



Intro to Astrobiology

PHYS 106
[2017 Spring]

Alt. Title *Are we alone? The possibility of life elsewhere in the universe!?!*

Credits 3 credits towards the Science (S) GEP requirements for UMBC graduation

Prerequisite **None** but Mathematical ability at the level of high-school algebra, geometry and trigonometry

Corequisite None

Meetings 2017 **Jan 30-May 16; Mon, Wed, Fri: 11:00-11:50; Math/Psych Building, Room 106**
(unless otherwise notified)

Texts/Resources **No Commercial Texts are required!**

A list of free online resources will be provided. A review of regular textbooks (for those that wish to purchase a regular text as a back-up resource) will also be provided.

Materials Scientific Calculator (non programmable). *No devices (like smart phones, tablets etc) with internet-connectivity will be allowed in exams*

Instructors etc Prime Instructor: **Dr. Ian M George**

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| Office | Physics Building, Room 410 |
| Office Hours | M, W, F, Time To be announced |
| Phone | +1-410-455-1618 |
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T.A./Grader(s): **To be announced (if any)**

| | |
|--------------|------------------------|
| Office | <i>To be announced</i> |
| Office Hours | <i>To be announced</i> |
| Phone | <i>To be announced</i> |
| e-mail | <i>To be announced</i> |

Course Overview The prospect of extraterrestrial life is considered in the context of our current paradigm for the formation and history of stars, galaxies *etc* in the Universe that ultimately led to life on Earth. Given 'life' happened here, could it have happened elsewhere? The course content mainly covers the fields of astronomy, planetology, and biology. However the multidisciplinary nature of this topic also requires some basic information in chemistry, geology, and physics. While a broad overview is stressed, some topics will be treated in depth. No formal experience in physics, biology or astronomy is required. However some familiarity with basic concepts in these fields will be helpful.

Course Objectives The main objectives of the course are for students to become familiar with the latest ideas in astrobiology. Specifically we will explore our current definitions of 'life', the prospects of life having evolved elsewhere in the known universe, and the prospects of humans discovering strong evidence for current (or past life) beyond Earth in the next few decades. The course will focus on the basic physical conditions for 'primitive' life to come into existence rather than the possibility of 'little green men' or the 'Borg' *etc* having already visited Earth. Should time allow, we will however take a quick look at the issues associated with reports, debates, & myths regarding Roswell, "Area-51" *etc*.



PHYS 106 addressed the following General Learning Goals and Course Learning Goals

- Course-specific learning objectives* By the end of the course, successful students will be able to:
1. Describe the wide variety of carbon-based life on Earth
 2. Have an overview of the formation, planetary science, and biological processes that made Earth habitable.
 3. Understand the search for evidence of past (or current) life elsewhere in our Solar System, particularly on Mars.
 4. Understand current ideas as to whether life may be present elsewhere in the universe.
 5. Discuss some of the claims & likelihood that intelligent life may have already visited Earth.

- Itemized Objectives*
- i) Understand and use mathematical and scientific methods of inquiry, reasoning, processes, and strategies to investigate and solve problems.
 - ii) Organize, interpret, draw inferences, and make predictions about natural or behavioral phenomena using mathematical and scientific models and theories.
 - iii) Recognize the ethical and social implications of scientific inquiry and technological change and distinguish science from non-science and pseudoscience.
 - iv) Recognize that mathematical, statistical, and scientific evidence requires evaluation.

Combining the general functional competencies with the topic-specific goals, students who successfully complete the course should be able to understand new articles in general astronomy and astrobiology relating to recent findings in astronomy as well as non-professional science periodicals.

Evaluation Student learning will be evaluated by their answers to questions set in exams, for homework, and/or in-class quizzes and projects.

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| <i>Grading Summary</i> | Final Exam | 30% |
| | Mid-Term#1 | 10% |
| | Mid-Term#2 | 20% |
| | Homework | 35% |
| | Attendance of "Telescope Night" | 5% |

A ***provisional*** schedule of topics to be covered will be supplied during the 1st few classes. However please note that this *may be revised* as the course progresses. **A detailed week-by-week schedule of topics covered, homework due-dates etc will be continuously updated during the semester via UMBC Blackboard, in-class announcements, and/or e-mails.**