

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

Academic Unit Astronomy

Book 3 Listing (e.g., Portuguese) Astronomy

Number 143 Title History of the Universe

18-Character Title Abbreviation History Universe Level G Credit Hours 05

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 the instructions in the OAA curriculum manual. If this is a course with decimal subdivisions, then use one New Course Request form for the generic information that will apply to all subdivisions; and use separate forms for each new decimal subdivision, including on each form the information that is unique to that subdivision. If the course offered is less than a quarter or a term, please complete the Flexibly Scheduled/Off Campus/Workshop Request form.

Description (*not to exceed 25 words*): Description of the history of the universe from Big Bang to present; how observations led to discovery of this history

Quarter offered: Au, Wi Distribution of class time/contact hours: 5 cl. or 3 1.5-hr. cl.

Quarter and contact/class time hours information should be omitted from Book 3 publication (yes or no):

Prerequisite(s):

Exclusion or limiting clause: Not open to students with credit for 162 or 172 or 292

Repeatable to a maximum of \_\_\_\_\_ credit hours.

Cross-listed with:

Grade Option (Please check): Letter  S/U  Progress  What course is last in the series? \_\_\_\_\_

Honors Statement: Yes  No  GEC: Yes  No  Admission Condition  
 Off-Campus: Yes  No  EM: Yes  No  Course: Yes  No

Embedded Honors Statement: Yes  No

Service Learning Course\*: Yes  No  \*To learn more about this option, please visit

<http://artsandsciences.osu.edu/currofc/>

Other General Course Information:

(e.g. "Taught in English." "Credit does not count toward BSBA degree.")

**B. General Information**

Subject Code 400201 Subsidy Level (V, G, T, B, M, D, or P) G

If you have questions, please email Jed Dickhaut at [dickhaut.1@osu.edu](mailto:dickhaut.1@osu.edu).

1. Provide the rationale for proposing this course:

Changes in the GEC require more stand-alone natural science courses. Astronomy 143 addresses the principal topic of modern astronomy to show how recent research paints a coherent picture of the origin and evolution of the universe.

2. Please list Majors/Minors affected by the creation of this new course. Attach revisions of all affected programs. This course is (check one):

Required on major(s)/minor(s)  A choice on major(s)/minors(s)  
 An elective within major(s)/minor(s)  A general elective:

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.  
 Fewer sections of the 161-162 sequence will be offered in the future; a new faculty member has been added to the department. The course is being offered as a 294 course in 2008.

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes  No  List:

5. If this course is part of a sequence, list the number of the other course(s) in the sequence: \_\_\_\_\_

6. Expected section size: 140 Proposed number of sections per year: 1 or 2

7. Do you want prerequisites enforced electronically (see OAA manual for what can be enforced)? Yes  No

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*):  
 Not Applicable

9. **Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the OAA curriculum manual and e-mail to [asccurrofc@osu.edu](mailto:asccurrofc@osu.edu).**

CONTACT PERSON NAME: \_\_\_\_\_ E-MAIL: \_\_\_\_\_ PHONE: \_\_\_\_\_

**Approval Process** The signatures on the lines in ALL CAPS ( e.g. ACADEMIC UNIT) are required.

	Printed Name	Date
1. Academic Unit Undergraduate Studies Committee Chair		
2. Academic Unit Graduate Studies Committee Chair		
3. <b>ACADEMIC UNIT CHAIR/DIRECTOR</b>	<b>Bradley M Peterson</b>	1/11/08
4. <b>After the Academic Unit Chair/Director signs the request, forward the form to the ASC Curriculum Office, 4132 Smith Lab, 174 West 18<sup>th</sup> Ave. or fax it to 688-5678. Attach the syllabus and any supporting documentation in an e-mail to <a href="mailto:asccurrofc@osu.edu">asccurrofc@osu.edu</a>. The ASC Curriculum Office will forward the request to the appropriate committee.</b>		
5. <b>COLLEGE CURRICULUM COMMITTEE</b>	<b>RICHARD E. HUGHES</b>	1/28/08
6. <b>ARTS AND SCIENCES EXECUTIVE DEAN</b>		
7. Graduate School (if appropriate)		
8. University Honors Center (if appropriate)		
9. Office of International Education (if appropriate)		
10. <b>ACADEMIC AFFAIRS</b>		

**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 area(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)

Category 3: Natural Science, Physical Science course (BA)

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 Quarter 2008

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

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](mailto:ascurofc@osu.edu).

