ASTRONOMY 0088_SEC1100: 21304 Syllabus (Spring 2025)

STONEHENGE TO HUBBLE

"The effort to understand the universe is one of the very few things which lifts human life a little above the level of farce and gives it some of the grace of tragedy."
~ Steven Weinberg, (1993)

Lecture Class: W, 6:00-8:30 pm, 104 Thaw Hall
There is no class meeting on March 5, 2025, due to Spring Recess.

Instructor:

Dr. John G. Radzilowicz
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Office Hours: The Instructor will hold office hours on Zoom (or in 812 Alumni Hall as needed) on Wednesdays from 4:30-5:30 pm (before lecture), and by appointment as needed. Please schedule appointments in person, either before or after class, or by email. Both Zoom and in-person options are acceptable.

Textbook: There is **no required text to purchase for this course**. Instead, lectures are based, in part, on Open Educational Resources – available FREE online – and readings will be assigned as appropriate through Canvas.

Course Rationale and Description: This course gives a historical perspective on the development of Astronomy, from the 4500-year-old monolithic monument, Stonehenge, to the recent spectacular discoveries by the Hubble and James Webb space telescopes. The ancient Greeks' many contributions to astronomy will be presented, along with the advancements made by individuals such as Copernicus, Newton, Kepler, Galileo, Einstein, and others. Phenomena that can be readily observed with the unaided eye or a small telescope are also discussed.

This is a self-contained course for students not majoring in the physical sciences. The course is conceptual and descriptive in nature but, since astronomy is a quantitative science, some of the lectures will make use of simple arithmetic and geometry. The course provides an historical perspective of our current understanding of our place in the Universe and on practical astronomy.

We start with a discussion of the nature of science and the process of scientific discovery, and a discussion of the earliest views of the Universe. This takes us from humankind's belief in an Earth-centered Universe to a Sun-centered Universe and up until the time of Newton.

We then focus on practical astronomy topics. This includes phenomena which can be readily observed with the unaided eye or a small telescope (seasons, tides, phases of the Moon, eclipses, the motion of the planets, other solar system objects, constellations, stars, nebulae, and galaxies), the use of small telescopes for astronomical observations, and practical topics related to optics.

The historical perspective then continues with a discussion of our modern view of the Universe, from successive realizations that the Sun is not at its center, that our Milky Way Galaxy is not at its center, and that we live in one Galaxy in an expanding Universe of about 1000 billion galaxies. The modern triumph of the Big Bang Theory for the origin of the Universe over the Steady State Theory is also discussed, along with some current speculative ideas about the nature of the Big Bang.

Finally, we conclude with discussions of unmanned space exploration of the solar system and the possibility of life elsewhere in the Universe

This course fulfills the Physical Science course requirement for School of Arts and Sciences students. It forms an appropriate sequence with Astronomy 0089 (Stars, Galaxies, and the Cosmos), Astronomy 0087 (Basics of Space Flight), Physics 0081 (Space and Time, Light and Matter) or Physics 0089 (Physics and Science Fiction).

Major Content Areas/Modules:

I. The Nature and Process of Science
II. Ancient Astronomy
III. The Greek Era
IV. Modern Astronomy
V. Our Place in the Cosmos
VI. Space Science – The Exploration of Space
VII. Current Cosmology
VIII. The Future: Deep Space, Life in the Universe, and Interstellar Exploration.

Course Learning Objectives:

By the end of this course, students will be able to…

1. Identify and describe the key components, major steps, and unique processes of scientific inquiry.
2. Describe the major historical figures and their contributions to the development of astronomy.
3. Identify objects in the universe, understanding them in terms of their sizes, ages, distances, composition, and evolution.
4. Evaluate the ways in which the evolution of the universe has influenced the development of life on Earth.
5. Describe exploration of space by robotic spacecraft and discuss the possibility of life beyond Earth.

Course Notes and Other Materials: The course Syllabus**,** PowerPoint lecture files, external links, assigned readings, and any other relevant course materials will be found posted on Canvas. Students should also consult Canvas regularly for announcements or updates. **Please be sure you have notifications turned ON.**

Attendance Policy: Lecture attendance is NOT required. However, students are responsible for all material discussed in the lectures. If you miss a class, ask a fellow student for the notes! **Please keep in mind that this course meets ONLY 14x for the entire semester!**

There will also be a **mandatory** (and fun!) trip to Pitt's **Allegheny Observatory. Details to follow.**

Course Grading Policy:

In this course, I apply the principles of a system known as "Ungrading." In this system, the focus is on **effort, engagement, learning,** and **understanding,** NOT on grades.

In order to achieve this focus, traditional summative grades are NOT assigned for any work in this class. Instead of grading, we will engage in assessment. Assessment is about reflecting on what you have done, how you have engaged with the materials, other students, and the instructor, and an honest appraisal of what you have learned and what you still need to learn.

