

# Pima Community College

## Downtown Campus

**Syllabus for Semester:** Spring 2012    **Course name and number:** AST 101IN

**Section code (CRN):** 20345

**Class Meeting Days/Times:** Monday and Wednesday 12:10-2:50pm

**Class Location:** ST 211

**Instructor:** Kate Follette

**Office hours/availability:** regular time TBD or by appointment

**Phone/voicemail:** (520) 206-3241

**Email address:** [kabrutlag@pima.edu](mailto:kabrutlag@pima.edu)

**Class website (MyPima, BlackBoard, etc) :** You will be expected to visit the class website ([www.katefollette.com/teaching/AST101S12](http://www.katefollette.com/teaching/AST101S12)) often for assignments, solutions, class calendar, announcements and discussions

**First day of class:** January 18, 2012

**Add date:** January 23, 2012

**Drop/Refund date:** January 30, 2012

**Withdrawal deadline:** April 5, 2012

**Final exam date:** Monday, May 14, 2012

**Last day of class:** Wednesday, May 9, 2012

### Course Description

Introduction to the science of the nature and origin of the solar system: the sun and its family of planets, along with the history of astronomy and special topics regarding the space program. Also includes scientific thinking, quantitative thinking, and science in contrast to pseudoscience. Also includes in-class measurement and mathematical observation projects, independent studies, and self-initiated trips to local astronomy facilities.

Prerequisite(s): none

Information: IN is the integrated version of the course with the lecture and lab taught simultaneously.

### Course Outline and Objectives

Upon completion of the course, the student will be able to do the following:

1. Demonstrate improvement in critical and quantitative thinking by applying the scientific method to fact-based learning, activities, some quantitative and mathematical, and assignments, some quantitative and mathematical.
2. Distinguish science from pseudoscience.
3. Describe the overall structure and individual components of the solar system.

4. Describe the solar system's origin.
5. Explain the historical development and multi-cultural aspects of the practice of science generally, and as specifically.
6. Outline the technical development of modern astronomy and space exploration.
7. Generate or expand global awareness by integrating astronomy's cosmic, worldwide and multi-cultural perspective of earth with insights gained from its historical development and scientific and societal impacts.
8. Demonstrate the improvement in critical and quantitative thinking by analyzing astronomical observations and specific information covered in lectures.
9. Expand global awareness by identifying aspects of the sky and recording common sky phenomena, utilizing naked eye or binoculars.
10. Expand global awareness by examining and describing the sky more closely based on at least one telescope viewing experience.
11. Describe astronomical and astronomy-related facilities in the Tucson area.
12. Discuss the Tucson area's importance to the field of astronomy and astronomy's role in the local economy.

## Course Outline

### I. General Introduction

- A. What is Science?
- B. The Role of Mathematics in Science
  - 1. Quantitative vs. Qualitative Understanding
  - 2. Linear and Angular Measurement
  - 3. Unit Conversion
  - 4. Equations
  - 5. Graphing
- C. What is Astronomy?
- D. Value of Astronomy and Benefits to the Individual
- E. Scientific Method and the Central Role of Skepticism
  1. Contrast With Pseudoscience
  2. Possible Pseudosciences to Examine as Related to Astronomy
    - a. Astrology
    - b. Scientific Creationism as Related to the Solar System and the Origin, Age and Life of Earth
    - c. Jupiter Effect
    - d. Moon Muddling
    - e. Comets as Mystical Messengers of Doom
    - f. Immanuel Velikovsky's Planetary Billiards

### II. Solar System

- A. Cosmic Perspective: The Solar System's Location in Space and Time
- B. General Description and Structure
- C. Age of the Solar System
- D. Origin: Theory and Evidence
- E. Planets Orbiting Other Stars

### III. Descriptive Study of Individual Objects

- A. Sun
- B. Earth and Moon
  1. Tidal Effect
  2. Solar-Terrestrial Connections
  3. Origin of the Moon
- C. Mercury
- D. Venus
- E. Mars and Satellites
- F. Jupiter and Satellites
- G. Saturn and Satellites

