

ASTR 101: PRINCIPLES OF ASTRONOMY
SPRING 2015
SCHEDULE #20278

COURSE INFORMATION

Class Days: Tuesday-Thursday
Class Times: 14:00-15:15
Class Location: EBA-343

Professor: Jerome A. Orosz
Contact Information:
Office Hours Days: Monday, Friday
Office Hours Times (and by appointment): 13:30-15:30
Office Hours Location: Physics 241
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Course Overview

Official Course Catalog Description: Discover the universe: planets, stars, galaxies, and our place in the cosmos; the Big Bang; how stars shine; comets, meteors, nebulae, the Milky Way; black holes and other exotic objects. Not open to students with credit in Astronomy 201.

Purpose and Course Content: This course will survey various topics in modern astronomy, with the goal of understanding and appreciating the wonders of the Universe. Emphasis will be placed on *understanding* concepts, and not simply on *memorizing* astronomical jargon. We will discuss *how* we are able to understand the Universe through the use of the *Scientific Method*, and how we can often use everyday experiences here on Earth to help us understand the Universe and its contents. I want you to appreciate the difference between an *objective* understanding of the world based on *observational data*, and a *subjective* view of the world, based on *beliefs*. “Critical thinking” here means objective, rational, and logical thinking.

Student Learning Outcomes: Upon the successful completion of this course, the student will

- Explain in detail the characteristics of the seasons on Earth and give the correct causes of them;
- Explain how we know that the Earth is spherical and that it is orbiting the Sun;
- Explain in detail why the Moon has phases;
- Give a brief outline of the persons in the historical development of astronomy;
- Explain the meaning of energy, and have an understanding of light and its importance to astronomy;
- Explain how the Sun and other stars shine;
- Discuss the various types of stars and explain how they form and evolve with time;
- Explain what galaxies are, and our place in the Milky Way;
- Explain how large and how old the Universe is, and give the currently favored scientific theory for the origin and ultimate fate of it.

Relation to Other Courses: This course satisfies the General Education requirement outlined in Part A (Natural Sciences and Quantitative Reasoning), Section 1 (Physical Sciences). A related class is ASTR 109 (Astronomy Laboratory). Although concurrent enrollment is encouraged, ASTR 101 can be taken without taking ASTR 109.

Enrollment Information

Prerequisites: The only prerequisite is student interest; there are no *college-level* prerequisites required. However, some basic mathematical skills are useful, such as:

- The use of the metric system.
- The use of scientific notation, as in $M = 2 \times 10^{33}$ grams.
- The use of simple relations such as $y = 1/x^2$.

The use of mathematics will be kept to a minimum, and in most cases is not needed for a basic understanding of the *concepts*. However, in some cases a *quantitative* understanding is as important as a *qualitative* understanding. We will review the mathematical concepts as we go along.

Adding/Dropping Procedures: Add codes are available upon request starting January 21, 2015. The last day to add or drop the class or change the grading basis is February 3, 2015.

Statement for Students with Disabilities: If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services. Your cooperation is appreciated.

Course Materials

Required Materials: The required textbook is *The Essential Cosmic Perspective, 7th Edition*, by Jeffrey Bennett, Megan Donahue, Nicholas Schneider, & Mark Voit (ISBN 978-0-321-92808-5).

The on-line companion web site is also required. It can be accessed at:

<http://www.pearsonmylabandmastering.com/northamerica/masteringastronomy/>

If you purchased a new textbook, an access code is included. Access codes can also be purchased separately from the bookstore or from the publisher. Refer to the last page of this syllabus for detailed instructions on how to access the Mastering Astronomy web pages.

The course ID for this section is MAOROSZ14636.

Recommended Materials: A good on-line resource is “Astronomy Notes” by Nick Stobel:
<http://www.astronomynotes.com/>.

Options for Accessing Course Materials: The publisher has options to obtain electronic access to the text.

Course Structure and Conduct

Style of the Course: This course will be a traditional lecture course. The subjects covered will include:

- Chapter 1 (A Modern View of the Universe), scale and history of the Universe (0.5 week);
- Chapter 2 (Discovering the Universe for Yourself), Patterns in the sky, seasons, the Moon, the motion of the planets (1.5 weeks);
- Chapter 3 (The Science of Astronomy), The scientific method, a brief history of Astronomy, (1 week);

