

OHIO STATE GROUP STUDIES REQUEST

College MAPS

Department ASTRONOMY
(e.g., Portuguese)

A. Course Offerings Bulletin Information. Follow instructions in the *OAA Procedures Manual*.

294 LIFE IN THE UNIVERSE
Course No. Title of Course

Level U P G Credit Hours: 5

Description (not to exceed 25 words): Investigation of life on Earth and the possibility of life elsewhere in the Universe.

Quarter /Yr: SU AU WI SP YR 08 Distribution of Class Time: 2 - 2^{hr} 20^{min} cl.

Prerequisite(s):

Exclusion or limiting clause:

Repeatable to a maximum of credit hours.

General Information Statement Natural Sciences GEC. Does not count towards astronomy major.

B. General Information (respond to all items):

1 This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (list units and attach letters):

N/A

2 Attach letters indicating concurrence or objection from academic units that might have jurisdictional interests.

3. Previous quarter(s) of offering and enrollment: Script version, Sp07 25 students

4. Attach the course syllabus that includes the topical outline of the course, student learning outcomes and/or course objectives, methods of evaluation, off-campus field experience, and other items as stated in the *OAA Procedures Manual*.

5. Provide the rationale for proposing this group studies topic.

ATTACHED

[over]

APPROVAL SIGNATURES (As needed. All signatures on lines in ALL CAPS (e.g. ACADEMIC UNIT) must be completed

[Signature] Approve Disapprove 10/8/07
 Date

» ACADEMIC UNIT CHAIR

[Signature] Approve Disapprove 10/8/07
 Date

x Academic Unit Undergraduate Studies Committee Chair (Undergrad course)

Approve Disapprove

Academic Unit Graduate Studies Committee Chair (Undergrad/Graduate course) Date

Approve Disapprove

» School /College Undergrad Curriculum Committee (Undergrad/Grad course) Date

Approve Disapprove

School /College Graduate Curriculum Committee (Undergrad/Grad course) Date

Approve Disapprove

School Director (If Appropriate) Date

[Signature] Approve Disapprove 10/8/07
 Date

x COLLEGE DEAN

Approve Disapprove

Graduate School (If Appropriate) Date

[Signature] Approve Disapprove 10/8/07
 Date

ASC Curriculum Committee Chair (If Appropriate)

Approve Disapprove

University Honors Center (If Appropriate) Date

Approve Disapprove

Office of International Education (study tour only) Date

Approve Disapprove

ACADEMIC AFFAIRS Date

SCHEDULING INFORMATION

Course No: 294 Limit: 50 Credit Hour 5 Restriction Code Days M+W Time PM 5:30-7:48 AM

Section Type: lecture Requested Bldg/Room: no preference

Instructor: D. Ennis S25 Need Type & Characteristics [1-20, max of 5] 1st Term 2nd Term Non-Standard begin/end dates

Contact person *Kristy Schackelhoff*

Phone number: *2-2022*

Astronomy 294 – Life in the Universe

The GEC requirements for Bachelor of Arts students in the Colleges of the Arts and Sciences include a decrease in the Natural Sciences requirement from 20 cr to 15 cr. We anticipate that this will result in (a) a decrease in demand for our Astronomy 161-162 sequence and (b) an increase in demand for stand-alone 5 cr GEC courses in the Natural Sciences. To deal with these anticipated trends, we are designing 5 cr GEC courses in Astronomy. These courses are intended to be built around topics of current popular interest and will develop both the specific topic and the requisite background material thoroughly, at a level of depth comparable to that of Astronomy 161-162.

This particular course is on “Life in the Universe”. Time is divided approximately equally between three topics: (1) the emergence and nature of life on the Earth, (2) the potential for life on other planets in the solar system, and (3) the search for habitable worlds and life throughout the Galaxy. To place all of this in proper context will require the standard physics taught in a survey course (gravitation, electromagnetic radiation), and astronomical topics such as the formation and evolution of stars, planets, and galaxies and the observed properties of the planets of the Solar System.

