues. For YouTube privacy guidelines, go to: https://www.youtube.com/static?template=privacy_guidelines.
- Feature-length videos will be available from the OSU Secured Media Library. A link to the assigned feature-length video for each week is provided on Carmen.

You must have an active **OSU Internet Username to access Carmen**. If you are a new student or have never used your OSU Internet Username for Carmen access, you must activate your username here: <https://acctmgt.service.ohio-state.edu/Password.html>

Accessibility Policy

For more information about The Ohio State University's Web Accessibility Policy, please visit <https://www.osu.edu/resources/web/accessibility>. For accessibility on the Carmen/Canvas platform, please visit <https://community.canvaslms.com/docs/DOC-2061>. For information on how to watch YouTube videos using a screen reader, please visit: <https://support.google.com/youtube/answer/189278?hl=en>

Student Support Services

Below are the links to all academic support services available to students:

- Academic services central: <http://mansfield.osu.edu/academics/>
- Academic advising: <http://mansfield.osu.edu/academics/academic-advising/>
- Conard Learning Center: <http://mansfield.osu.edu/academics/conard-learning-center/>
- Disability services: <http://mansfield.osu.edu/academics/disability-services/>
- Bromfield Library and Information Commons: <http://mansfield.osu.edu/blic/>
- Buckeyelink (OSU's online academic center): <https://buckeyelink.osu.edu>

Ohio State Mansfield offer many other student services and resources that can help you succeed. You can find these at <http://mansfield.osu.edu/current-students/>. For services offered by the Columbus campus, go to <http://ssc.osu.edu>.

Course delivery format

The course is delivered using the "flipped classroom" concept where course content is introduced to students through activities done online (outside of class) and "homework" (i.e., concept engagement through discussion, hands-on lab activities and exercises) takes place in the classroom with the help of the instructor. For more information on the "flipped classroom" concept visit this Carmen Wiki article from UCAT:

<https://carmenwiki.osu.edu/display/10081/Understanding+the+Flipped+Classroom>

Online course components:

- Lecture content (Essential Concepts) on Carmen
- Short lecture videos (on Carmen and YouTube)
- Full-length video library (OSU Secured Media Library)
- Unit review quizzes (on Carmen) – 20% of final grade
- Video quizzes (on Carmen) – 10% of final grade
- Discussion forum (on Carmen) – extra points for participation
- Live web-conferencing (Carmen Connect)

Face-to-face (live) course components:

- For recitation, lecture review, group discussion, hands-on lab exercises
- Hands-on lab exercises – 20% of final grade
- Mid-term exam – 20% of final grade
- Final exam – 30% of final grade

Hands-on lab exercises are due AT THE END OF EACH CLASS MEETING. If you have to miss any of these hands-on, collaborative activities, make sure you contact the instructor BEFORE the meeting. An exercise tutorial (containing detailed information to guide you through the hands-on exercises) is available on Carmen at the beginning of every week.

All **unit review quizzes** and **video quizzes** are delivered through Carmen. You can take the quizzes anytime during that weekly window. However, once you start the quiz, you will have a limited amount of time to complete it. The amount of time available will vary depending on the number of questions on each quiz. Questions on the unit review quizzes will be based on the readings for that particular week (select pages from your textbook + Essential Concepts on Carmen). This quiz will assess your understanding of the content for that week. Questions on the video quizzes will be based on the assigned video(s) for that week and will assess your understanding of the material in the video.

The **mid-term exam** will cover the lecture/reading material from weeks 1 to 8. The **final exam** is comprehensive and will cover ALL lecture/reading material in the course. The date and time of the exams will be posted at the course website on Carmen. There will be NO make-up exams unless in exceptional circumstances and ONLY if discussed with the instructor in advance of the date of the exam. Please get in touch with the instructor if you think a make-up exam will be necessary during the semester.

