

**The Pluto Saga:
How Do You Become a Planet and Stay a Planet?**
KHC AS 101 A1

Fall 2013
Mondays and Wednesdays 9:30-11am
---with additional times to be scheduled for student presentations,
tours and evening observations.
Room CAS 500

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Office hours: Mondays 2:30-4:00 PM and Thursdays 10:00-11:30 AM, or by appointment.
Office location: CAS 603

Course Description

The goal of this course is to use the recent controversy over Pluto's status as a planet to explore the astronomical concepts involved, together with the cultural, political and religious aspects that get linked to such science-and-society issues. The scientific topics deal with how solar systems form---our Sun and planets --- as well as planets around other stars. These involve the "Classic Physics" of Newton's Laws of Gravity and Motion. For larger context, the new views of gravity and space-time introduced by Einstein's Theory of General Relativity lead to discussions of Dark Matter and Dark Energy—the vast unseen components of the Universe. The central theme of the seminar is how to gather and evaluate evidence. We will discuss this by examining the broader scope of how science proceeds in quantitative ways using methods of sampling and observations. The special role that visualization plays in describing Nature is examined. Research skill development, observing opportunities, and museum visits.

Required Texts

1. The Pluto Files: The Rise and Fall of America's Favorite Planet by Neil de Grasse Tyson, W. W. Norton & Co., 2009. [ISBN 978-0-393-06520-6]
2. The Earth Moves: Galileo and the Roman Inquisition by Dan Hofstadter, W. W. Norton & Co., 2009. [ISBN 978-0-393-33820-1 pbk]
3. The Cosmic Perspective: Fundamentals by Bennett, Donahue, Schneider and Voit, Addison-Wesley/Pearson, 2010. [ISBN-13:978-032156-6959]

-----*Plus two additional books needed for book reports-----also ordered at BU Bookstore*

4. Case for Pluto: How a Little Planet Made a Big Difference by Alan Boyle, Wiley & Sons, 2010. [ISBN 978-0-470-50544-1]
5. How I Killed Pluto and Why It Had It Coming by Mike Brown, Spiegel & Grau, 2010 [ISBN 978-0-385-53108-5]

Attendance

Attendance in class is required

Academic Dishonesty

It is my expectation that each student does his or her own work. Joint study groups or team project efforts should not result in students submitting the same/copied report. All cases of suspected misconduct on exams or assignments will result in an official report to the University Honors College for possible disciplinary action. Students are expected to abide by both UHC and BU's Undergraduate Academic Conduct Code. The Academic Conduct Code can be found at <http://www.bu.edu/academics/resources/academic-conduct-code/>

Grading

The final semester grade depends upon the following five components:

- The higher score of two "hourly exams"15%
- Two papers (15% each).....30%
- Quantitative Project #1 (Survey)20%
- Quantitative Project #2 (Observing).....20%
- Final Exam.....15%
- 100%

Assignments are due on the dates announced: No **make-up** exams or **time-extensions** on assignments will be given. If you forget to bring an assignment to class on its due date, it may be left in my faculty mail box in the Astronomy Department office (CAS 514)

All assignments turned in by 5 PM on the due date are considered "on time."

Course Outline & Readings

Components of KHC AS101 Seminar: In addition to exams (see Schedule for assignment dates and due dates),

Paper #1 will deal with an aspect of evidence: What constitutes evidence? How is evidence evaluated? Do scientists and non-scientists have a fundamentally different notion of 'belief' versus 'confidence' in asserting a finding or opinion? Specific topics to be discussed in class.

Paper #2 will deal with the role of visualization in science. What constitutes description? How can "reality" be portrayed? Is seeing, believing? Can we understand Nature without visualization? Again, specifics to be discussed in class.

Quantitative Project #1 will deal with the formulation of a poll on Pluto's status. Opinion, rather than observational evidence, is examined. Clarity of goals and how to specify them; statistical analyses of results.

Quantitative Project #2 will require individual observations of the Moon, with data analysis to determine properties of the lunar terrain. You will be provided with a telescope to use (and keep) for this project. Use of BU Observatory also available in this multi-month project. Optimal observing times (*just after sunset*) center on the days spanning 1st Quarter Moon: For Fall 2013, these fall on 12 September, 11 October, 9 November and 9 December.

More inconvenient observing times that can be used as back-ups occur when the Moon is near Last Quarter phase---'inconvenient' because they are *prior to sunrise*. During Fall 2013, the 3rd Quarter Moon dates are 26 September, 26 October, and 25 November.