

# Astronomy

## COURSE DESCRIPTION

### **Astronomy: Exploring the Universe**

Why do stars twinkle? Is it possible to fall into a black hole? Will the sun ever stop shining? Since the first glimpse of the night sky, humans have been fascinated with the stars, planets, and universe that surrounds us. This course will introduce students to the study of astronomy, including its history and development, basic scientific laws of motion and gravity, the concepts of modern astronomy, and the methods used by astronomers to learn more about the universe. Additional topics include the solar system, the Milky Way and other galaxies, and the sun and stars. Using online tools, students will examine the life cycle of stars, the properties of planets, and the exploration of space.

## COURSE METHODOLOGY

- This is an inquiry-based course. Students will generate knowledge through online readings, synchronous chats, asynchronous discussions with students and their instructor, interactions with online tutorials, and online and hands-on simulations.
- A semester project developed by each student will be used to demonstrate knowledge and understanding of the material in the course.
- The instructor will act as a guide, a facilitator, an events planner, and a resource advisor. He/she will always be available through e-mail.
- The student must actively construct and acquire knowledge by being intrinsically motivated to succeed. To succeed, students must participate and complete all readings and activities. This course requires the student's active participation.
- Both formal and informal assessment methods will be used in the course. Informal assessment will include an evaluation of the quality and timeliness of participation in class activities. Formal assessment may include multiple-choice quizzes, tests, discussion board participation, and written assignments. A final exam will be given at the end of the course.

## COURSE PARTICIPATION OBJECTIVES

This course for which you are registered is a college preparatory, academically rigorous course that covers an entire semester's worth of material. As such, it is important that you adhere to the following guidelines as you manage your time and commit to successfully completing all required coursework:

1. The requirements for this course are equivalent to completion of minimum of 90+ hours of class instruction at a traditional on-site high school

2. Assignments must be submitted for each unit as they are completed so that the teacher may review and assess your performance. Do not hold your work, you must submit each unit's homework as it is completed, demonstrating weekly assignment completions
3. You must log in regularly to your course to demonstrate continued participation, and completion of all course requirements, including assignments, assessments and discussion forums
4. You must complete your individual work and any incident of suspected cheating, plagiarism or collaboration on assignments violates the academic integrity expectations outlined at the time of your enrollment and can result in failure of the course or further action as deemed appropriate

### **Citizenship**

Students are expected to conduct themselves in a responsible manner that reflects sound ethics, honor, and good citizenship. It is the student's responsibility to maintain academic honesty and integrity and to manifest their commitment to the goals of NUVHS through their conduct and behavior. Students are expected to abide by all NUVHS policies and regulations. Any form of academic dishonesty, or inappropriate conduct by students or applicants may result in penalties ranging from warning to dismissal, as deemed appropriate by NUVHS.

### **Communication**

Throughout this course students will need to be in close contact with their instructor and fellow students. Students are expected to communicate via email and electronic discussion boards. Therefore, students should plan on checking email at least three times a week and participate in the discussion boards during the weeks they are live.

Instructors strongly encourage and welcome open communication. Clear, consistent, and proactive communication will ensure a successful experience in this course. It is the student's responsibility to notify the instructor immediately if and when a personal situation occurs that affects his/her performance in this class. Being proactive with communication will result in a quick solution to any problems that may occur.

**COURSE OUTLINE**

**Unit 1: The Earth, Moon, and Sun Systems**

Day turns into night, and Summer turns into Fall. Why do we experience these predictable changes on Earth? In this introductory unit of Astronomy I, we will explore the systems and interactions between the Sun, Earth, and Moon. You will learn how the Earth’s motion in space causes us to experience days, nights, and seasons in a cyclic pattern. We will discuss the properties of gravity and how gravity affects the relationships between orbiting bodies in space. You will discover how solar and lunar eclipses occur and examine the characteristics, origin, and phases of the Moon.

**Learning Objectives**

- Learn about the interactions between the Sun, Earth, and Moon.
- Describe how the motion of the Earth causes seasons and night-day cycles.
- Identify the characteristics and phases of the moon.
- Explore how the moon’s gravitational pull manipulates tides on Earth.
- Distinguish between a lunar eclipse and a solar eclipse.

