Spring 2019

PHYS 202-006: Introductory Astronomy and Cosmology

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New Jersey Institute of Technology
College of Science and Liberal Arts
Department of Physics
Introductory Astronomy and Cosmology, Section 006
Phys 202–006
Spring 2019
Mondays, 10:00 a.m. to 11:20 a.m. **Kupfrian Hall, Room 202**
Thursdays, 10:00 a.m. to 11:20 a.m. **Kupfrian Hall, Room 202**

Textbook

Jeffrey Bennett, Megan Donahue, Nicholas Schneider, and Mark Voit. *The Cosmic Perspective Fundamentals*, Second Edition. Pearson Education, Inc., United States of America, 2015.

Grade

Your final grade will be based upon three examinations (25% each) and one Final Examination (25%). The examinations will be administered on the following dates.

First Examination	Thursday, February 14, 2019
Second Examination	Thursday, March 14, 2019
Third Examination	Monday, April 22, 2019
Final Examination	to be announced

If you miss an examination, you will receive a grade of zero that will be calculated into your final grade. There are no make-up examinations. The following table will determine your final grade.

85% to 100%	A
80% to 84%	B+
70% to 79%	B
65% to 69%	C+
50% to 64%	C
40% to 49%	D
0% to 39%	F

The examination grades will not be curved, nor will the final grades be curved. Each examination, including the Final Examination, will consist of multiple-choice and/or true-false questions, all of which will come directly from topics discussed in class and/or topics discussed in the textbook. Each examination, including the Final Examination, will be closed book and closed notes. No formula sheet or cheat sheet will be provided, nor will either be permitted for any of the examinations.

Introductory Astronomy and Cosmology (Phys 202) and Introductory Astronomy and Cosmology Laboratory (Phys 202A) are two separate courses for which you will receive two separate and independently-determined grades. Moreover, you are free to be registered for either one of these courses without being registered for the other course. If you are registered for both courses, withdrawal from one course does not mean you must withdraw from the other course.

Learning Objectives and Outcomes

comprehend our place in the universe
describe the size of the universe, and relate this size to everyday human experience
describe the age of the universe, and relate this age to everyday human experience
understand various astronomical coordinate systems
analyze the changes in the sky from different locations on the Earth
recall the brightest stars in the sky and several constellations in the sky
comprehend the electromagnetic spectrum
use the Doppler Effect to analyze blueshifts and redshifts
understand the laws of optics, and use them to construct telescopes
comprehend atomic theory, including subatomic particles
analyze different types of spectra
describe the changes in perspective that led to the Copernican revolution
apply Kepler's laws to explain observations of planetary motion
describe Newton's model of the universe, including Newton's laws and Newton's theory of gravitation
describe the origin of the Solar System, and explain how this model explains the properties planets
comprehend the geology and the atmospheric processes of the terrestrial planets
analyze the Jovian planetary systems as microcosms of the entire Solar System
discuss the minor objects of the Solar System, including asteroids, meteoroids, comets, and dust
describe the properties of the Sun
analyze the interior of the Sun, including the nuclear reactions in its core
analyze other stars in the context of the Hertzsprung-Russell diagram
use the Hertzsprung-Russell diagram to discuss the birth, evolution, and death of stars
evaluate various Hertzsprung-Russell diagrams for different types of star clusters
analyze the evolution of binary star systems
describe Einstein's model of the universe (both Special Relativity Theory and General Relativity Theory)
describe the properties of the Milky Way galaxy
analyze other galaxies in the context of the Hubble sequence
discuss various theories of the birth, evolution, and death of galaxies
describe the large-scale structure of the universe
explain the evidence, both theoretical and observational, for the expansion of the universe
calculate the age of the universe from the Hubble law
formulate the Big Bang model of cosmology
comprehend theories on the frontiers of theoretical physics
explain the history of the universe