

**Course Syllabus**  
**PHYS 101: Astronomy of Stars, Galaxies, and the Universe**  
**Spring 2012**

**Instructor:** Dr. Glenn Piner  
**Office:** Science 105E (office) or 105A (lab)  
**Office Hours:** M, W 1:00-3:00 (but drop by anytime)  
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**Class Hours:** Tu, Th 3:00-4:20, Science 116  
**Text:** Your Cosmic Context by Todd Duncan and Craig Tyler  
**Materials:** Scientific Calculator (TI-30Xa or equivalent, nothing fancy needed, but must be able to do scientific notation)

<b>Grading:</b>	First Exam:	17.5%
	Second Exam	17.5%
	Third Exam	17.5%
	Homework:	17.5%
	<b><u>Exam &amp; Homework Total 70%</u></b>	
	Reading Quizzes	10%
	In-Class Activities	10%
	Attendance	10%
	<b><u>In-Class &amp; Reading Total 30%</u></b>	

Date	Topic	Assigned Reading
1/26	Introduction	
1/31	Scientific Method and Mathematics Review	Chapter 1
2/2	Scientific Method and Mathematics Review (continued)	
2/7	The Sky We See from Earth	Chapter 2
2/9	The Sky We See from Earth (continued)	
2/14	Physics of Heat and Light	Chapter 3
2/16	Physics of Heat and Light (continued)	
2/21	Physics of Motion and Gravity	Chapter 4
2/23	Physics of Motion and Gravity (continued)	
2/28	Introductory Cosmology	Chapter 5
3/1	<b>First Exam on Chapters 1-4</b>	
3/6	Introductory Cosmology (continued)	
3/8	General Relativity and Spacetime	Chapter 6

Date	Topic	Assigned Reading
3/13	General Relativity and Spacetime (continued)	
3/15	The First Pillar: The Expansion of the Universe	Chapter 7
3/20	The Expansion of the Universe (continued)	
3/22	The Second Pillar: The Cosmic Microwave Background	Chapter 8
4/3	The Cosmic Microwave Background (continued)	
4/5	The Third Pillar: The Abundances of the Elements	Chapter 9
4/10	<b>Second Exam on Chapters 5-8</b>	
4/12	The Abundances of the Elements (continued)	
4/17	The Big Bang Theory	Chapter 10
4/19	The Big Bang Theory (continued)	
4/24	History and Future of the Universe	Chapter 11
4/26	History and Future of the Universe (continued)	
5/1	What does it All Mean (if anything)?	Chapter 14
5/4	<b>Third Exam on Chapters 9-11, 14, 1:00-3:00PM</b>	

**Overview:** PHYS 101 is the second part of a yearlong general education course in astronomy. The first part (PHYS 100) is taught in the fall, and covers observational astronomy and the planets of the solar system. The second part (PHYS 101) is taught in the spring, and covers mainly cosmology, or the study of the universe as a whole. Neither course is a prerequisite for the other, and you may take either one or both, in any order.

This course covers the “Big Questions” that physicists and astronomers ask about the universe: How old is it? How big is it? What is it made of? Where did it come from? What was it like in the past? What will it be like in the future? By the end of this course you should have a good idea of how scientists can attempt to answer these questions, how much we currently know, and how much we have left to find out. Because we deal with very large distances in this class, there is not very much that is accessible to the naked eye or small telescopes. Thus, this course has less of an emphasis on independent observations than does PHYS 100. If you would like to learn to observe the sky by eye and with small telescopes, and learn about the planets, then PHYS 100 is also recommended.

**Attendance:** Attendance is important, particularly since the topics in this course will be new to many of you. Attendance will be taken every class, and will count for 10% of the final grade.

**Reading:** The assigned reading is to be completed before the class period that it is listed with, so that we can discuss it in class. Five pop reading quizzes will be given on the readings, to make sure that you are keeping up. The reading quizzes will consist of five multiple-choice questions that should be easy if you have done the reading. The reading quizzes will be given on the day a chapter of the reading is due, for example, a reading quiz on Chapter 3 might be given on February 14. The reading quizzes will count for 10% of the final grade.

Be aware that reading a science text is not like reading a novel. You will need to read each assigned chapter slowly and carefully, think about it, and then read it again. The number of pages assigned per week is small (about 30 pages per week), so that you can spend the needed time with it.

**Homework:** Homework will be assigned roughly weekly, one assignment per chapter. Partial credit will be given for incorrect problems, but you must at least try the problem and show your work. Don't just read a problem and then give up, try your hardest to work out a solution. Homework solutions will be posted on the course web page.

**Late Homework Policy:** Late homework will ONLY be accepted up to 1 week from the due date for half credit.

**Star Party:** There will be an overnight star party in Joshua Tree National Park the night of Friday, March 16, where we will be setting up the department's telescopes to observe the moon, planets, stars, galaxies, and other objects far from city lights. While not required, it is highly recommended that you take advantage of this opportunity to observe the sky through real telescopes. Students attending this event will receive extra credit equal to one homework.

**Liberal Education Program:** This course satisfies the Communications I (Quantitative) requirement of the Liberal Education Program. This means that the course will use math regularly, as is necessary for a comprehensive understanding of the universe. Mathematics through algebra and geometry will be used, but no trigonometry or calculus. You are assumed to know basic algebra and geometry, as demonstrated by passing the Math Placement Exam, or having completed a college MATH class. Because we will work with very large and very small numbers, a scientific calculator is needed. Below are the objectives and the expected outcomes of a Communications I class, from the Liberal Education Program website:

Objectives and Outcomes for the Liberal Education Program:

According to a report by a Mathematics Association of America committee, the level of sophistication and maturity of thinking expected of a college student should extend to a capability for quantitative reasoning which is commensurate with the college experience. College students should be expected to go beyond routine problem solving to handle problem situations of greater complexity and diversity, and to connect ideas and procedures more readily with other topics both within and outside mathematics.

A quantitatively literate college graduate should be able to:

1. Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.
2. Represent mathematical information symbolically, visually, numerically, and verbally.
3. Use arithmetical, algebraic, geometric and statistical methods to solve problems.
4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.
5. Recognize that mathematical and statistical methods have some limitations.