Astronomy 1141 – *Life in the Universe*
Spring Semester 2016

Lectures: MWF, 9:10-10:05am, 1008 Evans Lab (EL1008)

Professor: Dr. Richard Pogge
Office: 4059 McPherson Lab (292-0274)
Office Hours: Tues & Thursday 1:30-3:30pm or by appointment
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Required Textbook: None, but copies of *Life in the Universe (3rd Edition)*, by Bennett & Shostak are held on reserve in the 18th Avenue Library for those who would like a secondary source of information for the course material.

Course Web Page: All online materials and updates will be posted to this course's Carmen page.

Course Objectives

Astronomy 1141 is a General Education (GE) Physical Science course in the Natural Science category. The goals of courses in this category are for students to understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

The expected learning outcomes for GE courses in the Natural Science category are as follows:

1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
3. Students describe the interdependence of scientific and technological developments.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Astronomy 1141 will meet these expected outcomes by:

1. Investigating the basic facts, principles, theories, and methods of modern science as practiced in astrobiology.
2. Learning about the basic observations of the natural world that underlie our inquiry into the nature of life in the universe.
3. Learning important events in the history of astronomy, biology, geology, and chemistry, and how they have caused our views of life in the universe to change with time.
4. Explaining the role of modern technology in our investigation of the Galaxy and the search for life beyond the Earth.

Course Organization

Astronomy 1141 meets three days per week for 3 hours of lecture. Lectures are Monday, Wednesday, and Friday at 9:10-10:05am in Room 1008 Evans Laboratory. **Attendance is required**. The lectures are your primary source of course content, and exams are based on the lectures. Attendance will be estimated daily using Top Hat. Similarly, participation in classroom activities (group problems and discussions) will factor into the final course grade. I will use attendance and participation to increase

your grade by one step (e.g., from B+ to A-) if your course grade is within 2% of the higher grade before applying the attendance and participation bump.

In-Class Exams

There will be two in-class exams, scheduled for the following days:

In-Class Exam 1: Monday, February 15
In-Class Exam 2: Friday, March 25

Please mark your calendars with these dates. The exams will be held at the normal class time and you will have the entire time in which to complete them. Exams cover the material in the lectures and labs sessions since the previous exam. All in-class exams will be 50-question **closed-book, closed-notes, multiple-choice** tests. Collectively, the two in-class exams will account for **30%** of the final grade.

Makeup exams are only offered by advance arrangement with the professor, except for legitimate, documented emergencies. If you are away on official University-sponsored activities (ROTC, sports, band, etc.), please get a letter from your coach, director, etc. **in advance** of the exam. Exams must be made up before the Wednesday following the missed exam date.

Final Exam

The Final Exam is on **Friday, April 29 from 10:00-11:45am in EL1008**. Attendance is mandatory. The final will be worth **40%** of your grade. **No makeup final will be offered.** Students who miss the final exam will be given an incomplete (I) with an alternative grade equal to getting a zero on the final, and have to make it up the following Semester to avoid the alternative grade. In keeping with University policy, early finals will **not** be available for persons wishing to depart early for the summer.

Extra Credit Project

A multi-part collaborative project during the month of April (the last month of the semester) will be worth *up to* 5% of extra credit to be added to the final course grade (the amount of credit will be determined by the number of parts completed and the overall performance). Details will be announced in class on Friday, April 1.

Grading Policy

Your course grade will be based on the following:

- 30% on each in-class exam (60% total)
- 40% on the final exam (30% multiple choice + 10% essay)

The two in-class exams will be 50-question, multiple-choice exams graded on a standard C+/B- curve. Each exam will be curved independently, and grade breakdowns will be posted when exams are returned. Exam 1 covers material from the first day of class until Exam 1, while Exam 2 covers only the material between Exam 1 and Exam 2.

The final exam is divided into two parts. The first part is a 50-question multiple-choice exam covering course material since Exam 2 plus another 20 questions derived from the material covered on the two in-class exams. Combined the multiple-choice part will be worth 30% of the course grade. The second part is an essay question that will be worth 10% of the course grade.

