

DISCOVER THE UNIVERSE

AST1002, CLASS #11586, 3 CREDIT HOURS, FALL 2023

INSTRUCTOR: *Dr. Chia-Yu Hu*

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TEACHING ASSISTANTS:

MEETING TIMES: *MWF, 4th Period (10:40 am to 11:30 am)*

CLASSROOM: *WEIM 1064*

OFFICE HOURS: *Wednesday 9:00 am to 10:00 am, or by appointment*

COURSE WEBSITE ON CANVAS

REQUIRED TEXT: The Essential Cosmic Perspective by Bennett, Donahue, Schneider, and Voit, 9th Edition, Publisher: Pearson/Addison-Wesley, San Francisco

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 Earth environment and the Universe we live in. Our goal is to help you gain a physical understanding and an appreciation of the cosmos, and more generally, of the scientific method and how scientific discoveries impact society. Along the way, we will use and practice critical thinking skills and learn how to formulate empirically testable hypotheses. (P)

The topics we will cover include:

- Observing the sky
- Scientific Method
- Tools of Astronomy
- 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

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. The course will focus on major scientific developments in astronomy & astrophysics and their impacts on society and the environment.

PREREQUISITE KNOWLEDGE AND SKILLS: Although this is essentially a non-mathematical science course, a basic knowledge of mathematics is required. Middle School arithmetic and pre-algebra are sufficient.

COURSE AND GEN ED STUDENT LEARNING OBJECTIVES AND OUTCOMES:

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 processes 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 scientific literacy. Literacy is 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. 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 POLICIES:

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

In class exams – (2 exams -15% each)	30%
Cumulative Final Exam	25%
Observing Project	20%
Homeworks	15%
Quizzes	5%
In class work & participation	5%

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 **Wednesday, September 27, 2023** and **Wednesday, November 1, 2023**. The Final exam (25% of grade) will be comprehensive and given during final period on **Wednesday, December 13, 2023 from 3 to 5 pm** in WEIM 1064. These exams will test the student's content knowledge but will emphasize applying critical thinking skills.

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 required to attend an observing session at the campus observatory. These take place every clear Friday evening during the semester and students will be assigned a range of dates that they can attend. Students must complete an observing report. Details about the project and the report can be found in the Observing Project Guidelines on our Canvas website. The report will be graded and will contribute to 20% of your grade. ***Do not wait until the due date to complete your observations - it may be cloudy!***

Homework (15%), Quizzes (5%) and In Class Participation (5%):

Homework, quizzes, in-class work, and participation will be used during the semester to facilitate and reinforce students' understanding of the course material and encourage critical thinking. The schedule for homeworks and quizzes can be found on the class website and also on Mastering Astronomy.

- Homework: Homework problems will be made available through the mastering astronomy web page. These problems will help you understand the subject material and are excellent preparation for the exams. Homework will be due every Friday at 10 PM except for the weeks of exams when no homework is due. Also, note the last homework will be due on the last day of class, Dec 7. Late homework will not be accepted. There will be 12 homework sets assigned. The 2 lowest homework grades will be dropped. **The ten highest homework scores will make up 15% of your class grade. The first homework is due Friday, September 1 at 10 PM.**
- Reading and quizzes: A major responsibility for this class will be to complete the reading assignments given each week, so you can fully participate in the class. Reading quizzes will be assigned each week to help you keep up with the reading and gauge your reading comprehension. There will be a total of 12 short (~10-minute) reading quizzes. These quizzes will be available through Mastering Astronomy (accessed via Canvas). The quizzes need to be completed by Monday morning before class each week. Late quizzes will not be accepted I will drop your two lowest quiz grades and only count the 10 highest grades toward your overall score. **The first reading quiz will be due Monday, August 28 at 11 am. These quizzes are worth 5% of your total grade.** Note Quiz 2 is due on Tuesday, September 5 due to the Labor Day Holiday.
- Class participation Your full attention and participation are expected during class time. It is important that you try to ask and answer questions in the lectures and participate in any class work. **Class participation will make up 5% of your grade.**

COURSE POLICIES AND EXPECTATIONS:

REQUIREMENTS: *Students are expected to:*

- *Attend all classes and actively and respectfully participate in discussions and in class work.*

- Complete all reading assignments, quizzes, and homeworks in a timely fashion.
- Attend an observing session at the Campus Teaching Observatory and Complete the observing project on time.
- Complete all exams.
- Notify the instructor in advance or as soon as possible of any excused absences or special accommodations (see policies below).
- Use of mobile phones and computers (for purposes other than note-taking) is prohibited during the lectures.

