PHYSICS 416: Cosmology

Spring 2023

Instructor:	Dr. Ivan Padilla	**Time:**	MW 10:00 – 11:15
Email:	padilla@jhu.edu	**Place:**	Interdisciplinary Life S 302

Course overview

Cosmology, the study of the Universe, its birth and evolution, is currently experiencing a tremendous renaissance, mostly due to a plethora of new observations such as those of the Cosmic Microwave Background (CMB) by recent missions such as WMAP (NASA) and Planck (a joint NASA and ESA mission). This introduction to modern cosmology discusses the Big Bang, the expanding Universe and the basic cosmological parameters describing it, the dynamics of our Universe, dominated by some unspecified dark matter and dark energy, arguments for an early inflationary period, the formation of light elements in the early Universe, and the wealth of information we extract from measurements of the CMB. By the time the semester is over, you will have an up-to-date knowledge of the evolving state of affairs in cosmology, of the things we are pretty sure we understand, as well as of the open issues that arguably make cosmology the most exiting area of physics and astronomy. We will focus our efforts on understanding the concepts of cosmology, their observational foundation, their range of applicability and their limitations. Beyond the required textbook (see below), we will make use of articles from journals such as "Scientific American", and "Science", and specialized astrophysics journals, as well as of web pages from various institutes and universities. The goal of the semester will be to cover the entire Ryden textbook, in addition to any outside material.

Main Reference: Barbara Ryden, *Introduction to Cosmology*,Cambridge University Press; 2nd edition (November 24, 2016) ISBN:1107154839. **(Note: Second Edition is required! Cosmology has changed a lot in 10 years).**

Office Hours: MW 8:30 – 10:00* Interdisciplinary Life S 302 (*subject to change).

Prerequisites: PHYS 324 or Instructor Permission

Late Homework/Missed exam Policy: Homework is due **before** the beginning of class the week after it is assigned. Late homework will not be accepted. When computing your final grade, your lowest homework score will be dropped.

NOTE: Clear handwriting, proper English grammar and syntax, as well as logical flow of your arguments and no missing steps are required in all exams and homeworks. If you cannot write neatly and legibly, you will be asked to type your homeworks.

Grading scale: A standard grading scale (with no curve) will be used. Thus 89.5-100 is an A, 79.5-89.4 is a B, etc.

Grading Scheme: There are two grading schemes. The one that gives you the highest grade will be automatically applied to you.

1. Homework (50%), Midterm (25%), Final (25%).
2. Homework (20%), Midterm (30%), Final (50%).

Important Dates:

First class	Jan 30
Last day to drop a course without a W grade	Feb 10
Mid-term Exam	March 15
Spring Break	March 19-26
Last class	May 15
Final Exam*	May 18-24

Academic Integrity: By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.