

Course Syllabus

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 Edit

Instructor	Dr. Kevin M. Lee
Phone	472-3686
Email	klee6@unl.edu (mailto:klee6@unl.edu)
Mailbox	JH 208 (access through staff, put my name on any paper/message)
Office (Zoom) Hours	MWF 2:30 - 3:30 pm
Class Time	MWF 1:30 - 2:20 pm
Class Location	Jorgensen 110
TAs (in class and shifts in the Resource Center/Zoom)	Sukaina Al-Hamedi Brianna Bernhardt Laura Casne

Course Overview:

This course focuses on the question "Are we alone in the Universe?". Although Earth is the only planet known to support life at present, we will apply scientific reasoning to the possibility of life elsewhere. We will explore how life arose on Earth, how it has evolved over time, what are the conditions necessary for life, do those conditions exist elsewhere in the universe, and how would we know if life did exist elsewhere. Life in the Universe is a multidisciplinary course involving components of Astronomy, Biology, Geology, Paleontology, and Chemistry.

Course Materials:

Required Text: Life in the Universe, Fifth Edition by Bennett et al. from Princeton University Press -- We will move through the text covering all sections in order (although some sections will certainly get more emphasis than others).

ISBN: 9780691241791

You can navigate to the book's webpage:


<https://press.princeton.edu/books/ebook/9780691241791/life-in-the-universe-5th-edition> 

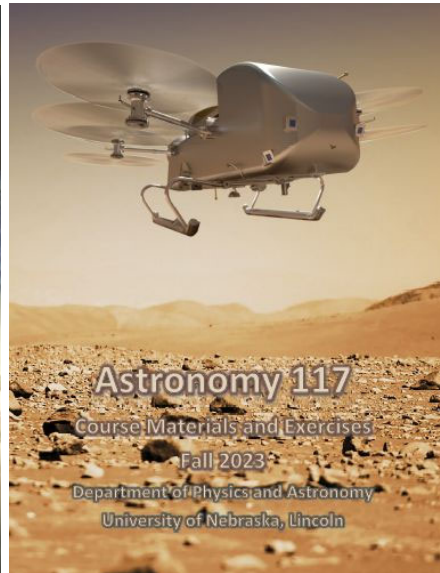
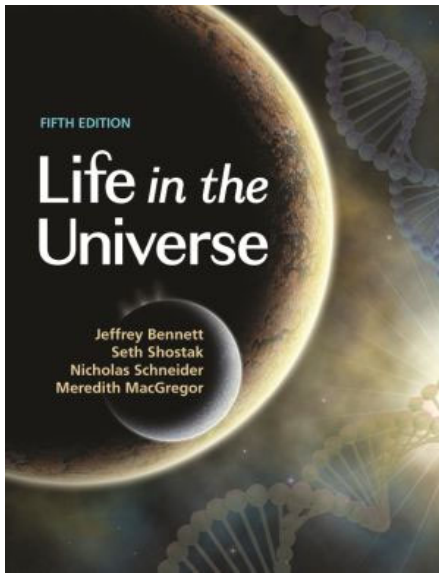
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[tU!D2vspc2nWH4EfUUOMjJf6Y8E4B6leeYCW3XznX0KrN9CwYilGaVXLfK0kcq1tlhal7sB93QZFX4at3RJS7ZIZu](https://redshelf.com/app/ecom/book/2106314/life-in-the-universe-5th-edition-2106314-9780691241791-jeffrey-bennett-gerson-seth-shostak-nicholas-schneider-meredith-macgregor)

and purchase the ebook (recommended) -- note the discount code.

