Astronomy 1101: Planets to Cosmos

Professor Todd A. Thompson

Lectures: MWF 12:40-1:35pm, University Hall 0014
Weekly Laboratory: All lab sections will start in 5033 Smith Lab (see below).
M: 1:50-3:40pm Smith 1042, 1064; T: 2:20-4:10pm Smith 1042, 1076

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Recommended Textbook (not required): *Astronomy Today*, 7th Edition, by Chaisson & McMillan

Course Web Page: www.astronomy.ohio-state.edu/∼thompson/1101

Course Goals & Learning Objectives:
Astronomy 1101 is an overview of astronomy from our solar system to the universe as a whole. It is a General Education (GE) Physical Science course in the Natural Science category. The goals of courses in this category are for students to understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

The expected learning outcomes for GE courses in the Natural Science category are as follows:

1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
3. Students describe the inter-dependence of scientific and technological developments.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Astronomy 1101 will meet these expected outcomes by covering three overarching and interconnected themes: (1) the long Copernican revolution, the discovery of the nature of our solar system and planetary systems around other stars, the physics of light and gravity; (2) the nature and evolution of stars and black holes and the origin of the elements we find in nature; (3) the history of galaxies and the universe, evidence for the Big Bang, and the structure of the universe on its largest scales. I will attempt to convey a number of the facts that astronomers and astrophysicists have learned about these topics, to describe the outstanding scientific problems that are the focus of current research, to illustrate ways in which physical principles are used to understand the universe, and to show how scientific theories are developed and tested against observations.

Among the questions that you should be able to answer by the end of the course are the following: What is the architecture of our solar system, and how do we find other planetary systems? What is a star? What is a galaxy? What is the evidence for dark matter? What is the Big Bang theory? What empirical evidence supports and/or challenges our explanations for the physical nature of stars, galaxies, and the cosmos?

Course Organization: This is a four-credit hour course; each week, there will be 3 hours of lecture and one two-hour laboratory session. For Arts and Sciences students in a Bachelor of Arts program, this course meets the Arts and Sciences GE requirement of a natural sciences course that includes a laboratory component.

Weekly Laboratory, Laboratory Write-Ups, & Homework:
Astronomy 1101 laboratory is weekly. Attendance is required. The primary goal is to reinforce the concepts covered in lecture and to introduce quantitative thinking. The lab will typically start with 0.5 hour in the Ohio State University Planetarium (5033 Smith Laboratory) or an introduction by the instructor to the topic and the analysis that will be carried out. Then the class will be divided into smaller groups who carry out the work of the lab and answer questions presented by the TA or professor. Each student will turn in a laboratory write-up at the end of the laboratory session. These lab components will be carried out in Smith 1042, 1064, and 1076. Attendance at the weekly laboratory and the lab write-ups account for 20% of the final grade.

Before leaving the lab, students will be given a homework assignment that is due at the start of the next week's laboratory. The homework will consist of short-answer and multiple-choice questions that follow from the laboratory exercises and the class lectures. Collectively, these homeworks will account for 20% of the final grade.

Collectively, laboratory attendance, writeups, and homework count for 40% of the final grade. No missed laboratory or late homework will be accepted, except for legitimate, documented emergencies. The grading policy is described further below.

In-Class Quizzes:
There will be three in-class quizzes, held at normal class time. There will be no lecture on quiz days, and the quiz will start promptly at class time. Each quiz will cover the material in the lectures and laboratory sessions since the previous quiz (accounting for the fact that not all students may have had the same number of lab sections at the time of each quiz). All quizzes are closed-book, closed-notes tests. The lowest score of the three quizzes will be dropped. Collectively, the remaining two quizzes will account for 30% of the final grade.

