

ASTRONOMY 101

Section 005

Introductory Astronomy

Scheduled Course Meeting: Monday and Wednesday evening, 7:00 - 8:15 PM,
LodeStar Astronomy Center - Domed Theater
1801 Mountain Road

Professor:

Dr. John T. McGraw
Physics & Astronomy 36
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277-2705 (office)
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TA:

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LodeStar:

Laurel, Jason and Amanda
NM Museum of Nat. History & Science
1801 Mountain Road NW
841-5955 (Information Hotline)
Web: <http://www.lodestar.unm.edu/>

Office Hours:

By appointment - please phone, email or see me or our TA. Wednesday evening after class I shall remain at the LodeStar Astronomy Center for class interactions, to answer questions and speak to students.

COURSE DESCRIPTION

Astronomy is a discipline based upon observation of the sky. It is an exciting exploration that supports the notion that “the universe is not only stranger than we know; it is stranger than we *can* know.” Because of its importance in founding society, astronomy represents an exploration undertaken by virtually every culture on the planet over the last 10 millennia. Now we’ll take our turn at learning about the sky.

In this course, using observations obtained with instruments ranging from our eyes to the most sophisticated ground- and space-based telescopes, we’ll learn about the objects we observe in the sky. Further, we’ll investigate the universe of these objects as a dynamic, evolving place. We’ll consider the evolution of stars and their planets, galaxies, and the universe itself. More usefully, perhaps, we’ll learn how scientists approach and solve problems, because many of these techniques usefully translate into problem-solving techniques useful in virtually any aspect of life.

All you need to bring is a healthy curiosity about the universe, a willingness to learn, and the open mind, responsibility and dedication of a true student.

Together we’ll have fun exploring, thinking, observing and learning about astronomy. I hope to share with you some of my love for and excitement about this most universal (literally!) of sciences.

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Class Format:

The class format is based on lectures delivered in the domed theater of the *LodeStar Astronomy Center* (LAC). We may hold class in other areas of LAC, or even in other locations if the opportunity for unique learning presents itself.

Textbook:

The required textbook is *UNIVERSE*, Eighth (or Seventh) Edition, by Roger A. Freedman and William J. Kaufmann III. It is available at the UNM Bookstore. Note that this text includes the Universe 8.0 CD-ROM and web-based learning activities that are engaging and useful for understanding key concepts.

The lectures will follow the text, though I'll also introduce additional material that might give new or different perspectives or the latest breaking news in astronomy. Please, *read your book regularly* – stay ahead of the lectures, and your learning experience and test preparation will benefit.

We will not, however, cover all of the material in the text, nor will we always explore in great depth all of the material we do cover – there simply isn't enough time in the semester for this. I selected this book because it is very inclusive of the latest developments in astronomy, and covers topics in sufficient depth that individuals can explore further on their own. This book provides a depth of understanding typical of someone interested in perhaps entering astronomy or other of the natural sciences as a career. This comprehensive text costs only a few dollars more than a limited version.

If we collectively do our jobs during this semester, many of you will end up reading this book from cover to cover and using the software resources long after the class is completed.

Homework:

There will be no scheduled homework, though I reserve the right to assign homework problems if a situation arises where homework would be instructive, necessary or fun. Homework will be critiqued, and/or graded. Any homework assigned will have relevance to the tests upon which grades will be based, so students who do well on homework will have an advantage during the tests.

Tests:

There will be a total of four tests, upon which will be based the majority of your grade. There will be three tests given during the semester, with the two highest scores counting towards your grade. The *tentative* schedule for these hour-long tests is 19 September, 22 October, and 14 November. Note that the exact dates of these tests can and will change. It is your responsibility to attend class to ensure that you know when the tests will actually be given!

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The **final examination** is scheduled for Monday, 10 December at 7:45 PM – 9:45 PM at the LodeStar Astronomy Center. Everyone *must* take the final. Recall that I will drop the lowest grade of the three prior tests.

Grading:

Grades will be given. They will be based upon the exams and other assignments. The professor or TA will grade all tests. Unannounced quizzes may be given and counted for credit towards the grade.

