



**SCIENCE, TECHNOLOGY, AND ENVIRONMENT BE170A2**  
**General Education Category: Natural Sciences**  
**Online version**

### **Description of Course**

The course progresses through the development of the universe, matter, sun, protoplanetary disk and solar system, earth, life, Precambrian climate, invertebrates and vertebrates, reptiles, mammals, humans, Neolithic Age, and Bronze Age. Required natural science topics include the environment, scientific method, technology, motion, energy, gases, heat, chemistry, and electricity and magnetism.

### **Instructor and Contact Information**

Peter Waller, 530 Shantz, 520-440-5803, [pwaller@email.arizona.edu](mailto:pwaller@email.arizona.edu)

Text, email, or call between 9 am and 5 pm. If I don't answer your call, it may be because I assume it is a spam call. Course home page [d2l.arizona.edu](http://d2l.arizona.edu) links to the following google sites.

<http://sites.google.com/email.arizona.edu/cosmos/> ,

Instructor home page: <http://cals.arizona.edu/abe/people/peter-waller>

Office hours: Monday 2-3 pm, Tuesday 7-8 pm, Thursday 8-9 am. <https://arizona.zoom.us/j/7879699700>. This Zoom address will be the Zoom address for all meetings during the semester.

### **Course Format and Teaching Methods**

Weekly modules in D2L include links to readings, videos, and websites, as well as quizzes and assignment locations. Each module/chapter has six to eight required sections, and one to two optional sections (not required).

### **Course Objectives and Expected Learning Outcomes**

#### Requirements

- Readings and videos
- Quizzes
- Short written chapter summaries
- Zoom discussions with instructor
- Voice Threads or other
- Comment on other Voice Threads

#### Learning Outcomes

- Students describe basic scientific concepts required for tier one natural science courses.
- Students use peer reviewed sources to understand topics and to make arguments.
- Students present technical information and arguments in concise written documents.
- Students present information in Voice Threads
- Students distinguish between laws, theories, hypotheses, and unknowns.

#### Learning Objectives

- Students understand cosmology
- Students understand how the earth and its environment formed
- Students understand the human transition from animals to civilization
- Students learn about strengths and weaknesses of models of natural history

The four General Education Program Outcomes are introduced, practiced, and assessed. (Think Critically, Communicate Effectively, Use Info Effectively, Understand and Value Differences)

## **Absence and Class Participation Policy**

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable: <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences from schoolwork, preapproved by the UA Dean of Students (or dean's designee) will be honored. See <http://policy.arizona.edu/employmenthuman-resources/attendance>.

## **Makeup Policy for Students Who Register Late**

Students who register late may make up quizzes, but not writing assignments, during first 3 weeks. The 2<sup>nd</sup> writing assignment is due 2 weeks after the beginning of the semester.

One writing assignment (one week) and 8 quizzes (one week) are dropped

## **Course Communications**

All course communications will be with your official UA email address. Emails are often generated through D2L email. Information is generally duplicated in D2L news page.

## **Required Texts or Readings**

Course notes (pdfs and videos, or websites) are electronically available in D2L Content in the weekly modules. You can select between pdfs, videos, and websites, depending on your learning style. All required information is in pdfs and websites. Most information is in videos.

## **Required or Special Materials**

none

## **Assignments and Examinations: Schedule/Due Dates**

Written summaries (see next section) of chapters are due in the Assignment box each Wednesday night (200 words). Instructor will grade the first few assignments on Thursday; however, subsequent assignments will be graded during every three weeks Zoom meetings with instructor. If you fail to attend a Zoom meeting, that is OK but you lose a few points, and the instructor will grade your assignments during a subsequent Zoom meeting. If you miss the subsequent Zoom meeting, then the instructor will go back and grade your ungraded assignments. It is much more interesting to talk about assignments than to just grade them and turn them back, but it is understandable that some people might think that it is better to lose the points than to attend Zoom meetings. If necessary, the instructor will ask you to revise your written assignment for additional credit.

Sets of multiple choice D2L quizzes are due each Wednesday night. Quizzes may be taken/repeated as many times as you like, and you will be credited for the highest score received. Each week includes approximately eight quizzes with five multiple choice questions per quiz. Four spot checks on quiz punctuality will be conducted on Thursdays. Students receive 1% of course grade if quizzes for the previous week were completed at the time of the spot check. Quiz availability after the Zoom discussions with the instructor.

Zoom discussions with the instructor every three weeks. The Zoom discussions are generally 10 to 15 minutes long.

