

ASTRONOMY & ASTROPHYSICS I

AST3018, CLASS NUMBER 12184, 3 CREDITS, FALL 2019

INSTRUCTOR: *Naibi Mariñas*

Office number: Bryant Hall, Room 224

E-mail address: (use Canvas Inbox)

phone number: (352) 294-1859

MEETING TIMES: *Tuesdays, 8th Period (3:00 – 3:50 pm) and Thursdays, 8th and 9th Periods (3:00 – 4:55 pm)*

CLASSROOM: *FLG270 (Tuesdays), PUGH 170 (Thursdays)*

FINAL EXAM: *Dec. 10th, 2019 (7:30 to 9:30 am)*

OFFICE HOURS: *will be posted on the Canvas calendar weekly*

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

TA: *Genevieve Markees*

E-mail address: gmarkees@ufl.edu

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

COREQUISITE: PHY 2049

RECOMMENDED TEXT: *Foundations of Astrophysics by Barbara Ryden & Bradley Peterson, Pearson Press. 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 |
|--|----------------------|
| Homework and Class Work | 15% |
| Observing Projects (Two projects 20% each) | 40 % |
| Exams (Midterm exam 20%, Final Exam 25%) | 45 % |

GRADING SCALE:

| Grade | % Points | GPA | Grade | % Points | GPA | 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- | 57 – 59 | 0.67 |
| B | 80 – 83 | 3.0 | C- | 67 – 69 | 1.67 | E | < 56 | 0 |

HOMEWORK AND CLASS WORK (15 %): Reading Assignments will be given out each week. It is your responsibility to keep up with the reading in order to participate in classroom discussions. There will be approximately 6 homework assignments due ~ every two weeks. These will mainly consist of problems from the textbook. Periodically I will also assign problems to be completed in class. The homework and in class work will count for 15% of the course grade.

PROJECT (40 %): Two observing projects will be assigned during the first few weeks of class. The projects will count for 40% of the course grade.

EXAMS (45 %): There will be two exams, a midterm and a final. The midterm will be in class on October 15th, 2019. The final exam will be on December 10th, 2019, 7:30 to 9:30 AM. The midterm will count for 20% of your grade and the final will count for 25% of your final grade. Therefore, 45% of your total course grade will be based on examinations. These exams will test your content knowledge but will emphasize applying critical thinking skills.

Students should bring a number 2 pencil and their UF ID to take the exam. All students have to present their UF ID's to the exam proctors at the end of the exam. **Without an ID, your exam will not be graded.**

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. *The format of a make-up test/exam will be at the discretion of the instructor; these exams*

will not be exclusively multiple-choice questions. Birthdays, weddings, and trips out of town are not excuses for taking a make-up exam.

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:

This is a one-term lecture class. The content in the class website is divided into modules where you can access the assignments, fill in the blank lecture notes, and any other material related to the course. The due dates for all assignments are listed in the Course Calendar.

REQUIREMENTS: *Students are expected to:*

- **Attend all classes**
- *Complete all homework and class activities in a timely fashion.*
- *Complete two observing projects and two exams.*

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

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 required to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at **GATOR RATER** <https://evaluations.ufl.edu/>. The evaluation Web site is typically*

open during the last two or three weeks of the semester, but specific times when the site opens will be announced. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

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 <http://www.dso.ufl.edu/students.php>.

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 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."*

NETIQUETTE: COMMUNICATION COURTESY: In this class students can use e-mail and chat in the class website to communicate with the instructor and other students. All members of the class are expected to follow rules of common courtesy in all email messages and chats. <http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf>

GETTING HELP:

For issues with technical difficulties with the class website, please contact the UF Help Desk at:

- (352) 392-HELP - select option 2 or <https://lss.at.ufl.edu/help.shtml>

UF Counseling Services:

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

AST3018 TENTATIVE SCHEDULE

FALL 2019

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|------------------------|---|---------------------|
| Aug 20, 22, 27 | Syllabus, motions of celestial objects, celestial sphere, seasons, calendar | Chapters 1 |
| Aug 29, Sept 3, 5 | Greeks to Kepler, Earth motion | Chapter 2 |
| Sept 10, 12 | Orbits | Chapter 3 |
| Sept 17, 19 | Earth-Moon System | Chapter 4 |
| Sept 24, 26, Oct 1, 3 | Radiation | Chapter 5 |
| Oct 8, 10 | Telescopes and detectors | Chapter 6 |
| Oct 15 | Midterm Exam | Chapters 1-6 |
| Oct 17, 22 | The Sun | Chapter 7 |
| Oct 24, 29, 31 | Properties of Stars | Chapter 13 |
| Nov 5, 7 | Stellar Atmospheres | Chapter 14 |
| Nov 12, 14 | Stellar Interiors | Chapter 15 |
| Nov. 19, 21, 26, Dec 3 | Interstellar Medium, Star Formation & Stellar Evolution | Chapter 16 & 17 |
| Dec 10 | Final Exam | 7:30-9:30 AM |