Course Assignments and Grading Scheme

The following are the course assignments and their contribution to your final grade:

1. Unit review quizzes (one per week) = 20% of the final grade
2. Video quizzes (one per week) = 10% of the final grade
3. Weekly hands-on activities (lab exercises) = 20% of final grade
4. Mid-term exam = 20% of final grade
5. Final exam = 30% of final grade

The course final grade will be determined by the following equation:

$$(UQ*20) + (VQ*10) + (LE*20) + (ME*20) + (FE*30) / 100$$

Where, **UQ** is the average grade from the unit review quizzes (20% of final grade),

VQ is the average grade from the video quizzes (10% of final grade),

LE is the average grade from the lab exercises (20% of the final grade),

ME is the grade from your mid-term exam (20% of the final grade), and

FE is the grade from your final exam (30% of the final grade).

All lab reports, quizzes and exams will be graded from 0 to 100. At the end of the semester, the arithmetic average for each assignment category will be calculated and multiplied by the respective factor weight as described in the formula above. The following grading scheme will be used to submit grades to the Registrar.

93 +	⇒	A	80 – 82	⇒	B-	67 – 69	⇒	D+
90 – 92	⇒	A-	77 – 79	⇒	C+	60 – 66	⇒	D
87 – 89	⇒	B+	73 – 76	⇒	C	0 – 59	⇒	E
83 – 86	⇒	B	70 – 72	⇒	C-			

Course Structure (Outline)

Module I: Geology, the Scientific Method, and the Universe

Essential Concept 1: Geology and Earth System Science (week 1)

Essential Concept 2: The Scientific Method (week 1)

Essential Concept 3: The Universe and the Solar System (week 1)

Module II: Plate Tectonics and the Dynamic Earth

Essential Concept 4: Earth's Internal Structure (week 2)

Essential Concept 5: Continental Drift and Seafloor Spreading (week 2)

Essential Concept 6: Plate Motion and Plate Boundaries (week 2)

Module III: Minerals, Magma, and Volcanoes

Essential Concept 7: Characteristics of Earth's Minerals (week 3)

Essential Concept 8: Mineral Properties and Classification (week 3)

Essential Concept 9: Earth's Mineral Resources (week 3)

Essential Concept 10: Magma and Lava (week 4)

Essential Concept 11: Volcanoes and Plate Tectonics (week 4)

Essential Concept 12: Volcanic Eruptions and Hazards (week 4)

Module IV: Earth Materials: Igneous, Sedimentary, and Metamorphic Rocks

- Essential Concept 13: Magma Cooling and Crystallization (week 5)
- Essential Concept 14: Igneous Intrusions – Plutons and Plutonism (week 5)
- Essential Concept 15: Igneous Rocks – Formation and Classification (week 5)
- Essential Concept 16: Weathering & the Formation of Sediments (week 6)
- Essential Concept 17: Products of Weathering and Soil Profiles (week 6)
- Essential Concept 18: Erosion, Sediment Transport, Mass Wasting (week 6)
- Essential Concept 19: Transport and Deposition of Sediment (week 7)
- Essential Concept 20: Sedimentation and Sedimentary Structures (week 7)
- Essential Concept 21: Sedimentary Rock Classification (week 7)
- Week 8 – Mid-Term Exam / Week 9 – Term Break
- Essential Concept 22: What is Metamorphism (week 10)
- Essential Concept 23: Types of Metamorphic Rocks (week 10)
- Essential Concept 24: Where Does Metamorphism Happen? (week 10)

Module V: Structural Geology

- Essential Concept 25: Faults, Fault Formation, and Earthquakes (week 11)
- Essential Concept 26: Earthquake Energy and Seismic Waves (week 11)
- Essential Concept 27: Earthquake Hazard Assessment (week 11)
- Essential Concept 28: Types of Stress and Deformation (week 12)
- Essential Concept 29: Joints, Faults, and Folds (week 12)
- Essential Concept 30: Geologic Mapping and Mountain Building (week 12)

