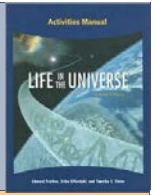


# ASTR 120: Life in the Universe

## Fall 2019



Rica Sirbaugh French, Professor of Astronomy  
[rfrench@miracosta.edu](mailto:rfrench@miracosta.edu)

Help Session: M 10-11am @ OCN STEM Center  
Help Session: W 10-11am ONLINE

<https://miracosta.instructure.com>

Canvas is your first source for information!

### Intelligence, ability, and talent can be developed!

#### Required Materials

[Activities Manual for Life in the Universe, 2e](#)

Prather et al. © 2007  
Pearson Addison-Wesley, ISBN:  
0805317120

**EVERY CLASS!**



Colored ABCD card  
**EVERY CLASS!**

access to [Life in the Universe, 4e](#), Bennett & Shostak © 2017  
Pearson, ISBN:  
0134089081 (but any format will do)

reliable internet access  
email, checked regularly  
appropriate commitment  
an open mind...



Hmmmm...

- What *is* meant by "life"?
- What is "evolution" and how do we know it happens?
- When and how did life begin on Earth?
- Are there other worlds suitable for life? How do we search for them?
- Should we expect "intelligence" to be common?
- Should we create artificial life?
- Is interstellar travel even possible?
- Are we equipped to make contact if/when the time comes? Who will speak for us?

### Could "they" be looking for us?

This is an introductory scientific exploration of life in the universe from the Big Bang to implications of contact with an extraterrestrial civilization. There are no prerequisites, but realize that *astronomy is a physical science*. This course emphasizes primarily *qualitative* comprehension but *quantitative* reasoning is required. I hope to convey to you some of the excitement and satisfaction that scientists derive from investigating the world around us while simultaneously inspiring you to do the same.

### You cannot teach a man; you can only help him to find it within himself.

Galileo said this hundreds of years ago. Socrates knew it thousands of years ago. Research shows that humans must construct their own knowledge: *cognitive conflict and rigorous intellectual discourse are required to elevate your understanding*. As facilitator, I will guide you through carefully designed intellectually engaging learning sequences that elicit your preconceptions, confront conflicting ideas, and resolve issues. **Successful students help each other become metacognitive and develop their critical reasoning abilities, quantitative literacy, evidence-based problem-solving skills, and communication skills by practicing regularly. It is not what I do that matters; it is what you do. Ultimately, you are responsible for your own level of preparation, engagement, and mastery.**

### Policies

- **Late/Make-up Work:** None, for any reason. There are safeguards built in; see the grading scale. **Successful students plan accordingly.**
- **Preparation & Attendance:** Mandatory. Lecture alone is insufficient for developing a robust understanding, so our active learning environment is an opportunity to work towards mastery. By engaging earnestly with your peers you will develop a more expert-like understanding. **Successful students regularly have all necessary materials, are prepared, timely, and participate fully in all aspects of the course.**
- **Collaboration:** Necessary. Refer to above course philosophy and previous bullet point.
- **Class Etiquette:** Focus! *Disruptions of the learning environment are not tolerated!* See MiraCosta [BP/AP 5500](#), [AP 5520](#), and the [college catalog](#). **All electronic devices will be silent and out of sight. Violations are not tolerated!**
- **Academic Integrity:** Required. Your work must be unique and original, even after collaborating. *Academic dishonesty is not tolerated!* See MiraCosta [BP/AP 5500](#), [BP/AP 5505](#), [AP 5520](#), and the [college catalog](#).
- **Note-Taking & Recording Devices:** Recording is explicitly prohibited. *Taking notes (not copying!)* is a skill you are expected to develop in a general education course.
- **Response Time:** Emails are returned within 48 hours, *excluding weekends and holidays*.

### Help Sessions & the Nordson STEM Learning Centers

In person and online help sessions are open to all students (see top). The STEM Centers offer free tutoring, workshops, talks, career seminars, counseling, study space, materials and equipment check-out, and more! Contact the [STEM Center](#) at 760.757.2121 x6388. Earn bonus points with each help session and STEM Center login after the first ones.

### Special Accommodations

A student with a verified disability may be entitled to appropriate academic accommodations. Contact [Disabled Students Program and Services](#) at 760.795.6658.

### Workloads for College Courses

You should expect to spend approximately two to three hours per week outside of class for each unit of credit attempted (full term courses).

| Overall % | Grade |
|-----------|-------|
| ≥ 90      | A     |
| 80 – 89   | B     |
| 70 – 79   | C     |
| 60 – 69   | D     |
| ≤ 59      | F     |

### Learning Objectives:

- Describe evidence that supports the hypothesis that biology is common in the Universe. Assess whether there may be life elsewhere in the Milky Way Galaxy.
- Identify the habitable zone around various stars. Evaluate which are likely to harbor planets with life as we know it.
- Why is water the most likely candidate for the liquid medium necessary for life processes?
- Debate and reach consensus about what content to include, methods to use, and who should speak for the human race when making contact with an extraterrestrial civilization. Examine the implications of contact.