The process of course assessment will occur through self-reflection, class discussions, participation in assessment activities, and instructor feedback.

In the end, **YOU** will propose your Final Grade through this process, as detailed below. **The instructor** will remain the **final arbiter** of what grades are assigned to each student. However, any divergence from the student recommended grade will be rare and fully explained. **Failure to submit a proposed grade will leave the student's final grade to be decided completely at the instructor's discretion.**

Course Assessment Activities:

The following assessment strategies will be used in this course.

1. **Quizzes:**

   There will be very brief quizzes given during each class (with some exceptions) or assigned as homework after each class (with some exceptions), starting on Wednesday, January 15th. All quiz answers will be discussed in detail in class. **Taking the quiz and participating in the quiz discussion are a combined activity. The number of correct answers/total questions will be indicated. This is NOT a grade – it is formative assessment ONLY.**

2. **Threaded online discussion participation:**

   Each student is expected to post a minimum of two substantial comments for each week's / module's discussions. A substantial comment adds to the discussion by providing new insights, offering opinions supported by evidence, and demonstrating the poster's familiarity with the assigned readings and the comments posted by me and other students. Posters may respond to threads or start a new thread relevant to the module. **Your primary audience is EACH OTHER.** I will read all posts, but respond only as needed to provide

feedback, highlight information, make corrections, or raise points. There will be significant opportunities to post, so there may be more than two prompts in each week. Therefore, you may choose the topics you wish to respond to from the prompts posted each week. **Posts will be marked as completed or not.**

3. **Mandatory Fieldtrip to Allegheny Observatory:**

   Every student is required to make a trip to Allegheny Observatory (AO) during the course of the semester. The trip is arranged by the PhyAst Department. It includes transportation to and from AO by bus, a tour of the facilities and, weather permitting, a chance to do some observing.

   PhyAst maintains a trip schedule and details will be provided on how to sign-up, attend, and receive credit. This will be discussed in class.

4. **Final Self-Assessment**

   Each student will submit a Final Course Assessment at the end of the semester. This will be due by end of day on **Wednesday, April 30, 2024**. **In this self-assessment, you will propose a Final Course Letter Grade for yourself.** You will then justify your proposed grade based on a discussion of the three factors below. The questions are meant to guide your thought process and reflection.

   A. **Assessment Activities:** How many Quizzes did you complete? How well did you do on them? Did you review material in preparation for taking/discussing the quizzes? Did you participate in the quiz discussions? Did you post the expected two (2) discussion posts per week? Did you post more than that? Were your posts thoughtful and complete and according to guidelines?
   B. **Course Engagement:** Did you regularly attend class, ask questions, review slides, watch videos, complete readings, participate in class and online discussions, and otherwise engage with the course material and your classmates, as well as the instructor?
   C. **Amount Learned:** How much did you learn? Did you reflect on the ideas discussed? Did you understand the content? Were you gaining knowledge, perspective, and understanding? Do you feel you can now talk intelligently about Space Flight and its implications for humanity?
   D. **Allegheny Observatory Trip:** Did you attend the required AO fieldtrip and submit proof of attendance? What did you learn from the experience?

Your self-assessment submission should be at least two full pages, APA format (12 pt., doubled-spaced, Times New Roman). **It should be clear, honest, and address all relevant issues. The grade should be submitted as a LETTER GRADE according to the scale below.** It is unlikely, but not impossible, that I will not accept your suggested grade. However, if you do not submit a grade, I will have no choice but to assign it based on my own interpretation of the guidelines above.

The final course grade will be determined in accordance with the School of Arts & Sciences Policies, and the PHYAST departmental guidelines. Letter Grades will be assigned as follows:

A+	4.00	**Superior**
A	4.00	
A-	3.75	
B+	3.25	**Meritorious**
B	3.00	
B-	2.75	
C+	2.25	**Adequate**
C	2.00	
C-	1.75	
D+	1.25	**Minimal**
D	1.00	
D-	0.75	
F	0.0	**Failure**

Other Important Course Policies and Guidelines

Diversity and Inclusion:

I consider this classroom – i.e. both our shared physical and digital spaces - to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sex, sexual orientations, ability – and other visible and nonvisible differences. Students in this class are encouraged to speak up, share their ideas, and participate during class meetings, and in online forums and assignments. All members of this class are also expected to conduct themselves in a professional manner that contributes to a respectful, welcoming, and inclusive environment for every other member of the class. **If you would like to share your pronouns, or you have a preferred name not listed in the roster, please email me, and consider adding them to NameCoach.**

Disability Resources:

If you have a disability that requires special testing accommodations or other classroom modifications, please notify both me and the Disability Resources and Services no later than the second week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call 648-7890 (Voice or TTD) to schedule an appointment. The Office is located in 216 William Pitt Union. **Appropriate Flex Plans will be filed as needed. All students will be given all needed help to successfully learn in this course.**

Academic Integrity Policy:

Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation, for any reason, during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity.