Module VI: Geologic Time and the Age of Earth

- Essential Concept 31: Defining the Relative Age of Rocks (week 13)
- Essential Concept 32: Stratigraphic Record and the Age of Earth (week 13)
- Essential Concept 33: A Brief History of Life on Earth (week 13)

Module VII: Energy Resources

- Essential Concept 34: Energy Needs and Sources (week 14)
- Essential Concept 35: Fossil Fuels – Oil, Coal, Natural Gas (week 14)
- Essential Concept 36: Renewable and Alternative Energy Resources (week 14)

Module VIII: Hydrology and Landscape Geomorphology

- Essential Concept 37: Hydrologic Cycle & Earth's Heat Balance (week 15)
- Essential Concept 38: Streams and Rivers – Drainage Patterns (week 15)
- Essential Concept 39: Stream Geomorphology (week 15)

Disability Service Statement

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: mcgregor.40@osu.edu; 419-755-4304; 279 Ovalwood Hall, 1760 University Drive.

Statement on Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (<http://studentlife.osu.edu/csc/>). Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, I expect that all students have read and understand the University's Code of Student Conduct linked above, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me or the Office of Student Affairs (Tel: 419-755-4034; E-mail: hight.6@osu.edu) or check the following sources of information:

The Committee on Academic Misconduct: <http://oaa.osu.edu/coam/home.html>

Preserving Academic Integrity: <http://oaa.osu.edu/coam/ten-suggestions.html>

Student Conduct

The code of student conduct (CSC) is established to foster and protect the core missions of the university, to foster the scholarly and civic development of the university's students in a safe and secure learning environment, and to protect the people, properties and processes that support the university and its missions. Learn more about the CSC at:

http://studentaffairs.osu.edu/resource_csc.asp. Students who violate faculty expectations may be subject to the code of conduct. For mental health and other behavioral related concerns, contact Student Life at 419-755-4317 and ask for an appointment with the Chief Student Life and Retention Officer. As a responsible community member, do not allow others to act inappropriately and impact the community.

Discrimination

The Ohio State University at Mansfield is committed to providing a learning, working and living environment that promotes personal integrity, civility and mutual respect in an environment free of discrimination of any type. This includes students creating a hostile environment for other students. To file a complaint, contact Student Life at 419-755-4317 and ask for an appointment with the Chief Student Life and Retention Officer; or Human Resources at 419-755-4047 and ask for an appointment with the Chief Human Resources Officer, who will connect you with the appropriate Columbus Offices.

Diversity

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different

from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Title IX and Sexual Misconduct

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find more information and the appropriate resources at <http://titleix.osu.edu/>.

HOW TO REPORT

Reports of sexual misconduct can be made to one of the following individuals:

- TITLE IX Investigator:
Donna L. Hight, Ph.D., Chief Student Life and Retention Officer
419-755-4317 / hight.6@osu.edu
- CAMPUS POLICE DEPARTMENT
Sgt. Jeff Hoffer
419-755-4210 / hoffer.30@osu.edu
- CAMPUS SEXUAL ASSAULT ADVOCATE
Sarah Metzger
419-565-2489 / smetzger@thedvshelter.com

Notice of an incident to the officials listed above, other than the Campus Sexual Assault Advocate, is considered official notice to the university. You can expect reports received by these individuals to be investigated and properly resolved through administrative procedures. Information will be shared only as necessary with investigators, witnesses, and the accused individual. The Campus Sexual Assault Advocate is considered a confidential resource.

For support without immediate investigation, please contact Student Advocacy at 614-292-1111 (<http://advocacy.osu.edu/sexual-violence/>) or the local Domestic Violence Shelter at 419-774-5840 (<http://www.thedvshelter.com/>).

