

CC 111 Core Natural Science I: Origins

Fall 2021 Course Syllabus

Course Description

From where do we come? Are we alone? Every human culture, for generations, has wondered about the origins of the Universe, the Earth, life on Earth, and of course human life. Many cultures have developed rich and original origin myths that seek to explain how our world came into existence. We live at an amazing time in human history; a time when scientists have the means and tools to address some of the most profound questions humans have ever dared to ask about themselves and their world. We now know that the Universe is 13.8 billion years old; the Earth 4.6 billion. We know roughly when life originated and how it evolved, and we know how an ancient ape evolved into what you see in the mirror every morning. But, *how* do we know these things? CC111 is designed to introduce you to four different sciences: astronomy, geology, biology, and anthropology as each seeks to understand the origins of our world, and ourselves, through the lens of science. Students will not only gain valuable insights into the origins of important events in our history as a species but will learn about the nature and process of science and how it is both similar and different in various disciplines.

Course Information

Lectures: Tues/Thurs 3:30-4:45 PM.

Location: WED 130. Lectures will be delivered in person and students are expected to attend. However, if you are not feeling well, please stay home. You will not be penalized. All lecture sessions will be recorded for the benefit of registered students to review the material. Recorded sessions will be made available to registered students only via their password-protected Blackboard account (learn.bu.edu). Students may not share such sessions with anyone not registered in the course and may not repost them in a public platform. Students have the right to opt-out of being part of the class recording. Please contact your instructor or teaching assistant to discuss options for attending the course in such cases.

Discussion Sections: You should be registered one weekly discussion section. All of the discussion sections are held on Fridays starting September 3rd. Attendance is required and discussion sections will *not* be recorded. If you aren't feeling well please contact your instructor prior to the discussion meeting to make alternate arrangements.

Laboratory Sessions: You should additionally be registered for one lab section (labs meet throughout the semester). Labs will begin on September 8. Laboratory sessions will *not* be recorded. See the Lab Syllabus for more detailed information about labs.

Course Credits: 4.0

BU Hub Units: Scientific Inquiry I, Quantitative Reasoning I, Teamwork/Collaboration

Instructors

Dr. Andrew Kurtz (Course Coordinator; Department of Earth and Environment)
Stone Science 141K

email: kurtz@bu.edu phone: (617) 358-2570

office hours: Tues 11:00am-12:30pm, Thurs 1:00-2:30pm or by arrangement via Zoom.

Dr. Robin Stevens (BU Core Curriculum)

CAS Building 119E

email: rjs01@bu.edu phone: (617) 358-2891

office hours: Mon 4-5pm; Tues 12:30-1:30pm, Thurs 11-12, or by appointment. Office hours in-person or via Zoom.

Dr. Matt Cartmill (Department of Anthropology)

232 Bay State Road, Room 101-A

email: cartmill@bu.edu phone: (617) 358-5488

office hours: W 12:30-2 or by arrangement via Zoom.

Dr. Devon Colcord (BU Core Curriculum)

CAS Building 129

email: dcolcord@bu.edu phone: (617) 358-4804

office hours: Tues 5-6pm, Thurs 2-3pm, Fri 3:30-4:30pm or by arrangement via Zoom

Guest Lecturer

Dr. Phillip Muirhead (Department of Astronomy)

Undergraduate Peer Tutors

Core peer tutors (CPTs) are BU undergraduates from a variety of majors who have previously taken the Core Curriculum and are on staff to help students with CC111 this semester. In addition to assisting in labs, CPTs will run study sessions and review sessions. More information about CPTs is located under the heading *Resources/Support/How to Succeed in this Course*.

<u>Name</u>	<u>E-mail</u>	<u>Major</u>
Lindsay Allebest	allebest@bu.edu	History
Lauren Gotard	lgotard@bu.edu	History
Bruce Hallgren	bmhii@bu.edu	English
Marta Hammers	martah@bu.edu	Anthropology
Jacob Hillman	hillman1@bu.edu	Philosophy, Economics and Mathematics
Alexandra Mascarello	alpm@bu.edu	Philosophy
Ashley Soebroto	ashsoeb@bu.edu	Journalism

Course Objectives

Scientific Inquiry: You will learn major concepts in the natural sciences (Astronomy, Geology, Biology, Anthropology) organized around the concept of "Origins". How did the Universe originate? How did the Earth, life, and humans originate? Furthermore, you will gain an understanding of how scientific knowledge originates. Rather than simply telling you *what* we know about the natural world, you will learn *how* we as scientists came to this understanding. In lab you will make your own observations and use these to develop a fuller picture of how science advances.

