

***Discover the Universe***  
**AST-1002**  
**Section 1069, Fall 2015**

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**Instructor:** Dr. Francisco Reyes

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**Office hours:** Tuesday 12:00-1:30 PM, Thursday 2:00-3:30 PM (Or by appointment)

**Class web site:** [www.astro.ufl.edu/~freyes/classes/ast1002/index.htm](http://www.astro.ufl.edu/~freyes/classes/ast1002/index.htm)

**Lecture time and place:** Tuesday 4<sup>th</sup> period (10:40- 11:30 AM) and Thursday 4<sup>th</sup>-5<sup>th</sup> periods (10:40 AM – 12:35 PM), PUGH 170

**Required Text:** *Astronomy: A Beginner's Guide to the Universe*, Seventh Edition by Chaisson & McMillan, Pearson Press.

**Pre-requisites and Co-requisites:** None

**Credits:** 3

**Course Content:** This course offers a broad overview of modern astronomy. We will examine how observation, experimentation and exploration have led to our present day understanding of the universe we live in. Although this is essentially a non-mathematical science course, a very basic knowledge of mathematics is required. Our goal is to help you gain a physical understanding and an appreciation of the cosmos and more generally of scientific method. Along the way, we will also use and practice critical thinking skills. This course is primarily for those not majoring in physical science or mathematics. (P)

The topics we will cover include:

- Motions of the sky
- A historical development of our understanding of the solar system: An example of the scientific method
- Light and telescopes
- The properties of the planets within our solar system
- The nature and lives of stars
- The nature of our Milky Way Galaxy
- Properties of other galaxies
- The origin and fate of the Universe
- The search for extraterrestrial life.

**General Education:**

AST 1002, Discover the Universe, is a GenEd physical science (P) course. As the list of topics above demonstrates, the course covers not only the Universe and the bodies in it -- planets, moons, stars, galaxies, etc. -- but also how we know about those things, making

use of our understanding of the underlying physics of orbits and radiation.

**Course and Gen Ed Learning Objectives:**

- To introduce students to the basic concepts of astronomy & astrophysics, providing an overview of modern astronomy.
- To teach students the scientific process and how we can understand the universe using basic physical laws derived on Earth.
- To teach scientific reasoning and improve scientific literacy. Scientific reasoning - the use of logic, observations, and critical thinking to interpret the world around you is a skill will serve you well in your daily lives regardless of what career you pursue. Likewise, literacy in the basic concepts and terminology of science is necessary if you wish to follow science stories in the news or make informed decisions (such as voting) on issues that pertain to science.
- Communicate scientific ideas clearly and effectively using oral, written or graphic forms.

**Grading Information:**

Your grade for the course will be based on the following:

In class exams – (2 exams -15% each)	<b>30%</b>
Cumulative Final Exam	<b>30%</b>
Observing Project	<b>20%</b>
Homework, Quizzes, or small projects	<b>20%</b>

**Grading scale:**

Letter Grade	% Points	GPA	Letter Grade	% Points	GPA	Letter Grade	% Points	GPA
A	≥90	4.0	B-	77 - 79	2.67	D+	64 - 66	1.33
A-	87 - 89	3.67	C+	74 - 76	2.33	D	60 - 63	1.0
B+	84 - 86	3.33	C	70 - 73	2.0	D-	56 - 59	0.67
B	80 - 83	3.0	C-	67 - 69	1.67	E	≤ 55	0

**Examinations** (60% of grade): Two in-class examinations will be given during the semester. Each of these in-class exams will be worth 15% of your grade. The Final exam (30% of grade) will be comprehensive and given during final period. The in-class exams and final will each consist primarily of multiple-choice questions.

**Telescope Observing Project (20%):** One of the most enjoyable aspects of Astronomy is actually observing the sky either with the eyes, binoculars or a telescope. Students are expected to attend an observing session at the campus observatory. These take place every clear Friday evening during the semester (directions to the observatory and times are provided in lecture and on the class web site). You must complete an observing form (download from the class web site) describing what the objects that you observe through

the telescopes actually look like and explaining their astronomical significance. You must also obtain a special token from the staff at the observatory and attach it to your form. Remember to put your name on your form. This report will be graded and will contribute to 20% of your grade. *Do not wait until the due date - it may be cloudy!*

### **Homework, Quizzes and Small Projects:**

Homework, quizzes, and small projects to facilitate and reinforce students understanding of the course material and encourage critical thinking will be assigned in each section. The content of this work will be at the discretion of the individual instructor for each section of the course

### **Attendance, Class Participation and Conduct Policy:**

- Attendance at lectures is expected.
- Students should arrive on time and not get ready to leave until the lecture is finished.
- Reading assignments will be given approximately once each week. These will consist of reading pages/chapters from the textbook. Students will read material that will be covered by the lecture the following week.
- In order to stimulate critical thinking and gauge how well you understand the material, questions based on the lectures, reading assignments and projects/homework will be posed in class. Students should participate in the lecture by answering these questions and also by asking your own questions.
- *Use of mobile phones and computers (for purposes other than note-taking) are prohibited during the lectures*

### **Make-up Policy:**

Students are expected to complete all requirements by the specified due dates. If a student misses class or an assignment due to an excused absence as specified in the undergraduate catalog and provides the instructor with timely notification, they will be allowed a reasonable time to make up the missed work. The format of a make-up test/exam will be at the discretion of the instructor.

### **Course Evaluations:**

Students are expected to provide feedback on the quality of this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last few weeks of the semester, and an announcement will be made when they are open. A summary of the results of the assessment can be found at <https://evaluations.ufl.edu/results/>.