You can navigate to RedShelf for various rental options:

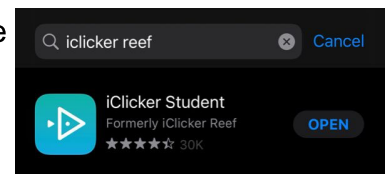
<https://redshelf.com/app/ecom/book/2106314/life-in-the-universe-5th-edition-2106314-9780691241791-jeffrey-bennett-gerson-seth-shostak-nicholas-schneider-meredith-macgregor> 
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[tU!D2vspc2nWH4EfUUOMjJf6Y8E4B6leeYCW3XznX0KrN9CwYilGaVXLfK0kcq1tlhal7sB93QZFX4at3RJS8Kflu](https://redshelf.com/app/ecom/book/2106314/life-in-the-universe-5th-edition-2106314-9780691241791-jeffrey-bennett-gerson-seth-shostak-nicholas-schneider-meredith-macgregor)



Required Course Pack: A course pack is available at the Union Bookstore.

Required Mobile Device: Students will be required to bring a mobile device with them to class each day. This can be a smartphone (preferred), tablet, or laptop.

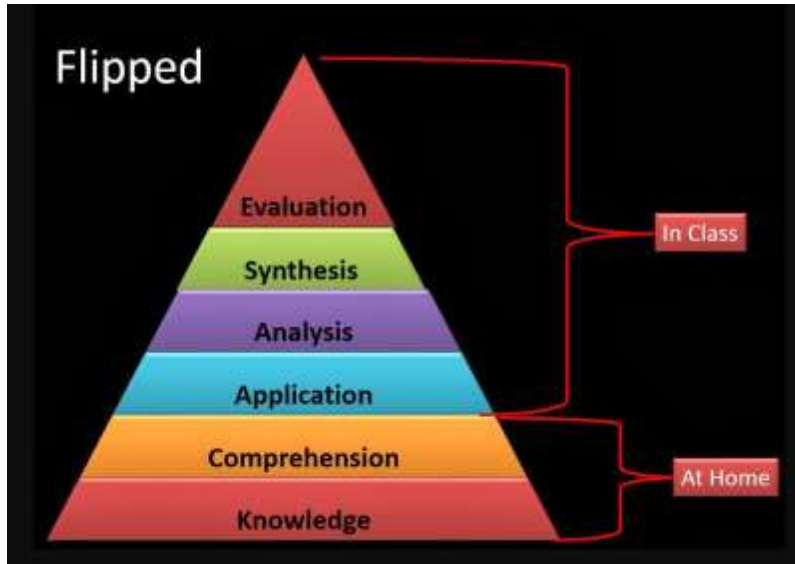
Required Peer Instruction License: iClicker REEF app subscription (may be called iClicker Student) – will allow you to vote on conceptual questions with your mobile device (desktop, laptop, or smartphone). Cannot be a handheld remote! This license is likely available through the app store of your smartphone (iPhone App Store version shown).



Note that the "voting" landscape at UNL has 3 software players and is evolving. You should purchase a license only for the duration of the course. It will be about \$15 for the semester.

Educational Philosophy: Learning is not a spectator sport! Students don't learn much from listening to their instructor lecture or from reading a textbook -- students learn by doing! Every effort will be made to make this course as interactive as possible with feedback supplied on a regular basis.

The general pedagogy used here is known as learner-centered instruction as opposed to instructor-centered instruction (and the specific pedagogy is known as "flipping"). The role of the instructor changes from "sage on the stage" to "guide on the side", where the instructor's job is to create an environment where there are good support mechanisms to help students learn on their own. Students are asked to prepare before class and then participate in activities using this information in class. They are encouraged to be "active



seekers of information" as opposed to passively listening to a lecture. Students are also encouraged to develop metacognitive skills -- to be good at recognizing the concepts that they understand well and those that need additional work and a plan for improving understanding.

Collaborative activities of all sorts are used in student-centered learning. Students learn well both by explaining things and having things explained to them by peers. Many of these collaborative activities make use of a model

known as elicit-confront-resolve which has been shown to be effective in combating misconceptions.

It should be emphasized that this pedagogical approach and all of the instructional tools used in this course are informed by educational research. Considerable data has been taken from many students in many different courses illustrating the effectiveness of these techniques.