Quantitative Reasoning: In lab, homework, discussion sessions and study groups run by Core Peer Tutors, you will learn how observations are explored and expressed through equations and statistics to develop a science-based understanding of the natural world. You will work extensively with computers, and learn to manipulate data using graphs, data tables, and equations to make predictions. Finally, you will communicate findings learned in quantitative terms in and demonstrate awareness of the distinction between proper and improper use of data.

Teamwork/Collaboration: Lab and discussion sections will take a team-based approach. In lab you will work in small groups to gather data (make observations), enter data into computer programs, and interpret results. In your discussion section you will also work in a team to complete a research project focusing on a topic from the course. Each team will work in stages on various component elements necessary for the accomplishment of the project. Teams will present their project to their discussion section. Throughout the semester we will consider the characteristics of a well-functioning team. Additional information about discussion-group projects will be presented early in the semester.

Instructional Format, Course Pedagogy, and Approach to Learning:

Lectures: Students are encouraged to ask questions and participate in class discussions during the lecture portion of the course. **The use of laptops is not allowed in CC111 unless you have special permission from the instructor or learning accommodations.** In addition to being a distraction for both you and your fellow students, scientific studies have shown that taking notes electronically can actually lead to *worse* performance on recall tests. We therefore request that you refrain from using laptops in lecture.

Discussion: In addition to lecture, students attend a weekly discussion section. Here, students will discuss readings, ask questions, complete exercises, and address issues that arose in lecture. Discussions are also an opportunity for faculty to provide guidance on the team projects, and students will present their projects during a discussion section.

Labs: Throughout the semester, students will meet for laboratory exercises. The lab schedule, lab assignments, and additional information can be found on the Lab Syllabus, which is located on Blackboard under in the “Lab” folder. Labs will meet eight times throughout the semester.

Books and Other Course Materials

You are not required to buy a textbook for the course; an online textbook will be provided. The online textbook is for your own personal use. Do not copy, distribute, or post the textbook online or elsewhere. Readings will be assigned throughout the semester and will be posted to our Blackboard course website (learn.bu.edu).

Courseware: Students should routinely visit the course website on Blackboard (<https://learn.bu.edu>). Course materials and readings will be posted there, as will any course announcements.

Assignments and Grading Criteria

- a. **Tests (3). 25%.** Tests will cover all lecture material, discussion sections, homework, and labs. Tests will take place during lecture periods throughout the semester.

- b. **Final exam. 10%.** The final exam will be somewhat longer than a regular test, and will emphasize lecture material from the last section of the course, but will include all of the material covered in the lectures, discussion sections, homework, and labs throughout the semester.
- c. **Lab. 25%.** Your lab grade will be based on your pre-lab questions, lab reports and data analysis for eight labs that will be held throughout the semester. Lab partners will receive the same grade on their lab reports, but each person will receive an individual grade on pre-lab questions. Your combined lab scores will be worth 25% of your total course grade. More information about labs is found in the Lab Syllabus.
- d. **Research Project. 10%.** Students will work in teams on research projects based in their discussion groups. Projects will involve a written component and a group presentation. A detailed description of these projects will be distributed at the start of the semester.
- e. **Discussion participation and attendance. 10%.** You are expected to actively participate in weekly discussion meetings. If you are not able to attend for any reason you must notify your instructor prior to the meeting. Students with multiple unexcused absences will receive a grade penalty.
- f. **Homework. 20%.** Homework will be assigned throughout the semester (~8 assignments in total) to reinforce key concepts. Most homework assignments will be completed on Blackboard and must be turned in prior to the posted due date.

Resources/Support/How to Succeed in This Course:

The course instructors are available during office hours listed above and by appointment at other times. Additionally, the Core Peer Tutors will provide the following resources to students enrolled in CC111:

Study group sessions. Core peer tutors will lead weekly study groups (exact times will be announced at a later date). These sessions will be opportunities to review lecture material, get help with assignments, or ask general questions about CC111 or other Core courses.

Weekly e-mails. The peer tutors will send a weekly e-mail with a brief summary of that week's lecture topics and other important course information. In the past students have found these e-mails to be an excellent study guide for exams, so be sure to save them!

Help with Core. Most of the peer tutors have taken all first-year Core Curriculum courses, so they are happy to help with any questions you may have about the program.

The Core Writing Fellows are an additional resource that will be available throughout the semester. Fellows are graduate students who have been trained in compositional skills and are familiar with the works read in the Core. To make an appointment, consult the online reservation instructions at www.bu.edu/core/writing or email an at-large Writing Fellow.

