

ASTRONOMY 101
Section 004

Introductory Astronomy

Scheduled Course Meeting: Monday and Wednesday evening, 6:00 - 7:15 PM,
NM Museum of Natural History & Science - Domed Theater
1801 Mountain Road – South Entrance (Doors open at ~5:45 pm)

Professor:

Neil McFadden & Dr. John McGraw
Physics & Astronomy 128
(NE corner Yale and Lomas)
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mcgraw@phys.unm.edu

Domed Theater:

Jim Greenhouse,
NM Museum of Nat. Hist. & Sci.
1801 Mountain Road NW
841-5955(Information Hotline)
www.nmnaturalhistory.org

Office Hours:

By appointment - please email or see Professor McFadden to schedule. If you need help or just want to chat, do not hesitate to ask.

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 university 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 science.

Class Format:

The class format is principally based on lectures, discussions and question/answer sessions held in the Domed Theater of the *NM Museum of Natural History and Science*. We may hold class in other areas of NMMNHS, or even in other locations if the opportunity for unique learning presents itself.

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Textbook:

The **required** textbook is “Astronomy,” by Andrew Fraknoi, David Morrison and Sidney Wolff. This book can be found for free in pdf form at <https://openstax.org/details/books/astronomy> or you can buy a printed copy from the UNM bookstore.

The lectures will generally 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. Your learning experience and test preparation will benefit.

Our goal is to help you understand the form and function of our universe. Note the word “help”: understanding is always yours to discover. Our job is to help optimize your discovery process.

We will not 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. This book 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. 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 other resources we provide long after the class is completed.

The book also points to other resources for those of you interested in astronomy and other sciences.

Homework:

There will be regular reading assignments and homework. Reading assignments should be completed BEFORE the class time. Homework assignments will be handed out at the beginning of lecture and will be turned in at the end of the same lecture. The material covered in each lecture should be sufficient to answer the homework by the end of that lecture. The homework will only count positively towards your final grade. The homework grade will count for up to 25% of any test grade. For example:

Billy has a 100% in his homework grade, a 75% on Test 1, a 100% on Test 2, a 100% on Test 3 and a 100% on Test 4, he would end up with a final grade of a 100% in the class. Billy’s homework score has improved his Test 1 score from a 75% to a 100%.

For your first homework assignment please email Professor McFadden the following:

- a link to the class website
- acknowledging that you understand the grading policy
- acknowledging that you know how what textbook we are using
- acknowledging that you know where to find a free copy
- AND acknowledging that you have read the whole syllabus

If the first homework assignment is not completed by the Spring drop date, 2/2/2018, we will consider your withdrawal from the class.

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Web Site:

Look at <http://physics.unm.edu/Courses/McFadden/> to find this syllabus, class lectures, and other astronomy resources and information about our class.

Tests:

There will be a total of four tests, each of which will be 25% each of your grade. The fourth test will be a comprehensive test that will be longer than the previous three tests. You must take the fourth exam in order to pass the class. The *tentative* schedule for these hour-long tests is Feb 12, March 7, April 9, May 7. 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!

Grading:

Grades will be given. They will be based upon the tests and in class homework. Grades for the course will be assigned on the basis of the percentage of correctly answered questions on the tests. I 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. Continuous, significant improvement throughout the semester will also warrant a higher grade.

Missed Tests:

We know that emergencies can and do occur. At our discretion, we **may** allow a makeup test. Make-up tests will be given **within one week** of the missed exam, no exceptions.

Observing:

A 16-inch telescope will be available for observing the sky after many of our classes. These observations, with tutoring by an expert observer, will count towards the observing requirements of ASTR-101L, the laboratory class that, when taken with ASTR-101 (not necessarily concurrently), fulfills the A&S science requirement.

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.

Communication about the class, special events, scheduling and announcements will be made by email. Please ensure that I have your “best” email address so you get all notices and information. Valid communication is bidirectional. Thus, you are responsible for communicating with me, too!

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Lecture schedule:

	Topic	Reading
15 Jan	MLK Day- No Lecture	
17 Jan	Introduction -- Quick Tour of the Universe	
22 Jan	Science and the Universe	Chapter 1
24 Jan	The Birth of Astronomy	Chapter 2
29 Jan	Orbits and Gravity	Chapter 3
31 Jan	The Earth, Moon, and Sky	Chapter 4
5 Feb	The Electromagnetic Spectrum	Chapter 5
7 Feb	Astronomical Instruments/Test 1 review	Chapter 6
12 Feb	Test 1	Chapter 1-6
14 Feb	Introduction to the Solar System	Chapter 7
19 Feb	Earth	Chapter 8
21 Feb	The Moon and Mercury	Chapter 9
26 Feb	Venus and Mars	Chapter 10
28 Feb	The Jovian Planets	Chapter 11
5 March	The Moons of Sol	Chapter 12
7 March	The Origin of our Solar System/ Test 2 review	Chapter 14
12 March	SPRING BREAK	
14 March	SPRING BREAK	
19 March	Test 2	Chapters 7-14
21 March	The Sun	Chapter 15-16
26 March	Measuring the Stars	Chapter 17-19
28 March	The Interstellar Medium	Chapter 20
2 April	Stellar Evolution part 1	Chapter 21
4 April	Stellar Evolution part 2	Chapter 22
9 April	Star Death/ General Relativity	Chapter 23-24
11 April	Test 3	Chapters 15-24
16 April	The Milky Way Galaxy / Galaxies	Chapter 25-26
18 April	Active Galaxies and Galactic Structure	Chapter 27-28
23 April	Dark Matter from a Particle Physics Approach	
25 April	Cosmology	Chapter 29
30 April	Life in the Universe	Chapter 30
2 May	Test 4 Review	
9 May	Test 4 6:00-8:00 pm in STEM classroom	Chapters 1-30