Instructional Components

Course Schedule: A thorough (evolving) schedule is provided on the modules page. It will contain information on material that you are expected to prepare before each class (assigned reading from the text and short YouTube videos on related topics). There will also be additional links to other resources that you might find useful or that will be used in class. All materials that should be prepared before a given day's class is shaded yellow.

PreFlights: A short quiz over the assigned readings and YouTube videos is due before class. It is not meant to be a major hurdle, but simply ensure that students are sufficiently prepared to participate in the activities in class. Students may take the *randomized* PreFlight 3 times with only the highest score counting.

Class Participation: When you come to class you will already have completed the assigned readings and short videos. Thus, you will already be familiar with basic vocabulary and concepts. This will allow

class time to be spent on more important issues -- like how to apply these concepts to substantial problems requiring higher-order thinking.

A number of different instructional methods will be utilized during class:

- Peer Instruction - This method of instruction/assessment involves posing conceptual questions (known as ConcepTests) to students and having them discuss the solution with their peers before voting with their iClicker2 on the answer.
- Structured Worksheets - These short worksheets contain carefully crafted sequences of questions to help collaborative groups of students understand a concept.
- Simulations - Many animations and simulations will be demonstrated in class. The majority of them have links on our class home page so you can play with them after class.
- Astronomy Demonstration Videos -- Some of these short videos on common demonstrations are included in the preclass lectures and others will be used in class.
- Ranking Tasks --Short pencil & paper exercises or computer animations requiring you to rank objects according to a given criteria.

The majority of these methods will involve you working with your peers. It is vital that you fully participate!

You are expected to participate in all class activities -- voting on peer instruction questions and worksheets (some will be collected).

Any behaviors that discourage or interfere with participation are not allowed. These include (but are not limited to) cell phone usage, laptop usage, doing homework from other classes, sleeping, and anything involving the internet. Your instructor reserves the right to institute new policies to rectify inadequate levels of class participation and will ask students to leave if necessary!

Weekly Homework: Homework problems will be assigned each week. Some will be from your textbook, but many others will be "experiential" in nature and using materials out on the web. You should plan on submitting your solutions electronically on the assignments page as .pdf documents. They will be graded and feedback provided electronically in Canvas. A homework assignment will come out most Mondays.

Experiential Projects: It is expected that you will complete 5 experiential projects throughout the course. These are activities that give you some other important practical exposure to astrobiology. They will be graded and feedback provided electronically in Canvas.

Experiential Projects will be assigned on Exploring Geology Concepts visiting Morrill Hall, Exploring the History of Life on Earth visiting Morrill Hall, Attending a public presentation on the evening of October 6 in the Union (or using the En-Roads simulation as a substitute), Observing and Analyzing Jupiter's Moons at the UNL Student Observatory, and Analyzing Exoplanet Transit Data in Citizen Science.

Exams: There will be a midterm and a final exam given in the Mobius web-based assessment software. Exams are thoroughly randomized, but similar versions are available for practice beforehand. Students

who fully participate in the course will have seen all material on the exams through the readings and in-class activities.

Grading

Approximate Percentage Ranges and Weighting:

Component	Weight	Range	Grade
Midterm	15%	85% - 100%	Some type of A
Final Exam	15%	75% - 85%	Some type of B
PreFlights	15%	65% - 75%	Some type of C
Class Participation	15%	55% - 65%	Some type of D
Weekly Homework (~10)	20%	0% - 55%	The only type of F
Experiential Projects (5)	20%		

Smartphones: You have been required to vote in class with a smartphone using the REEF iClicker App. Delivering course content on student smartphones is a major goal in education. Please endeavor to have a QR-code reading capability for your smartphone camera. Please make sure that your smartphone is used only for course related purposes in the classroom.