Learning and testing accommodation: Boston University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. If you are a student who needs

academic accommodations because of a documented disability, you should contact your discussion seminar leader and present your letter of accommodation as soon as possible. If you have questions about documenting a disability or requesting academic accommodations, contact the Office of Disability Services: 19 Deerfield Street, 2nd floor; 617-353-3658; <http://www.bu.edu/disability>

The Office of Disability Services is responsible for assisting students with disabilities. If you have a disability, you are strongly encouraged to register with this office. Lecture hall and seminar rooms are accessible and ADA compliant. Letters of accommodation should be presented as soon as possible to ensure that student needs are addressed from the start of the course.

Community of Learning: Class and University Policies:

Attendance and Absences: You are expected to attend the lab and discussion sections in which you are registered, and attendance will be taken. If you know in advance that you will not be able to attend a lab or discussion, please let your instructor know. We may be able to arrange for you to attend a different lab or discussion meeting that week, or make other accommodations for you. You are expected to attend each lecture as well. If you must miss a lecture because you are feeling unwell or are asked to self-isolate, you are encouraged to view the lecture recording on Blackboard.

Assignment Completion and Late Work:

Homework: Homework assignments that are turned in late without prior approval from an instructor will be penalized by 10% per day.

Labs: Please see details in the **Lab Syllabus** for more information about the late policy for lab reports. Late pre-lab assignments will be penalized unless a prior arrangement with your instructor has been made.

Academic Conduct:

You are responsible for reading and knowing the CAS Academic Conduct Code:

<https://www.bu.edu/academics/policies/academic-conduct-code/>

Using another's ideas or words without proper attribution is unacceptable and will result in an immediate zero on the assignment. Serious cases of plagiarism will be referred to the Dean's office. If you are uncertain about what constitutes plagiarism or improper collaboration, come talk to us. Collaboration with lab partners and group members is expected, but homework assignments and other individual assessments should represent your own work.

Diversity and Inclusion:

The CC111 team is committed to upholding the principles expressed in BU's Statement on Diversity:

Boston University's founders opened its doors to all students without regard to religion, race, or gender. Building and sustaining a vibrant community of scholars, students, and staff remains essential to our mission of contributing to, and preparing students to thrive in, an increasingly interconnected world.

We strive to create environments for learning, working, and living that are enriched by racial, ethnic, and cultural diversity. We seek to cultivate an atmosphere of respect for individual differences in life experience, sexual orientation, and religious belief, and we aspire to be free of intellectual parochialism, barriers to access, and ethnocentrism.

Success in a competitive, global milieu depends upon our ongoing commitment to welcome and engage the wisdom, creativity, and aspirations of all peoples. The excellence we seek emerges from the contributions and talents of every member of the Boston University community.

Detail of Class Meetings

Below is a tentative schedule of lecture topics. This schedule is subject to change throughout the semester (updates will be posted on Blackboard). Associated readings from the online textbook, homework due dates, and weekly discussion topics will be announced in lecture and on Blackboard.

LECTURE SCHEDULE		
Date	Lecture	Instructor(s)
2-Sep	Introduction to course	All Staff
7-Sep	Our place in the universe	Muirhead
9-Sep	Origin and future of the universe	Muirhead
14-Sep	Formation of stars and stellar evolution	Muirhead
16-Sep	Origin of our solar system and planets/Exoplanets	Muirhead
21-Sep	Origin of the moon	Kurtz
23-Sep	Test #1	
28-Sep	Origin of continents, atmosphere, and oceans	Kurtz
30-Sep	Plate tectonics and habitability of Earth	Kurtz
5-Oct	Planetary homeostasis and Gaia	Kurtz
7-Oct	Hot and cold climates of the past	Kurtz/Colcord
12-Oct	Monday Schedule, no class	
14-Oct	Fossil record of life on Early Earth	Kurtz/Colcord
19-Oct	What is life?	Stevens
21-Oct	Test #2	
26-Oct	Building blocks of life	Stevens
28-Oct	Theories for the origin of life	Stevens
2-Nov	Natural selection	Stevens
4-Nov	Evolution and speciation	Stevens
9-Nov	LUCA to the Cambrian Explosion	Stevens

11-Nov	Early life	Cartmill
16-Nov	Test #3	
18-Nov	Making mammals	Cartmill
23-Nov	Primate origins	Cartmill
25-Nov	Thanksgiving Break, no class	
30-Nov	Hominin origins	Cartmill
2-Dec	Human origins	Cartmill
7-Dec	Language, art, and agriculture	Cartmill
9-Dec	Integrating forum - Is there life on other worlds?	All Staff

Final Exam Thursday, December 16, 3-5pm

(Note: this exam time is tentative and will follow the official BU final exam matrix)