

Syllabus:

(Also see <http://eeyore.astro.uiuc.edu/~lwl/classes/astro230/fall04/>)

Astronomy 230: Extraterrestrial Life

Instructor Info

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Office Hours:	MTF, 10:30 – 11:30 am; or by appointment		

Welcome to Extraterrestrial Life!

You have chosen a great time to take this course. The search for extraterrestrial life is making larger and larger strides. In the last 10 years, we have gone from knowledge of only 9 planets around only our Sun to 100s of planets around many suns. In the near future, NASA will have missions that may find signs of life on Titan or under the oceans of Europa, evidence of life on Mars, or even imaging Earth-like planets around nearby stars. In this course, you will get an understanding of arguably the biggest astronomical question of all time: *Are we alone?* We will address this question with scientific methods, but also perhaps with some philosophy and science fiction thrown in too.

Course Goals

My goals for a graduate of this course are that they will understand our current scientific view of life in the universe, conceptualize the factors involved with the ultimate question, propose what the future may hold for the field, make informed decisions about science policies, and hold any “discovery” of extraterrestrial life to a personal scientific standard of proof.

Nonetheless, this class is designed to be fun. It will endeavor to teach the student about extraterrestrial life, but it will also combine various topics. This course will revolve around an equation (discussed in Chapter 1 of the text) called the "Drake Equation". The Drake Equation looks like an attempt to calculate how many intelligent extraterrestrial civilizations exist with whom we *might* be able to communicate. However, the equation actually helps us understand our ignorance about the subject and illuminates the various topics and issues worth thinking about when we ask the question, *“Is there life out there?”*, with an open mind.

After some introductory material to get us thinking about what we mean by life, we review some basic astronomy, which I'm hoping you will remember from your introductory astronomy classes. After that, we cover topics in: planetary and solar system astronomy; biology and biochemistry; geology, paleontology, and evolution; some more detailed planetary astronomy; history and the future of mankind on Earth; and finally, interstellar communication and travel, including UFO's. In addition, the class presentations will allow us to adventure wherever the interests of the class take us. Take part in the journey, and let's enjoy the ride!

Credit Hours and Exclusions

This course gives 3 hours credit. Students should have taken Astr 100, 121, 122, or 210.

Course Requirements

Requirement	Percentage of Grade		Points
Class Participation (best 10 of 12)	10 x 1% each	10%	100
Presentation Synopsis		2%	20
Homework Assignments	8 x 1% each	8%	80
Oral Presentation		15%	150
Research Paper Draft		10%	100
Research Paper		10%	100
Midterm		20%	200
Final Exam		25%	250
Total		100%	1000

Grading

The following table shows the approximate grading scale in this course.

Grade	Approximate Range
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	< 60%

Final course grades will follow these guidelines. Plusses and minuses will be used.

The ranges are approximate in that I may have to adjust them if, for example, I give an exam that is a little too hard. In any case, I will not increase the minimum cutoffs for each letter grade.

Text

Neal Evans, *Extraterrestrial Life*, 5th edition, 2003. This is a nice book (really three ringed binder sheets) that is priced low.

Class Participation

You are expected to attend lectures. I will cover material here that will not always be in the text, and the lecture material will be included on the exam. In addition, one of the main points of this class is to develop an estimate of the likelihood of extraterrestrial intelligent life in our Galaxy. This estimate is a fundamental aspect of the course making class participation required.

Class time is the most valuable for you if you come prepared, having done the reading and ready to actively engage the material. To encourage your engagement, the lectures will often be punctuated by opportunities for your feedback, in the form of asking questions, "voting" on the possible outcomes of observations or demonstrations, or brainstorming answers to open-ended questions. To reward your participation in these activities, you will occasionally be asked to write down and hand in your response.

These *participation surveys* are not "quizzes" in the usual sense, in that you are not required to get all answers right. Rather, to get full credit you simply must offer a *scientifically reasonable* response. The point of this is that the survey is always an opportunity to gain points as long as you are actively engaged, even if you are still a little confused. Indeed, the most difficult and potentially confusing subjects are precisely those that most require your participation!

Each survey is worth 10 points. Of these, your name is worth 5 points, while you will receive the remaining 5 points for any *scientifically reasonable* (but not necessarily correct!) response. There will be a number of these through out the semester, but only 12 will be handed in for credit and your total participation score will be the 10 best of 12. This means that you can miss 2 surveys without penalty.