Covid Information: Extensive information for students on Covid-19 and UNL rules regulations regarding it are available at: <https://covid19.unl.edu/>

Instructional Research in this Course

Research on Astronomy Smartphone Formative Assessment Tools: Your instructor Kevin Lee and undergraduate student Sukaina Al-Hamedi will be collecting information on the effects of smartphone simulations on your knowledge of astrobiology and attitudes toward science. This study has received IRB approval: [IRB_ApprovalLetter.pdf \(https://canvas.unl.edu/courses/156584/files/16157744?wrap=1\)](https://canvas.unl.edu/courses/156584/files/16157744?wrap=1)
 ↓ (https://canvas.unl.edu/courses/156584/files/16157744/download?download_frd=1)

Study Title: Development and Research on Smartphone Formative Assessment Tools in Introductory College Astronomy

Purpose of the Study: We wish to improve college introductory astronomy classes by creating formative assessment tasks that will run upon student smartphones and generate knowledge regarding task efficacy. These tasks will ask students to rank, sort, and label graphical icons that convey the concepts of astrobiology. We will also make use of computer simulations delivered on smartphones to a lesser extent. We want to take advantage of the tremendous prevalence of smartphones among college students and their special affinity for them. One can argue that delivering instructional tools tackling astronomy concepts on the devices that students love offers special promise for forging connections between students and science -- benefitting both their understanding of astronomy and their attitudes toward science. But we need to do the research and see if it supports that argument.





Components of the Study: There are several components to the study. Student participation in all components of the study is voluntary.















-- All students will be asked to complete two surveys on their attitudes toward astronomy and their knowledge of important astronomy concepts – one early in the course and one late in the course. Students will receive 15 participation points for completion of each survey, regardless of consenting whether or not to allow the use of their responses in the research.














-- A small group of students will be invited to participate in a Zoom interview with Sukaina Al-Hamedi. Students will be financially compensated for their participation. Your instructor will not be aware of which students are participating.




Benefits of the Study: The study can help improve instruction in introductory astronomy at UNL and nationally as this course is taken by over 300,000 students each year in the United States.















Course Summary:













Date	Details	Due
	 <u>PreFlight2A (recommended 8/23 1:30 pm, in reality EOD 8/28)</u> https://canvas.unl.edu/courses/156584/assignments/1587637	due by 11:59pm
Mon Aug 28, 2023	 <u>PreFlight2B (recommended 8/25 1:30 pm, in reality EOD 8/28)</u> https://canvas.unl.edu/courses/156584/assignments/1587694	due by 11:59pm
	 <u>PreFlight2C (recommended 8/28 1:30 pm, in reality EOD 8/28)</u> https://canvas.unl.edu/courses/156584/assignments/1594554	due by 11:59pm
Wed Aug 30, 2023	 <u>PreFlight3A</u> https://canvas.unl.edu/courses/156584/assignments/1594555	due by 1:30pm


Date	Details	Due
Fri Sep 1, 2023	 PreFlight3B https://canvas.unl.edu/courses/156584/assignments/1594556	due by 1:30pm
	 PreFlight3B https://canvas.unl.edu/courses/156584/assignments/1594556 (1 student)	due by 11:59pm
	 PreFlight3C https://canvas.unl.edu/courses/156584/assignments/1598294	due by 1:30pm
Wed Sep 6, 2023	 Week 1 (Homework A) https://canvas.unl.edu/courses/156584/assignments/1582246	due by 11:59pm
	 Week 2 (Homework B) https://canvas.unl.edu/courses/156584/assignments/1594899	due by 11:59pm
Fri Sep 8, 2023	 PreFlight3D https://canvas.unl.edu/courses/156584/assignments/1598295	due by 1:30pm
	 PreFlight4A https://canvas.unl.edu/courses/156584/assignments/1601085	due by 1:30pm
Mon Sep 11, 2023	 Week 3 (Homework C) https://canvas.unl.edu/courses/156584/assignments/1599583	due by 11:59pm
Wed Sep 13, 2023	 PreFlight4B https://canvas.unl.edu/courses/156584/assignments/1601088	due by 1:30pm
Fri Sep 15, 2023	 PreFlight4C https://canvas.unl.edu/courses/156584/assignments/1601091	due by 1:30pm
Mon Sep 18, 2023	 PreFlight4E https://canvas.unl.edu/courses/156584/assignments/1603789	due by 1:30pm
Wed Sep 20, 2023	 PreFlight4D https://canvas.unl.edu/courses/156584/assignments/1603790	due by 1:30pm
Fri Sep 22, 2023	 PreFlight5A https://canvas.unl.edu/courses/156584/assignments/1603791	due by 1:30pm
Mon Sep 25, 2023	 PreFlight5B	due by 1:30pm