- Chapter 4 (Making Sense of the Universe: Understanding Motion, Energy, and Gravity) Gravity, Newton's laws of motion (1 week);
- Chapter 5 (Light: The Cosmic Messenger), The nature of light, telescopes (1 week);
- Chapter 6 (The Formation of the Solar System) Atmospheres) A brief tour of the Solar System, the nebular theory of solar formation, the age of the solar system (0.5 week);
- Chapter 7 (Earth and the Terrestrial Worlds), Earth as a planet, Mercury, Venus, and Mars (1 week);
- Chapter 8 (Jovian Planets) Jovian planets and moons (1 week);
- Chapter 9 (Asteroids, Comets, and Dwarf Planets: Their Nature, Orbits, and Impacts), (1 week);
- Chapter 10 (Other Planetary Systems: The New Science of Distant Worlds), Detecting planets around other stars, the nature of planets around other stars (0.5 week);
- Chapter 11 (Our Star), The Sun (0.5 week);
- Chapter 12 (Surveying the Stars), Properties of stars (1.5 weeks);
- Chapter 13 (Star Stuff), The formation and evolution of stars (1 week).
- Chapter 14 (The Bizarre Stellar Graveyard), White dwarfs, neutron stars, and black holes (1 week)

Individual and Group Activities Required: There will be weekly assignments on the Mastering Astronomy web pages. There are interactive tutorials and some multiple choice quizzes. The point value for each assignment will be between 5 and 10 points. The total point value of all of the assignments will be approximately 100, but *the homework score will be a percentage computed from 60 points*, and will count for 15% of the overall course grade. Under this policy, the student can skip a few of the assignments and still receive full credit for the homework portion of the final grade. Because of the policy on the scoring, late homework (after the due date) will not be accepted (note the student can still access the tutorials until the end of the semester).

Apart from "bonus questions" on the exams, there will be no opportunities for written extra credit.

Technology Utilized in the Course: Class notes that are in electronic form will be made available via Blackboard.

Course Assessment and Grading

Exam Dates: There will be two intra-term exams. The first midterm exam will be held on **Thursday, Thursday, February 19, 2015 at 14:00**. The second midterm exam will be held on **Thursday, April 9, 2015 at 14:00**. The dates of these exams *will not change except under extreme circumstances*. **The final exam will take place Tuesday, May 12, 2015 at 13:00**. *As per University regulations, the time of the final exam cannot be changed under any circumstances*. Please review the rules regarding final exams at http://arweb.sdsu.edu/es/registrar/finalexams/14_fall.html and in the 2014-2015 General Catalog, page 470. The exams will be closed-book. The exams will be typically be multiple-choice, and will also contain short-answer questions. There will also be a few more difficult “bonus questions” where you can earn extra points.

Scored Activities and Weighting by Percentage of Total Score: There will be two intra-term exams. Each score will count 25% of the class grade (100 points each). The final exam will be comprehensive and will count for 30% of the grade (120 points). The homework will count for 15% of the grade (60 points), and attendance will count for 5% of the grade (20 points).

Grading Scale: Please review the definitions of letter grades and the SDSU policies regarding grades on page 468-469 of the 2014-2015 General Catalog. The final course letter grade will be based on the following scale:

A	90%—100%
A-	85%—89%
B+	80%—84%
B	75%—79%
B-	70%—74%
C+	65%—69%
C	60%—64%
C-	50%—59%
D	40%—49%
F	0%—39%

The boundaries for the grades *may* be lowered at the discretion of the instructor. However, the boundaries will *not* be raised. In some cases, I may raise your grade by up to one mark (e.g., C- to C; B+ to A-, etc.) based on such subjective criteria as my sense of your overall enthusiasm for the class and course material. This can be demonstrated in many ways, including “class participation,” attendance, coming to office hours, evidence of effort and dedication, and so forth. Note that giving the sense that you are an engaged listener is considered to be just as important as actively contributing to the discussion. Although our class is large, questions during lecture are encouraged—don’t be afraid to put your hand up if something has confused you. Finally, note that I will never lower a grade that you have earned—your enthusiasm can only help you.

If you are taking the course with the “credit/no-credit” option, you need a C or above to earn the credit (see pages 468-469 of the 2014-2015 General Catalog). An incomplete grade (“I”) for the course will only be given in cases involving serious medical or legal issues. The entire responsibility for arranging to make up the lost work lies with the student.

Excused Absence Make-up Policies: In the case of missed exams, make-ups will only be considered under the most extreme circumstances may consist of an essay test.

Other Course Policies

Attendance Policy: I strongly encourage you to come to class, since you will find that it is *much* easier to do well in the course if you come to the lectures. Although the general *outline* of the course will more or less follow the textbook, some parts of the book will be emphasized more than others. Also, many lectures will contain supplemental material not found in the textbook.