Mental Health Statement

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus by contacting the Office of Student Life at 419-755-4317. You can also ask for an appointment with the Chief Student Life and Retention Officer, Dr. Donna Hight, at the Office of Student Affairs (Tel: 419-755-4034; E-mail: hight.6@osu.edu). For university-wide options via the Office of Student Life's Counseling and Consultation Service (CCS), please visit <http://ccs.osu.edu> or call 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower on the Columbus campus. You can reach an on call counselor when CCS is closed at 614-292-5766. 24-hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at <http://suicidepreventionlifeline.org>.

Drop/Withdrawal Statement

It is the student's responsibility to know the deadlines for dropping a course or withdrawing from the University. Term drop & withdrawal deadlines can be found at: <http://registrar.osu.edu> (click on the current term under "Important Dates" and scroll down to ADD/DROP/WITHDRAW DEADLINES). If you receive financial aid, you should always talk with a financial aid specialist prior to adjusting your schedule. If you stop attending a course but do not drop it, you risk receiving a failing grade which could negatively affect your GPA and your financial aid status. You can call 419-755-4317 to set up an appointment with an academic advisor or a financial aid specialist in 104 Riedl Hall.

Retention Statement

The Ohio State University-Mansfield is committed to the success of students. If you are having academic or personal difficulties, you can contact the Student Life and Retention Services (419-755-4034) or Darla Myers at 419-755-4036, for referral resources.

The Writing Center

The Writing Center (<http://english.mansfield.ohio-state.edu/writing/>) provides free individual writing consultation for students of all writing abilities and in any course or field of study. The Writing Center assists students in the production of writing assignments and in the development of best writing practices. You are welcome to use Writing Center services on a walk-in basis, or by appointment. They are located on the first floor of Ovalwood Hall (OV-136). The computer classrooms (Ovalwood 114, 120, 131, and 135) are available for writing and research when they are not in use as classrooms.

The Writing Center Director is James Snyder; his office is OV-136A, and he can be contacted at snyder.524@osu.edu or 419-755-4371. Visit or e-mail the Writing Center at mans-writingcenter@osu.edu. The Writing Center is also available during extended hours. Contact them to schedule an appointment.

Arts and Sciences Distance Learning Course Component Technical Review Checklist

Course: Earth Sciences 1100 Planet Earth: How It Works

Instructor: Ozeas S. Costa Jr.

Summary: Distance Hybrid Course Offering (DH)

Standard - Course Technology	Yes	Yes with Revisions	No	Feedback/ Recomm.
6.1 The tools used in the course support the learning objectives and competencies.	✓			<p>The tools used in this course support the learning objectives and competencies in the following ways.</p> <ul style="list-style-type: none"> • In class practice exercises (hands-on) • Reading comprehension quizzes (timed) • Video quizzes (timed) • Discussion board posts
6.2 Course tools promote learner engagement and active learning.	✓			<p>Students will engage with the course materials and instructor on a weekly basis in the following ways to promote active learning.</p> <ul style="list-style-type: none"> • Carmen • Carmen Connect • Secure media library • YouTube
6.3 Technologies required in the course are readily obtainable.	✓			<p>All technologies being used for this course are readily obtainable through the Carmen LMS and/or a web browser.</p> <ul style="list-style-type: none"> • Carmen • Carmen Connect • Secure media library • YouTube <p>YouTube videos are embedded within the Carmen LMS.</p>
6.4 The course technologies are current.	✓			<p>All technologies being used for this course are current and available through the Carmen LMS and/or a web browser. YouTube videos are embedded within the Carmen LMS.</p>
6.5 Links are provided to privacy policies for all external tools required in the course.	✓			<p>A link has been provided to the privacy policy for YouTube. YouTube is the only external tool being used in this course.</p>
Standard - Learner Support				
7.1 The course instructions articulate or link to a clear description of the technical support offered and how to access it.	✓			<p>A link has been provided in the "Technical Requirements" section of the syllabus for the</p>