Student Response System (Top Hat)

Every non-testing day in class we will use OSU's web-based student response system Top Hat (resourcecenter.odee.osu.edu/top-hat). Top Hat works with laptops and mobile devices (with free iOS and Android apps) connected to the OSU wireless network. You login using your usual OSU name.# and password (no new account needed – you don't need to formally subscribe to TopHat, nor should you be paying for use). We will use Top Hat to ask group questions, take attendance, and perform brief concept assessments, surveys, and reviews and practice tests. Your Top Hat scores are recorded and I will use them to track attendance and participation in class to be factored into the attendance and participation components of your final course grade. The TopHat join code for our class is 888875

Students with Disabilities

Students with disabilities that have been certified by Office of Student Life Disability Services (SLDS) will be appropriately accommodated and should inform the instructor as soon as possible of their needs. SLDS is located in 150 Pomerene Hall, 1760 Neil Avenue; Phone: 292-3307, VRS: 429-1334; (slds.osu.edu). We will rely on SLDS to verify the need for accommodation and work with them to develop appropriate strategies. Students with disabilities who have not previously contacted SLDS are encouraged to do so by visiting the SLDS website and requesting an appointment. Please take care of this well in advance of the exams, as processing the paperwork takes time.

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct (COAM) to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (studentconduct.osu.edu).

Classroom Etiquette

To help establish and maintain a courteous, respectful, and distraction-free learning environment in our classroom, I ask that everyone please observe the following rules of classroom etiquette:

Making or taking phone calls and texting is prohibited.
During class, please put your cell phone into silent ring mode, and do not make or take calls or text during class. This is very rude and distracting to others around you.

Use of laptops, tablets, smart phones, or other wireless devices is reserved for in-class activities.
When not being used for in-class activities via Top Hat, please put laptops, tablets, smart phones, etc. into standby mode (closed lid/dark screen) until the next activity. Please do not surf the web, text, tweet, post, work on other classes, etc. Such activity is very distracting to others around you.

Please do not start packing up until class is completely over
I'll be clear when we're done, and I work very hard to stay on time, please wait until I finish.

No conversing during lectures.
Please respect the wishes of your fellow students to listen to the lecture, and do not carry on conversations during class except during group discussions or problem-solving sessions.

Topical Outline

The following topics will be covered in this class, by week.

Unit 1: Imagining Other Worlds

Week 1 (1/11-15): Introduction & Overview, "Imagining Other Worlds", "Our Place in Space"

Week 2 (1/20-22): "Our Place in Time", "Matter & Energy"

Unit 2: Life on Earth

Week 3 (1/25-29): "The Earth We Stand On", "The Air We Breathe", "The History of Earth"

Week 4 (2/1-5): "Climate Change & Regulation", "What is Life?", "Cells & Metabolism"

Week 5 (2/8-12): "The Chemistry of Life", "DNA, RNA, & Heredity", "Extreme Life"

Week 6 (2/15-19): Exam 1 (2/15), "The Origin of Life on Earth", "The First Living Things"

Week 7 (2/22-26): "The History of Life on Earth", "Impacts & Extinction", "The Solar System"

Unit 3: Life in the Solar System

Week 8 (2/29-3/4): "The Terrestrial Planets", "The Jovian Planets", "The Requirements for Life"

Week 9 (3/7-3/11): "The Deserts of Mars", "Life on Mars?", "The Galilean Moons of Jupiter"

Spring Break 3/14-18

Week 10 (3/21-23): "The Children of Saturn", "Goldilocks & The Three Planets", **Exam 2 (3/25)**

Unit 4: Life in the Universe

Week 11 (3/28-4/1): "The Properties of Stars", "Meet the Neighbors", "The Lives of Stars"

Week 12 (4/4-8): "Habitable Zones around Stars", "Exoplanets", "The Pale Blue Dot"

Week 13 (4/11-15): "Intelligent Life in the Universe", "The Drake Equation", "SETI"

Week 14 (4/18-22): "Interstellar Travel & Colonization", "Fermi Paradox", "Extraterrestrials"

Week 15 (4/25): Course Summary: This View of Life

Final Exam: Friday, April 29 (10:00-11:45am)