

# ASTRONOMY & ASTROPHYSICS I

AST3018, 3 CREDITS, FALL 2021

**INSTRUCTOR:** *Naibi Mariñas*

*E-mail address: [marinas@ufl.edu](mailto:marinas@ufl.edu) (use Canvas Inbox for class communication, outside class time)  
Telephone: (352) 294-1859*

**MEETING TIMES:** *Tuesdays (10:40 am to 11:30 am) and Thursdays (10:40 am – 12:00 pm)*

**CLASSROOM:** *Zoom Conferences – (only for the first few weeks of term)/ FLG 280 afterwards*

**FINAL EXAM:** *12/15/2021 (7:30 AM - 9:30 AM)*

**OFFICE HOURS:** *11:40 am – 1:00 pm or by appointment*

**COURSE WEBSITE:** *<https://ufl.instructure.com/>*

**TA:** *Alyssa Bulatek*

**COURSE COMMUNICATIONS:** *For any class-related logistic or content questions outside class time or office hours, students should use **Course Questions** discussion board. This will benefit all students that might have similar questions and avoid repetitive questions. The instructor will regularly answer all questions posted in the board. **If a student has a private question, the student should contact the instructor using the Inbox in Canvas instead.***

*Students can expect a reply from the instructor within 24 hours during weekdays in the Course Questions discussion board, unless the question is posted during the two final weeks of classes. If a post is made Friday afternoon or during the weekend, it will not be answered until Monday.*

*The instructor will use the **Announcements** in the class website to communicate with the whole class outside class time. Students should frequently check the Announcement page. The class settings can be adjusted so that announcements are sent directly to emails.*

**PREREQUISITE:** PHY 2048 or PHY 2060 and MAC 2311 or MAC 3472

**COREQUISITE:** PHY 2049

**REQUIRED TEXT:** *Foundations of Astrophysics* by Barbara Ryden & Bradley Peterson, Cambridge Press. You can get the e-book or the paper copy. AST3018 will cover chapters 1 – 7 and 13 – 17.

**COURSE DESCRIPTION:** This course offers a broad overview of modern astrophysics. This course is the first of a two-semester sequence consisting of AST3018 and AST3019. This sequence is intended for majors in a physical science or engineering who have completed the first semester (i.e. mechanics and optics) of a calculus based introductory physics course and are taking the second semester of a calculus-based physics course (i.e. electricity & magnetism and thermodynamics).

AST3018 will cover:

1. Motions of the sky
2. A historical development of our understanding of the solar system
3. The generation of light and the interaction of light with matter
4. Telescopes and modern astronomical instrumentation
5. The properties and classification of stars
6. The physics of stellar interiors and atmospheres
7. The formation and evolution of stars

AST3019 will cover:

- Special and General Relativity
- Stellar remnants: white dwarfs, neutron stars and black holes
- The nature of the Milky Way Galaxy
- The nature, formation, distribution and evolution of galaxies
- Cosmology and the early universe
- The solar system

## GRADING POLICIES:

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

Assignment	Points or percentage
Attendance/Participation	5 %
Video Quizzes	15 %
Homework	20 %
Observing Project	20 %
Exams (Midterm exam 20%, Final Exam 20%)	40 %

## GRADING SCALE:

Grade	% Points	GPA	Grade	% Points	GPA	Grade	% Points	GPA
A	> 90	4.0	B-	77 to < 80	2.67	D+	64 to < 67	1.33
A-	87 to < 90	3.67	C+	74 to < 77	2.33	D	60 to < 64	1.0
B+	84 to < 87	3.33	C	70 to < 74	2.0	D-	57 to < 60	0.67
B	80 to < 84	3.0	C-	67 to < 70	1.67	F	< 57	0

**ATTENDANCE/PARTICIPATION (5 %):** This class will have both synchronous and asynchronous components. You will be responsible for studying all the material assigned and for participating in all in-class assignments.

**QUIZZES (15 %):** A major responsibility for this class will be to read the book chapters and watch the lecture videos every week before we cover the material in class. Video quizzes will be due each week before class to help keep you on track with the material.

**HOMEWORK (20 %):** There will be approximately 6 graded homework assignments due every two weeks. The homework will include problems from the textbook and additional related problems.

**OBSERVING PROJECT (20 %):** One of the most enjoyable aspects of science is doing research and making discoveries. One observing project will be assigned during the first few weeks of class.

**EXAMS (40 %):** There will be two exams, a midterm and a final. Both exams will be proctored. These exams will test your content knowledge, but will emphasize applying critical thinking skills and solving problems. The mid-term will take place during class time on one of our double periods. The Final will be at the assigned day/time by the college.