- H. Uranus and Satellites
- I. Neptune and Satellites
- J. Pluto and Charon
- K. Comets, Asteroids and Their Origins

#### IV. History of Astronomy

- A. Astronomical Practice, Invention, and Discoveries Around the World
- B. Development of Modern Science
  1. The Greeks
  2. Aristotelian Science
  3. Demise of Science
  4. Islamic Contributions
  5. The Scientific (Copernican) Revolution and its Impact on the World

#### V. The Technical Development of Modern Astronomy

- A. Major Observatories
- B. Telescopes
  1. Optics
  2. Instruments
- C. Celestial Coordinates

#### VI. Space Exploration and Development

- A. History
- B. Values: Costs Versus Benefits
- C. Future Explorations and Economic Development

#### VII. Reprise: Cosmic Perspective – Beyond Global Awareness

- A. Our Location in Time and Space
- B. Astronomical Numbers
- C. Specialized Units

#### VIII. In-Class Collaborative Exercises and Activities

- A. Solar System to Scale
- B. Solar System Models
- C. Celestial Sphere and Star Charts
- D. Equatorial Coordinates
- E. Horizon Coordinates
- F. Lost on the Moon
- G. Planetary Models
- H. Discussion Groups on Varied Topics
  1. Aspects of Pseudoscience
  2. Global Warming and What to Do About It
  3. Space Exploration: Pros and Cons
  4. Pluto as a Planet: Pros and Cons

#### IX. Individual Laboratory Exercises

- A. Terrestrial Planets Mercury and Venus
- B. Terrestrial Planets Mars
- C. Kepler's Law
- D. Sidereal Time
- E. Stellar Parallax
- F. Measuring Large Distances
- G. Lunar Geology
- H. Construction of a Sun Dial

## X. Videos Related to Lecture Topics

## XI. Space Exploration and Economic Development

- A. Historical Development
- B. Future Exploration Possibilities
- C. Pros and Cons of Space Development

## XII. Observation Projects

- A. Standardized Observing and Recording of Sky Phenomena
- B. Sun
- C. Moon
- D. Planets and Their Satellites
- E. Identifying Bright stars and Constellations
- F. Star Counts
- G. Finding Asteroids

## XIII. Potential Field Trips

- A. Kitt Peak National Observatory
- B. Whipple Observatory on Mt. Hopkins
- C. Flandrau Planetarium
- D. Group Observational Session at a Dark Site With Telescope
- E. University of Arizona Mirror Lab

### **Required Text Book(s)**

*Custom Textbook* (may be purchased at the Downtown Campus Bookstore)

### **Required Materials**

#### **Optional Materials**

Planisphere (may be obtained at most bookstores or from instructor)

### **Class Preparation and Policies**

You are expected to come prepared to each class. This means that you should be in class on time and should have completed any assigned prelabs, readings and homeworks. Your preparedness as evidenced by your ability to participate in class discussions will affect your participation grade, as will your engaged participation in in-class laboratory activities and your attendance and timeliness.

### **Class Attendance**

You are expected to attend all classes in their entirety. It will be noted and your participation grade affected if you are late or leave class early without advance permission from the instructor. Your final participation grade will reflect any unexcused absences and late arrivals to class. A limited number of absences may be unavoidable over the course of the semester, therefore participation points will be graded out of 90%. A score above 90% for participation will result in extra credit.

Early departure from class without permission will result in a grade of zero for the lab assigned that day, as labs are due at the end of class.

### **Assignments**

#### Homework

Regular homework assignments are due at the beginning of class on the due dates indicated on the calendar on the course website and on the course schedule you were given on the first day of class. Homework may be typed or NEATLY handwritten and may include an online discussion or e-mail component.

Additionally, you will be expected to complete one Mastering Astronomy assignment each week by Sunday at 10pm. These assignments may be found on the course's Mastering Astronomy website. Instructions for accessing the site are included in the printed instructions for Homework #1 that you received on the first day of class and are also available on the course website.