**Activities**

Unit 1 Text Questions	Homework	10 points
Unit 1 Lab Questions	Homework	10 points
Unit 1 Discussion Part 1	Discussion	5 points
Unit 1 Discussion Part 2	Discussion	5 points
Unit 1 Quiz	Quiz	15 points

**Unit 2: The Universe**

In this unit we will take a journey through space and time from the beginning to the end of the universe. Can you think of anything larger or more expansive than the universe? How was the universe created? How is the universe changing? What exactly is our universe made from? These are all questions that scientists have been trying to answer since the idea of a universe was formed in the minds of our earliest cosmologists. Astronomers and other scientists have since accumulated a great deal of knowledge about what has happened—and what is currently happening—since the inception of the universe. Scientists study how the universe is dynamically evolving and its possible demise in the distant future.

In this unit you will explore cosmology, the study of our infinitely expanding home, the universe. You will discover the theory behind how the universe began and how it has evolved, or changed, to become the universe we know today. We will discuss what makes up the matter in our universe and the components and distribution of this matter. Finally, we will examine the possible fates, or even death, of our universe.

**Learning Objectives**

- Describe the study of the cosmos.
- Discuss the theory of the origin of the universe.
- Examine the evidence that supports the big bang theory.
- Examine the composition of matter and how it is distributed within the universe.
- Describe the theories of evolution and fate of the universe.

**Activities**

Unit 2 Text Questions	Homework	10 points
Unit 2 Lab Questions	Homework	10 points
Unit 2 Discussion Part 1	Discussion	5 points
Unit 2 Discussion Part 2	Discussion	5 points
Unit 2 Quiz	Quiz	15 points

**Unit 3: Stars**

What are stars? Where did they come from? Will stars evolve with time? In this unit you will discover the secrets behind the stars in our night sky. We will solve the mystery behind why and how stars shine. We will explore the characteristics and composition of stars. You will learn how astronomers classify types of stars using the H-R diagram and how stars are identified within the celestial sphere. Finally, we will examine the evolution, or life cycle, of a star from conception to death.

**Learning Objectives**

- Describe the composition and characteristics of stars.
- Learn how astronomers identify and describe constellations such as Ursa Major, Ursa Minor, Orion, and Cassiopeia.
- Analyze and characterize stars by their physical and chemical properties.
- Explain the use of diagrams and models in obtaining physical data on stars.
- Examine the evolution of stars.

**Activities**

Unit 3 Text Questions	Homework	10 points
Unit 3 Lab Questions	Homework	10 points
Unit 3 Discussion Part 1	Discussion	5 points
Unit 3 Discussion Part 2	Discussion	5 points
Unit 3 Quiz	Quiz	15 points

**Unit 4: Galaxies**

Galaxies are beautiful, majestic, and mysterious places within our universe. Our home in the Milky Way galaxy is a galactic suburb, far from other galaxies. Our Sun is just one of approximately 500 billion stars in our galaxy, meaning that there could possibly be up to 500 billion solar systems, maybe like our own, in the universe. In addition, the Milky Way galaxy is only one of the 50 billion to one trillion galaxies that are thought to exist in our observable universe. Compared with the whole universe, our home, Earth, is like a speck of sand in the largest desert imaginable.

In this unit, we will examine and describe the evolution, organization, distribution, and differences among types of galaxies. You will be able to characterize the movement of galaxies within the universe and describe the properties of our own galaxy, the Milky Way. Finally, we will discover the incredibly mysterious and dark forces that shift and shape galaxies.

**Learning Objectives**

- Differentiate and describe the types of galaxies within the universe.
- Characterize the Milky Way.
- Identify how galaxies are organized and distributed within the universe.
- Describe the evolution of galaxies.
- Examine the forces that shape galaxies of stars.

