Course Website: https://brahms.phys.westminster.edu/aliens

Instructor:
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Office Hours:  MWF 10:30-11:20AM, by appointment, or when you can find me

Textbook:


Course Overview

*Are we alone?* This may be one of the deepest questions facing humanity today, finding a scientific answer to which could have huge implications for our understanding of our place in the Universe.

“Wait, a college course on *space aliens*?” you may be thinking. Well, yes and no. Science fiction has for more than a century speculated about the possibility of life on places other than Earth. In popular culture, a lot of people believe (incorrectly) that we’re interacting with it all the time (UFOs, ancient aliens, and other popular phenomena that are completely unsupported by any scientific evidence). However, the search for life in the Universe, also known as astrobiology, is a growing and exciting field of hard science. In the last several decades, human civilization has come to gain the knowledge and the technology to allow it to do meaningful searches for life outside Earth. Indeed, some believe that within the next several decades, we will either know that there is life elsewhere in our Galaxy, or we will know that life is *extremely* rare, and we are effectively alone. This course will explore our understanding of what life is, and why we might expect there to be life elsewhere in our Solar System, or elsewhere in the Universe. It will explore the current status of real science about the possibility of life on planets other than Earth. This will *not* be a class about UFOs, or about urban-legend style aliens, but it will rather be a science class about an area of active research in astronomy.

Course Goals

These are the things I want students to be able to understand by the end of the course. I want students to be able to describe these things to other people, and to be able to understand the context of popular astronomy articles on related topics.

- Broadly speaking, the history of life on Earth
- The conditions necessary for life to arise
- The prospects for our finding life in the Solar System
- The state of our search for exoplanets, and how that relates to finding life elsewhere in the Universe
- Science and speculation (and the difference between the two!) about intelligent alien life

Assignments and Grading

- Two Midterm Exams 20%
- Final Exam 20%
- Group Presentations 15%
- Final Presentation 20%
- Book Report 5%
- Reading Questions 10%
- Lab 10%

**Midterm Exams:** There will be two in-class midterms during the semester. Each will have several multiple-choice questions, followed by two or three short-answer questions requiring written answers (potentially with references to equations or simple calculations to back them up).

The **Final Exam** at the end of the semester will be comprehensive, covering material from the entire semester. The exam will have a creative writing component to it, but will require you to demonstrate understanding of material from the course.

There will be at least two **Group Presentations**, where you will research a topic in a group of about 3 people, and present the results of your research in class. (Presentations will be on Mars Missions and Extremophiles.)

You will give a **Final Presentation** on a topic of your choice. Later in the semester, there will be a list of suggested topics on the course website.

Your **Book Report** will be about a science fiction novel that deals with humans finding life on other planets.

**Reading Questions** will be assigned every night there is a reading assignment. After you complete a reading assignment, go to the course webpage and click on the “Reading Questions” link in the sidebar. There, you will receive the reading questions associated with this assignment. Reading questions will always be due by noon on the day the reading assignment is due; late reading questions will not be accepted. Reading questions are graded based on whether or not you made an honest effort, not on how correct your answer is. The purpose of the reading questions is twofold. First, it’s a way of giving you grade credit for doing the reading; your instructor has been teaching long enough to know that such incentives are helpful in encouraging students to do the things they should do to be ready for class anyway. Second, they will help the instructor figure out how well you understood the reading, so that he might adjust what we’ll do in class to compensate. (This is why the reading assignments are due a couple of hours before class starts.)

Your **Lab** grade will be based on a combination of participation and the results of short quizzes and work that you turn in.

**Attendance**

You are expected to come to every class meeting. That being said, we’re all adults here. If you are unwell, or even just excessively tired and know you won’t get anything out of the lecture, make the decision that is best for you. However, if you do miss any meetings of the course, you are still...
responsible for everything that happened during that course meeting, including any announcements about changes in due dates for assignments. While changes of these sorts of things will generally be announced on the course website, you should speak with a friend after any missed course meeting to make sure that you are up to date with the course. In any event, I will not rehash or summarize what happened in class for you if you miss class.

**Academic Integrity**

(This section was borrowed and modified from a syllabus written by Jamie McMinn.)

You are expected to comply with Westminster College’s policy on Academic Integrity, as described in the College Catalog. If you are suspected of violating this obligation, then you will be required to participate in the procedural process at the instructor level.

Examples of academic integrity violations include but are not limited to: plagiarizing another person’s published work or ideas; cheating or receiving unauthorized help on assignments; damaging, destroying, or stealing material from library resources; using unauthorized materials during a midterm or final exam; falsifying data for laboratory experiments

**Special Accommodations**

(Borrowed from a syllabus written by Jamie McMinn.)

If you have special needs that may affect your academic life during this semester, you should speak to a member of Disability Resources at x7192. Accommodations that are consistent with college policy will be considered. If you need additional assistance with your coursework and study habits, then you should contact the Learning Center at x6700. For issues that may affect your personal life this semester, please contact the counseling Center at x7340.

**Course Schedule**

This schedule is subject to change! This is just a basic outline of what I expect we’ll be doing each week of the course. The detailed schedule of topics, including due dates for reading and presentations, can be found on the course website. (See the top of this syllabus for the address.)

Week 1  What is life?
Week 2  The history of life on Earth
Week 3  Conditions for life; where might life be in the Universe?
Week 4  Extremophiles
Week 5  **Exam 1**; our Solar System
Week 6  Mars
Week 7–8  Planets in and out of our Solar System
Week 9–10  **Exam 2**; SETI
Week 11  Getting speculative: interstellar civilizations
Week 12  Extraterrestrial life in science fiction
Week 13–14  Physical, biological, and cultural implications
Week 15  Final presentations

The Final Exam will be on Wednesday, December 13, 11:30AM-2PM.