Astronomy 106: The Cosmic Origins of Life

Prof. Kelly Douglass

Fall 2019

In Astronomy 106, we will learn about the evidence for habitats and the building blocks of life in extraterrestrial space, the possibilities for the development of life elsewhere, and what we can infer from these ideas about the origins of life here on Earth. We will also discuss the future of civilizations like our own, the possibilities of travel to other habitable planets, and the possibilities of communication between advanced cultures spread widely throughout space. Life's origins are, perhaps, the ultimate interdisciplinary subject: the material we will discuss draws from astronomy, physics, geology, chemistry, biology, paleontology, and history — and will be presented with a minimum of mathematical complexity.

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Office B&L 425

Office hours Tuesday 3:30–5PM or by appointment *in advance*

TI Danielle Bovie

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TI Joshua Ratajczak

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Office hours Tuesday 6–7PM

TI Navya Uberoi

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Office hours Wednesday 12:30–1:30PM

Website

The course website can be found at `http://www.pas.rochester.edu/~kdouglass/Classes/Ast106/`; this is the main reference for the course. Here, one can find complete lecture presentations, the electronic homework, exams (both practice and real), as well as other helpful resources.

Textbooks

Required: *An Introduction to Astrobiology*, 3rd edition, edited by Rothery, Gilmour, and Sephton. There is a copy available on reserve at the POA Library for your use. Please note that about one-quarter of the material introduced during lecture is *not* found in the required textbook.

Here is a list of supplemental recommended texts for your reference. These mostly cover the biological, paleontological, and historical aspects of the course. They will sometimes be referenced during the lecture. You should not feel compelled to buy any of these.

Neal Evans	*Extraterrestrial Life*
Jared Diamond	*Guns, Germs, and Steel: The Fates of Human Societies*
	Collapse: How Societies Choose to Fail or Succeed
Nick Lane	*Life Ascending: The Ten Great Inventions of Evolution*
Colin McEvedy	*The Penguin Atlas of African History*
	The New Penguin Atlas of Ancient History
	The Penguin Historical Atlas of the Pacific
Svante Pääbo	*Neanderthal Man: In Search of Lost Genomes*
Chris Stringer	*Lone Survivors: How We Came to be the Only Humans on Earth*

Lectures

Tuesdays and Thursdays from 2–3:15PM in B&L 109, conducted by Prof. Douglass. All the material for each lecture will be available to you on the website. It is strongly encouraged that you take notes on the slides during lecture, so either print these out and bring them with you or have them downloaded on your laptop/tablet with note-taking capabilities.

Recitations

Recitations will begin the second week of classes. Danielle, Joshua, and Navya will conduct the recitation sections. You may attend any or all of the sections, but you must register for one. See the Recitations page on the course website for a schedule of events.

Day	Time	Location	TA
Tuesday	3:25–4:40PM	Meliora 224	Navya
Wednesday	3:25–4:40PM	B&L 269	Danielle
Thursday	4:50–6:05PM	Wilmot 116	Joshua

Attendance & class participation

All members of the class are expected to attend all lectures and one recitation each week. This is, of course, for your own benefit. To emphasize the importance of coming to and being an active member of class, class participation will comprise 8% of your final grade for the course. Your class participation score will be based upon the submission of your answers to in-class questions and upon your attendance in recitation.

Homework assignments

Problem sets will be due roughly every other week at 7pm on either Monday or Wednesday (see schedule). Each problem set will involve use of the WeBWorK system, a program that enables students to answer questions interactively with immediate feedback and immediate, automatic

grading. In general, your problem sets will be different than your classmates'. Once assigned, your personalized problem sets will be accessible online. Each problem set will be 2.5% of your final grade; with eight total throughout the semester, this means that your homework assignments count for 20% of your final grade for the course.

We strongly encourage you to work together with your fellow classmates on the problem sets. The solutions you submit, however, must be your own thought and expressed in your own words, in accordance with the University's academic honesty policies.

Exams

There will be three exams given throughout the course, given in class on Tuesday, October 1, November 7, and December 10. You will have one (1) hour and fifteen (15) minutes to complete each exam. Each exam is cumulative, although they will concentrate on any material that was not yet covered on another exam. Therefore, there is no final exam for this class. You must take all three exams in order to pass the course. Each exam is worth 24% of your final grade for this course.

If you miss an exam due to illness or emergency, a make-up exam can be scheduled. All make-up exams will be oral examinations of one hour and fifteen minutes in length. Prof. Douglass will determine if a situation is an emergency or not; her decision is final, whether or not it aligns with your opinion. Suddenly finding yourself with airline tickets for an exam date, for example, does not count as an emergency. Oral exams will be administered and graded by Prof. Douglass.

The best way to study for an exam is by doing the homework and working through the sample exams on WeBWorK (made available a few days before each exam). The TIs will host review sessions the night before each exam.

Academic honesty

According to the UR Academic Honesty Policy, cheating consists of submission of homework or exam solutions that are not your own work, or submissions of solutions under someone else's name. By University rules, any detected act of cheating that is not the result of a simple misunderstanding will be handed over to the Board on Academic Honesty for investigation.

Grading

As outlined above, your grade for this course will be calculated as follows:

Homework	20%
Exam 1	24%
Exam 2	24%
Exam 3	24%
Class participation	8%

No extra credit assignments will be assigned that are not available to the entire class. Final letter grades will be assigned based on an absolute scale (not "by a curve"). The grading scale will be as follows:

Percentage score	≥ 90	≥ 85	≥ 80	≥ 75	≥ 70	≥ 65	≥ 60	≥ 55	≥ 45	< 45
Final grade	A	A-	B+	B	B-	C+	C	C-	D	F

Extra help

Office hours are listed on the course website; if you cannot make the hours, appointments are available. Please come in and see us. We will also answer questions via email and will often be electronically accessible late into the night when problem set due dates and exams approach. We are happy to answer any questions you have concerning the course by either means. Questions from those who find the material confusing enough that they do not know what to ask are most welcome.

Credit hour policy

This course follows the College credit hour policy for four-credit courses. This course meets two times weekly for three academic hours per week. The course also includes recitations that meet for 1.5 academic hours per week.

