

Astronomy 143 and Earth Sciences 110 Natural Science Sequence Proposal

Astronomy 143 – History of the Universe has recently been approved for Physical Science course status.

Earth Sciences 110 – History of Life on Earth: *Global Change in the Biosphere* currently has Physical Science course and sequence status with Earth Sciences 100 and 105. As part of the GEC Cluster proposal for Before History, the course was approved with temporary Physical Science Sequence status with Astronomy 294 (recently approved as Astronomy 143). This proposal seeks permanent Physical Science Sequence status for these two courses.

The goal of the two quarter sequence within the cluster is not simply to list a chronology of major events. Instead, it is to understand the physical, chemical, and biological framework in which these events occurred and the evidence and analysis needed for scientists to gain our present knowledge. Courses will build from one to the next. For example, the conditions of the origin of the Universe and Earth (Astronomy 143) set the stage for the origination and early evolution of life on Earth, where Earth Sciences 110 begins. The faculty of this cluster has met to develop a seamless transition among the courses. To that end, students will learn the basic physical and chemical background to understand how Earth formed (why it has the chemical composition that it has, how Earth coalesced and formed during its early meteorite impact phase, processes that left us with a solid Earth with virtually no atmosphere, and the processes operating on a nascent planet). These topics are covered in a complementary, constructive manner in Astronomy 143 and Earth Sciences 110, thus providing an appropriate context for discussion of the emergence of life that follows. This process of building on knowledge establishes the sequential nature of the two courses.

The topics covered in these two courses are continued by Anthropology 200 (Biological Science Course) which completes the story of how early humans developed to round out the Cluster and satisfy the Natural Science requirement for BA students under the new GEC.

Assessment Plan

As part of the Before History Cluster, this sequence will be assessed using multiple methods. A survey will be administered at the end of ES 110 (as well as Anthropology 200) to gain information as to how the students perceive the connections between the courses. The faculty teaching the courses will be interviewed as a team to determine what is working effectively in the cluster as well as what issues may need to be addressed, such as gaps in student knowledge. Grades for clusters students will be compared to non-clusters students in the courses to determine if there is any difference. The individual courses are expected to assess the specific GEC learning objectives within the context of their classes as normal.

The Ohio State University
Colleges of the Arts and Sciences Course Change Request

Earth Sciences

Academic Unit

Earth Sciences

110

Book 3 Listing (e.g., Portuguese)

Course Number

Summer Autumn X Winter Spring Year 2008

Proposed effective date: choose one quarter and put an "X" after it; and fill in the year. See the OAA curriculum manual for deadlines.

A. Course Offerings Bulletin Information. Follow instructions in the OAA curriculum manual. Before you fill out the "Present Course" information, be sure to check the latest edition of the *Course Offerings Bulletin* and subsequent Circulating Forms. You may find that the changes you need have already been made or that additional changes are needed. If the course offered is less than quarter or term, please also complete the Flexibly Scheduled/Off-Campus/Workshop Request form.

COMPLETE ALL ITEMS THIS COLUMN

Present Course

1. Book 3 Listing: Earth Sciences

2. Number: 110

3. Full Title: History of Life on Earth: Global Change in the Biosphere

4. 18-Char. Transcript Title: GLOBL CHG BIOSPHER

5. Level and Credit Hours U5

6. Description: 3.5 billion years of biosphere gobal change; introduction to major evolutionary and extinction events; processes responsible for change; and biosphere, atmosphere, and lithospere interrelationships.

7. Qtrs. Offered : Sp

8. Distribution of Contact Time: 4 cl and 1 lab (e.g., 3 cl, 1 3-hr lab)

9. Prerequisite(s): 100, or Biology 102 or 114

10 Exclusion:

(Not open to....)

11. Repeatable to a maximum of _____ credits.

12. Off-Campus Field Experience:

13. Cross-listed with:

14. Is this a GEC course? Yes – Physical Science BA, sequence with ES 100 & 105

15. Grade option (circle): Ltr S/U P
 If P graded, what is the last course in the series?

16. a) Is an honors version of this course available? Y N
 (may be available)

b) Is an Embedded Honors version of this course available?
 Y N

c) Is this a Service Learning Course: Y N

B. General Information

17. Other general course information:

COMPLETE ONLY THOSE ITEMS THAT CHANGE
Changes Requested

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. 100, or Biology 102 or 114, or Astronomy 143

10. _____

11. _____

12. _____

13. _____

14. add Physical Science Sequence with Astronomy 143

15. _____

16. a) _____

b) _____

c) _____

17. _____

**The Ohio State University
General Education Curriculum (GEC)
Request for Course Approval Summary Sheet**

1. Academic Unit(s) Submitting Request

Earth Sciences

2. Book 3/Registrar's Listing and Number (e.g., Arabic 367, English 110, Natural Resources 222)

Earth Sciences 110

3. GEC areas(s) for which course is to be considered (e.g., Category 4. Social Science, Section A. Individuals and Groups; and Category 6. Diversity Experiences, Section B. International Issues, Non-Western or Global Course)

Natural Science: Physical Science Sequence with Astronomy 143 (in addition to current Physical Science standing)

4. Attach:

- A statement as to how this course meets the general principles of the GEC Model Curriculum and the specific goals of the category(ies) for which it is being proposed;
- An assessment plan for the course; and
- The syllabus, which should include the category(ies) that it satisfies and objectives which state how this course meets the goals/objectives of the specific GEC category(ies).

