

**Instructor:**

- Professor Dr. Harold A. Geller
  - Office: Research Hall Room 216
  - Telephone: 703-993-1276
  - E-mail: hgeller@gmu.edu
  - Office Hours: 4:30-5:30PM Tuesday/Thursday and by appointment (on campus 5 days/week)
  
- **Lecture Meetings:** Tuesday/Thursday 3:00-4:15PM (R A248)
- **Textbook:** Life in the Universe (4th edition) by Jeffrey Bennett and Seth Shostak

**Grading Policy**

	Homework assignments	20 %	
Participation			15 %
	Mid-Term Examination		

**Honor Code Adherence**

Students are expected to follow the George Mason University rules of student honor. As noted in the catalog:

"George Mason University shares in the tradition of an honor system that has existed in Virginia since 1842. The Honor Code is an integral part of university life. On the application for admission, students sign a statement agreeing to conform to and uphold the Honor Code. Therefore, students are responsible for understanding the provisions of the code. In the spirit of the code, a student's word is a declaration of good faith acceptable as truth in all academic matters. Therefore, cheating and attempted cheating, plagiarism, lying, and stealing of academic work and related materials constitute Honor Code violations. To maintain an academic community according to these standards, students and faculty must report all alleged violations of the Honor Code to the Honor Committee. Any student who has knowledge of, but does not report, an Honor Code violation may be accused of lying under the Honor Code."

[Source: <http://www.gmu.edu/catalog/apolicies/index.html> ]

**Course Format - Socratic Discussion**

Discussions will consist of various forms of presentation material including videos, computer displays, demonstrations and transparencies. Questions are acceptable at any time during the lecture. Students should be alert during the lecture and prepared to answer queries posed as they arise.

**Entry level Competencies**

The course is a conceptual-based course using a minimal amount of algebra and geometry. Students should have English composition skills.

**Course Objectives**

1. Describe the origins of life in the universe and on Earth.
2. Explain the scientific method and the philosophy of science, as related to the study of astrobiology.
3. Describe the physical laws that govern the interaction of matter, energy, time, and space in the cosmos.
4. State how astrobiologists utilize electromagnetic radiation to gain the knowledge of the mechanics of the birth, life, and death of stars from the distant past.
5. Appreciate the magnitude of the scientific problem of the search for extraterrestrial life in the universe.

6. Exploration of biochemical properties of living systems that are essential to all life.
7. The physical, chemical and biological constraints underlying the exploration of the universe and the habitation of other planets.

### **Major Topics to be Included**

1. The origins of the universe.
2. The origins of solar and planetary systems.
3. The physics of light, gravity, matter, energy, magnetism, radioactivity, nuclear energy, and relativity.
4. The geology of volcanism, plate tectonics, and erosion as applied to all planets.
5. The birth and death of stars and galaxies.
6. The H-R diagram for stars including the location of the main sequence, red giants and white dwarfs.
7. The "Big Bang" theory of universal creation, pulsars, neutron stars, and black holes.
8. Stellar and galactic evolution.
9. Cosmology and life in the universe.
10. The biochemical principles of all living systems.
11. The evolution of life on Earth and its biochemical principles.
12. The physical, chemical and biological aspects of space exploration and the habitation of extraterrestrial planets.
13. Laboratory work dealing with measuring instruments of the astrobiologist, and drawing conclusions from astrobiological data.

### **Additional Topics Regarding Classwork**

As deemed appropriate, the course may be supplemented with homework, guest speakers and discussions of new discoveries.