COURSE TECHNOLOGY: Competency in the basic use of a computer is required. Coursework will require the use of a computer. For additional information on UF College of Liberal Arts and Sciences policy regarding computer requirements, you can visit:

<https://it.clas.ufl.edu/policies/student-computer-requirement/>

MAKE-UP POLICY: Students are expected to complete all requirements by the specified due dates. If a student misses a 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 EVALUATION BY STUDENTS: 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/>.

UF POLICIES:

UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. Go here to get started with the Disability Resource Center: <https://disability.ufl.edu/get-started/>. 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. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

UNIVERSITY POLICY ON 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 possible sanctions. Go here to read the Conduct Code: <https://sccr.dso.ufl.edu/process/student-conduct-code/>.

Cheating, including plagiarism, is not tolerated in this class. Any student found cheating will automatically receive a failing grade, 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.***

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 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.

ETIQUETTE: COMMUNICATION COURTESY: In this class, students can use in-person interactions, office hours, e-mail, and Canvas to communicate with the instructor, teaching

assistant(s) and other students. All members of the class are expected to follow rules of common courtesy in all interactions.

GETTING HELP, RESOURCES AND REPORTING CONCERNS:

HEALTH & WELLNESS RESOURCES:

- UF Counseling Services: On-campus resources are available at the UF Counseling & Wellness Center (392-1575) for students experiencing personal or stress-related problems
- 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.
- 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 well-being, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

STUDENT SAFETY:

- UF Campus Police: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- UF Alert: <https://ufalert.ufl.edu>

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.

REPORTING CONCERNS: Please report any concerns about this course first to the TA and/or Instructor. If this does not resolve the concern, please contact the Department of Astronomy Undergraduate Coordinator (desika.narayanan@ufl.edu) or Department Chair (elada@ufl.edu) and if that doesn't resolve the issue then you should contact the UF Ombudsperson (<https://www.ombuds.ufl.edu>).

OTHER STUDENT RESOURCES:

- Dean Of Students: <https://dso.ufl.edu>
- Orange Book: <https://housing.ufl.edu/wp-content/uploads/2022/02/The-Orange-Book-Web.pdf>
- Student Handbook: <https://www.eng.ufl.edu/students/wp-content/uploads/sites/5/2022/03/Undergraduate-Student-Handbok-1.pdf>

TENTATIVE SCHEDULE:

Note that this is only tentative and is subject to change, please refer to Canvas schedule for the most up-to-date information.

Lecture Date	Lecture Content	Weekly Assignments
Week 1	Overview	Chap 1
Week 2	Celestial motions, phases of the moon and eclipses	Chap 2 Q1 HW 1
Week 3	Early Astronomy, modeling the cosmos, and the scientific method <i>Labor Day Holiday</i>	Chap 3 Q2, HW 2
Week 4	Newton's laws and gravity	Chap 4 Q3, HW 3
Week 5	The nature of light and telescopes	Chap 5 Q4, HW 4
Week 6	Exam 1 - Overview of the solar system	Chap 6 Review
Week 7	Earth, moon, and terrestrial planets <i>HOMECOMING Holiday</i>	Chap 7 Q5, HW 5
Week 8	Jovian planets	Chap 8 Q6, HW 6
Week 9	Asteroids, comets, exoplanets	Chap 9-10 Q7, HW 7
Week 10	Sun, nuclear fusion, properties of stars	Chap 11-12 Q8, HW 8
Week 11	Low- and high-mass stars, binaries	Chap 13 Q9, HW 9
Week 12	EXAM 2 - <i>Veteran's Day Holiday</i>	Review
Week 13	White dwarfs, neutron stars, and black holes	Chap 14 Q10, HW 10
Week 14	Milky Way <i>Thanksgiving Holiday</i>	Chap 15 Q11

Week 15	Other galaxies, cosmology	Chap 16-17 HW 11
Week 16	Dark matter, dark energy, life in the Universe	Chap 18-19 Q12, HW 12
Exam Week	Final Exam	Cumulative – all chapters

Important Dates:

Exams:

Exam 1 – Wednesday, September 27, 2023 in class

Exam 2 - Wednesday, November 1, 2023 in class

Final Exam - Wednesday, December 13, 2023 from 3 to 5 pm WEIM 1064

Observing Project Sessions:

A-I: 8 Sep (F), 15 Sep (F), 22 Sep (F), 29 Sep (F)

J-Z: 13 Oct (F), 20 Oct (F), 27 Oct (F), 3 Nov (F)

Project Reports Due: A-I – October 11, 2023

J-Z – November 15, 2023