You may work together on regular homework assignments, but you must each hand in your own copy and you must state explicitly on your assignment who you worked with. Collaboration is ok, but if your assignments are identical or nearly so, the points will be split between you. You may NOT collaborate on Mastering Astronomy assignments.

Regular assignments handed in one class late will be worth half credit. No assignments will be accepted later than one class after the due date as that is when I will post the solutions on the class website.

I will drop your lowest two homework assignments, therefore very few excuses will be accepted for missing a due date.

### Labs

With the exception of the Semester Observing Lab, all labs will be conducted during class and are designed to be finished in the time allotted. You may leave class early if and only if you hand in your completed lab before leaving. If you are unable to finish a lab activity during class, you may work on it at home and hand it in at the BEGINNING of the following class period. For each in-class lab, you will be expected to have answered any pre-lab questions before coming to class. Failure to do so will result in the deduction of participation points. The in-class labs are designed to be completed within the allotted time for each class. If you don't complete the lab in class for any reason, you will be expected to finish it at home.

If you miss a lab for any reason, you will be expected to arrange to make it up. If special materials are required, this can only be done on designated "Lab Makeup" days (the days of the Midterm and Final Review classes on October 18 and December 13). You may only make up two labs per semester barring exceptional circumstances.

### Exams

The midterm will be on Wednesday, March 7, 2012 and the final will be on Monday, May 14, 2011. Both will take place in class, however you may be asked to complete an essay ahead of time as part of your final exam grade. In both cases, you must clear any expected absence and make arrangements for a makeup exam with the instructor **a minimum of one week** before the date of the scheduled exam. If you are ill on the day of the exam, you must call the Downtown campus Adjunct Faculty office **and** e-mail your instructor **at least one hour** before the start of class. Your instructor will then contact you to make arrangements for a makeup exam. A 3 x 5" notecard will be allowed on both exams.

### Presentations

Several times during the semester you will be asked to present a small research project in pairs or small groups. You will NOT be able to make up an absence on a presentation day barring exceptional circumstances or prior arrangements.

### Readings/Discussions and Reading Quizzes

You will be assigned readings every other week in this course. In each case, a "reading quiz" will be administered at the start of class on the day we are to discuss it. If you miss a reading quiz, you must make arrangements with your instructor to make it up before the following class period or you will receive a zero.

### **Extra Credit Assignments**

At the beginning of each class, there will be an opportunity for a student to give a brief ~2 minute presentation on a relevant news story or recent podcast that relates to material learned in class. If you

would like to present, please send the instructor the article, picture or podcast you wish to discuss at least one day in advance of the class. A student may present no more than twice during the same semester.

The following are some useful websites to get you started on astronomy related-news, however nearly any news source is acceptable if the content is relevant to what we have been discussing in class.

The Astronomy Picture of the Day: <http://apod.nasa.gov/apod/>

New York Times Science News: <http://www.nytimes.com/pages/science/>

NASA news: <http://www.nasa.gov/news/index.html>

NPR's "Science Friday" podcast: <http://www.sciencefriday.com/>

Dr. Pamela Gay's "Astronomy Cast" podcast: <http://www.astronomycast.com/>

Furthermore, attendance at any Astronomy-related lecture or activity (star party, observatory tour) outside of class can also result in extra credit. You must let me know in advance that you plan to attend and you will be expected to hand in a one page typed synopsis (250 words) of what you learned from the lecture.

Public Lecture Series at the U of A's Steward Observatory:

[http://enterprise.as.arizona.edu/~taf/pubeve/pub\\_lect.html](http://enterprise.as.arizona.edu/~taf/pubeve/pub_lect.html)

Public Lecture Series at the U of A's Lunar and Planetary Laboratory:

<http://www.lpl.arizona.edu/calendar/lecture.php>

Extra credit points will be added into your homework grade. See the "Extra Credit Options" portion of the class website for more details.

