

Astronomy 116

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Modern astronomy concerns itself with the Universe, its origin, its structure, its contents, its processes, its evolution and its ultimate fate. While modern astronomy attempts to explain the Universe in terms of physical principles, the ordered study of the heavens for the purpose of making predictions is as old as human civilization. Astronomy can thus claim to be the oldest of the natural sciences. This enterprise continues because humanity continues to believe that the Universe is comprehensible.

Course Objectives. This course is an introductory survey of the science of astronomy. Students completing Astronomy 116 are expected to have an ordered understanding of the development of the human quest for knowledge of the heavens, of the ways in which modern astronomers know the Universe and of the important current questions and issues in astronomy. They are expected to learn basic information about the Sun, the Solar System, stars, galaxies and modern cosmology, as well as to develop a basic understanding of physical principles underlying astronomical research. They should be able to identify objects in the night sky and develop the foundation for a lifetime of appreciation and enjoyment of the heavens.

Textbook and Readings. The textbook for the course is Kaufmann and Comins, *Discovering the Universe*, 5th edition, published by W. H. Freeman and Co., 2000. Additional readings from other sources may be assigned from time to time, as may films that supplement the readings and lectures. A calendar of textbook readings is given at the end of this syllabus. You are asked to bring your textbook to class every class period since we will often need to refer to tables, graphs and illustrations in the textbook during lectures.

Laboratory. Laboratory activities are designed to give the student opportunities for investigating nature with scientific methodology. The regular laboratory schedule will begin in the second week of classes. All laboratory sessions will begin promptly at 8:00 p.m. in the Multimedia Classroom in Humanities Hall.

Laboratory work will consist of investigatory projects based on those from the laboratory manual *Voyages Through Space and Time*, by Jon K. Wooley, Wadsworth, 1995, using *Voyager II* software, as well as actual observation and the use of *Voyager III* software. Ideally each laboratory session would involve both types of activities, but actual observation requires clear skies; therefore, more than one indoor project may be assigned on a particular night. Normally the laboratory will last for three hours. Attendance at laboratory sessions is mandatory.

The preparation needed for a particular laboratory session will be announced in class on the Thursday preceding the laboratory session.

Laboratory Reports. Students will submit laboratory reports in connection with the computer projects mentioned above. All reports will require written work and will be judged on the quality of writing as well as on the presentation of the results of laboratory investigations. Standards for reports will be issued and discussed in laboratory.

Supplemental Observing Sessions. Additional opportunities for observing the heavens will be provided by your professor from time to time, especially in connection with astronomical events of particular interest. Times for such observations will be announced in class or on the class conference (see below). Attendance at any particular supplemental observation is not required, although it is required that each student will attend at least one of these supplemental observation sessions. It is not to be assumed that transportation to an observation site will be provided.

Observation Requirements and Journal. The student will be expected to observe on at least three occasions (supplemental or independent observations) outside the laboratory observation periods. Students will maintain a record of observations in a separate notebook, preferably a small spiral notebook. All observations (laboratory, supplemental or independent) are to be reported in this observation journal. Journals will be submitted and commented upon after the second laboratory observation and at the end of the course. Standards for the journal will be issued and discussed after the first observation.

The following is a summary of the observation requirement:

- (1) all laboratory observations (Please see “Absences” for make-up policy)
- (2) three observations outside the laboratory sessions, one of which must be a supplemental observation.

Tests. The tests in Astronomy 116 will include objective as well as essay questions. Some questions will be quantitative in nature. A significant number of questions will stress reasoning with principles. Laboratory material may be included.

Three tests will be given, during class time, on the following dates:

Test I - Tuesday, 25 September
 Test II - Tuesday, 23 October
 Test III - Tuesday, 20 November

These dates are included on the calendar of textbook reading assignments. The textbook material included on each test can be inferred from the placement of the tests.

Writing Assignments. Writing assignments will be given. Two of them are major ones and will involve reading and interpreting articles in popular scientific magazines such as *Sky and Telescope* and *Scientific American*. Details pertaining to the major assignments will be given to the class several weeks before the assignments are due. The due dates, which are also included on the calendar of textbook readings, are as follows:

Writing Assignment I - due Thursday, 18 October
 Writing Assignment II - due Tuesday, 27 November

Oral Presentation. Laboratory groups will prepare and give short, illustrated oral presentations concerning objects in the night sky. Details will be issued after midterm. It is planned that the oral presentations will take place during the last two laboratory sessions (28 November and 5 December).

Grading. Course grades will be assigned on the basis of 1000 points, composed as follows:

Tests (3 at 100 points each)	300 points
Laboratory Reports	225 points
Writing Assignments	125 points
Observation Journal	100 points
Presentation	30 points
Comprehensive Final Exam	220 points

In general course grades will be determined, as follows:

A	900 or more points
B	800 to 899 points
C	700 to 799 points
D	600 to 699 points
F	fewer than 600 points

Grades of A-, B+, B-, C+, C-, D+ may be assigned for sums of points near the ends of the grade ranges given above.

Class Conference. A conference, named 116 Astronomy, has been set up. Students should stay "tuned" to the conference. It is hoped that this arrangement will promote discussion among students and your professor. Announcements, special assignments, and other matters of interest will be posted on the conference.

Homework and Other Assignments. Questions, exercises, supplemental readings, film-viewing, etc., to be prepared prior to class during a given week will be assigned in class on the preceding Thursday at the latest. Such assignments will not be turned in for a grade, but they are considered part of the student's preparation for class lectures and discussions.

Additional Materials. Students will need scientific calculators for laboratory work and often in class. A medium-sized loose-leaf binder (3-hole punch) for lab reports, classroom notes and handouts, etc., is recommended.

Absences. As stated above, attendance at laboratory is mandatory. Excused absences for serious reasons are possible, but the missed laboratory work must be made up. The general make-up requirement for one missed laboratory with an acceptable excuse will be two supplemental observations (in addition to the required one) and independent completion of any computer projects assigned for the laboratory period missed. Unexcused absences must be made up, as well, but in addition to the make-up, a substantial point reduction in laboratory grade will be imposed.

Office Hours. Tuesdays and Thursdays: 2:00 - 3:30 p.m. Additional hours are available by appointment.

THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE.