

ASTRONOMY 0088: FROM STONEHENGE TO HUBBLE

Syllabus – Fall 2021 (102 Thaw Hall, Tuesday, 6:00 – 8:30 pm)

Instructor: Prof. David Turnshek

Email: turnshek@pitt.edu

Office Hours: All of my office hours will be zoom appointments; email me for an appointment time.

Teaching Assistant Grader: Mr. Jared Hand

Email: jsh89@pitt.edu (For HW grading questions you should contact him directly.)

Welcome:

Welcome to our class! These continue to be difficult times due to pandemic restrictions. Consistent with the University's recent announcement, I have decided that **this class will meet via zoom for (at least) the first two weeks of the term.** These zoom classes will be recorded. However, when we transition to in-person classes, they will not be recorded and we will meet in 102 Thaw Hall. Please know that I will help you get through any issues that arise to the best of my ability. Email me and explain your problems to receive help.

Course Description:

I suspect that for most of you, much of what you will learn in this course will amaze you. The Universe is an unimaginably vast and exotic place. We came to understand this over thousands of years. Therefore, one of the main goals of this course is to provide historical perspective, but we will also cover some practical astronomy. **The course is divided into three parts; at the end of each part there will be an exam.** The **first part** covers ancient astronomy, especially the contributions of the Greek astronomers, phases of the Moon, and eclipses. We will also cover astronomy after the Middle Ages, especially the contributions of Copernicus, Tycho, Kepler, Galileo, and Newton. The **second part** covers practical astronomy, including some of the basics of observational astronomy, especially some Earthly phenomena and the motions of objects in the sky, the properties of light, and the use of telescopes; we will also cover objects that can be observed with a small telescope. For the **third part** we continue with a more historical perspective and cover some discoveries and new physics that have led to the development of modern astronomy; we will also cover current thinking in cosmology, manned and unmanned exploration of our Solar System, and searches for other solar systems and the possibility of intelligent life elsewhere in the Universe. In the end you will find that our Universe is understandable through the same physical laws that apply here on Earth. This should be a journey for you. Therefore, be engaged and enjoy the journey!

Use of Math:

This is a self-contained course for students not majoring in the physical sciences. However, at its heart, astronomy is a quantitative science. Thus, while his course is mainly descriptive in nature, some of the lectures will make use of basic math (e.g., simple arithmetic, algebra, and geometry) that you should be familiar with since you are a student who was admitted to the University of Pittsburgh.

Canvas:

Our course is hosted on *Canvas*, the learning management system that all Pitt classes now use (canvas.pitt.edu). *Firefox* and *Chrome* browsers work best. If you are registered for this class, you already have access to our *Canvas* page. I will organize all materials for the class into modules within *Canvas*. A *Canvas* app is also available for your phone or tablet. Use *Canvas* to access all course materials, including announcements and homework assignments. You should submit all homework assignments through *Canvas*.

Course Materials:

Study Guide and Lecture Slides: On *Canvas* you will find the *Study Guide for ASTRONOMY 0088: From Stonehenge to Hubble* (3rd edition, 2013, by David Turnshek, University of Pittsburgh, with minor revisions in August 2021) and the in-class **Lecture Slides**. These are each organized into **three parts** and are the main course materials you should use to prepare for exams and do homework. The **Study Guide** notes and the **Lecture Slides** are meant to be independent but complementary; as such, they don't refer to each other or have a one-to-one correspondence. **Note: I review my lecture slides before I present them in class, and they will occasionally be updated during the course to correspond to material presented during class.** Specifically, there will be three posted pdf files for the **Study Guide** notes (25 different Units, with 8 or 9 Units for each part) and three posted pdf files for the **Lecture Slides**. The three parts correspond to material covered on the three midterm exams. Each of the Unit notes has Overview, Learning Objectives, Key Words, and Written Notes sections. The Written Notes are presented in an itemized summary fashion, not in a textbook style. At the end of each **Study Guide part** there is a Study Outline for the exam.

Reference Textbook: *Discovering the Cosmos* (2nd edition, 2013, by Robert Bless, University Science Books) is a good reference textbook. This book is not "required" but may be useful for students who need help understanding the **Study Guide** and **Lecture Slides**. A copy will be available in the University's Library. If you wish buy it or rent it, see: <https://www.uscibooks.com/bless2.htm> (electronic version available).

Lectures: Tu 6:00 – 8:30 pm (remote for first two weeks; in-person in 102 Thaw Hall thereafter)

Lectures for the first two weeks will be live online via zoom (link on *Canvas*); these initial zoom lectures will be recorded and available on *Canvas*. When the University approves in-person classroom lectures, they will not be online via zoom and nothing will be recorded. *Canvas* announcements will be posted as needed.

Homework Assignments (worth 20% of your grade):

Ten graded short-essay homework assignments will be given throughout the term. Due dates will be on Mondays before midnight and posted on *Canvas*; assignments should be submitted on *Canvas*. They will pertain to material covered during lecture (see the **Study Guide** and **Lecture Slides**). In total, **they are worth 20% of your final course grade** (i.e., each is worth 2% of your grade). For each submission the TA grader will give you 2 points (full credit), 1.5 or 1.0 or 0.5 points (partial credit), or 0 points (no credit).

