Astron 0088: Stonehenge to Hubble

Spring 2019

Lecture: Mon/Wed/Fri 11:00-11:50 AM

Alumni Hall 343

Recitation: **Required** with TA

Office Hours: TBA

Contact Information:

Instructor: Melanie L. Good

Office: 113D Old Engineering Hall

Email: mlgood@pitt.edu

Prerequisites: Basic mathematics. Any MATH Course or MATH PLACEMENT SCORE (61 or Greater) or SAT HIMAT SCORE (620 or Greater) or ACT HIMAT SCORE (27 or Greater)

Materials: The materials essential for this course will be posted on courseweb (also called blackboard). This includes the course notes in the form of a three-part Study Guide, as well as condensed versions of the slides that will be shown in lecture class. Also, the Study Guide makes reference to the following supplemental reference textbook by Robert C. Bless: *Discovering the Cosmos* (2nd edition, University Science Books). While not required, this reference textbook is a good secondary resource. Other recommended books are *Coming of Age in the Milky Way*, by Timothy Ferris, *Cosmos* by Carl Sagan, and *Big Bang* by Simon Singh.

Course Description: This is a self-contained course for students not majoring in the physical sciences. Lectures focus on practical astronomy and provide a historical perspective of our place in the Universe. Phenomena that can be readily observed with the unaided eye or a small telescope are discussed. The historical perspective starts with the earliest views, and discusses scientific discovery as a process leading up to the modern idea of the expanding Universe of galaxies. Part of this course includes the requirement of one evening "field trip" to the University of Pittsburgh's Allegheny Observatory. The purpose of these trips will be to tour the facility and, if possible, make observation with a telescope. On any one evening only a small fraction of the class will make a trip, so it should be possible to accommodate the students' evening schedules. Nominally, the trips will take place on a Tuesday or Wednesday evening. Bus transportation from the Oakland campus to the Observatory will be provided. A small percentage of the course grade will be based on participation in these field trips. Broad units, arranged by theme, are listed below:

- Unit 1: Early Astronomy
- Unit 2: Early Greek astronomy
- Unit 3: Copernicus and the Heliocentric Theory
- Unit 4: Tycho, the Great Observer

- Unit 5: Kepler and His Three Laws of Planetary Motion
- Unit 6: Galileo, The Experimentalist and Observer
- Unit 7: Newton, The Synthesizer
- Unit 8: The Nature of Models
- Unit 9: Earthly Phenomena
- Unit 10: The Sky and the Calendar
- Unit 11: The Basics of Matter and Radiation
- Unit 12: Brightness and Distance
- Unit 13: Telescopes
- Unit 14: Solar System Objects
- Unit 15: Galactic Objects Outside the Solar System
- Unit 16: Extra-Galactic Objects Outside the Galaxy
- Unit 17: Recognition of the Milky Way Galaxy
- Unit 18: Recognition of External Galaxies
- Unit 19: Some New 20th Century Physics
- Unit 20: Hubble and the Expansion of the Univers
- Unit 21: Einstein and His Relativity Theories
- Unit 22: Active Galactic Nuclei and Quasars
- Unit 23: Cosmology
- Unit 24: Exploration of the Solar System
- Unit 25: Extra-Solar-System Planets and Life Elsewhere

Structure of Class:

Research has shown that student learning is optimized when students are actively engaged in their learning, so this course will make use of evidence-based approaches to facilitate active engagement. In order to gain the most benefit from these approaches, you will need to be an equal partner in the learning process, which will involve in-class discussions, group work, and coming to class prepared to engage with the content (for example, reading any relevant material **prior** to lecture). Being equal partners in the learning process means that I will arrive to class prepared to serve and support you in your learning through interactive discussions, thought-provoking questions, and carefully designed activities. I will also listen intently to any difficulties you encounter, be sensitive to the diversity of backgrounds of my students, and be accessible to you during my office hours and via email. My hope is that by the end of the semester, you will view the subject of astronomy as interesting and understandable when we work effectively towards unraveling its mysteries.