### **Grading Procedures and Policy**

Your grade will break down as follows:

Homework: 30%

Participation: 15%

Midterm: 10%

Final: 15%

Labs: 30%

If you obtain the following overall percentage of available points, you will be guaranteed each grade. These numbers may be lowered, but they will not be raised.

A: 90%

B: 80%

C: 70%

D: 60%

F: Below 60%

A grade of W or I will be given only if the conditions in the following sections regarding each are met. To receive an AU, all requirements described in the AU section of this syllabus must be met, and you will be expected to participate in all in-class activities and labs and to hand in all homework assignments, although you will not be required to take the midterm or final or to hand in a formal lab report.

### **Student Withdrawal "W" Grades**

Students may withdraw from class without instructor permission through **April 5, 2012**. This can be done on-line or by submitting a "Registration Form" at any Pima College Campus. Students who withdraw receive a "W" as a grade. For further information on how withdrawing will affect your academic record or financial aid, please see an advisor or counselor.

This grade may be requested by the student only during the first two-thirds of any session and may be given by the instructor on or before the official census reporting date to students who have ceased attending class before that date. Students who stop attending class after this date may receive a grade of "F."

W's after the official student withdrawal date will only be given at the instructor's discretion under emergency situations where the student submits a written request. Failure to withdraw from the class by the withdrawal deadline and/or failure to earn enough points for a passing grade are NOT emergency situations.

### **Incomplete "I" Grades**

The incomplete grade (I) is given to the student who is on track all semester but is unable to complete the final portion of the course due to an unforeseen event. A grade of "I" will only be given if all following requirements are met.

- You must have completed at least 70% of the coursework.
- You must provide valid documentation showing a medical or other reason for needing an I grade.

To receive a grade of "I," you must make the request to your instructor in writing and fill out the required forms no later than April 5, 2012.

The final decision for awarding an "I" grade rests with your instructor. Being behind or overwhelmed with work is NOT a valid reason for an "I."

### **"AU" Audit Grades**

Auditing a PCC class means that you enroll, attend and do work for the class but do not expect to receive credit or a grade. To audit the class, you need the instructor's permission and signature on an audit request form from any campus admissions office. This form and appropriate payment must be returned to the admissions office for admission. An audit registration cannot be completed until the first day of class. You must complete your audit registration by the end of the add period for the class you wish to audit. The instructor is not required to grade assignments submitted by students who are auditing the class.

### **Final Grades**

For privacy and security reasons, instructors are advised **NOT** to give grades over the telephone or via email unless the student signs the exception box on the acknowledgment page of this syllabus. Students who wish to check grades may use the grade report that they can access through MyPima (or Blackboard Vista, if applicable).

### **Class Calendar**

See the Course on the class website. The instructor reserves the right to alter due dates and class topics, however the midterm and final exams will absolutely be on the dates listed above. Any changes to the course schedule will be announced in class.

### **Student's Rights and Responsibilities**

Students are expected to abide by Pima Community College's rules and regulations. A summary of the Student's Rights and Responsibilities, including the Student Code of Conduct and the Code of Academic Ethics, is available at <http://www.pima.edu/studentsev/studentrights>. A violation of the Code of Academic Ethics may result in a failing grade in the course and may be subject to further penalties.

### **Caveats**

The instructor reserves the right to make changes to the syllabus and will notify students of those changes in class.





## Acknowledgment of Receipt of Syllabus

Student Name \_\_\_\_\_

Please complete and return the following acknowledgment to your instructor in class.

I, (print name) \_\_\_\_\_, have received my AST102IN syllabus (including course objectives, policies, requirements and schedule), and have read and understand all the enclosed materials, including the course/instructor expectations and deadlines.

Please read the following statements and check all that apply:

\_\_\_\_ I have no objection to receiving email from the instructor.

\_\_\_\_ I give permission for my instructor to e-mail any grades and materials associated with my student record for this course during this semester to the email address listed above.

\_\_\_\_ **I understand that I will be expected to regularly access the internet in order to obtain and to complete the assignments for this course. I will check my e-mail and the course website regularly.**

Student Signature: \_\_\_\_\_ Date: \_\_\_\_\_