Grades for the course will be assigned on the basis of the percentage of correctly answered questions on the tests. Plus/minus grades will be used, as necessary. I also reserve the right to “curve” grades to ensure that testing is conducted at a level appropriate to learning. “Curving” cannot lower your grade, it can only improve it, and the curve is applied *only* at the end of the semester. Continuous, significant improvement throughout the semester will also warrant a higher grade.

Missed Tests:

We know that emergencies can and do occur. If you must miss a test, please let me know as soon as possible, but before the date of the test (if possible). There are no makeup tests for the first three hour exams. The test you miss will be the lowest, thus the one that is discarded for grading purposes.

Comments:

This course will be successful for me if *you* are successful. My purpose is to do the best job I can at enabling your understanding of the content, physical laws and evolution that created the universe we can observe. I also want to expose you to the techniques used by scientists, because critical thinking, skepticism and the ability to reason logically and quantitatively are extremely useful traits applicable in virtually any career.

We have responsibilities relative to each other. Perhaps the most important is communication. If you are having problems with the course, its content, or the professor, you need to speak to me about it immediately. The vast majority of problems are easily solved if addressed honestly and immediately. I shall treat you as a class and as individuals in the same honest and respectful manner, and I'm confident we shall have a very productive semester.

Finally, I believe that learning is fun. Research is fun. Discovery is fun. Astronomy is fun. I encourage you to discover the fun in what we do during this course. And believe me, I am always interested in talking about the positive aspects of this course and the universally engaging science we are addressing.

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7:00 - 8:15 PM, LodeStar Astronomy Center Domed Theater

Class	Date	Lecture Title	Textbook Chapter(s)
1	20-Aug-07	Introduction to the Course, "Astronomy and the Universe"	1
2	22-Aug-07	"Understanding the Night Sky: The Onset of Civilizations," Academic Ethics Quiz	2
3	27-Aug-07	"Science and You," "Eclipses and the Motion of the Moon"	3
4	29-Aug-07	"Gravitation and the Planet Dance"	4
	3-Sep-07	Labor Day - UNM Holiday	
5	5-Sep-07	"Art and Information: The Nature of Light"	5
6	10-Sep-07	"The Instrument That Changed Humanity - The Telescope"	6
7	12-Sep-07	"Comparative Planetology I: Our Solar System"	7
8	17-Sep-07	"Comparative Planetology II: The Origin of Our Solar System"	8
9	19-Sep-07	TEST 1	
10	24-Sep-07	"Rare Earth?"	9
11	26-Sep-07	"Earth's Companion - Our Moon"	10
12	1-Oct-07	"The Rocky Earth-like Worlds - Mercury, Venus and Mars"	11,12,13
13	3-Oct-07	"Lords of the Dance: The Gas Giant Planets of the Sun and Stars"	14, 16.1-16.8
14	8-Oct-07	"Worlds Upon Worlds: Astonishing Environments"	15
15	10-Oct-07	"Icy Worlds and the Detritus of the Solar System"	16.9,17
16	15-Oct-07	"The Source: Our Sun"	18
17	17-Oct-07	"It's Full of Stars!"	19
18	22-Oct-07	TEST 2	
19	24-Oct-07	"In the Stellar Nurseries"	20
20	29-Oct-07	"The Curious Life and Times of Stars"	21, 22
21	31-Oct-07	"Variable and Binary Stars Reveal All"	21.5, 21.6
22	5-Nov-07	"A Visit to the Stellar Necropolis"	22.4-22.10, 23, 24
23	7-Nov-07	"White Dwarfs, Neutron Stars and Black Holes"	23, 24
24	12-Nov-07	"Our Home in the Cosmos: The Milky Way"	25
25	14-Nov-07	TEST 3	
26	19-Nov-07	"As Grains of Sand: Galaxies"	26
27	21-Nov-07	"Quasars and Their Friends and Relatives"	27
28	26-Nov-07	"Once Upon a Time: The Origin of Our Universe"	28
29	28-Nov-07	"The Formative Years: Exploring the Early Universe"	29
30	3-Dec-07	"The Dark Universe"	
31	5-Dec-07	"Is There Intelligent Life in the Universe?"	30
32	10-Dec-07	FINAL EXAM (7:45 PM - 9:45 PM)	