Syllabus for AST 1002 (#11493)
Discovering the Universe
Fall 2024

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Office: 211 Bryant Space Science Center
Class Periods: MWF Period 7 (11:45-12:35)
Office Hours: M Period 8 (12:50-1:40),
W Period 9 (1:55-2:45)

Online Course Information: Handouts and additional information can be found on the course Canvas page. Homework assignments will be online through the Mastering Astronomy interface in Canvas.

Required Text: The Essential Cosmic Perspective 9th edition with Mastering Astronomy *(Bennett, Donahue, Schneider, & Voit)*

The electronic version of this textbook is available through UF All-Access. If you purchase this version, it comes with access to Mastering Astronomy. There are instructions posted in Canvas.

Course Description:
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.
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 planets
- 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.

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 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 that 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 a science stories in the news or make informed decisions (such as voting) on scientific issues.
- Communicate scientific ideas clearly and effectively using oral, written or graphic forms.

General Education

AST 1002 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.

Gen Education Student Learning Objectives

- 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 and 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.

General Education Subject Area Objectives

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.

Critical Dates

- September 27: 1st Exam
- November 1: 2nd Exam
- November 13: Projects Due
- December 4: Last Day of Class
- December 11: Final Exam (10:00am-12:00pm)

Class Expectations

There will be weekly reading assignments from the textbook. You are expected to read the material in advance of the lectures and be ready to actively participate in class. I will not cover all of the assigned reading during class, but will rather focus upon the topics and concepts that are most important. If you wish for clarification on sections of the reading that you find confusing, you can send me email and I will try to adjust the lectures to cover that material.

You are also expected to not engage in any activity during class that is distracting to other students or detrimental to their ability to learn. Please be courteous to your fellow classmates and turn off the ringer on your phones. Use of phones is prohibited during lectures.

Course & Grading Information

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

In class exams – (2 exams -17.5% each)	**35%**
Comprehensive Final Exam	**25%**
Class Projects	**20%**
Homeworks, Quizzes, or small projects	**20%**

Grading scale: The following grading scale is guaranteed:

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

- Your actual final grade will be no lower than on this scale, which may be curved based upon the overall performance of the class. Grading in this class is consistent with UF policies available at: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Assignment Values

Exams (60% of grade): The two mid-term exams will be given on September 25 and Wednesday, October 28. Each of these in-class exams will be worth 17.5% of your

grade. The final exam, worth 25% of your grade, is scheduled for December 11 from 10:00am-12:00pm.

Homework (20%) : Homework will be online through the Mastering Astronomy interface on the Canvas page. The deadlines for each assignment will be clearly posted on this web page. In general assignments will be due each week on Mondays. Homework assignments must be submitted on time to receive full credit. For late assignments there will be a deduction of 33% per day. No homework extensions will be granted unless the extension is approved in advance of the deadline or documentation of a medical issue is provided.

Class Projects (20%): An important element of this course is the assigned hands-on class project. This will be an observing project at the campus teaching observatory. Details will follow shortly.

Make-up Policy

Students are expected to complete all requirements by the specified due dates. If a student misses 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. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Extra Credit

There will be occasional extra credit problems on the homework. There will also be a few opportunities for additional extra credit during the course of the semester up to a maximum of 5% for the semester.

Relevant UF Policies

Accommodations for Students with Disabilities:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. This class supports the needs of different learners; it is important for students to share their accommodation letter with their instructor and discuss their access needs as early as possible in the semester.

Course Evaluations:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via

https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Academic Misconduct:
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Click here to read the Conduct Code. If you have any questions or concerns, please consult with the instructor or TAs in this class.

I **DO NOT TOLERATE CHEATING** and will report any violations. If you have any questions or concerns, please consult with the instructor or TA.

In-Class Recording:
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or guest lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Campus Resources

Health and Wellness Resources

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 the 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.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

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.

Preliminary Lecture Schedule (Subject to Change)

The lectures will follow the textbook fairly closely. The table below shows the approximate dates when each topic/chapter is scheduled to be covered.

Lecture Date	**Lecture Content (Listed by corresponding chapter titles in textbook)**	**Weekly Reading Assignment**
Week 1 (8/23)	*Part I: A Modern View of the Universe* – An introduction to basic concepts in astronomy such as distance scales.	Chapters 1
Week 2 (8/26)	*Part I: A Modern View of the Universe,* *Part I: Discovering the Universe for Yourself* – Learn about constellations, and how Sun-Moon-Earth configurations result in Moon phases and Solar and Lunar eclipses. Understand the reason for seasons. *Part I: The Science of Astronomy* – Learn about the roots of astronomy and 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.	Chapters 1,2,3
Week 3 (9/4)	*Part I: The Science of Astronomy* *Part II: Making Sense of the Universe: Understanding Motion, Energy, and Gravity* – Learn about the laws of gravity and motion.	Chapters 3,4
Week 4 (9/9)	*Part II: Light: The Cosmic Messenger* – Learn the nature of light and how astronomers observe various light wavelengths with telescopes to learn about astrophysical phenomena.	Chapter 5
Week 5 (9/16)	*Part III: Formation of the Solar System, Earth and the Terrestrial Worlds* – Using the scientific method and observations discussed in this class, we discuss likely scenarios for the formation of our Solar System, and we will discuss the properties of the inner planets.	Chapters 6,7
Week 6 (9/23)	*Part III: Jovian Systems, Asteroids, Comets, and Dwarf Planets* – We will learn about the properties of objects in the outer solar system, which reveal clues about the origin and evolution of our solar system. **Exam**	Chapters 8, 9
Week 7 (9/30)	*Part III: Other Planetary System* – Learn how we find planets around other stars and the properties of these planetary systems. *Part IV: Our Star* – Properties of the Sun and the	Chapters 10, 11

	mechanics of nuclear fusion are discussed.	
Week 8 (10/7)	*Part IV: Our Star, Surveying the 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.	Chapters 11, 12
Week 9 (10/14)	*Part IV: Star Stuff* – Discover how the stars form out of the interstellar medium. Follow the timeline for typical stars from infancy to death *Part IV: The Bizarre Stellar Graveyard* – Learn about the dense remnants of stars and discuss the unusual gravitational effects observed near Black Holes.	Chapters 13,14
Week 10 (10/21)	*Part IV: The Bizarre Stellar Graveyard*	Chapter 14
Week 11 (10/28)	*Part V: Our Galaxy* – 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. **Exam**	Chapter 15
Week 12 (11/4)	*Part V: A Universe of Galaxies* – Discover the different types of galaxies in the Universe and how they compare to the Milky Way. Learn about galaxy interactions and mergers, galaxy evolution and supermassive black holes.	Chapter 16
Week 13 (11/13)	*Part V: Dark Matter, Dark Energy, and the Fate of the Universe* – Discover the importance of dark matter and how it has been identified in galaxies and larger scale structures.	Chapter 18
Week 14 (4/12)	*Part V: The Birth of 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.	Chapter 17
Week 15 (11/18)	*Part V: The Birth of the Universe* *Part VI: Life in the Universe* – Learn about the history and properties of life on Earth, life in the solar system, and search for life elsewhere.	Chapters 17, 19
Week 16 (12/2)	*Part VI: Life in the Universe,* Exam Review	Chapter 19
Exam Week	**Final Exam**	Cumulative – all chapters