### **Academic Honesty Policy:**

- This is an excerpt from the Academic Honesty Guidelines and Student Conduct Code in the University of Florida Undergraduate Catalog:
  - “Academic Honesty: The university requires all members of its community to be honest in all endeavors. A fundamental principle is that

the whole process of learning and pursuit of knowledge are diminished by cheating, plagiarism, and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff, and administrators who practice dishonest or demeaning behavior.”

- Cheating is not tolerated in this class. Everyone in this class is expected to follow the University of Florida Honor Code: *We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.* Any student caught cheating will automatically fail the course and the case will be referred to the Honor Code Chancellor.
- On all work submitted for credit by students at the university, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

#### **Accommodations for Students with Disabilities:**

- Students who require a classroom accommodation for a disability are required by UF policy to arrange accommodations themselves when needed.
- Students must first contact the Dean of Students Office of Disability Resources in Peabody 202 (phone: 352-392-1261). Please see the University of Florida Disability Resources website for more information at: <http://www.dso.ufl.edu/drp/services/>.
- The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

#### **UF Counseling Services:**

- On-campus resources are available at the UF Counseling & Wellness Center (392-1575) for students experiencing personal or stress related problems.

#### **Exams, critical and important dates**

- Review for Exam #1, Thursday October 8<sup>th</sup>
- Deadline for Homework #1, part 2, Thursday October 8<sup>th</sup>
- Exam #1 Tuesday October 13<sup>th</sup>
- Deadline for Telescope observing project (A-J) Thursday October 15<sup>th</sup>
- Review for Exam #2 Thursday November 5<sup>th</sup>
- Deadline for Homework #2, part 2, Thursday November 5<sup>th</sup>
- Exam #2 Tuesday November 10<sup>th</sup>
- Deadline for Telescope observing project (K-T) Thursday November 12<sup>th</sup>
- Deadline for Telescope observing project (U-Z), Thursday November 19<sup>th</sup>

- Review for Final Exam Tuesday December 8<sup>th</sup>
- Deadline for Homework #3, part 2, December 8<sup>th</sup>
- Final exam, Friday December 18<sup>th</sup> at 7:30 AM

**Tentative Course & Lecture Schedule (Subject to Change)**

<b>Lecture Date</b>	<b>Lecture Content</b>	<b>Weekly Reading Assignment</b>
<b>Week 1</b>	Charting the Heavens – An introduction to basic concepts in astronomy such as distances, constellations, Sun-Moon-Earth configurations that result in Moon phases and Solar and Lunar eclipses	Chapter 0
<b>Week 2</b>	The Copernican Revolution. Modern Astronomy & Understanding the Solar System – Learn how the scientific method has been used over hundreds of years to interpret the motions of planets and understand the nature of our Solar System	Chapter 1
<b>Week 3</b>	Properties of Light and Matter & Tools of Astronomy – Learn the nature of light and how astronomers observe various light wavelengths with telescopes to learn about astrophysical phenomena	Chap 2,3
<b>Week 4</b>	Earth & Moon – Learn about the Earth and Moon as well as their relationship to each other and Moon exploration	Chap 5
<b>Week 5</b>	Terrestrial Planets – Properties of the inner planets are discussed and compared to Earth	Chap 6
<b>Week 6</b>	Jovian Planets – Properties of the outer gas giants are discussed and compared to Earth	Chap 7
<b>Week 7</b>	Moons, Rings, and Plutoids–Learn about the nature of these other constituents of the Solar System which reveal clues about our planetary system and formation	Chap 8
<b>Week 8</b>	Formation of the Solar System – Asteroids, Meteors & Comets. Using the scientific method and observations discussed in this class, we discuss likely scenarios for the formation of our Solar System and the origin of these small bodies. Planets beyond the solar system. Detection and properties of exoplanets	Chap 4

<b>Week 10</b>	Measuring and Properties of Stars – Learn the properties of stars and how they are measured, including some distance determination techniques. Discover how color-magnitude diagrams are used to determine ages and binary star systems to estimate stellar masses.	Chap 10
<b>Week 11</b>	Sun, Nuclear Fusion and the Interstellar Medium – Properties of the Sun and the process of nuclear fusion are discussed. Learn properties of the material between the stars known as the ISM	Chap 9,11
<b>Week 12</b>	Star Formation & Stellar Evolution – Discover how the stars form out of the ISM. Follow the timeline for a typical, Sun-like star from infancy to death	Chap 12
<b>Week 13</b>	Stellar Remnants, White Dwarfs, Neutron Stars & Black Holes – Learn about the dense remnants of high mass stars and discuss the unusual gravitational effects observed near Black Holes	Chap 13
<b>Week 14</b>	The Milky Way & other Galaxies – Learn the properties of our Milky Way galaxy and how the scientific method has been used to learn the nature of this large system of stars, gas and dust. Discover the different types of galaxies in the Universe and how they compare to the Milky Way	Chap 14,15
<b>Week 15</b>	Galaxies & Dark Matter – Discover the importance of dark matter and how it has been identified in galaxies and larger scale structures. Learn about galaxy interactions and mergers and galaxy evolution	Chap 16
<b>Week 16</b>	Cosmology & Life in the Universe – Learn how we observe the effects of the Big Bang around us today including the cosmic microwave background, universal expansion and acceleration, the curvature of space and the formation of structure, leading to the existence of life in the Universe	Chap 17,18
<b>Exam Week</b>	<b>Final Exam</b>	Cumulative – all chapters