Sexual Misconduct, Required Reporting, and Title IX:

The University is committed to combatting sexual misconduct. As a result, you should know that University faculty and staff members are required to report any instances of sexual misconduct, including harassment and sexual violence, to the University's Title IX office so that the victim may be provided appropriate resources and support options. **What this means is that as your professor, I am required to report any incidents of sexual misconduct that are directly reported to me, or of which I am somehow made aware.**
There are two important exceptions to this requirement about which you should be aware:

1. Designated University employees who, as counselors and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here.

2. An important exception to the reporting requirement exists for academic work. Disclosures about sexual misconduct that are shared as part of an academic project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX office. If you are the victim of sexual misconduct, Pitt encourages you to reach out to these resources:

IX Title IX Office: 412-648-7860

SHARE @ the University Counseling Center: 412-648-7930 (8:30 A.M. TO 5 P.M. M-F) and 412-648-7856 (AFTER BUSINESS HOURS)

If you have safety concerns, please contact the **University of Pittsburgh Police, 412-624-2121.** Other reporting information is available here.

E-mail Communication Policy:

Each student is issued a University e-mail address (username@pitt.edu) upon admittance. This e-mail address may be used by the University for official communication with students. Students are expected to read e-mail sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. The University provides an email forwarding service that allows students to read their e-mail via other service providers (e.g., Hotmail, AOL, Yahoo). Students that choose to forward their e-mail from their pitt.edu address to another address do so at their own risk. If e-mail is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University e-mail address. To forward e-mail sent to your University account, go to http://accounts.pitt.edu , log into your account, click on Edit Forwarding Addresses, and follow the instructions on the page. Be sure to log out of your account when you have finished. (For the full E-mail Communication Policy, go to here.

Classroom Recording Policy:

This course will adhere to the University's Senate Educational Policy Committee recommendation on classroom recording of May 4, 2010:
To ensure the free and open discussion of ideas, students may not record classroom lectures, discussions, recitations, and/or other activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Generally, classes will NOT be recorded. This may change due to University policies on Covid or other accommodations. Students will be notified if a class will be recorded. No student will appear in a recording without their informed consent.

Intellectual Property Policy:

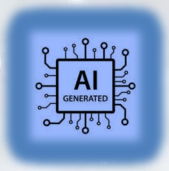
Per the University's policies regarding copyright and intellectual property, the instructor retains the rights to all original course materials – including, but not limited to, lectures, lecture notes, Power Point or other presentations, assignments, quizzes, exams, papers, diagrams, etc. – and none of this material may be used, shared, or reproduced in any way, for other than **a student's own private educational use**.

In addition, legal rights for all third-party materials, whether used by direct permission or under the Fair Use educational rules, is fully retained by the original authors. None of this material may be used, shared, or reproduced in any way, for other than a student's own private educational use, **unless permission is granted by the original authors or sources.**

University of Pittsburgh Land Acknowledgement:

We recognize that the University of Pittsburgh occupies the ancestral land of the Adena culture, Hopewell culture, and Monongahela peoples, who were later joined by refugees of other tribes (including the Delaware, Shawnee, and Haudenosaunee), driven here from their homelands by colonizers. We honor these traditional Native inhabitants of this place and uplift their historic, unique, and enduring relationship with this land, which is their ancestral territory. We pay our respects to their Elders and their past, present, and future people, community, and culture. While we cannot change the past, we commit to continued gratitude for the gifts of nature, along with ongoing respect, care, and stewardship of the land, each other, and future generations. Learn More About Pitt's Land Acknowledgement.

Use of Generative AI Permitted/Encouraged Within Specified Guidelines:



Generative AI is a new and exciting tool for doing scholarly work. The ability to use this tool will be an important skill for the 21st century. Therefore, the use of Generative AI tools, including ChatGPT, is encouraged/permitted in this course for students who wish to use them. You may choose to use AI tools to help brainstorm assignments or projects or to revise existing work you have written, or to compare answers and reasoning. However, there are risks as well as benefits to this new tool. In order to adhere to scholarly values, students must cite any AI-generated material that informed their work (this includes in-text citations and/or use of quotations, and in your reference list). Using an AI tool to generate content without proper attribution qualifies as academic dishonesty.

"Exploration is in our nature. We began as wanderers, and we are wanderers still. We have lingered long enough on the shores of the cosmic ocean. We are ready at last to set sail for the stars."

~ Carl Sagan, Cosmos (1980)

Background Photo: The Horsehead Nebula, ©NASA/Hubble