Date	Details	Due
	(https://canvas.unl.edu/courses/156584/assignments/1606138)	
	 Project #1: Morrill Hall Rocks & Fossils (https://canvas.unl.edu/courses/156584/assignments/1602970)	due by 11:59pm
Wed Sep 27, 2023	 PreFlight5C (https://canvas.unl.edu/courses/156584/assignments/1606147)	due by 1:30pm
	 PreFlight6A (https://canvas.unl.edu/courses/156584/assignments/1606192)	due by 1:30pm
Fri Sep 29, 2023	 PreSurvey1 (https://canvas.unl.edu/courses/156584/assignments/1602188)	due by 11:59pm
	 PreSurvey2 (https://canvas.unl.edu/courses/156584/assignments/1602190)	due by 11:59pm
	 PreFlight6B (https://canvas.unl.edu/courses/156584/assignments/1608363)	due by 1:30pm
Mon Oct 2, 2023	 Project #2: Morrill Hall "Evolution of Life" (https://canvas.unl.edu/courses/156584/assignments/1603796)	due by 11:59pm
Wed Oct 4, 2023	 PreFlight6C (https://canvas.unl.edu/courses/156584/assignments/1608364)	due by 1:30pm
Fri Oct 6, 2023	 PreFlight6D (https://canvas.unl.edu/courses/156584/assignments/1608366)	due by 1:30pm
	 PreFlight7A (https://canvas.unl.edu/courses/156584/assignments/1611073)	due by 1:30pm
Mon Oct 9, 2023	 Week 7 (Homework D) (https://canvas.unl.edu/courses/156584/assignments/1609204)	due by 11:59pm
Wed Oct 11, 2023	 PreFlight7B (https://canvas.unl.edu/courses/156584/assignments/1611074)	due by 1:30pm
Fri Oct 13, 2023	 DLC Midterm Fall2023 (https://canvas.unl.edu/courses/156584/assignments/1611149)	due by 11:59pm

Date	Details	Due
Wed Oct 18, 2023	 PreFlight8A (https://canvas.unl.edu/courses/156584/assignments/1612481)	due by 1:30pm
	 PreFlight8B (https://canvas.unl.edu/courses/156584/assignments/1612484)	due by 1:30pm
Fri Oct 20, 2023	 MakeUpVersion_Midterm_Fall2023 (https://canvas.unl.edu/courses/156584/assignments/1611150)	due by 11:59pm
	 PracticeVersion_Midterm_Fall2023 (https://canvas.unl.edu/courses/156584/assignments/1611147)	due by 11:59pm
Mon Oct 23, 2023	 PreFlight8C (https://canvas.unl.edu/courses/156584/assignments/1615270)	due by 1:30pm
	 MakeUpVersion_Midterm_Fall2023 (https://canvas.unl.edu/courses/156584/assignments/1611150) (1 student)	due by 11:59pm
Tue Oct 24, 2023	 MakeUpVersion_Midterm_Fall2023 (https://canvas.unl.edu/courses/156584/assignments/1611150) (1 student)	due by 11:59pm
Wed Oct 25, 2023	 PreFlight9A (https://canvas.unl.edu/courses/156584/assignments/1615271)	due by 1:30pm
	 PreFlight9B (https://canvas.unl.edu/courses/156584/assignments/1615272)	due by 1:30pm
Fri Oct 27, 2023	 MakeUpVersion_Midterm_Fall2023 (https://canvas.unl.edu/courses/156584/assignments/1611150) (1 student)	due by 11:59pm
	 Project #3: Response Paper on Visiting Speaker Daniel Reichart (https://canvas.unl.edu/courses/156584/assignments/1611151)	due by 11:59pm