				technical support available for YouTube.
7.2 Course instructions articulate or link to the institution's accessibility policies and services.	✓			a
7.3 Course instructions articulate or link to an explanation of how the institution's academic support services and resources can help learners succeed in the course and how learners can obtain them.	✓			b
7.4 Course instructions articulate or link to an explanation of how the institution's student services and resources can help learners succeed and how learners can obtain them.	✓			c
Standard – Accessibility and Usability				
8.1 Course navigation facilitates ease of use.	✓			Recommend using the Carmen Distance Learning "Master Course" template developed by ODEE and available in the Canvas Commons to provide student-users with a consistent user experience in terms of navigation and access to course content.
8.2 Information is provided about the accessibility of all technologies required in the course.	✓			A link has been provided in the syllabus for the accessibility information available for YouTube (screen reader).
8.3 The course provides alternative means of access to course materials in formats that meet the needs of diverse learners.	✓			Recommend that resources be developed to address any requests for alternative means of access to course materials.
8.4 The course design facilitates readability	✓			Recommend using the Carmen Distance Learning "Master Course" template developed by ODEE and available in the Canvas Commons to provide student-users with a consistent user experience in terms of navigation and access to course content.
8.5 Course multimedia facilitate ease of use.	✓			All assignments and activities that use the Carmen LMS with embedded multimedia facilitates ease of use. All other multimedia resources facilitate ease of use by being available through a standard web browser.

Reviewer Information

- Date reviewed: 9/26/2107
- Reviewed by: Mike Kaylor

Notes:

- On page 4 of the syllabus, you reference the students having to purchase MS Office. MS Office 365 Pro is now free to all OSU students. Please update your syllabus accordingly with this information\link. It is now included in their email. <https://ocio.osu.edu/blog/community/2015/08/18/free-microsoft-office-for-ohio-state-students>
- On page 5 of the syllabus under “Online Course Components” you mention the video library and external sites. These sites will need to be explicitly listed on the syllabus in order to complete the syllabus review.

^aThe University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know via email immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue. **Consider putting text for the accessibility statement in BOLD 16 pt font.**

^bAdd to the syllabus this link with an overview and contact information for the student academic services offered on the OSU main campus. <http://advising.osu.edu/welcome.shtml>

^cAdd to the syllabus this link with an overview and contact information for student services offered on the OSU main campus. <http://ssc.osu.edu>. Also, consider including this link in the “Other Course Policies” section of the syllabus.

**GEC COURSE ASSESSMENT PLAN AND REPORT FOR
EARTHSCI 1100: The PLANET EARTH: HOW IT
WORKS**

JANUARY, 2009
Updated March, 2018

PREPARED BY LINDSAY SCHOENBOHM FOR THE SCHOOL OF EARTH
SCIENCES; Updated by Wendy Panero

I. ABSTRACT

This document details the assessment plan and report for EarthSci 1100: The Planet Earth: How it works. Course goals and objectives for ES1100 were revised during Winter 2008 to align them more closely with GEC goals and objectives (Appendix A). During Fall 2008, direct testing with embedded questions (Appendix B) was implemented across all four concurrent sections of EarthSci1100 to assess whether learning objectives were being met. Results of the assessment were analyzed in December of 2008. Students met the goal of a score of 75% or higher for 8 of the 9 questions, but with significant standard deviation indicating differences in uniformly meeting learning objectives 1 and 3 across all four sections. Faculty will meet in 2009 to assess ways to improve student learning and to reassess the evaluation method. Evaluation is repeated annually to ensure continued success of the course.

This document was again updated in March 2018 to reflect updated ELOs, reflect the semester format of the course, and improve the rigor of questions 6 and 9.