## GENERAL EDUCATION REQUIREMENTS:

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

**PHYSICAL SCIENCE:** The physical and biological sciences provide instruction in the basic concepts, theories, and terms of science and the scientific method. Courses focus on major scientific developments and their impacts on society and the environment. You will formulate empirically-testable hypotheses derived from the study of physical processes and living things and you will apply logical reasoning skills through scientific criticism and argument.

**STUDENT LEARNING OUTCOMES** for a GenEd physical science course in astronomy are as follows:

### I. Content

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

### II. Critical Thinking

1. Formulate empirically-testable hypotheses derived from the study of physical

- processes in astronomy.
2. Apply logical reasoning skills effectively through scientific criticism and argument in astronomy.
  3. Apply techniques of discovery and critical thinking effectively to solve experiments and to evaluate outcomes.

### III. Communication

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

## COURSE POLICIES:

AST3018 is a one term course and the first in the Astronomy and Astrophysics sequence. Each week students will be required to complete a set of assignments. All assignments are listed in the course schedule by week; specific due dates can be found in the Course Calenda, but they can change. Dates for assignments will be adjusted to the pace of the class. As this course has an online component, students must plan to have regular Internet access and time to explore the resources available.

### **REQUIREMENTS:** *Students are expected to:*

- Complete all modules in a timely fashion. Each module includes reading assignments, lecture videos and additional material. **Assignments will begin on the first week of classes. If you do not login to the class website and work on the content weekly, the assignments will be late and will be penalized.**
- Attend classes and participate in class activities.
- Complete all weekly video quizzes by their due date.
- Complete all homework sets by their due date.
- Complete one observing project during the term and submit the project report. The class project will be time consuming and you will need to work on it throughout the semester to be able to finish the assignment on time.
- Complete two proctored exams.

- Check the **course announcements** and class e-mail regularly. You are responsible for knowing all the information posted in announcements.

**COURSE TECHNOLOGY:** Access to and on-going use of a computer is **required** for all students. Competency in the basic use of a computer is required. Course work will require use of a computer and a broadband connection to the Internet. For additional information on UF College of Liberal Arts and Sciences policy regarding computer requirements you can visit: <http://it.clas.ufl.edu/policies/student-computer-requirement/>

**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/>.

**LATE ASSIGNMENT POLICY:** Students may submit individual assigned work after the stated deadline. A 10% grade penalty is assessed for work up to twenty-four hours late; an additional 10% is assessed for **EACH** additional day the work is late.

**MAKE-UP POLICY:** 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. Students should contact the Dean of Student Office Care Area if they have personal or family issues that prevent them from attending class.

All make-up exams will be different from regular exams and the format will be at the discretion of the instructor. **Birthdays, weddings, and trips out of town are not excuses for taking a make-up exam.**

## UF POLICIES:

**UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. 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:** Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>

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 suspected of academic misconduct will be automatically referred to the Honor Code Chancellor as required by UF.

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."*

**NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. <http://sfrc.ufl.edu/courses/distance/NetiquetteGuideforOnlineCourses.pdf>

**UF ONLINE HANDBOOK:** Additional information can be found on <http://handbook.uflonline.ufl.edu/>

**PRIVACY AND ACCESSIBILITY POLICY:**

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image

recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

## INFRASTRUCTURE (CANVAS)

- [Privacy Policy](#) Links to an external site.
- [Accessibility](#) Links to an external site.

## ZOOM

- [Privacy Policy](#) (Links to an external site.)
- [Accessibility](#) (Links to an external site.)

## YOUTUBE (GOOGLE)

- [Privacy Policy](#) (Links to an external site.)

## HONORLOCK

- [Privacy Policy](#) (Links to an external site.)
- [Accessibility](#)

## GETTING HELP:

For issues with technical difficulties for E-learning, **do NOT contact the instructor**, please contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <https://elearning.ufl.edu/keep-learning/>

**Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them.** The ticket



number will document the time and date of the problem. Students MUST contact the instructor within 24 hours of the technical difficulty to request a make-up.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should students have any complaints with their experience in this course they should visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

## AST3018 TENTATIVE SCHEDULE

FALL 2021

Week 1, 2	Syllabus, Introductions, motions of celestial objects, celestial sphere, seasons, calendar	Chapter 1
Week 3	Greeks to Kepler, Earth motion	Chapter 2
Week 4, 5	Orbits	Chapter 3
Week 5	Earth-Moon System	Chapter 4
Week 6	Radiation (BB & Spectra)	Chapter 5
Week 7	Telescopes and detectors	Chapter 6
Week 8	The Sun	Chapter 7

Week 9, 10	Properties of Stars	Chapter 13
Week	Stellar Atmospheres	Chapter 14
Week 11	Stellar Interiors	Chapter 15
Week 12, 13	Interstellar Medium, Star Formation & Stellar Evolution	Chapter 16
Week 14	Stellar Evolution	Chapter 17
<b>April 30</b>	<b>Final Exam</b>	<b>10:00 AM-12:00 PM</b>