SPO8 course
Will use same syllabus as W108

Astronomy 294 – Life in the Universe
Winter Quarter 2008
Syllabus

Professor: Scott Gaudi, Office: 4057 McPherson Lab (614-292-1914), E-Mail: gaudi.1@osu.edu

Recommended Textbook: *Life in the Universe* (2nd Edition), by Jeffrey Bennett and Seth Shostak.

Course Web Page: <http://www.astronomy.ohio-state.edu/~gaudi/AST294/index.html>

Course Description

The general theme of Astronomy 294 is the study of life in the universe, or alternatively, astrobiology. The topics that will be covered in the course exist at the interfaces of astronomy, chemistry, biology, geology, and the earth and planetary sciences. Students will learn about scientists' ongoing quest for answers to some of the most fundamental human questions: How did life originate on Earth? Is there life on other planets? Are we alone in the universe? What is the long-term future of life in the universe?

In particular, we will divide our time approximately equally between three topics: (1) the emergence and nature of life on the Earth, (2) the potential for life on other planets in the solar system, and (3) the search for habitable worlds and life throughout the Galaxy. The course will begin with an introduction to modern science and astronomy, and end with a brief digression on the long-term future of life on our planet, and in the universe in general.

Course Outline (3 days a week, 5 credit hours)

Unit 1: Introduction to Science and Astronomy

Lectures 1-3: Overview and goals, history of modern science, basic physical concepts.

Unit 2: Life on the Earth

Lectures 4-8: Nature of life on the Earth, the geological history of the Earth, the rise of life on the Earth, the Earth's global environment and its impact on biology.

Unit 3: Life in the Solar System

Lectures 9-16: The solar system: formation and overview, requirements for habitability, the deserts of Mars, the search for life on Mars, life on the moons of Jupiter, life elsewhere in the Solar System, the evolution of the habitability of Venus, the "Goldilocks" effect and the comparative habitability of Earth, Mars and Venus.

Unit 4: Life in the Universe

Lectures 17-22: Stars: masses, luminosities, temperatures, habitable zones, lifetimes, and other considerations for habitability, our local solar neighborhood: nearby stars, stellar populations, and the Galaxy, the search for extrasolar planets, the search for life on extrasolar planets, the search for extraterrestrial intelligence and the Drake equation, interstellar travel and colonization, the Fermi Paradox and the rare earth hypothesis.

Unit 5: Death in the Universe

Lecture 23-24: The long-term fate of life on the Earth, the long-term fate of life in the Universe.

Homework Assignments

There will be four (4) homework assignments during the quarter, each consisting of set of short answer or multiple-choice questions. The questions are open-book, open-notes, open-discussion. Homework will be due on the following Fridays:

- Homework 1: Friday, January 18
- Homework 2: Friday, February 1
- Homework 3: Friday, February 8
- Homework 4: Monday, February 22

Collectively the homework will count for 15% of your grade. The questions on the homework will generally be more challenging than those on the quizzes. They are designed to get you thinking about the course topics in an active way. I strongly encourage you to form study groups to discuss the questions, though you must decide on the final answers yourself.

Homework is due in class on the due date and no late homework will be accepted, except for legitimate, documented emergencies.

In-Class Quizzes

There will be three (3) in-class quizzes, scheduled for the following Fridays:

- In-Class Quiz 1: Friday, January 25
- In-Class Quiz 2: Friday, February 15
- In-Class Quiz 3: Friday, February 29

Each of your quiz grades will count for 15% of your grade. The quizzes will cover the material in the lectures and readings since the previous quiz. All of the quizzes are closed-book, closed-notes multiple-choice tests. You only need to bring a #2 pencil for the quiz. Please mark your calendars with the quiz dates. The quizzes will be held at the normal class time and you will have the entire class period to complete the quiz. Makeup quizzes are only offered by advance arrangement with the professor. Exceptions are for legitimate, documented emergencies and require no advance notice. If you will be away on an official University-sponsored activity (e.g., sports teams, band, etc.), you must bring me a letter from your coach, director, etc. in advance of the quiz. Quizzes must be made up by the Wednesday after the missed quiz.