II. COURSE DESCRIPTION

EarthSci 1100, *The Planet Earth: How it Works*, meets the University's Natural Science GEC requirement and provides a laboratory experience for undergraduates. This course provides a basic introduction to the principles and methods of Earth Science and explores its relevance to problems of the contemporary world. The course bulletin accurately describes EarthSci 100 as: "the materials of the Earth's crust, the processes that produce and modify them, and the development of the Earth and its life forms through time." The syllabus for this course (section V) includes a goals statement for GEC Natural Science courses and lists core learning objectives for EarthSci 1100, which describe how this course meets the GEC goals and objectives for this category.

Six sections of this course are taught each year for a total of ~2000 students per year on the Columbus campus, and taught each semester at Marion, Lima, and Mansfield campuses. More than 80% of lecture sections are taught by regular faculty in the department, where the remaining sections are taught by adjunct faculty and lecturers. Lecture sections are divided into lab sections of 20-24 students each and are taught by GTAs. GTAs attend a mandatory training session annually and weekly preparation meetings led by the head GTA and are overseen by the coordinator for this course. The chair of the graduate committee oversees the student evaluation of instruction (SEIs) including student comments for GTAs and addresses issues as they arise. Labs assignments were written in 2007 and revised upon the transition from quarters to semester with a focus on active student learning, implementing best practices such as jigsaw exercises. Hands on learning include with wave tanks, stream tables, and experience with GIS software. The revised lab book is [Exercises for Earth Sciences 1100 \[2016\]](#), written and developed by School of Earth Sciences faculty and senior graduate teaching assistants.

III. LEARNING OUTCOMES ASSESSMENT PLAN

A. Appendix A outlines both core and specific learning objectives for EarthSci 1100, which are in agreement with the learning goals and objectives of the Natural Science GEC. The method of embedded testing will be used to evaluate whether this course is meeting its objectives. Appendix B gives the 9 multiple choice questions written to test Objectives 1, 2, 3 and 4. Each test question relates directly to a course and GEC learning objective (as indicated by section heading) and to specific subcategories of Earth Science (as indicated in italics below each question) to ensure breadth of coverage. These questions have been approved by the faculty of the School of Earth Science.

B. Our goal in this assessment is that 75% of students give the correct answer for the embedded multiple-choice test questions and that 75% of student survey results indicate meeting the ELOs by marking "agree" or "strongly agree," averaged across all sections. Questions for which fewer than 75% of students give a correct answer or disagree with meeting the objectives will be pinpointed as areas of weakness.

C. Assessments have been implemented since Fall 2008. As exam dates and content are determined by the individual faculty, it will also be left to them to decide when and in what order each question appears in each exam. Students will not be informed that these questions are different in any way. Data for each question will be forwarded to the Associate Director of the School of Earth Sciences and combined anonymously. Each question will be evaluated against the metric for success described above.

E. If results are not satisfactory of any of the 9 embedded test questions, The Associate Director of the School of Earth Sciences will organized a meeting with faculty to plan, as a group, ways to adjust delivery methods to improve student learning or to decide whether the test questions instead need to be adjusted in terms of scope, subject or wording.

F. The embedded test question procedure will be repeated annually to test for improvement and ensure that the course continues to meet GEC goals and learning objectives. We will also explore ways to assess the labs in future faculty and GTA meetings

GE Expected Learning Outcomes	Methods of Assessment *Direct methods are required. Additional indirect methods are encouraged.	Level of student achievement expected for the GE ELO. (for example, define percentage of students achieving a specified level on a scoring rubric)	What is the process that will be used to review the data and potentially change the course to improve student learning of GE ELOs?
<u>ELO 1</u> Students understand the basic facts, principles, theories and methods of modern science.	Standardized questions 1-4, attached Student survey question 1	75% of students give the correct answer for the embedded multiple-choice test questions, averaged across all sections.	Standardized questions for which fewer than 75% of students give a correct answer will be pinpointed as areas of weakness.
<u>ELO 2</u> Students understand key events in the development of science and recognize that science is an evolving body of knowledge.	Standardized questions 5 and 6 Student survey question 2	75% of students give the correct answer for the embedded multiple-choice test questions, averaged across all sections.	Survey question responses for which fewer than 75% of students agree or strongly agree will be pinpointed as areas of weakness.
<u>ELO 3</u> Students describe the inter-dependence of scientific and technological developments.	Standardized questions 7 and 8 Student survey question 3	75% of students give the correct answer for the embedded multiple-choice test questions, averaged across all sections.	To address weaknesses, an <i>ad hoc</i> committee of EarthSci 1100 instructors will be formed to analyze instructional materials and propose changes.
<u>ELO 4</u> Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.	Standardized question 9 Student survey question 4	75% of students give the correct answer for the embedded multiple-choice test questions, averaged across all sections.	