Allegheny Observatory Trip (worth 5% of your grade):

This course includes one required evening trip to the University of Pittsburgh's Allegheny Observatory located in Riverview Park on the North Side. The purpose is to tour this historic facility and, weather permitting, make telescopic observations of available celestial objects. Making this trip is worth 5% of your course grade. A bus transports students from Allen Hall to the Observatory on Tuesday and Wednesday nights from October 5 to December 8 (except Thanksgiving week). **I have reserved Tuesday night, October 5, for our class**, but you could sign up for a Wednesday if you have a scheduling problem with this date. You must use the bus to get to the Observatory. Arranging your own transportation or bringing friends along is not allowed. Signing up for a date other than what I reserve should occur by the end of September.

In-person Exams (worth 75% of your grade):

Three midterm exams will each cover approximately one-third of the course, while the fourth exam will be cumulative. These will be multiple-choice paper exams given in class. The use any materials (books, notes, internet, cell, calculators) is not allowed. The lowest exam grade will be dropped. If you are satisfied with your course grade after the first three exams, you do not have to take the cumulative final exam.

In-Person Exam Dates (102 Thaw Hall – indicated are exams times during the 6:00 – 8:30 pm class):

- Midterm Exam 1: Tuesday, September 28, 6:00 – 7:15 pm
- Midterm Exam 2: Tuesday, November 2, 6:00 – 7:15 pm
- Midterm Exam 3: Thursday, December 9, 7:15 – 8:30 pm
- Cumulative Final Exam (Exam 4): finals week, Tuesday, December 14, 6:00 – 7:50 pm

Grading Scheme:

Your final grade will be determined from the distribution of final percentage grades. Obtaining >90% guarantees an A grade (A+, A, A-), >80% guarantees a B grade (B+, B, B-), >70% guarantees a C grade (C+, C, C-), and >60% guarantees a D grade (D+, D, D-). If you are taking the class pass/fail (S/NC), you need to achieve a score equivalent to a C or higher (>72%) to receive a passing grade (S); a grade of C- will be recorded as no credit (NC). Note that I do not negotiate grades and I do not allow students to complete additional assignments for extra credit. In my opinion this is the only way to ensure that the playing field is level for everyone. In summary, weighting of the exams, homework, and observatory trip are as follows:

- Best three of four exams weighted to be worth 75%
- Homework weighted to be worth 20%
- Allegheny Observatory trip weighted to be worth 5%

Other Course Policies

Medical Absences:

Unless you are going to miss a substantial number of lectures, there is no need to inform me about absences for medical or personal reasons or due to athletic events. The exception is on the exam dates. If you are sick or incapacitated on the day of an exam, and you want to reschedule the exam, make sure you see a doctor and provide me with a note as described in the University policy for medical absences. This also applies to weekly HW assignments (available for 1-week). See studentaffairs.pitt.edu/shs/medical/medical-excuses.

University Health and Safety Statement:

During this pandemic, it is extremely important that you abide by the public health regulations, the University of Pittsburgh's health standards and guidelines. These have been developed to protect the health and safety of all of us. Universal face coverings are required in all classrooms and in every building on campus, without exceptions, regardless of vaccination status. This means you must wear a face covering that properly covers your nose and mouth when you are in the classroom. If you do not comply, I will ask you to leave class. It is your responsibility to have the required face covering when entering any University building or classroom. For the most up-to-date information and guidance, please visit coronavirus.pitt.edu and check your Pitt email for updates. If you are required to isolate or quarantine, become sick, or are unable to come to class, contact me to discuss arrangements.

Academic Integrity:

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. This may include, but is not limited to, the confiscation of an exam of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and calculators.

Disability Services:

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Code of Conduct:

Communication is key to a productive learning environment, and we can maintain productive communication by exhibiting respect for one another. The success of the course for yourself and others depends on all of our commitment to behavior that demonstrates respect for differences, understanding towards others, and a willingness to listen and learn. For these reasons, it is unacceptable to harass, discriminate against, or abuse anyone because of race, ethnicity, gender, disability, religious affiliation, sexual orientation, or age. If you witness or are subject to such harassment, please report it to the instructor or to the Office of Diversity and Inclusion.

Title IX:

Legal text: “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.” As a professor I am a mandatory reporter, and I am required to report violations of Title IX that I observe or am made aware of to the Title IX office. Title IX violations include, but are not limited to, sexual harassment, sexual violence, and verbal or sexual abuse. For this course, behavior in violation might appear as: suggestive jokes or innuendos, inappropriate touching, and unwanted sexual behavior or advances. My capacity and obligation to report issues does not end in the classroom.

Your Well-being Matters:

College can be an exciting and challenging time for students. Taking time to maintain your well-being and seek appropriate support can help you achieve your goals and lead a fulfilling life. It can be helpful to remember that we all benefit from assistance and guidance at times, and there are many resources available to support your well-being while you are at Pitt. You are encouraged to visit Thrive@Pitt to learn more about well-being and the many campus resources available to help you thrive. If you or anyone you know experiences overwhelming academic stress, persistent difficult feelings and/or challenging life events, you are strongly encouraged to seek support. In addition to reaching out to friends and loved ones, consider connecting with a faculty member you trust for assistance with connecting to helpful resources. The University Counseling Center is also available for you. You can call 412-648-7930 at any time to connect with a clinician. If you or someone you know is feeling suicidal, please call the University Counseling Center at any time at 412-648-7930. You can also contact the Resolve Crisis Network at 888-796-8226. If the situation is life threatening, call Pitt Police at 412-624-2121 or dial 911.