5. Proposed Effective Date Autumn 2008

6. If your unit has faculty members on any of the regional campuses, have they been consulted? _____

7. Select the appropriate descriptor for this GEC request:

Existing course with no changes to the *Course Offerings Bulletin* information. Required documentation is this GEC summary sheet and the course syllabus.

Existing course with changes to the *Course Offerings Bulletin* information. Required documentation is this GEC summary sheet, the course change request, and the course syllabus.

New course. Required documentation is this summary sheet, the new course request, and the course syllabus.

For ASC units, after approval by the academic unit, the documentation should be forwarded to the ASC Curriculum Office for consideration by the appropriate college curriculum committee and the Arts and Sciences Committee on Curriculum and Instruction (CCI). For other units, the course should be approved by the unit, college curriculum committee, and college office, if applicable, before forwarding to the ASC Curriculum Office. E-mail the syllabi and supporting documentation to ascurofc@osu.edu.

9. Approval Signatures

Lawrence Kusack Associate Director for Administration 4/8/2008
Academic Unit JES Date

College Office/College Curriculum Committee _____ Date

Colleges of the Arts and Sciences Committee on Curriculum and Instruction _____ Date

Office of Academic Affairs _____ Date

**The Ohio State University
General Education Curriculum (GEC)
Request for Course Approval Summary Sheet**

1. Academic Unit(s) Submitting Request

Astronomy

2. Book 3/Registrar's Listing and Number (e.g., Arabic 367, English 110, Natural Resources 222)

Astronomy 143

3. GEC areas(s) for which course is to be considered (e.g., Category 4. Social Science, Section A. Individuals and Groups; and Category 6. Diversity Experiences, Section B. International Issues, Non-Western or Global Course)

Natural Science: Physical Science Sequence with Earth Sciences 110 (in addition to current Physical Science standing)

4. Attach:

- A statement as to how this course meets the general principles of the GEC Model Curriculum and the specific goals of the category(ies) for which it is being proposed;
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9. Approval Signatures


Academic Unit

4/4/08
Date

College Office/College Curriculum Committee

Date

Colleges of the Arts and Sciences Committee on Curriculum and Instruction

Date

Office of Academic Affairs

Date

The Ohio State University

EARTH SCIENCES 110--HISTORY OF LIFE ON EARTH: GLOBAL CHANGE IN THE BIOSPHERE (Spring 2008)

Instructor: William I. Ausich Office Hours: 1:30-2:30 MTWRF or by appointment
Office: 160D Orton Hall Telephone: 292-3353
E-mail: ausich.1@osu.edu

This course fulfills the Physical Science course and Lab requirement for the GEC. It fosters students' understanding of the principles, theories and methods of modern science, the relationship between science and technology, and the effects of science and technology on the environment. Expected outcomes are:

- Students understand the basic facts, principles, theories and methods of modern science.
- Students learn key events in the history of science.
- Students provide examples of the inter-dependence of scientific and technological developments.

Lectures: MTRF, 2:30; 191 Mendenhall Laboratory

Laboratory/Discussion: 163 Mendenhall Laboratory

Each student must be enrolled in one of the following sections:

Wednesday: 10:30-12:18

Wednesday: 12:30-2:18

Wednesday: 2:30-4:18

Text: Ausich, W.I., and N. G. Lane. 1999. *Life of the Past* (Fourth Edition).

Prentice-Hall, New York, 321 p. [ISBN: 0-13-896069-0]

Laboratory Manual and Other Course Materials: Available at UNIPRINT at Tuttle Park Place and can be ordered on line at <uniprint.osu.edu>.