V. SYLLABUS:

See attached for current syllabus

APPENDIX A: COURSE GOALS AND LEARNING OBJECTIVES

EARTHSCI 1100: THE PLANET EARTH: HOW IT WORKS

COURSE GOALS: This course provides a basic introduction to the principles and methods of Earth Science, and its relevance to daily life and the problems of the contemporary world. This course fulfills the learning objectives of the GEC Natural Science requirement and provides a laboratory experience for students.

LEARNING OBJECTIVE 1: Students explain and recall the basic facts, principles, theories and methods of modern earth science, including: the formation and structure of the earth; principles of plate tectonics; composition of and interrelationship among earth materials; geologic time; hazards such as earthquakes, tsunamis, volcanic eruptions, and floods; the hydrologic cycle; controls on global climate; and human sustainability. Students should be able to describe how the earth operates as a system and apply the scientific method. This fulfills the first objective of the GEC Natural Science requirement: *Students understand the basic facts, principles, theories and methods of modern science.*

LEARNING OBJECTIVE 2: Students describe and explain the significance of key events in the history of earth science, especially pertaining to the development of plate tectonic theory to reflect changes in scientific thinking and discovery. Students will also learn key events in the geological, hydrological, atmospheric and biological history of the earth. This fulfills the second objective of the GEC Natural Science requirement: *Students understand key events in the development of science and recognize that science is an evolving body of knowledge.*

LEARNING OBJECTIVE 3: Students will be able to discuss the inter-dependence of scientific and technological developments in measuring and modeling physical and chemical aspects of the earth and environment. This fulfills the third objective of the GEC Natural Science requirement: *Students describe the inter-dependence of scientific and technological developments.*

LEARNING OBJECTIVE 4: Students will explain the ways in which aspects of earth science impact society. Students should be able to describe the relationship between science and societal decision-making pertaining to natural hazards, natural resources, global climate and human sustainability. This fulfills the fourth objective of the GEC Natural Science requirement: *Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.*

APPENDIX B: EMBEDDED TEST QUESTIONS

EARTHSCI 100: THE PLANET EARTH: HOW IT WORKS

Embedded Questions: multiple choice questions that test GEC objectives to be included in exams (correct answers shown in bold)

LEARNING OBJECTIVE 1: students understand the basic facts, principles, theories and methods of modern science.

1. Science...

- A) as a method, entails formulating, testing and evaluating hypotheses.
- B) as a body of knowledge, cannot be revised if new information strongly challenges its accepted principles.
- C) as a body of knowledge, may undergo revision as new data come to light.
- D) Both A and B are true.

E) Both A and C are true.

Question addresses application of the scientific method.

2. Arrange the following from *largest* to *smallest* in terms of the percentage of the total mass of Earth.

- A) Lithosphere, Biosphere, Mesosphere.
- B) Outer Core, Inner Core, Mantle, Lithosphere.
- C) Inner Core, Outer Core, Crust, Mantle.
- D) Mantle, Outer Core, Inner Core, Crust.**

Question addresses structure of Earth and Earth materials.

3. Which volcanoes are most likely to erupt explosively and why?

- A) Strato- because the magma is more viscous than in shield volcanoes**
- B) Strato- because the magma is less viscous than in shield volcanoes
- C) Shield- because the magma is less viscous than in strato volcanoes
- D) Shield- because the magma is more viscous than in strato volcanoes

Question addresses earth materials and hazards.