The quizzes are scheduled for the following class days at normal class time:

Friday, September 26
Friday, October 31
Friday, December 5

Makeup quizzes are only offered by advance arrangement with the professor. Exceptions are for legitimate, documentable emergencies. If you will be away on an official University-sponsored activity (e.g., ROTC, sports teams, band, etc.), please bring me a letter from your coach, director, etc. in advance of the quiz. Quizzes must be made up by the Wednesday after the quiz you missed, otherwise that quiz becomes the one that I will drop in computing your final grade.

Final Exam:
Attendance at the Final Exam is mandatory. The final will be comprehensive, covering all lectures and laboratories, and has the same multiple-choice/short answer format as the in-class quizzes and homeworks, only about two times longer. It is worth 30% of your grade.

Students who miss the final exam will be given an incomplete (I) with an alternative grade equal to getting a zero on the final, and have to make it up early the following Semester, as per University policy, to avoid the alternative grade. In keeping with official University policy, early finals will not be available for those persons who wish to depart early for break. Please plan ahead and make your travel plans accordingly.

Grading Policy:

- Weekly laboratory attendance and laboratory writeups account for 20% of your final grade. Laboratory attendance is required and graded pass/fail. The writeups will be graded as "check" (100% = complete), "check-plus" (105% = exceptional effort), "check-minus" (90% = items missing). The lowest score on the laboratory writeups will be dropped in calculating a final laboratory grade.
- Weekly homework accounts for 20% of your final grade. It will be graded on a 100 point scale. The lowest score on the homeworks will be dropped in computing your final homework grade.
- Quizzes account for 30% of your final grade. The lowest score of the 3 in-class quizzes will be dropped in computing your final quiz grade.
- The comprehensive final exam accounts for 30% of your final grade, and must be taken by all students.
- Curving: If the median of the distribution of scores on the combined homeworks, any individual quiz, or the final exam is substantially below C+/B-, scores for that element of the class will be curved to a C+/B- scale.
- Attendance at lectures is strongly encouraged. Attendance counts towards your final grade, and will be used to bump it up (e.g., from a B+ to an A-) in the event that your calculated final grade is within approximately 1 % of the higher score.
- Participation is strongly encouraged. I will often ask if there are any questions or comments on the topics covered, or on sample Quiz and Homework questions we discuss in class. Participation counts towards your final grade, and will be used to bump it up (e.g., from a B+ to an A-) in the event that your calculated final grade is within approximately 1 % of the higher score. If you are reticent to speak up in class, please email me your questions and comments and I will incorporate them into the next lecture.
- Extra credit: Up to 5% may be earned by carrying out 20 measurements of the Moon's phases and motions throughout the semester (see handout) and turn in an observing log at the end of the semester. Students who wish to complete the extra credit should start early in the semester.

Lectures, Notes, & Readings:
The lectures, laboratory meetings, and homeworks, are your primary resource for this course. The textbook may be used as a secondary reference from which related readings will be suggested, but it is not required for the course.

In between these two resources in importance are the lecture notes available on the web. These notes are meant to be useful aids for studying and following along during lectures; they are no substitute for attendance. Most students find that the best strategy is to print out the notes, bring them to class, and then add their own notes in the margins. Remember, these are only outlines of what I cover each day in class, not comprehensive transcripts of the lectures.

Textbook:
The textbook is not required. Because introductory astronomy textbooks designed for non-majors are rarely organized exactly the same as our courses, we will not strictly follow the order of topics in the book. You can expect to jump around as the course progresses. As such, instead of specific reading assignments, each section of the course has related reading suggestions from the text. Not all topics in this course are covered by the book, and similarly not all topics covered in the book will be discussed in class. You are only responsible for the contents of my lectures and the laboratory meetings.

Academic Misconduct:
It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Students with Disabilities:

Students with disabilities that have been certified by the Office for Disability Services (ODS) will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/. We will rely on ODS to verify the need for accommodation and to help develop the appropriate strategies. Students with disabilities who have not previously contacted ODS are encouraged to do so, by visiting the ODS website and requesting an appointment. Please take care of this well in advance of the quizzes, as processing the paperwork takes time.