Lecture Schedule (lecture number in parenthesis)

March	24	Geological Time (1)	(Ch. 1)
	25	Fossils and Fossilization (2)	(Chs. 2 and 3)
	27	Plate Tectonics (3)	(Ch. 6)
	28	Evolution (4)	(Ch. 5)
	31	Evolution (5)	
April	1	Plant and Animal Classification (6)	(Ch. 2)
	3	Abiotic Synthesis of Life (7)	(Ch. 4)
	4	Precambrian Life (8)	(Ch. 8)
	7	Metazoan Diversification (9)	(Ch. 9)
	8	Marine Paleoecology (10)	
	10	Life during the Cambrian (11)	
	11	MIDTERM EXAMINATION I	
	14	Ordovician Radiations/Extinctions (12)	(Ch. 10, p. 133-152)

- 15 Middle Paleozoic Ocean Predators (13) (Ch. 12, p. 179-190)
 17 Plankton of the Oceans (14) (Ch. 11, p. 162-165, 170-178)
 18 Epifaunal Suspension Feeders and
 Terminal Paleozoic Extinctions/Recoveries (15)
- 21 Mesozoic & Cenozoic Ocean Predators (16) (Ch. 12, p. 190-192)
 22 Mesozoic Ocean Life (17) (Ch. 10, p. 152-160)
 24 Emergence of Plant Life on Land (18)(Ch. 13, p. 193-198)
 25 Early Themes in Plant Evolution (19)
- 28 Greening of the Globe (20) (Ch. 14, p. 205-232)
 29 Evolution of Tetrapods onto Land (21) (Ch. 13, p. 198-204)
- May 1 Paleozoic and Early Mesozoic Tetrapods (22) (Ch. 15, p. 233-240)
 2 **MIDTERM EXAMINATION II**
- 5 Dinosaurs 1 (23) (Ch. 15, p. 241-254)
 6 Dinosaurs 2 (24) (Ch. 15, p. 241-254)
 8 Dinosaurs 3 (25)
 9 Birds (26) (Ch. 15, p. 255-258)
- 12 Dinosaurs and End-Cretaceous Extinctions (27)
 13 Radiation of Mammals--Mesozoic Mammals and Paleogene Fauna (28)
 (Ch. 16, p. 259-267)
 15 Neogene Mammalian Fauna (29) (Ch. 16, p. 267-270)
 16 Evolution of Horses (30) (Ch. 16, p. 271-275)
- 19 Evolution of Aquatic Mammals (31)
 20 Great American Exchange (32) (Ch. 16, p. 275-277)
 22 **MIDTERM EXAMINATION III**
 23 Evolution of Man (33) (Ch. 17)
- 26 **MEMORIAL DAY -- NO CLASS**
 27 Evolution of Man (34) (Ch. 17)
 29 Pleistocene Faunas and Pleistocene Glaciations (35)
 30 End-Pleistocene Extinctions (36)(Ch. 16, p. 277-280)

FINAL EXAMINATION: Wednesday, June 4, 2008, 1:30-3:18 pm

GRADING

During the 10th week of the quarter, students may choose one of two options for their final grade determination for GS 110, see options below. In both cases, examinations will cover material from lectures, assigned readings, films, and laboratory/discussion. Examinations will include three one-hour Midterm examinations and a Final examination. You will also receive a grade for the laboratory portion of the course., based on your weekly work on exercises.

NO MAKE-UP EXAMS WILL BE GIVEN !! Midterm examinations will cover material since the previous exam, and the final examination will be comprehensive. Grades will be determined on a

90/80/70 scale, where 100 to 90 % is in the A range, 89-80% is in the B range, etc.

Option 1: If you are satisfied with your grade based only on three Midterm examinations and the Laboratory, you do *not* have to take the Final Examination. Your grade will be based solely on your three Midterms and Laboratory (you must do all of the Labs), as follows.

	<u>Percent of final grade</u>
Midterm examination	28.3
Midterm examination	28.3
Midterm examination	28.3
Laboratory/discussion exercises	<u>15</u>
	100

Option 2: If you have not taken all three one-hour midterms or if you are *not* satisfied with your grade based only on the three Midterms (Option 1), you need to take the comprehensive Final Examination. In Option 2, the final grade is based on your two highest Midterm examinations, Laboratory, and Final Examination, as follows:

	<u>Percent of final grade</u>
Midterm examination	25
Midterm examination	25
Laboratory/discussion exercises	15
Final examination	<u>35</u>
	100

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://studentaffairs.osu.edu/info_for_students/csc.asp>.

DISABILITY SERVICES

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 located in 150 Pomerene Hall, 1760 Neil Avenue; 292-3307, TDD 292-0901; <<http://www.ods.ohio-state.edu/>>.

ASTRONOMY 143

The History of the Universe

Winter Quarter 2009

Time: TBA

Location: TBA



"Where Do We Come From? What Are We? Where Are We Going?" – Paul Gauguin, 1897

Instructor: Professor Barbara Ryden

Office: 4035 McPherson Lab (4th floor), 140 W. 18th Avenue

Office hours: TBA

Telephone: 292-4562

Email: ryden@astronomy.ohio-state.edu

Required text: *On the Shores of the Unknown: A Short History of the Universe*, by Joseph Silk (Cambridge University Press, 2005)

Class website: www.astronomy.ohio-state.edu/~ryden/ast143/

The website will contain the PowerPoint slides for each lecture, the course syllabus, the assigned problem sets, and useful (or at least amusing) astronomy links.