Grading Scheme:
20% Recitation work
5% In-class clicker responses
5% Allegheny Observatory trip
70% Exams

Important Dates:
Jan. 18 Add/Drop Ends
Jan. 21 MLK Day–No Class
March 8 Withdrawal Deadline
March 10-17 Spring Recess

Tentative Schedule:

Week	**Mon**	**Wed**	**Fri**
1	**Jan.** 7 (Prelim)	9 (U1)	11 (U2)
2	14 (U2)	16 (U3)	18 (U4)
3	21 X	23 (U5)	25 (U5)
4	28 (U6)	30 (U7)	**Feb.** 1 (U8)
5	4 (Review)	**6 (Exam 1)**	8 (U9)
6	11 (U10)	13 (U11)	15 (U12)
7	18 (U13)	20 (U14)	22 (U14)
8	25 (U15)	27 (U15)	**Mar.** 1 (U16)
9	4 (Review)	**6 (Exam 2)**	8 (U17)
10	Spring	Break	No Class
11	18 (U17,U18)	20 (U19)	22 (U20)
12	25 (U21)	27 (U21)	29 (U22)
13	1 (U23)	3 (U23)	5 (U24)
14	8 (U24)	10 (U25)	12 (U25)
15	15 (Review)	**17 (Exam 3)**	

X = No Class

U1, U2, etc. = Unit 1, Unit 2, etc.

Homework:

Your homework will consist of reading the assigned materials and occasionally taking quizzes on courseweb related to the readings. Some of these activities (namely the reading quizzes) impact your grade directly, while others will have an indirect effect on other components of your grade. For example, careful reading of the assigned materials will typically result in better test performance than skipping these activities.

Group Work:

Group work will be essential in both lecture and recitation class time. Collaborating and discussing helps allow you to co-construct knowledge with your peers and achieve enhanced insight together.

Clickers:

We will make extensive use of clickers for discussion questions. Clicker questions will be formatted as multiple choice questions; however, you will receive 80% credit simply for participating in the clicker response. Should you get the correct answer, then you will receive 100% credit for that question. You do not have to give the same response as the other members of your group–your clicker responses are confidential and individual. Discussions among your group helps you think about what you believe the answer might be, but ultimately you are free to take a dissenting position from the members of your group.

Exams:

Exams will include both multiple choice and open-ended questions. The exams will synthesize all of the aspects you have been learning about in both lecture and recitations. Each exam will be preceded by a review session, but you should still plan to study and review the covered material on your own. You should not expect exams to be curved, nor will there be any make-ups allowed for missed exams. However, the lowest exam will be dropped, and there will be no final exam during finals week. Exams will take place on the following dates:

- **Exam 1: February 6**
- **Exam 2: March 6**
- **Exam 3: April 17**

Attendance:

Your attendance is absolutely crucial for obtaining a good grade. If you must miss class for health-related reasons, you should notify me in advance of your absence. If you must miss class for an emergency, please notify me as soon as you possibly can. Whether or not you are excused from in-class assignments will be at my discretion. Generally-speaking, if you have been absent more than three times, I will request a doctor's note to justify excusing any further absences. If an absence is unexcused, you will not receive credit for in-class graded activities. If an absence is excused, the activities will be excused from your grade, but there will not be time in the schedule to afford makeups of those activities. Therefore, you will be responsible for ensuring that you understand the material and concepts that have been covered in class, as you will still be expected to utilize this understanding on exams and/or recitation work. Feel free to ask your classmates to share any information they have about what you missed. Even if you do not receive credit for them, it will be good for you to know what was done in class.

Honor Code:

Students are expected to uphold the University's standard of conduct relating to academic honesty. Students assume full responsibility for the content and integrity of the academic work they submit. Students shall be guilty of violating the honor code if they:

1. represent the work of others as their own
2. use or obtain unauthorized assistance in any academic work
3. give unauthorized assistance to other students
4. modify, without instructor approval, an examination, paper, record, or report for the purpose of obtaining additional credit
5. misrepresent the content of submitted work

Any student violating the honor code is subject to receive a failing grade for the course and will be reported to the Vice President of Academic Affairs.

Disability Services:

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and 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 (412) 648-7890 to schedule an appointment. The Disability Resources and Services office is located at 140 William Pitt Union, and is open Monday-Friday from 8:30AM to 5:00PM.