Student presents overviews of chapters: one or two minutes per chapter.

Instructor asks 5 or 10 questions related to quiz questions, not multiple choice format.  
Instructor and student discuss outside sources of information in written summaries.  
Evaluation written summaries based on Instructor and Grammarly (Turnitin.com) edits.  
Optional general discussion (not scored)

Instructor will schedule Zoom sessions during the 4<sup>th</sup>, 7<sup>th</sup>, 10<sup>th</sup>, 13<sup>th</sup>, and finals week. Each Zoom discussion is worth 2% of the course grade. Students will drop in at their convenience. Students will wait in Zoom waiting room if other students are already on Zoom. Students can also schedule prearranged Zoom sessions. This would be appropriate if student is limited on time and cannot wait in waiting room or if student would like to have a general discussion about the chapters. See "Zoom discussion with instructor rubric" for evaluation criteria. Students can also enter the Zoom discussion in groups. If necessary, the instructor will ask you to revise

Students post Voice Threads on the 5<sup>th</sup>, 8<sup>th</sup>, 11<sup>th</sup>, and 14<sup>th</sup> weeks. Students are also welcome to post on Instagram or YouTube, but add a link to it in the Voice Thread.

Cool Instagrams can be 30 seconds to a minute. Please check with the instructor to make sure your Instagrams are cool. The instructor will know because he is so cool. YouTube or VoiceThread videos should be 6 slides and a minimum of 4 minutes. You can summarize the three chapters, focus on one chapter, or focus on one topic in a chapter. You can read your written summary or summaries or not. See "Voice Thread" rubric for grading criteria.

Students post verbal (not chat) comments on three other student's Voice Threads on the 6<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup>, and 15<sup>th</sup> weeks. Listen to the VoiceThreads, YouTube videos, or Instagrams with a pen and paper, and write down comments while you are listening. Then turn on the mike and made those comments in VoiceThread.

<https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information?audience=students&cat1=10&cat2=31>

## Writing Requirement

All Tier One and Tier Two General Education Courses are writing intensive (<http://gened.arizona.edu/content/writing-component>).

**Assignment.** Each week, students will write a 200-word summary of the chapter or of a section in the chapter. The 200 words does not include the reference. One written summary is dropped. This will result in slightly more than 10 written pages (The Core Curriculum requirement) by the end of the semester. See the "Written chapter summary rubric" for grading criteria. There will be one summary that combines four chapters later in the semester (to be determined).

**Grammar.** Students will turn summaries into the Assignment box and check grammar with Turnitin.com/Grammarly (available in assignment box) or another grammar checker in Word or Google. If necessary, students will resubmit assignment based on Grammarly response. Only the last submission will be graded. Instructor and student will review papers during Zoom discussions and discuss grammar as well as content of the papers.

**Subject.** You can either review the chapter as a whole, select a section of the chapter that is of interest, or focus on your external reference.

**Structure.** As long as the summaries are organized and citations and reference follow a standard format (MLA, APA, or Chicago), there is leeway in the structure. The following suggestions might be helpful.

Introduction: two sentences, one on the subject, and one on the external reference

Paragraph: general description of section or chapter

Paragraph: description and analysis of the external peer reviewed reference, and citation

Reference: Pasted at the end of the document

**Selection and analysis of reference.** Select a peer-reviewed or academic reference that relates to your topic. In order to analyze your reference, you need to understand it. For example, selecting a high level mathematical analysis of cosmological inflation is probably not a good choice. On the other hand, you need to find a reference by an expert so you can't use newspapers or magazines, unless the article is written by an expert. You can find peer-reviewed references in Google Scholar or library search engines. Academic references are at government or university websites. You can also use a YouTube video that is made by an acknowledged academic expert. For example, if the subject is the expansion of the universe, then you might try NASA or a professor's web page that attempts to explain a subject to the general public.

## Grading Scale and Policies

In general, the class has approximately 30% A grades, 30% B grades, 30% C grades, and 10% lower grades. All students who remain in the class and turn in assignments generally earn at least a C grade. University policy regarding grades and grading systems is available at <http://catalog.arizona.edu/policy/grades-and-grading-system>

The assignments are weighted according to the following percentages.

Written summaries	32%
Zoom discussions	10%
Quiz scores	34%
Quiz punctuality (spot checks)	4%
Voice Thread posts	16%
Voice Thread comments	4%

Drop lowest eight quiz scores (1 week), and lowest written summary (1 week).

Students are guaranteed the following minimum grades (the curve will not be higher).