9. Approval Signatures

  
Academic Unit

12/21/2007  
Date

College Office/College Curriculum Committee

Date

Colleges of the Arts and Sciences Committee on Curriculum and Instruction

Date

Office of Academic Affairs

Date

## ASTRONOMY 143

### The History of the Universe

How this course meets the GEC goals for Category 3: Natural Science (BA)

Astronomy 143 is proposed as a GEC Physical Science course in the Natural Science category. The general goal for courses in the natural sciences is to foster an 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. The more specific goals of Astronomy 143 are:

- 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 in the development of modern cosmology.
- Exploring the effects of modern cosmological theory on human society and human attitudes toward the environment.

In Astronomy 143, the learning objectives intended to achieve the course goals are:

- To investigate the basic facts, principles, theories, and methods of modern science as practiced in cosmology. (In other words, the course will ask not only “What do cosmologists know?”, but also “How do they know it?”)
- To learn important events in the history of astronomy (particularly the development of our understanding of the nature of stars and galaxies, and the discovery of the physical laws that govern their motions).
- To explain the role of modern technology in the investigation of the universe. Here ‘modern technology’ covers everything from Galileo’s first telescope in the early 16th century, to the cutting-edge spacecraft of the early 21st century. (Looking at the universe with higher sensitivity, or at a different wavelength, permits startling new insights.)
- To consider how increased knowledge of the age of the universe has affected humanity’s philosophical viewpoint. (The realization that the Earth is not at the center of the universe, and that the universe is much older than the ~ 6000 years of written history has caused reactions ranging from exhilaration to terror -- sometimes both at once.)

ASTRONOMY 143  
The History of the Universe  
Assessment Plan

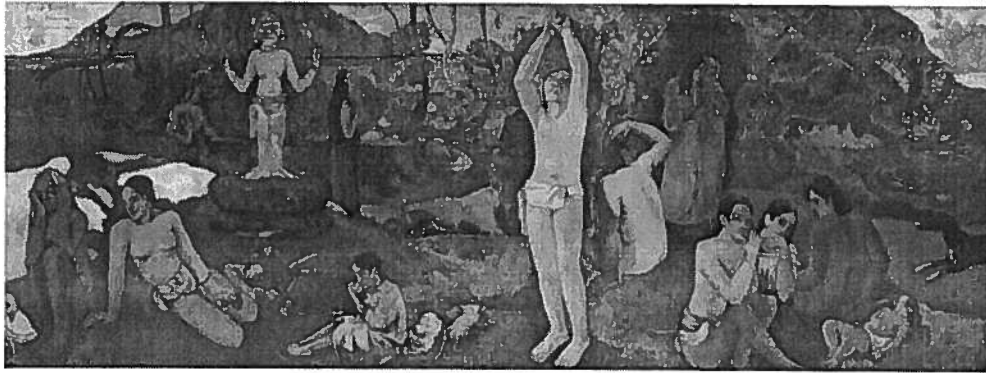
Astronomy 143 is being offered in Winter 2008 as a group studies course, 294. As a consequence, assessment of Astronomy 294 will be particularly crucial for adapting and improving the course, in preparation for future offerings. There will be two main assessment tools for the course. The first will consist of questions embedded in the final exam; the second will be an anonymous written exit survey administered to all students in the course (or, more realistically, as many students as possible). The embedded questions in the final exam will be tailored to test the students' grasp of concepts directly linked to the GEC goals for Natural Science courses. The students' responses will be checked to see which goals were inadequately met, as shown by a lower percentage of correct answers. The next time the course is taught, more emphasis (and a greater proportion of class time) will be placed on the goals that were not adequately met the first time the course was taught. The exit survey will be based on the exit survey for Astronomy 161, another GEC course offered by the astronomy department. In that survey, students are asked whether they strongly agree, agree, disagree, or strongly disagree with statements such as "This course helped me understand the basic facts, principles, theories, and methods of modern science." In addition to asking students whether they believed the course met the GEC goals, the Astronomy 294 exit survey will also solicit narrative evaluations. The exit survey will be used to identify those GEC goals that the students perceived as not being met; this in turn will help the instructor to modify the content and presentation of the inadequately met goals the next time the course is taught. Astronomy 294 is part of a three-quarter cluster; assessment of the cluster as a whole will be handled by the Colleges of the Arts and Sciences.

# 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 (4<sup>th</sup> floor), 140 W. 18<sup>th</sup> 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/](http://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.

**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 wherever committed; illustrated by, but not limited to, cases of plagiarism and cheating on examinations. Instructors shall report all instances of alleged misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct ([studentaffairs.osu.edu/info\\_for\\_students/csc.asp](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 accommodated; please inform the professor as soon as possible of your needs. The Office for Disability Studies is located in 150 Pomerene Hall, 1760 Neil Avenue, telephone 292-3307, TDD 292-0901, [www.ods.ohio-state.edu](http://www.ods.ohio-state.edu).



## 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?"