**Activities**

Unit 4 Text Questions	Homework	10 points
Unit 4 Lab Questions	Homework	10 points
Unit 4 Discussion Part 1	Discussion	5 points
Unit 4 Discussion Part 2	Discussion	5 points
Unit 4 Quiz	Quiz	15 points

**Midterm Exam Objectives**

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from the first four units in this course (Note: You will be able to open this exam only one time.)

**Midterm Exam Activities**

Midterm Discussion	Discussion	5 points
Midterm Exam	Exam	50 points

**Unit 5: Inner Planets**

The inner planets of our solar system are more closely related than the outer planets of the solar system. These planets are sometimes referred to as terrestrial planets and include Mercury, Venus, Earth, and Mars. Although all of these planets are notably rocky and dense, each one is unique.

In this unit, we will examine the formation of our solar system and describe the unique features of the four inner planets, Mercury, Venus, Earth, and Mars. We will compare and contrast the characteristics of the inner planets. Finally, you will discover the special attributes that make life on Earth possible.

**Learning Objectives**

- Describe how planetary matter is distributed within the solar system.
- Explain the formation of the solar system.
- Differentiate and describe the inner planets within our solar system.
- Identify the shared characteristics among all inner planets in the solar system.
- Explain the features of Earth that are essential to the development of life.

**Activities**

Unit 5 Text Questions	Homework	10 points
Unit 5 Lab Questions	Homework	10 points
Unit 5 Discussion Part 1	Discussion	5 points
Unit 5 Discussion Part 2	Discussion	5 points
Unit 5 Quiz	Quiz	15 points

**Unit 6: Outer Planets**

In this unit, we will examine the outer planets, Jupiter, Saturn, Uranus, and Neptune. We'll learn more about their structure, motion, atmosphere, and moons. We'll examine what space expeditions, observations, and mathematical predictions are telling us about these distant planets and their roles in our Solar System. Finally, we will learn more about the dwarf planet Pluto and examine the controversy over Pluto's reclassification as a dwarf planet from its former classification as our Solar System's ninth planet.

**Learning Objectives**

- Differentiate and describe the unique characteristics of the outer planets in the Solar System.
- Identify the shared features and characteristics among the outer planets in the Solar System.
- Describe the arrangement and distances between the outer planets.
- Explain why Pluto is no longer classified as a true planet of the Solar System.
- Compare and contrast the outer planets with Earth.

**Activities**

Unit 6 Text Questions	Homework	10 points
Unit 6 Lab Questions	Homework	10 points
Unit 6 Discussion Part 1	Discussion	5 points
Unit 6 Discussion Part 2	Discussion	5 points
Unit 6 Quiz	Quiz	15 points



**Unit 7: The Sun**

The Sun plays one of the most important roles in our Solar System and certainly life on Earth. In this unit, we will learn more about this closest star to Earth. We'll discuss the structure and composition of the Sun, including the different layers of the Sun's atmosphere. We'll also learn how the Sun creates energy through nuclear fusion and the process by which this takes place. Finally, we'll learn more about solar weather and the events that take place in and around the Sun, including sunspots, solar flares, and coronal mass ejections.

**Learning Objectives**

- Identify the five regions of the Sun.
- Discuss the structure and composition of the Sun.
- Learn about nuclear fusion in the Sun, including the proton-proton chain reaction.
- Examine solar activity, such as sunspots and solar flares.
- Define and discusses solar eclipses.

**Activities**

Unit 7 Text Questions	Homework	10 points
Unit 7 Lab Questions	Homework	10 points
Unit 7 Discussion Part 1	Discussion	5 points
Unit 7 Discussion Part 2	Discussion	5 points
Unit 7 Quiz	Quiz	15 points

**Unit 8: Comets, Asteroids, and Meteors**

In this unit, we will examine comets, asteroids and meteors. Although smaller than the Sun, Moon, and planets, these celestial bodies are an important part of our Solar System. They can also produce dramatic visions in the Earth’s skies and have the potential to collide with the Earth. We’ll consider their composition, structure, and function in our Solar System.