To further encourage class attendance and participation, I will hand out sign-in sheets after certain lectures. The dates will not be announced in advance, and I will do this between 10 and 20 times in the semester. You can earn up to 20 points for the attendance component, based the fraction of classes attended:

80%—100% attendance	20 points
60%—79% attendance	16 points
40%—59% attendance	12 points
20%—39% attendance	8 points
10%—19% attendance	4 points
1%—9% attendance	1 point
no attendance	0 points

Note there are 26 lectures this semester *not counting the two days we have exams (see above)*. The two exam days will not be included in the attendance component.

Please note: **Signing another person's name on the attendance sheets constitutes fraud. If this happens, the guilty parties will receive automatic F's for the course and will be referred to the Judicial Procedures Office.**

Classroom Etiquette: I expect that the students will maintain a professional atmosphere and show respect to their fellow students.

In particular, the following is prohibited in the classroom:

- Cell phones, laptop computers and similar devices (please turn them off!).
- The reading of newspapers, magazines, etc.
- Talking above a whisper.
- Eating or drinking anything noisy.

Any form of behavior deemed to be inappropriate by the instructor will not be tolerated. A student will be advised once by the instructor that his/her behavior is inappropriate. The first time this inappropriate behavior is repeated, the matter will be turned over to the University's Judicial Procedures Office for appropriate disciplinary action.

Statement of Plagiarism:

Cheating in any form, which includes plagiarism (see page 479 of the University's 2014-2015 General Catalog for a definition), is a grave offense. Cheating will not be tolerated, and evidence of cheating by a student will result in an automatic "F" as that student's grade. Any evidence of cheating will be promptly reported to the Judicial Procedures Office.

Safety Issues

The CSU takes the issue of classroom and campus safety very seriously. The office of Business and Financial Affairs has set up a web site where SDSU staff, faculty, and students can find information about San Diego State University's emergency preparedness plan and opportunities for training on many aspects of the classroom/workplace. See <http://bfa.sdsu.edu/emergency/>.

In particular, please note the following:

Campus Safety:

- Be aware of your surroundings.
- If you see something suspicious, report it!
- If you have an emergency, call 911 from any phone on campus.
- Other incidents, call Campus Dispatch at 4-1911.
- In the evening, call Campus Escort if you would like an escort to your vehicle or campus dorm.

Classroom Safety

- If there is an emergency, stay calm, and follow the procedure in the flip book.
- Follow the Evacuation Route if you need to evacuate. *We evacuate to the Education Quad*, and a roll call will occur there. Please show up at the evacuation area since your absence from roll call could cause resources to be used that could be used to help others who may actually be in trouble.
- "Shelter in place" is usually called when a person that is carrying a weapon on campus has become violent and has injured others, or is threatening to injure others. Lock the door from outsiders, only open to the Department Safety Officer, PDS, or other officials of the University.

Note that during any emergency, *students should not use their cell phones*. The lines of communication are critical to keep open for emergency information. Only Staff and Faculty should keep their cell phones on, and only receive calls if the situation calls for it.

Get Started with Pearson's MasteringAstronomy

First, make sure you have these 3 things...

Email: You'll get some important emails from your instructor at this address.

Course ID: A Course ID looks something like MApprofessor12345. Ask your instructor for your Course ID!

Access code or credit card: The required access code comes either with your book or by itself at your bookstore. Alternatively, you can buy instant access with a credit card or PayPal account during registration



Next, get registered!

1. Go to www.masteringastronomy.com. Under the large **Register Now** section on the right side of the page, click the **Student** button.
2. Read the onscreen instructions and select your location. Next, check off whether or not you have a **Course ID**. If you have a **Course ID** code provided by your instructor, type it in and Click **Go**. If your course does not require an ID, Click on that radio button next to it and Click **Next**. Check with your professor to be sure.
3. Next, check off whether or not you have an **Access Code**. If you don't have an access code and want to purchase access, select your textbook and whether you want to purchase an eText. If purchasing access online, it is important to check with your professor to make sure you select the correct title, author, and edition so you can enroll successfully into the course.
4. Before continuing, make sure you read and accept the License Agreement. After this, either **Create** a new Pearson username/password, or, if you've already registered for another Pearson product (i.e. MyMathLab), enter that username/password. If you have an **Access Code**, enter it on the bottom of the page.
5. On the next page, fill out the appropriate information fields then click **Next**. If you entered an **Access Code**, you will be brought to a page from which you can access your product. If not, enter your payment information so that you can **Purchase Access**, after which you'll be granted access.
6. You are now registered! Now, it's time to enroll in your course. Click **Log In Now**. Enter your course ID. Enter your student ID if prompted. That's it!

Need help?

Visit www.masteringastronomy.com for:

- Helpful videos
- Frequently Asked Questions
- Set Up Your Computer

Or visit our 24/7 Technical Support site at <http://247pearsoned.custhelp.com>