Lectures: Please **silence your cellphone** and **turn off any wireless devices** during lecture. (Exceptions will be made for assistive technology for the vision- or hearing-impaired.)

Grading policy: Your course grade will be determined from the results of a midterm exam (30%), a final exam (35%), and seven take-home problem sets (a total of 35%). The midterm exam will be on **Date TBA** at class time. The final exam will be at the university-approved date and time. Problem sets will be handed out on Tuesdays, and will be due the following Tuesday, at class time.

The midterm and final exam will be closed-book, closed-notes tests. The final exam will be cumulative, covering the entire course. If you know in advance that you will miss an exam because of attendance at a University-sponsored activity, please contact the professor at least one week prior to the scheduled exam date, in order to arrange a makeup exam. If you miss the midterm due to a sudden illness or other emergency, please contact the professor as soon as possible after the missed exam, in order to schedule a makeup exam. If you miss the **final** exam, you will receive a grade of incomplete (I) for the course; it will be your responsibility to contact the professor as soon as possible to make up the final exam.

To avoid a penalty for lateness, problem sets must be handed in by 5 pm on the Tuesday they are due. If they are handed in between 5 pm Tuesday and 5 pm Wednesday, they will suffer a deduction of 25 points (out of 100). If they are handed in between 5 pm Wednesday and 5 pm Thursday, they will suffer a deduction of 50 points (out of 100). No problem sets will be accepted more than 48 hours after they are due. The problem sets and exams will be graded on a standard C+ curve; this means that the median grade of the class will approximately correspond to a C+.

General Education Curriculum (GEC) Goals: Astronomy 143 is a GEC Physical Science Course in the Natural Science category. The goals for this course include:

- Understanding the theories and methods of modern cosmology, and their relation to other ideas in the physical sciences.
- Investigating the relation between science and technology.
- Exploring the effects of science and technology on human society.

In Astronomy 143, the specific learning objectives to achieve these course goals include:

- Investigating the basic facts, principles, theories, and methods of modern science as practiced in cosmology. (We'll ask not only, "What do cosmologists know?" but also, "How do they know it?")
- Learning important events in the history of astronomy (particularly the development of our understanding of planets, stars, and galaxies, and the discovery of the physical laws that govern their motions).
- Explaining the role of modern technology in the investigation of the universe (where "modern technology" embraces everything from Galileo's telescope to cutting-edge spacecraft).
- Considering how increased knowledge of the size and age of the universe has affected humanity's philosophical viewpoint.

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Sample Course Outline

(Taken from the pilot course, Astronomy 294z, during Winter 2008)

1. (Jan 3) Naked Eye Observations: Early Models of the Universe
Reading: Prologue
2. (Jan 8) From Earth-centered to Sun-centered Models of the Universe
Reading: Chapter 1
3. (Jan 10) Telescopic Observations: The Nature of Stars and Galaxies
Reading: Chapter 2
4. (Jan 15) Spectroscopic Observations: The Expanding Universe
Reading: Chapter 3
5. (Jan 17) Multi-wavelength Observations: The Big Bang Theory
Reading: none
6. (Jan 22) From Alchemy to Chemistry: Atomic Theory
Reading: Chapter 4
7. (Jan 24) Subatomic Particles in the VERY Early Universe
Reading: Chapter 5
8. (Jan 29) Forging Elements in the Not-Quite-So-Early Universe
Reading: Chapter 6
9. (Jan 31) Newton's Cosmology: Gravity and the Expansion of the Universe
Reading: Chapter 7
10. (Feb 5) Einstein's Cosmology: Gravity and the Shape of the Universe
Reading: Chapter 8
11. (Thursday, February 7) **MIDTERM EXAM**
12. (Feb 12) How Old is Our Galaxy? Determining the Ages of Stars
Reading: none
13. (Feb 14) How Old is the Earth? Determining the Ages of Planets
Reading: Chapters 9, 10

14. (Feb 19) Why is the Universe Lumpy? Intergalactic Matter and Gravitational Instability
Reading: Chapter 11
15. (Feb 21) The Biggest Things in the Universe: Large-Scale Structure
Reading: Chapter 12
16. (Feb 26) Formation and Evolution of Galaxies (in particular, the Milky Way)
17. (Feb 28) Formation and Evolution of Stars (in particular, the Sun)
18. (Mar 4) Formation and Evolution of Planets (in particular, the Earth)
19. (Mar 6) A Glimpse of the Future: "Where Are We Going?"