Fall 2012 ASTR101a Astronomical Ideas, http://tinyurl.com/HavAstro
MWF 2 - 3 pm, 3 - 4 pm Stokes 010
Professor Beth Willman, Strawbridge Observatory
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Office hours Doodle poll: http://doodle.com/hg2cxyffphc2g9cr
Math orientation session poll: http://doodle.com/ktznren5888xmi2

Brief Class Description:

This is a one semester survey course that satisfies the QU requirement, but is intended for non-science majors. We will discuss and analyze a broad range of astronomical phenomenon, from properties of the night sky, to extrasolar planets, to the life histories and properties of stars, galaxies, and the universe as a whole. This course is organized conceptually by the questions listed below in the course outline. There are no prerequisites; We will use basic algebra, geometry, and statistics.

The primary books used in this course are Cosmos by Carl Sagan, Stardust by John Gribbin, and Strange New Worlds by Ray Jayawardhana. We will also use a paperback pamphlet written by Edward Tufte. All four of these are available at the bookstore. This will be supplemented by material from the lecture and from other readings.

Goals:

These are adapted from Goals for "Astro 101": Reports of Workshops for Department Leaders

1. A cosmic perspective - a broad understanding of the nature, scope and evolution of the Universe, and where the Earth and Solar System fit in.
2. An understanding of a limited number of crucial astronomical quantities, together with some knowledge of appropriate physical laws.
3. An understanding of the notion that physical laws and processes are universal.
4. An understanding of the notion that the world is knowable, and that we are coming to know it through observations, experiments, and theory.
5. Exposure to the types, roles and degrees of uncertainty in science.
6. An understanding of the evolution of physical systems.
7. Training in analyzing evidence and critical thinking.
8. Training in quantitative reasoning, including the ability to make reasonable estimates and how to make and use spatial/geometrical models
Course Outline:

Conceptually, this class is organized as a series of questions:

1. What is science?
2. Where, when, and how big are we?
3. Does the Universe revolve around me?
4. Are we alone?
5. Why should I believe anything astronomers say?
6. How can data be effectively visualized?
7. Why do stars in the sky have different colors and apparent brightnesses?
8. Why does the Sun shine?
9. Where did the elements that compose my body come from?
10. Do black holes suck?
11. What is a galaxy?
12. If dark matter is dark, then why are we so sure its there?
13. How did the Universe begin and how is it going to end?
14. What sorts of questions are astronomers answering today?

Assignments and Grading:

The lectures, assignments and exams will stress reasoning and problem solving rather than memorization.

25% Homework sets: There will be 5 written homework assignments over the course of the semester - generally due on Fridays. There will also be reading assignments each week. Because the written assignments are not weekly, you must take care to begin them in a timely manner.

10% Labs: There will be 2 graded lab exercises, one near the beginning and one near the end of the semester.

45% Two exams: There will be a midterm (20%) and a final exam (25%). The midterm and final will both be timed, closed book exams.

20% Participation: There will be ~5 primarily participatory activities that count for 10% of your grade: e.g. a planetarium show, observing, a visit to Special Collections, a podcast, and a movie screening. For the other 10% - The quality of a variety of written work will be evaluated, including in-class collaborative calculations and written reflections. You can also constructively participate in ways such as regular and prompt attendance, asking and answering questions, participating in discussions, responsibly preparing, and thoughtful completion of assignments.
Expectations for Attendance:

A significant amount of the learning in this course will take place during the class session. On-time attendance is thus expected at each class. Late arrivals disturb students already settled into class.

Because some missed classes are inevitable (for example for illness or athletics), you may miss up to four class sessions without penalty. Each class missed over four sessions will result in a 1.5% deduction off of your final course grade. The Wednesday before Thanksgiving is a freebie - attendance that day is optional. Attendance the Friday before Fall break is not optional.

Expectations for Written work:

Expectations for written work is high; you and I should both be able to know what question you are answering and why from your written work alone. Points will be deducted if this expectation isn't met. Points will also be deducted for sloppiness.

Work is due during the class period on the assigned due date. Work not handed in during lecture is considered late. Late work will only be accepted without penalty in serious circumstances: religious holiday, death in the family, illness. Otherwise, late work will be graded down by 10% credit per day late. Between 5 and 10 days late, work will be penalized by 50%. Work that is more than 10 days late will receive no credit.

Honor Code:

An important guiding principle of academic honesty is that you must never represent the work of another as your own. You must also never fabricate data, or write down data "kind of how you remember it". Please request clarification of the following if you find yourself in any doubtful situations: Discussion and collaboration with other students on homework sets and labs is encouraged. However, all submitted work must be your own. While working together is permitted, merely copying the work of another student (whether a calculation, an observation of the sky, or a measurement made for a lab) without indicating that you have done so is clearly a representation of his or her work as your own and so is a violation of the code. You should always try all work by yourself before collaborating with classmates, asking the TAs questions, or asking me questions.

Accommodations:

Students who think they may need accommodations in this course because of the impact of a disability are encouraged to meet with me privately early in the semester. Students should also contact Rick Webb, Coordinator, Office of Disabilities Services (rwebb@haverford.edu, 610-896-1290) to verify their eligibility for reasonable accommodations as soon as possible. Early contact will help to avoid unnecessary inconvenience and delays.