### Overarching Goals:

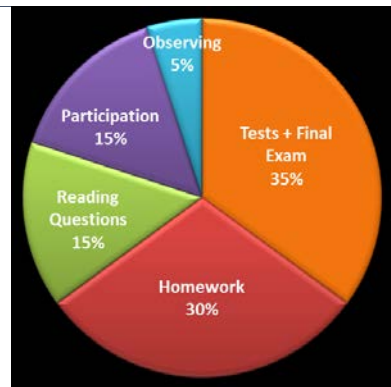
- Witness, appreciate, and employ the nature and process that is science through the eyes of astronomy.
- Appreciate the practicality and relevance of astronomy to your everyday life.
- Comprehend the main ideas and develop the “big picture”.
- Develop critical reading, thinking, and problem-solving skills useful in a variety of situations.
- Foster a lifelong interest in astronomy and relevant current events.
- Look up occasionally!

### Stargazing Opportunities

[MiraCosta Astronomy](#) holds free public star parties during regular semesters. See [Twitter](#), the [website](#), or call 760.757.2121 x6201.

### I do not give grades; you earn your grade.

Everyone starts with a zero. Your grade is based on your absolute score; there is no curve. It is in your best interest to help each other learn astronomy. Incompletes can only result from “incomplete academic work for unforeseeable, emergency, and justifiable reasons.” See the [college catalog](#) for more information.



- Observing (5%)** – The observing assignments are due by the last regular class meeting before final exams. Full instructions are on [Canvas](#). *Do NOT procrastinate!*
- Reading Questions (15%)** – Multiple-choice reading questions (RQs) are required prior to most class meetings (see the course calendar). They are electronic only (on [Canvas](#)) and due 30 minutes before class time on each due date. Each set is untimed and allows two attempts but you must finish each time you start. The higher of the two attempts per set contributes to your grade. Reading assignments are for the text [LIU 4e](#) and are on [Canvas](#). ***The Syllabus Quiz is a graded online attendance requirement in Canvas: you will be dropped if you do not have a nonzero score on it before its deadline!***
- Participation (15%)** – Some activities (both in and outside of class, planned and unplanned) will be graded primarily on your level of preparation and engagement.
- Homework (30%)** – Significant emphasis is placed on assessing how well you explain your evidence-based reasoning, both verbally and in writing. **Successful students master this skill.** You will greatly benefit from working with assistance (help sessions, STEM Center, etc.) to ensure you fully understand the evidence and reasoning that leads to correct answers. This will properly prepare you for exams. Any activity not finished in class is homework, deserving of a significant amount of out-of-class practice time. Most graded homework will be in the form of activities and Ranking Tasks (RTs), all of which are emphasized on tests. **Successful students practice all activities and RTs in sequence with the flow of topics (see the course calendar) and again multiple times during the course.** Prior to each test you will turn in a “portfolio” of your 10 best assignments from that test’s material. They will be graded using the rubrics posted on [Canvas](#) and the final score of each portfolio scaled out of 25 points. **The RTs are PDF “fillin” forms that require using Adobe Reader [free] outside of a web browser.** *Opening the files inside of a web browser and/or using other PDF handlers rarely works properly!* A few assignments are not included in the portfolios and have separate due dates in the course calendar, e.g. discussion boards, citizen science assignments, etc.
- Scaled Participation and Homework** – Both the “Participation” and “Homework” portions of your grade will be scaled as indicated at right. This can alleviate an occasional low score and/or a missed assignment but will not make up for substantial deficits. **Note that this does not apply to your overall course grade.**
- Tests + Final Exam (35%)** – There are four regular tests, each over material covered since the previous one, and a cumulative final exam. The fourth test is during the final exam period and the final exam is online only (see course schedule and calendar). All tests may include various question types (e.g. multiple-choice, short answer, etc.). The cumulative final exam is timed, and you may have one *handwritten* 8-1/2” × 11” cheat sheet (final exam only). The lowest of the five scores will be dropped.

| Score (%)   | Scaled |
|-------------|--------|
| ≥ 86.0      | A      |
| 74.0 – 85.9 | B      |
| 62.0 – 73.9 | C      |
| 50.0 – 61.9 | D      |
| ≤ 49.9      | F      |

### Important Dates

Your responsibility!

|           |   |
|-----------|---|
| 19 Aug    | First day of classes (full term)                        |
| 25 Aug    | Last day to add this course                             |
| 01 Sept   | Last day to drop w/no record and be eligible for refund |
| 20 Sept   | Last day to file for P/NP                               |
| 15 Nov    | Last day to drop with a W                               |
| 10-13 Dec | Final Exams   |
| 14 Dec    | End of term   |