暨南大學 JINAN UNIVERSITY

Summer 2021

0702P150

Introduction to Astronomy

Instructor: TBA
Time: June 14, 2021-July 16, 2021
Office Hours: 2 hours (according to the teaching schedule)
Contact Hours: 60 (50 minutes each)
Credits: 4
E-mail: TBA

Course Description

The main emphasis of Introduction to Astronomy will be on the newest discoveries in astronomy and the latest developments in space exploration. This course offers a general survey of many topics in modern astronomy. We discuss 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 on 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 human civilization.

Required Textbook(s)

The Cosmic Perspective Fundamentals, 2nd edition (2016), by J. Bennet, M. Donahue, N. Schneider, M. Voit. Publisher: Pearson. ISBN-13: 978-0133889567.

Prerequisites

No prerequisites

Mode of Delivery

This course is 100% online. All course content – including video lectures and chapter review quizzes – will be delivered through the Moodle online platform .

There are no required face-to-face sessions, but students are **expected to follow a week-by-week schedule** as outlined in the **course schedule** below. To help students keep up with the pace, all course activities listed in the schedule have deadline dates by which coursework should be completed.

Weekly **synchronous (live) online meetings** will be used for recitation sessions (group exercises) and for instructor office hours. These live sessions will occur through Zoom, a FREE online cloud platform for video and audio conferencing. Schedules and details of these meetings will be distributed during the first week of classes.

Course Requirements

The following is a summary of everyone's expectations in this online course:

- Students are expected to **complete all required readings** prior to watching the video lectures and working on the chapter review quizzes, as indicated in the **course schedule** below;
- Students are expected to **watch all video lectures** and complete the associated review quizzes by the listed deadlines. Homework submitted late (after the deadline) may not be accepted.
- Students are expected to **log in regularly to the course website on Moodle** to check for updates and download course material.
- Students are expected to **attend the weekly recitation sessions** (on Zoom) for work in the group exercises. Tentative dates for these sessions are listed in the **course schedule** below.
- Class Conduct: **Consistent, respectful, and informed participation** is expected from every student in the course.

Course Schedule

Please note: the schedule is meant to give an overview of the major concepts and activities in this course. Changes may occur in the schedule as needed to aid in the student`s development.

Week	Reading or activity	Topics of videos and lectures	Review quiz	Deadline
Week 1	Ch 1 A Modern View of the Universe	1.1. Our place in the universe	Chapter 1 review quiz	Mon.
		1.2. Measuring astronomical distances		
		1.3. How big is the universe?		
		1.4. Hubble and the expanding universe		
		1.5. Hunting the edge of space		
		1.6. Defining planets		
	Ch 2 Understanding the Sky	2.1. Constellations in the sky	Chapter 2 review quiz	Tue.
		2.2. What causes the seasons?		
		2.3. The Milankovitch Cycles		
		2.4. Phases of the Moon		
		2.5. Solar and Lunar eclipses		
		2.6. Planetary motions		
	Ch 3 Changes in Our Perspective	3.1. The history of Astronomy	Chapter 3 review quiz	Wed.
		3.2. The geocentric universe		
		3.3. The Copernican revolution		
		3.4. Kepler's laws of planetary motion		
		3.5. The universal law of gravitation		
		3.6. Our current view of the universe		
	Feature-length video	Hunting the Edge of Space – Part 1	Video Quiz #1	Thur.
	Group exercise #1	Astronomical measurements (sizes, distances, mass, motion)	Via Zoom	Fri.

Week	Reading or activity	Topics of videos and lectures	Review quiz	Deadline
Week 2	Ch 4 Origins of the Solar System	4.1. The Solar System	Chapter 4 review quiz	Mon.
		4.2. The nebular theory		
		4.3. Terrestrial and Jovian planets		
		4.4. Asteroid belt and Oort clouds		
		4.5. Patterns in the Solar System		
		4.6. The age of the Solar System		
	Ch 5 Terrestrial Worlds	5.1. Planetary interiors and surfaces	Chapter 5 review quiz	Tue.
		5.2. Iron catastrophe & magnetosphere		
		5.3. Planetary geological activity		
		5.4. Cratering, volcanism, tectonics, erosion		
		5.5. Geological histories of planets		
		5.6. Planetary atmospheres		
	Ch 6 The Outer Solar System	6.1. Inside Jovian planets	Chapter 6 review quiz	Wed.
		6.2. Jovian atmospheres and weather		
		6.3. Magnetosphere of Jovian planets		
		6.4. Jovian ring systems		
		6.5. Jovian moons and satellites		
		6.6. Asteroids, comets, and dwarf planets		
	Feature-length video	Origins – Earth is Born	Video Quiz #2	Thur.
	Group exercise #2	Terrestrial and celestial coordinates (seasons and the ecliptic)	Via Zoom	Fri.