Oral Presentation

Most students in this class come with a topic that is of interest to them. The student is expected to build this interest into a research project. Logically, if one student is interested then other students will likely be interested in the topic as well. This forum provides the opportunity to investigate issues that may not be explored or not explored in depth during class. Examples of topics could include: Faces and Pyramids on Mars, Aliens in South Park: Satire or Silly, or Alien Abductions. When developing the research topic, make sure to address the following questions:

1. How relevant is the topic to the search for extraterrestrial life?
2. How interesting is the topic for the general class audience?
3. What is the extent of your knowledge of the topic?
4. What is the quality of the overall research?
5. Does the research have a solid scientific basis?

In the first 2-3 weeks, every student will have to submit a topic on which they will give a 10-minute presentation with an additional 5 minutes allowed for questions from the audience. Students may give these talks in any way that they chose-- powerpoint, overheads, slides, etc. The grade for the presentations will be determined from audience questionnaires that will assign 1-10 points on the above 5 aspects of the presentation.

Each student must turn in a Presentation Synopsis that has 1-2 paragraphs describing the main idea behind the presentation, in particular addressing the above 5 points, and a list of 5 or more references for the presentation / research paper. This is necessary to help you avoid some of the more questionable sources.

Research Paper

You will be writing a research paper this semester on the presentation topic. This paper must be 8 to 10 pages double-spaced 12-point font, not including references. A draft of the paper is due 1 week after your presentation. The final paper is due at the beginning of class, Friday December 3, 2004.

Below are two basic forms of referencing sources from the WWW from *Electronic Styles: A Handbook for Citing Electronic Information*, 2nd ed.

(1) Author/editor. (Last update or copyright date). Homepage Title [Homepage of ...], [Online]. Available: URL [Access Date]

(2) Homepage Title[Homepage of ...], [Online]. (Last update or copyright date), Available: URL [Access date].

You should adhere to the following rules when citing web pages: (1) when author or editor is not available, use the second basic form. (2) Treat homepages as edited or compiled works, non-serial in nature. The names of the sites and services should be treated as proper nouns. (3) If citing an editor or editors as the first element, include a note "Ed." or "Eds." in parentheses. (4) Indicate the last update of the homepage if available. Otherwise, give the copyright date. (5) Provide a note indicating the information supplier in the form of "Homepage of information supplier." (6) It is not necessary to repeat the protocol (HTTP) on the WWW after the "available" statement since it is stated in the URL.

An example:

In the main text:

... *The Universe is Freaky big (Looney 2004)*. ...

In the Reference section:

Looney, Leslie (2004, 10 Aug-last update). Astronomy 230 - Extraterrestrial Life [Homepage of Astronomy 230 Fall 2004, Astronomy Department, Univ. of Illinois], [Online]. Available: <http://eyore.astro.uiuc.edu/~lwl/classes/astro230/fall04> [2004, August 21].

If a source is used in any form, reference it. Keep in mind that I have access to google as much as you do. Academic honesty is vital! See the *Academic Integrity and Collaborative Work* section below.

Homework

There will be 8 homework assignments given throughout the course. These will be simple answer or short essay, and are meant to sharpen your thinking on the material covered in lecture, and to help prepare you for the exams.

Homework is due at the beginning of class or at the announced time, after which the answers will be made available. **No late homework will be accepted.**

Exams

Exams will be one midterm exam and a comprehensive final exam for this course. The exams will consist of short answer essay and multiple-choice questions. Dates are as follows.

- Hour Midterm Exam: In class Friday, October 15th
- Final Exam: **1:30-4:30 pm Saturday, December 18th**

Academic Integrity and Collaborative Work

Academic honesty is essential to this course and the University. Any instance of academic dishonesty (including but not limited to cheating, plagiarism, falsification of data, and alteration of grade) will be documented in the student's academic file. In addition, the particular exam, homework, or report will be given a zero.

Guidelines for collaborative work: Discussing course material with your classmates is in general a good idea, but each student is expected to do his or her own work. On homework, you may discuss the questions and issues behind them, but you are responsible for your own answers. In writing observing and planetarium reports, you may discuss with classmates during the activity, but again, you are must give your own answers in your own words. Finally, on exams your work and your answers must of course be your own.

For further info, see http://www2.uiuc.edu/admin_manual/code/rule_33.html.

Accessibility Statement

To insure that disability-related concerns are properly addressed from the beginning, students with disabilities who require reasonable accommodations to participate in this class are asked to see the instructor as soon as possible.

Course Schedule

Note that the lecture material may vary, especially as the presentations are yet to be decided. Remember to check the webpage for the most up to date schedule.

<http://eeyore.astro.uiuc.edu/~lwl/classes/astro230/fall04/schedule.htm>