4. Approximately what percent of water on the planet is contained in the oceans?

- A) 36%
- B) 54%
- C) 70%
- D) 97 %**

Question addresses the hydrologic cycle.

LEARNING OBJECTIVE 2: Students learn key events in the history of science.

5. Alfred Wegener proposed the theory of _____ in 1912.

- A) Sea floor spreading
- B) Evolution
- C) Continental drift**
- D) Radiometric dating

Question addresses key events in the history of science (also addresses objective 1, specifically plate tectonics).

6. Which of the following are true with respect to geologic time? (Mark all that are correct)

- A) It is subdivided into smaller units based on equal time intervals
- B) It is subdivided into smaller units based on major events in Earth history**
- C) It is recorded or preserved in rock strata on Earth**
- D) It would not be recorded if Earth were a gas giant planet rather than a terrestrial planet**
- E) It would not be recorded if Earth were a terrestrial planet rather than a gas giant planet

Question addresses key events in the history of Earth (also addresses objective 1, specifically geologic time).

LEARNING OBJECTIVE 3: Students provide examples of the inter-dependence of scientific and technological developments

7. We know the outer core of Earth is liquid because:

- A) P waves are reflected back to the surface when they hit the crust-mantle boundary.
- B) S waves cannot travel through a liquid, and there is an S-wave shadow on the opposite side of Earth from a big earthquake.**
- C) Molten (liquid) iron is found in kimberlite pipes.
- D) P waves travel faster than S waves.

Question addresses technology (geophysical methods) (also addresses objective 1, specifically Earth structure).

8. Computer models of Earth's climate system:

- A) can be made infinitely complex, and therefore can perfect predictions for the future.
- B) are limited by our understanding of Earth's system and by technology, but can be used to understand general processes and make reasonable predictions.**
- C) show conflicting results, and therefore should not be trusted.

Question addresses data modeling (also addresses objective 1, specifically global climate).

LEARNING OBJECTIVE 4: Students discuss social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

9. Global climate change is a current problem that illustrates the relationship between science and society. Which of the following are true about global climate change? (Mark all that are correct).

A) most of the warming over the last several decades can be attributed to human activities that release CO₂ and other greenhouse gases into the atmosphere

B) most of the warming over the last several decades can be attributed to human activities that release N₂ and O₂ gases into the atmosphere

C) the burning of fossil fuels (e.g., coal, oil, and natural gas) for energy is the single largest human driver of climate change

D) the use of renewal energy (e.g., solar and wind) is the single largest driver of climate change

E) geoengineering approaches to combating global climate change include the sequestration of atmospheric carbon dioxide in forests, agricultural systems, or through direct air capture with geological storage.

Earth Science 1100 and 1121
General Education Assessment
Student Survey

1) This course provided opportunities for me to meet the following Learning Objective of OSU's General Education Physical Science category: "Students understand the basic facts, principles, theories and methods of modern science."

a) strongly agree b) agree c) neither agree or disagree d) disagree e) strongly disagree

2) This course provided opportunities for me to meet the following Learning Objective of OSU's General Education Physical Science category: "Students learn key events in the history of science."

a) strongly agree b) agree c) neither agree or disagree d) disagree e) strongly disagree

3) This course provided opportunities for me to meet the following Learning Objective of OSU's General Education Physical Science category: "Students provide examples of the interdependence of scientific and technological developments."

a) strongly agree b) agree c) neither agree or disagree d) disagree e) strongly disagree

4) This course provided opportunities for me to meet the following Learning Objective of OSU's General Education Physical Science category: "Students discuss social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world."

a) strongly agree b) agree c) neither agree or disagree d) disagree e) strongly disagree

5) I am a student in

a) Earth Sci 1100 b) Earth Sci 1121