Date	Details	Due
Mon Oct 30, 2023	 PreFlight9C (https://canvas.unl.edu/courses/156584/assignments/1619222)	due by 1:30pm
Wed Nov 1, 2023	 PreFlight10A (https://canvas.unl.edu/courses/156584/assignments/1619224)	due by 1:30pm
Fri Nov 3, 2023	 PreFlight10B (https://canvas.unl.edu/courses/156584/assignments/1619226)	due by 11:59pm
Mon Nov 6, 2023	 PreFlight10C (https://canvas.unl.edu/courses/156584/assignments/1622487)	due by 1:30pm
Wed Nov 8, 2023	 PreFlight11A (https://canvas.unl.edu/courses/156584/assignments/1622490)	due by 1:30pm
Fri Nov 10, 2023	 PreFlight11B (https://canvas.unl.edu/courses/156584/assignments/1622491)	due by 1:30pm
Mon Nov 13, 2023	 PreFlight11C (https://canvas.unl.edu/courses/156584/assignments/1626122)	due by 1:30pm
Wed Nov 15, 2023	 PreFlight11D (https://canvas.unl.edu/courses/156584/assignments/1626361)	due by 1:30pm
Fri Nov 17, 2023	 PreFlight11E (https://canvas.unl.edu/courses/156584/assignments/1627878)	due by 1:30pm
Mon Nov 20, 2023	 PreFlight12A (https://canvas.unl.edu/courses/156584/assignments/1628823)	due by 1:30pm
Mon Nov 27, 2023	 PreFlight12B (https://canvas.unl.edu/courses/156584/assignments/1631331)	due by 1:30pm
Fri Dec 1, 2023	 Week 12 (Homework E) (https://canvas.unl.edu/courses/156584/assignments/1627897)	due by 11:59pm
Fri Dec 1, 2023	 PreFlight13A (https://canvas.unl.edu/courses/156584/assignments/1635819)	due by 1:30pm
	 Project #4: Observing Jupiter's Moons	due by 11:59pm

Date	Details	Due
	(https://canvas.unl.edu/courses/156584/assignments/1615664)	
	 Project #5: Citizen Science Project (https://canvas.unl.edu/courses/156584/assignments/1615672)	due by 11:59pm
	 PostSurvey1 (https://canvas.unl.edu/courses/156584/assignments/1632051)	due by 11:59pm
	 PostSurvey2 (https://canvas.unl.edu/courses/156584/assignments/1632053)	due by 11:59pm
Fri Dec 8, 2023	 Project #6: EN-Roads Simulation (https://canvas.unl.edu/courses/156584/assignments/1623089)	due by 11:59pm
	 Week 14 (Homework F) (https://canvas.unl.edu/courses/156584/assignments/1637915)	due by 11:59pm
Tue Dec 12, 2023	 DLC_FinalExam (https://canvas.unl.edu/courses/156584/assignments/1640501)	due by 11:59pm
	 MakeUp_FinalExamF2023 (https://canvas.unl.edu/courses/156584/assignments/1640503)	due by 11:59pm
Fri Dec 15, 2023	 Practice_FinalExamF2023 (https://canvas.unl.edu/courses/156584/assignments/1640498)	due by 11:59pm
	 NotDLC_FinalExam (https://canvas.unl.edu/courses/156584/assignments/1669836)	due by 11:59pm
Fri Jan 26, 2024	 Practice_FinalExamF2023 (https://canvas.unl.edu/courses/156584/assignments/1640498) (1 student)	due by 11:59pm
	 iClicker Grade (https://canvas.unl.edu/courses/156584/assignments/1601794)	
	 Mobius Gradebook (Yes, you can see all of your Mobius work :-) (https://canvas.unl.edu/courses/156584/assignments/1510173)	

Date	Details	Due
	 <u>Uploaded Score</u> <u>(https://canvas.unl.edu/courses/156584/assignments/1647228)</u>	