Astronomy 3019: Astronomy & Astrophysics 2

Course Dates for 2025 Spring:
January 14 – May 2

Lecture Times and Locations:
Tuesdays: 1:55 PM – 2:45 PM (7) in FLG 280
Thursdays: 1:55 PM – 2:45 PM (7) and 3:00 PM – 3:50 PM (8) in FLG 280

Instructor:	Dr. Paul Sell
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Course Website: Canvas/E-Learning

Textbook: You must purchase the required text, *Foundations of Astrophysics*, by Ryden and Peterson (https://www.cambridge.org/us/academic/subjects/physics/astrophysics/foundations-astrophysics?format=AR), which is available in hardback (ISBN 978-1-108-83195-6) or ebook (ISBN 978-1-108-935-012-9). This is the same text used for AST3018: Astronomy and Astrophysics 1. Other references may be used for supplemental information.

Catalog Description: Second part of a two part sequence. Survey of astronomy and astrophysics for physical science, engineering or mathematics majors. Covers compact objects; the Solar System; exoplanets; the Milky Way and galaxies; cosmology and relativity.

Prereq: (PHY 2048 or PHY 2060) and (MAC 2311 or MAC 3472). Coreq: PHY 2049.

Course Description: This is an introductory course in Astronomy and Astrophysics designed for students majoring in astronomy, physics, math, or engineering. This course pairs with AST 3018, discussing about half of the major topics in astronomy. While the other course focuses on stellar astrophysics and the interstellar medium, this course primarily focuses on planetary science, relativistic phenomena, Galactic and extragalactic astrophysics, and cosmology.

Course Objectives and General Education Course Description

AST 3018 & 3019 are GenEd physical science (P) courses.

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.

As the list of topics above demonstrates, the course covers not only the Universe and the bodies in it – planets, moon, 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.

Student learning outcomes for a GenEd physical science course in astronomy are as follows:

I. Content — assessed through all graded categories below

- Know the basic concepts, theories, and terminology of natural science and the scientific method in astronomy.
- Know the major scientific developments in astronomy and the impacts on society and the environment.
- Know relevant processes that govern physical systems in astronomy.

II. Critical Thinking — assessed through all graded categories below

- Formulate empirically-testable hypotheses derived from the study of physical processes in astronomy.
- Apply logical reasoning skills effectively through scientific criticism and argument in astronomy.
- Apply techniques of discovery and critical thinking effectively to solve experiments and to evaluate outcomes.

III. Communication — assessed through the class project, a data analysis project with a writeup

- Communicate scientific findings clearly and effectively using oral, written, and/or graphic forms.
- Write effectively in several forms, such as in research papers and laboratory reports.

Detailed Description of the Graded Course Structure

Worksheets: Worksheets will be assigned during most classes to give you an opportunity to review the material and give the instructor the opportunity to check your comprehension of the material. Worksheets typically will be due at the end of the class they are assigned and are not accepted late. Class participation is expected and will greatly help you complete this work.

The number and frequency of these assignments is at the discretion of the instructor. The lowest few (depending on the total number given) will be dropped or counted as extra credit for your final grade (this action is completed at the very end and does not show up in the Canvas gradebook). Given this lenient policy, please do not contact the instructor to make up this work unless you have a serious ongoing problem, which should be an excused absence consistent with university policy: **https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/**.

Homeworks: Problem sets will be regularly assigned throughout the semester. Late homework is penalized 25% per day; exception: when answers must be posted promptly for exam studying, no late homework after that point will be accepted. The assignment with the lowest grade will be dropped.

Working in groups is allowed for homeworks and (usually strongly encouraged) for worksheets, although if you do, discuss the problem/solution and then write your own answers without looking at the other students' paper; also write the names of the people you worked with on the submitted homework. Each student is required to show all work and submit separate homework solutions. No emailed work.

Exams: There will be one midterm exam and a final exam. The midterm exam will cover material from approximately the first half of the class (outline of topics/chapters will be provided when appropriate) and the final exam will primarily cover material after the midterm exam; both will include material from lecture and the book. The midterm exam will be during normal class time about halfway through the semester. The final exam is scheduled for 7:30 AM – 9:30 AM on 05/02/2025. Bring a working scientific calculator without memory capability, at least two pencils (with erasers), and your ID with you to all exams.

Project: A handout and discussion to explain the project fully will be provided when appropriate. All guidelines including due dates will be provided in the handout.

Extra Credit: A handout and discussion to explain the extra credit options will be provided early in the semester. All guidelines including due dates will be provided in the handout.

Course Grade Summary Breakdown: Each of the components of class described above will be assigned the following weights to determine your final score:

- Worksheets: 15%
- Homeworks: 35%
- Midterm Exam: 15%
- Final Exam: 20%
- Project: 15%

Grading Scale: (https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)

Score	Grade	Score	Grade	Score	Grade
90% – 100%	A	77% – 79%	B−	64% – 66%	D+
87% – 89%	A−	74% – 76%	C+	60% – 63%	D
84% – 86%	B+	70% – 73%	C	57% – 59%	D−
80% – 83%	B	67% – 69%	C−	< 57%	E

Class/University Policies

- Please put your phones and, unless you are taking notes, your laptops away during class: no Facebook, Twitter, texting, etc.
- You may need to make calculations, so you should always have available a scientific calculator in addition to your usual materials for taking notes.
- Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. As early as possible in the semester, students should discuss their accommodations with the instructor. Appropriate accommodations will be made after verification.
- 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 Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. **This includes the use of AI: no student is allowed to use any AI tools (e.g., including Grammarly) to assist with any assignments in this course. Doing so will be considered a violation of the student honor code.** Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.
- 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/.

Campus Resources

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.
- 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.
- *On-Line Students Complaints*: View the Distance Learning Student Complaint Process.

Tentative Class Schedule

(40 total classes; 12 chapters)

Week Starting	Lecture #'s	Topics Discussed	Homework Assignments
01/13	1-3	Introduction to the Course, Math/Astronomy Review Material Needed from AST3018	
01/20	4-6	Chapter 8: Overview of the Solar System	
01/27	7-9	Chapter 9: Earth and Moon	Homework 1
02/03	10-12	Chapters 9/10: The Planets	
02/10	13-15	Chapters 10/11: Small Bodies in the Solar System	Homework 2
02/17	16-18	Chapters 11/12: The Solar System in Perspective	Homework 3
02/24	19-21	Chapter 12 (Exoplanets); Relativity	Homework 4
03/03	22	Relativity, Midterm Exam	
03/10	23-25	Chapter 18: Stellar Remnants	Homework 5
03/17	NA	Spring Break	
03/24	26-28	Chapter 19: Our Galaxy	Homework 6
03/31	29-31	Chapter 20: Galaxies	
04/07	32-34	Chapter 21: Active Galaxies Chapter 22: Clusters and Superclusters	Homework 7
04/14	35-37	Chapter 23: Cosmology	
04/21	38	Chapter 24: History of the Universe	Homework 8
The final exam is 05/03 at 7:30 AM – 9:30 AM.			

Notes regarding other assignments:

- Worksheets are assigned and completed during most lectures, as we approach the relevant material.
- The class project will be assigned immediately after completing Chapter 12 and will be due approximately a couple weeks before the last day of class. A separate handout thoroughly describes all guidelines for the project.
- Generally, all graded expectations are described in the detailed description of the graded course structure above.