Discover the Universe
AST-1002
Class # 24610, Section 208F
Fall 2021

Instructor: Professor Elizabeth Lada
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Course Website: Canvas/eLearning
Lecture time: Tuesday Period 4(10:40AM-11:30AM), Thursday Period 4-5 (10:40AM–12:35 PM)
Lecture Location: Pugh 170
Office hours: Tuesday 2:00-3:00 PM (in person or online), Wednesday online 3:00 to 4pm (online only) or by appointment.
Zoom Office Hours Meeting Information:
https://ufl.zoom.us/j/97433036509?pwd=U0FWaUxpRW0yKy9DQzFvVDY4V3NOZz09
Meeting ID: 974 3303 6509
Passcode: 887277

TA: TBD

Required Text: *Astronomy: A Beginner's Guide to the Universe*, Ninth Edition by Chaisson & McMillan, Pearson Press with Mastering Astronomy. "Mastering Astronomy" will be used for all the homework and is also required. You may purchase the e-copy of the book that includes access to "Mastering Astronomy". Doing this through UFAllAccess, which will provide you with your access code, is highly recommended. See Canvas site for Pearson office hours and instructions on access.

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 and learn how to formulate empirically testable hypotheses. (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:
This course meets the requirements for a General Education physical science (P) course. Physical Science courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the physical sciences. Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern physical systems. Students will formulate empirically-testable hypotheses derived from the study of physical processes, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments. A minimum grade of "C" is required for general education credit.

General Education Student Learning Outcomes:
- Students demonstrate competence in the terminology, concepts, methodologies and theories used within the discipline.
- Students communicate knowledge, ideas, and reasoning clearly and effectively in written or oral forms appropriate to the discipline.
- Students analyze information carefully and logically from multiple perspectives, using discipline specific methods, and develop reasoned solutions to problems.

Course Learning Objectives:

- To provide students with a broad overview of modern astronomy. This will be accomplished through lectures and weekly reading assignments. Students will be able to define common astronomical terms and explain basic concepts and theories for a range of astrophysical phenomena.

- To teach the students the scientific process and how we can understand the Universe using basic physical laws derived on Earth. This will be accomplished through lectures and in-class discussions as well as homework assignments. Students will gain an understanding of how the scientific method is applied to the field of astronomy.

- To review the major scientific developments in astronomy and summarize their impacts on society and our environment such as recognizing our place in the Universe, comparing energy sources, and how atmospheric effects of planets influence climate change. Students will be able to critically evaluate the

difference between good science and bad science. Evaluations will be based on in-class discussions, exams and an observing project.

- To teach scientific reasoning. Scientific reasoning is the use of logic, observations, and critical thinking to interpret the world around you. This will be accomplished through in-class discussions, homework assignments and the observing project. Students will formulate empirically-testable hypotheses derived from the study of physical process and phenomena and apply logical reasoning skills through scientific criticism and argument. These skills will serve you well in your daily lives regardless of what career you pursue.

- To improve the scientific literacy. Literacy is the basic concepts and terminology of science is necessary if you which to follow science stories in the news or make informed decisions (such as voting) on issues that pertain to science. This will be accomplished through in-class discussions about current news topics in astronomy and as part of the observing project.

- To help students learn to communicate scientific ideas clearly and effectively using oral, written or graphic forms. This will be done through in-class discussions (oral) and as the written component of the observing project.

Grading Information:
See https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx for general UF grading policies. Your grade for the course will be based on the following:

In class exams – (2 exams -15% each)	**30%**
Cumulative Final Exam	**25%**
Observing Project	**20%**
Homework, Quizzes, Class Participation	**25%**

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 (55% 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 dates of these exams are **Tuesday, September 28, 2021** and **Tuesday, November 2, 2021**. The Final exam (25% of grade) will be comprehensive and given during final period on Thursday, **December 15, 2021 from 7:30 to 9:30AM** in Pugh 170. These exams will test the student's content knowledge but will emphasize applying critical thinking skills.

Class Project (20%): One of the most enjoyable aspects of Astronomy is actually observing the sky either with the eyes, binoculars or a telescope. An observing project will be assigned in the first few weeks of the semester. ***Do not wait until the due date - it may be cloudy!***

Homework, Quizzes and Class Participation (25%):
Homework will be used during the semester to facilitate and reinforce students understanding of the course material and encourage critical thinking.

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, activities and worksheets based on the lectures, reading assignments and projects/ homework will be carried out in class. The frequency of these activities is at the discretions of the instructor and will count toward the class participation grade. Students should also participate in the lecture by answering 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 and documentation, 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 professional and respectful 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 with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodations. Students with disabilities should follow this procedure as early as possible in the semester.

UF Counseling Services:

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

Health and Wellness

- *U Matter, We Care*: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.
- *Counseling and Wellness Center*: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.
- *Student Health Care Center*: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.
- *University Police Department*: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- *UF Health Shands Emergency Room / Trauma Center:* For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road,

Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

Academic Resources

- *E-learning technical support*: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
- *Career Connections Center*: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
- *Library Support*: Various ways to receive assistance with respect to using the libraries or finding resources.
- *Teaching Center*: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring.
- *Writing Studio:* 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
- *Student Complaints On-Campus*: Visit the Student Honor Code and Student Conduct Code webpage for more information.
- *On-Line Students Complaints*: View the Distance Learning Student Complaint Process.

Exams, critical and important dates

- Exam #1, Tuesday, September 28, 2021 in class Pugh 170
- Exam #2 Tuesday, Nov. 2, 2021 in class Pugh 170
- Final Exam, Thursday December 15, 2021 at 7:30 AM (Pugh 170)
- The homework and the deadline for homework will be announced on canvas

Tentative Course & Lecture Schedule (Subject to Change)

Lecture Date	Lecture Content	Weekly Reading Assignment
Week 1 & 2	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 1
Week 3 & 4	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 2
Week 5	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 3, 4, 5
Week 6 & 7	Earth & Moon – Learn about the Earth and Moon as well as their relationship to each other and Moon exploration	Chap 6,7,8,
Week 8	Terrestrial Planets – Properties of the inner planets are discussed and compared to Earth	Chap 8,9,10
Week 9	Jovian Planets – Properties of the outer gas giants are discussed and compared to Earth	Chap 11,12,13
Week 10	Plutoids, asteroids, meteoroids, comets –Learn about the nature of these other constituents of the Solar System which reveal clues about our planetary system and formation. Exoplanets	Chap 14, 15
Week 11	Sun	Chap 16
Week 12	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 17
Week 13	Interstellar Medium and Star Formation – Discover where and how stars form. Stellar Evolution – Follow the timeline for a typical star from infancy to death	Chap 18 - 22
Week 14 & 15	The Milky Way & other Galaxies – Learn the properties of our Milky Way galaxy and how the scientific method has been used to learn	Chap 23-25

	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. 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	
Week 16	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 26-28