New Jersey Institute of Technology
College of Science and Liberal Arts
Department of Physics
Introductory Astronomy and Cosmology, Section 002
PHYS 202-002
Spring 2017

Thursdays	**10:00AM – 11:25AM**	**Kupfrian Hall 118**
Fridays	**10:00AM – 11:25AM**	**Kupfrian Hall 118**

Instructor

Prof Alexander Kosovichev
507 Cullimore Hall
alexander.g.kosovichev@njit.edu
973-596-3491

Textbook

The Cosmic Perspective Fundamentals (2nd Edition)
Author(s): Jeffrey Bennett; Megan Donahue; Nicholas Schneider; Mark Voit
ISBN-13: 9780133889567
https://www.vitalsource.com/products/cosmic-perspective-fundamentals-the-2-e-bennett-jeffrey-o-v9780133919813

Grade

Your final grade will be based upon homework, quizzes, class participation, four examinations, and one Final Examination.

The examinations will be administered on the following dates.

First Examination	Thursday, February 9, 2017
Second Examination	Friday, March 3, 2017
Third Examination	Thursday, April 6, 2017
Fourth Examination	Friday, April 28, 2017
Final Examination	to be announced (during May 5-11)

There will be no "make-up" quizzes or examinations. If you miss a quiz or an examination, you will receive a grade of zero for that quiz or examination. The grades you earn will determine your final grade based on the following table.

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 homework grades will not be "curved," nor will the quiz grades be "curved." The examination grades will not be "curved," nor will the final grades be "curved." The homework, the quizzes, and the examinations will cover topics discussed in class and/or topics discussed in the textbook. The Final Examination will cover the entire course's material. Each quiz and each 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.

Academic Integrity

Any student who is disruptive in the classroom will be in violation of the Academic Honor Code and will be reported to the Dean of Student Services. Any student who cheats during a quiz or an examination will be in violation of the Academic Honor Code. The student will automatically fail the course and will be reported to the Dean of Student Services so that further action may be taken. Examples of cheating during a quiz or an examination include, but are not limited to, talking with another student, copying work from another student's work, allowing another student to copy work from your own work, or use of any materials besides the examination paper and a writing utensil.

Syllabus

Thursday	19-Jan	Lec 1 Our place in the Universe (Chapter One)
Friday	20-Jan	Lec 2 Basic patterns and motions on the sky (Chapter Two)
Thursday	26-Jan	Lec 3 Light, the electromagnetic spectrum, photons, and telescopes (p.43,80,132)
Friday	27-Jan	Lec 4 Atoms and atomic spectra (p.152)
Thursday	2-Feb	Lec 5 Early models of the Universe (Chapter Three)
Friday	3-Feb	Lec 6 The Newtonian model of the Universe (Chapter Three)
Thursday	9-Feb	**First Examination**
Friday	10-Feb	Lec 7 Introduction to the Solar System (Chapter Four)
Thursday	16-Feb	Lec 8 The Earth-Moon system (Chapter Five)
Friday	17-Feb	Lec 9 Histories of the terrestrial worlds (Chapter Five)
Thursday	23-Feb	Lec 10 Global warming (Chapter Five)
Friday	24-Feb	Lec 11 The Jovian worlds of the Solar System (Chapter Six)
Thursday	2-Mar	Lec 12 The minor objects of the Solar System (Chapter Six)
Friday	3-Mar	**Second Examination**
Thursday	9-Mar	Lec 13 Our star, the Sun (Chapter Eight)
Friday	10-Mar	Lec 14 Stars and their properties (Chapter Eight)
Thursday	23-Mar	Lec 15 Stars and stellar evolution (Chapter Eight)
Friday	24-Mar	Lec 16 Star formation (Chapter Nine)
Thursday	30-Mar	Lec 17 Star death (Chapter Nine)
Friday	31-Mar	Lec 18 Neutron Stars and Black Holes (Chapter Ten)
Thursday	6-Apr	**Third Examination**
Friday	7-Apr	Lec 19 Einstein's two theories of relativity (Chapter Ten)
Thursday	13-Apr	Lec 20 Our galaxy, the Milky Way Galaxy (Chapter Eleven)
Thursday	20-Apr	Lec 21 Galaxies beyond the Milky Way (Chapter Eleven)
Friday	21-Apr	Lec 22 Galaxy evolution & the big bang (Chapters Twelve and Thirteen)
Thursday	27-Apr	Lec 23 Dark matter and dark energy (Chapter Fourteen)
Friday	28-Apr	**Fourth Examination**
Tuesday	2-May	Review
Thursday	4-May	Reading Day

Final Exam date to be announced (5-11 May)

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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 every day 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 redshifts and blueshifts.
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 the special relativity and the general relativity theories).
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.