**East China Normal University**
**GEC International Summer School**

**PHY 13: Introductory Astronomy**

**Term: June 16th to July 18th, 2025**
**Class Hours: Monday through Friday, 110 minutes each day (2,750 minutes in total)**
**Instructor: Ozeas Costa**
**Home Institution: TBD**
**Office hours: TBD**
**Email: TBD**

## *Course Description*

This course focuses on the newest discoveries in astronomy and the latest developments in space exploration. Topics covered include: our location in the universe, the Solar System, and its planetary bodies, how they orbit the Sun, and their major properties.
We explore how thousands of exoplanets have been discovered in other planetary systems, and if alien life is possible on those planets. We describe the mode of operation of telescope technology of the biggest observatories on earth. We explain the properties of stars, and their evolution from nebulae to final objects such as black holes. We distinguish between the different morphologies of galaxies and explore their properties. We discuss the big bang and the birth of the universe and explore potential scenarios for the end of the universe. We investigate dark matter and dark energy, and the roles they play in the universe expansion.
By the end of this course, students should have a clear understanding of how our universe works, and how astronomical discovery is linked to the technical and cultural progress of civilization.

*Prerequisite: None*

### *Required Text*

The Cosmic Perspective Fundamentals, 2nd edition (2016), by J. Bennet, M. Donahue, N. Schneider, M. Voit.

ISBN: 978-0133889567.

### *Course Hours*

The course has 25 class sessions in total. Each class session is 110 minutes in length, for a total of 2750 minutes of in-class time. The course meets from Monday to Friday. ECNU awards 3 credits for this course. Different universities may count course credits differently. Consult officials at your own home institution.

### *Attendance*

Summer school is very intense and to be successful, students need to attend *every class*. Occasionally, due to illness or other unavoidable circumstance, a student may need to miss a class. ECNU policy requires a medical certificate to be excused. Any absence may impact on the student's grade. Moreover, ECNU policy is that a student who has more than 3 absences will fail the course. Arriving late or leaving early will count as a partial absence.

### *Grading Policy*

ECNU awards grades of A, A-, B+, B, B-, C+, C, D, and F. Most colleges and universities do not award transfer credit for grades of D or F.

In this course, grading will be based on the following:

| | |
|---|---|
| Attendance/participation | 5% |
| Assignments*5 | 5%*5=25% |
| Quizzes*3 | 5%*3=15% |
| Midterm Exam | 25% |
| Final Exam | 30% |

### *General Expectations*

Students are expected to:

- Attend all classes and be responsible for all material covered in class and otherwise assigned. Any unexcused absence may impact a student's grade.
- Arrive to class on-time: Late arrivals are disruptive to your fellow students and to the conduct of the class.
- Complete the day's required reading and assignments before class
- Review the previous day's notes before class; make notes about questions you have about the previous class or the day's reading
- Refrain from texting, phoning or engaging in computer activities unrelated to class during class (不要用手机) It is highly disrespectful to the professor and to the class.
- Participate in class discussions and complete required written work on time.

***Course Schedule***

The planned schedule sketched out below may be modified to suit the interests or abilities of the enrolled students or to take advantage of special opportunities or events that may arise during the term.

*Week 1*

- *Day 1*
  - *Course outline*
  - *A Modern View of the Universe (Chapter 1)*
- *Day 2*
  - *Understanding the Sky–Seasons, Moon, Planetary Motion (Chapter 2)*
- *Day 3*
  - *Changes in Our Perspective–Universe, Telescopes, Gravity (Chapter 3)*
- *Day 4*
  - *Changes in Our Perspective–Universe, Telescopes, Gravity (Chapter 3) - continued*
- *Day 5*
  - *Hunting the Edge of Space–Part 1 (NOVA-PBS)*
  - *Assignment 1 due*

*Week 2*

- *Day 1*
  - *The Solar System (Chapter 4)*
  - *Quiz 1*
- *Day 2*
  - *The Solar System (Chapter 4) - continued*
- *Day 3*
  - *The Terrestrial Planets (Chpater 5)*
- *Day 4*
  - *The Terrestrial Planets (Chpater 5) – continued*
  - *The Outer Solar System (Chpater 6)*
- *Day 5*
  - *Origins–Earth is Born (NOVA-PBS)*
  - *Assignment 2 due*

*Week 3*

- *Day 1*
  - *Extrasolar Planets (Chapter 7)*
  - *Quiz 2*
- *Day 2*
  - *The Sun and other Stars (Chapter 8)*
- *Day 3*
  - *Stellar Lifecycles (Chapter 9)*
- *Day 4*
  - *Midterm review session*
- *Day 5*
  - *Midterm exam (covering Chapters 1-8)*
  - *Assignment 3 due*

*Week 4*

- *Day 1*
  - *White Dwarfs, Neutron Stars, Black Holes (Chapter 10)*
- *Day 2*
  - *The Milky Way and Other Galaxies (Chapter 11)*
-
- *Day 3*

  - *Cosmic Distances and Hubble's Law (Chapter 12)*
- *Day 4*
  - *Big Bang Theory and the Birth of the Universe (Chapter 13)*
- *Day 5*
  - *Dark Matter and Dark Energy (Chapter 14)*
  - *Quiz 3*
  - *Assignment 4 due*

*Week 5*

- *Day 1*
  - *Hunting the Edge of Space–Part 2 (NOVA-PBS)*
- *Day 2*
  - *Life in the Universe (Chapter 15)*
- *Day 3*
  - *Origins–How Life Began (NOVA-PBS)*
- *Day 4*
  - *Final review session*
  - *Assignment 5 due*
- *Day 5*
  - *Final exam*

### *Academic Honesty*

Students are expected to maintain high standards of academic honesty. Specifically, unless otherwise directed by the professor, students may not consult other students, books, notes, electronic devices or any other source, on examinations. Failure to abide by this may result in a zero on the examination, or even failure in the course.