Final Exam

The Final Exam will be on TBD. Attendance at the Final Exam is mandatory. You only need to bring a #2 pencil for the final. The final will be comprehensive, covering all lectures, and has the same multiple-choice format as the in-class quizzes, only it will be twice as long. It is worth 40% of your

grade. No makeup final will be offered. If you miss the final exam, you will be given an incomplete (I) with an alternative grade equal to getting a zero on the final, and have to make it up during Spring Quarter 2007 to avoid the alternative grade.

In keeping with official University policy, early finals will not be available for those persons who wish to depart early for the break. Please plan ahead and make your travel plans accordingly.

Grading Policy

- The 5 homework assignments will collectively account for 15% of your grade.
- Together, in-class quizzes count for 45% of your grade (15% each).
- The final exam will be cumulative, covering all material from the class. It accounts for 40% of your grade, and must be taken by all students.
- All grading, homework and exams, is done on a standard C+ curve. This means the median grade in the class will approximately correspond to a C+.

Lectures and Attendance

Lectures will be TBD. The daily lectures are your primary resource for this course. We will not cover all of the topics in the book and I will supplement the book with additional material that is not covered in the book. Outlines of each lecture will be available via the class website. These outlines are intended to be useful aids for studying and following along in class. I recommend that you print out the outlines, bring them to class, and take notes in the margins. Remember, these are only outlines of what I cover each day in class, not comprehensive transcripts of the lectures. In particular, I will show many images and animations during class that will not be available on the class website.

Related Readings in Life in the Universe

Because introductory astrobology textbooks designed for non-majors are rarely organized exactly the same as our courses, we will not strictly follow the order of topics in the book. You can expect to jump around some as the course progresses. As such, instead of specific reading assignments, each section of the course will have reading suggestions listed on the class website. However, not all topics in this course are covered by the book, and similarly not all topics covered in the book will be discussed in class. You are only responsible for the contents of my lectures.

Students with Disabilities

Any student who feels that he or she may need an accommodation based on the impact of a disability should contact Professor Gaudi to discuss their specific needs. We will rely on the Office of Disability Services at OSU to verify the need for accommodation and to help develop the appropriate strategies. Students with disabilities who have not previously contacted ODS are encouraged to do so by visiting the ODS website (www.ods.ohio-state.edu) and requesting an appointment.

Academic Misconduct

All OSU professors are required to report suspected cases of academic misconduct to the Committee

on Academic Misconduct. See the University's Code of Student Conduct for details. The most common forms of misconduct in classes such as this one is copying from another student's exam. All cases will be investigated following University guidelines.

Classroom Etiquette

To help establish and maintain a courteous, distraction-free learning environment in our classroom, I ask that all students please observe the following basic rules of behavior during lectures and exams:

Use of cell phones and pagers is prohibited.

This includes using cell phones for instant messaging, email, web, pictures, etc. When in class, all cell phones and pagers must be turned off (i.e., not in a standby or "silent ring" mode).

Use of laptops and networked devices is prohibited.

Surfing the web, instant messaging, reading email, or typing notes on a keyboard during class is very distracting to those around you. When in class, all laptop computers and networked devices (e.g., PDAs) must be turned off and put away. The only exceptions are approved devices for enhancing sound or vision for the hearing/vision impaired.

Please do not start packing up until class is completely over.

Nothing is more rude or distracting than the noise of notebooks closing and jackets and backpacks rustling while the professor is trying to finish up. I'll be very clear when we're done, and I work very hard to stay on time, so please wait until I get to the end.

If you come late or have to leave early, please sit near the back of the room.

This will make your late arrival or early departure less disruptive for your fellow students.

No conversing during lectures.

Please respect your fellow students and do not carry on conversations during class. Your cooperation in observing these rules is greatly appreciated.