AST 347 Fall 2025 Syllabus

Lecturer

Prof. Will M. Farr

Contact

- Email: will.farr@stonybrook.edu
- Office: ESS 457B
- Course Materials are Accessible via Brightspace

Class Times

0930 to 1050 Mondays and Wednesdays in Chemistry 128

Office Hours

Tuesdays, 1200 to 1500, ESS 457B

Course Grade

- 70% Problem Sets. Problem sets will be periodically assigned throughout the course; you will have at least one week to complete each problem set. Late submissions will incur a penalty of 10% per day. I will drop the lowest two problem set scores before averaging the remaining scores with equal weight to compute this portion of the grade. Problem sets will be announced and turned in via Brightspace.
- 30% Final Project. In place of an exam, students will submit a final project. The final project will involve a significant research component and will be due during the final exam period. The topic and modality will be determined by the student in consultation with the instructor. Examples of possible final projects include:
  - A code package or library with documentation and test cases that implements calculations described in the course (e.g. a calculator of cosmological distance measures, as in Astropy Cosmology).
  - A reproduction of the plots / results from a paper we discuss in class based on a public data set (e.g. the Pantheon+ Supernova Data Set).
  - A review article (in Scientific American style, for example) on a topic of modern cosmology as discussed in class, with references to the primary literature.
  - A white paper discussing a next-generation astronomical observatory or other laboratory facility that is would significantly advance the present state-of-the-art in cosmology. The paper should identify the main scientific goals of the facility and discuss the engineering constraints and tradeoffs involved in its design and implementation.

Course Textbook

Introduction to Cosmology, 2nd Edition, by Barbara Ryden (Cambridge University Press, 2017). ISBN: 978-1-107-66541-6. The textbook is **required** for the course; we will be following the structure and presentation of the material in this text closely, and working problems primarily out of this text.

Course Topics

- Fundamental Observations
- Intro to Spacetime Curvature
- Cosmic Dynamics
- Single-Component Universes
- Multi-Component Universes
- Measuring Cosmological Parameters

- Dark Matter
- The Cosmic Microwave Background
- Nucleosynthesis and the Early Universe
- Inflation and the Very Early Universe
- The Formation of Structure

Grading Scale

Grading scale with grade thresholds: A 93-100; A- 90-92; B+ 87-89; B 83-86; B- 80-82; C+ 77-79; C 74-76; C- 72-74; D+ 70-72; D 60-69; F 0-59

NOTE: These letter grades are threshold scores only. Actual final scores needed to earn a certain letter grade may be lowered if warranted based on the difficulty of the course. In other words, if your final total points in the course equal 93%, you will not earn less than an A; however, the threshold for an A may be lower.

Student Accessibility Support Center Statement

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Professions, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Criticial Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.