> 90%	A
> 80%	B
> 65%	C
> 50%	D
< 50%	E

**Requests for incomplete (I) or withdrawal (W)** must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

**Dispute of Grade Policy:** Students are welcome to dispute grades at any time during the semester, until the grades are turned in.

## Honors Credit

This course has no honors contract.

## Bibliography

Supplemental materials are listed in weekly modules in D2L.

## Classroom (internet) Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed.

## Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any

member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

## Scheduled Topics/Activities

Due Dates	Subject	Quizzes and writing assignments
<b>Sept 1 Wed</b>	Chapter 1 The Structure and History of the Universe Introductory video and syllabus	Written Assignment 1 Chapter 1 Quizzes
<b>Sept 8 Wed</b>	Chapter 2 Matter and Energy	Written Assignment 2 Chapter 2 Quizzes
<b>Sept 15 Wed</b>	Chapter 3 Stars	Written Assignment 3 Chapter 3 Quizzes
<b>Sep 17-18 Fri-Sat</b>	Zoom discussion (chapters 1-3) Friday (3-8 pm), Saturday (8 am – 5 pm)	
<b>Sept 22 Wed</b>	Chapter 4 Protoplanetary Disks	Written Assignment 4 Chapter 4 Quizzes
<b>Sept 29 Wed</b>	Chapter 5 Earth and other Planets VoiceThread due on Wednesday, February 17 (Ch. 1-3)	Written Assignment 5 Chapter 5 Quizzes
<b>Oct 6 Wed</b>	Chapter 6 Origin of Life Comment on 2 other VoiceThreads, due Feb 24	Written Assignment 6 Chapter 6 Quizzes
<b>Oct 8-9 Fri-Sat</b>	Zoom discussion (chapters 4-6) Friday (3-8 pm), Saturday (8 am – 5 pm)	
<b>Oct 13 Wed</b>	Chapter 7 Earth's Climate	Written Assignment 7 Chapter 7 Quizzes
<b>Oct 20 Wed</b>	Chapter 8 Invertebrates VoiceThread due on Wednesday, March 10 (Ch. 4-6)	Written Assignment 8 Chapter 8 Quizzes
<b>Oct 27 Wed</b>	Chapter 9 Vertebrates Comment on 3 other VoiceThreads, due March 17	Written Assignment 9 Chapter 9 Quizzes
<b>Oct 29-30</b>	Zoom discussion (chapters 7-9) Friday (3-8 pm), Saturday (8 am – 5 pm)	
<b>Nov 3 Wed</b>	Chapter 10 Age of Reptiles and Birds	Written Assignment 10 Chapter 10 Quizzes
<b>Nov 10 Wed</b>	Chapter 11 Evolution and Diversification of Mammals VoiceThread due on Wednesday, March 31 (Ch. 7-9)	Written Assignment 11 Chapter 11 Quizzes
<b>Nov 17 Wed</b>	Chapter 12 Age of Mammals Comment on 2 other VoiceThreads, due April 7	Written Assignment 12 Chapter 12 Quizzes
<b>Nov 19-20 Fri-Sat</b>	Zoom discussion (chapters 10-12) Friday (3-8 pm), Saturday (8 am – 5 pm)	
<b>Nov 24 Wed</b>	Chapter 13 Human evolution	Written Assignment 13 Chapter 13 Quizzes
<b>Dec 1 Wed</b>	Chapter 14 Neolithic Age (Agriculture) VoiceThread due on Wednesday, Apr 31 (Ch. 10-12)	Written Assignment 14 Chapter 14 Quizzes
<b>Dec 8</b>	Chapter 15 Bronze Age (Civilization) Comment on 2 other VoiceThreads, due April 28	Written Assignment 15 Chapter 15 Quizzes
<b>Dec 10 Dec 11 Dec 15</b>	Zoom discussion (Ch. 13-15), mostly review of grades. Friday (Dec 10) 3-8 pm. Saturday (Dec 11) 8 am – 5 pm. Wednesday (Dec 15) 12-4 pm	

## **Notification of Objectionable Materials**

There are no objectionable materials that are required in this class. There are links to optional excursions at the ends of chapters that focus on God and science, but these are completely optional and not part of the regular course.

## **Accessibility and Accommodations**

Our goal in this class is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

## **Code of Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

*Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent.* Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

## **UA Nondiscrimination and Anti-harassment Policy**

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

## **Additional Resources for Students**

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>.

Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

## **Confidentiality of Student Records**

<http://www.registrar.arizona.edu/ferpa/default.htm>

## **Subject to Change Statement**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.