Week	Reading or activity	Topics of videos and lectures	Review quiz	Deadline
Week 3	Ch 7 Planets Around Other Stars	7.1. Finding extrasolar planets	Chapter 7 review quiz	Mon.
		7.2. Kepler mission & the transit method		
		7.3. Properties of extrasolar planets		
		7.4. Revisiting the nebular theory		
		7.5. Finding Earth-like planets		
		7.6. The future of planet hunting		
	Ch 8 The Sun and Other Stars	8.1. Properties of the Sun	Chapter 8 review quiz	Tue.
		8.2. The Sun's internal structure		
		8.3. The Sun's energy balance		
		8.4. Solar activity: sunspots and flares		
		8.5. Properties of other stars		
		8.6. Patterns among stars		
	Ch 9 Stellar Lifecycles	9.1. The birth of stars: Where & Why	Chapter 9 review quiz	Wed.
		9.2. Star-forming clouds		
		9.3. Stellar energy balance		
		9.4. Birth stages on a life track		
		9.5. Death of a low-mass star		
		9.6. Death of a high-mass star		
	Exam	Mid-Term Exam (Chapters 1-9)	Exam	Thur.
	Group exercise #3	Searching Extrasolar Planets (radial velocity and transit)	Via Zoom	Fri.

Week	Reading or activity	Topics of videos and lectures	Review quiz	Deadline
Week 4	Ch 10 The Stellar Graveyard	10.1. White Dwarfs	Chapter 10 review quiz	Mon.
		10.2. White dwarf in close binary system		
		10.3. Novas and supernovas		
		10.4. Neutron stars and pulsars		
		10.5. Black holes		
		10.6. Singularities and the limit of gravity		
	Ch 11 Galaxies	11.1. The Milky Way revealed	Chapter 11 review quiz	Tue.
		11.2. Structure of the Milky Way		
		11.3. Galactic recycling		
		11.4. Star clusters		
		11.5. Types of galaxies		
		11.6. The galactic center		
	Ch 12 Cosmic Distances and Galaxy Evolution	12.1. Measuring distances to galaxies	Chapter 12 review quiz	Wed.
		12.2. The period-luminosity relationship		
		12.3. Hubble's Law		
		12.4. Lookback time		
		12.5. The observable universe		
		12.6. Galaxy evolution		
	Ch 13 Big Bang and the Birth of the Universe	13.1. The early universe conditions	Chapter 13 review quiz	Thur.
		13.2. The four universal forces		
		13.3. From particles to galaxies		
		13.4. Evidence for the Big Bang		
		13.5. The Big Bang and Inflation		
		13.6. WMAP and the universe structure		
	Group exercise #4	Spectrum, Spectral Classification, and Luminosity of Distant Stars	Via Zoom	Fri.

Week	Reading or activity	Topics of videos and lectures	Review quiz	Deadline
Week 5	Ch 14 Dark Matter and Dark Energy	14.1. Dark matter and visible matter	Chapter 14 review quiz	Mon.
		14.2. Dark matter and gravity		
		14.3. Evidence for dark matter		
		14.4. Dark matter & galaxy formation		
		14.5. Dark energy & universe expansion		
		14.6. The fate of the universe		
	Feature-length video	Hunting the Edge of Space – Part 2	Video Quiz #3	Tue.
	Ch 15 Life in the Universe	15.1. Life on Earth: When and How	Chapter 15 review quiz	Wed.
		15.2. A brief history of life on Earth		
		15.3. The building blocks of life		
		15.4. Life in the Solar System		
		15.5. Life around other stars		
		15.6. Search for extraterrestrial intelligence		
	Feature-length video	Origins – How Life Began	Video Quiz #4	Thur.
	Exam	Final Exam (Chapters 1-15)	Exam	Fri.

Grading Policy

Your final grade is based on the following components:

Type	**Percentage**
Chapter Quizzes	20% of grade
Video Quizzes	10% of grade
Group Exercises	20% of grade
Midterm Exam	20% of grade
Final Exam	30% of grade
Total	**100%**

Grading Scale

The instructor will use the grading system as applied by JNU:

Definition	Letter Grade	Score
Excellent	A	90~100
Good	B	80~89
Satisfactory	C	70~79
Poor	D	60~69
Failed	E	Below 60

Academic Integrity

As members of the Jinan University academic community, students are expected to be honest in all their academic coursework and activities. Academic dishonesty, includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e., misrepresenting as one's own work any work done by another; submitting the same paper, or a substantially similar paper, to meet the requirements of more than one course without the approval and consent of the instructors concerned; or sabotaging other students' work within these general definitions. Instructors, however, determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any portion of the academic work face penalties that range from the lowering of their course grade to receiving a failing grade (E) in the course.