**Learning Objectives**

- Define comet, asteroid, meteoroid, meteor, and meteorite.
- Examine the origin of comets and how their tails form.
- Discuss the location of asteroids in the Solar System.
- Learn about the different types of meteorites.
- Investigate how comets, asteroids, and meteorites influence life on Earth.

**Activities**

Unit 8 Text Questions	Homework	10 points
Unit 8 Lab Questions	Homework	10 points
Unit 8 Discussion Part 1	Discussion	5 points
Unit 8 Discussion Part 2	Discussion	5 points
Unit 8 Quiz	Quiz	15 points

**Final Exam Objectives**

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from units five to eight in this course – the last four units.  
(Note: You will be able to open this exam only one time.)

**Final Exam Activities**

Class Reflection Discussion	Discussion	10 points
Final Exam	Exam	50 points

**HOW YOU WILL BE GRADED**

**For critical thinking questions**, there are no right or wrong answers. For example, a question on your thoughts on why you think people are shy is a pretty open-ended type of question. Grades will be based on the depth of personal insight you present. **Do not simply agree or disagree** with an insight question. We are looking for critical thinking and possibly a related personal experience with the question.

**It is important to provide detailed answers for insight/opinion questions.**

**For review questions**, you should produce a more academic answer. For example, "What two categories are norms divided into?" This type of direct question requires a specific answer. Please use full sentences and proper grammar.

**When submitting paragraphs**, use these guidelines.

1. The first, second or last sentence contains the main idea and key words from the question or assigned topic.
2. Paragraph contains one to three explanatory sentences.
3. Paragraph contains two to four sentences about specific details related to question.
4. Details are colorful, interesting and appropriate.
5. Paragraph ends with a good closing sentence that refers to the main idea without repeating it.
6. Free of spelling and grammatical errors.

**GRADE SCALE**

The following grading scale will be used to determine your final letter grade.

Letter Grade	Percentage Earned
A	95%+
A-	90% - 94.9%
B+	87% - 89.9%
B	84% - 86.9%
B-	80% - 83.9%
C+	77% - 79.9%
C	74% - 76.9%
C-	70% - 73.9%
D+	67% - 69.9%
D	64% - 66.9%
D -	60% - 63.9%
F	59% and lower

## **SUPPORT**

At NUVHS you will have access to multiple support teams. Who you contact will depend on the questions you have. Always start by contacting your teacher through the Message Center in the course. Your teacher should be able to answer your question, but if they can't, then they will direct you to another support team. If you have questions about any of the course content, your grades, or course policies, you should contact your instructor.

For questions about your enrollment, transcripts, or general school-wide policies, you can contact **NUVHS Student Services** at [info@nuvhs.org](mailto:info@nuvhs.org) or by phone at 866.366.8847. For example, if you would like to withdraw from your course, you should contact Student Services. Please note that a refund for your course can only be obtained if you drop within the first seven days of enrolling in the course.

For help with login/password issues, or other technical issues specific to the Blackboard website, you can contact the team at [National University Blackboard Learn](#). They can also be reached by phone at (888) 892-9095.

## **EXPECTED SCHOOL-WIDE LEARNING RESULTS (ESLRs)**

### **Engaged Learners**

- Demonstrate self-directed learning skills such as time management, and personal responsibility through the completion of course requirements
- Develop an understanding of their own preferred learning styles to enhance their overall academic potential
- Incorporate effective and relevant internet and multimedia resources in their learning process to broaden their knowledge base

### **Critical Thinkers**

- Effectively analyze and articulate sound opinions on a variety of complex concepts
- Illustrate a variety of problem-solving strategies that strengthen college preparation and workforce readiness
- Formulate a framework for applying a variety of technology and internet-based research to enhance information literacy and collaborative thinking

### **Effective Communicators**

- Demonstrate awareness and sensitivity to tone and voice in multiple forms of communication
- Express concepts and ideas in a variety of forms
- Enhance communication skills through the use of media rich or other technology resources

**Global Citizens**

- Appreciate the value of diversity
- Understand the range of local and international issues facing today's global community
- Demonstrate awareness of the importance of cultural sensitivity and social responsibility in the 21st century