

AST 203: Astronomy / Fall 2022

Instructor: Prof. Will M. Farr, ESS 457B, will.farr@stonybrook.edu

Class Meeting Time/Place: Tues. and Thurs., 11:30 am to 12:50 pm, location: Hvy Engr Lab 201

Recitation Meeting Time/Place: Fri., 11:45 am to 12:40 pm, location: Mellville Lbr N4006
Fri., 2:40 pm to 3:35 pm, location: Mellville Lbr N4072

Learning Outcomes

Students will use physics and calculus to study the stars, the interstellar medium, galaxies, and the Universe.

Prerequisite

PHY 125 or 131/133 or 141. It is very important that you have the necessary prerequisites—we will assume a knowledge of mechanics from your physics class. Any other material needed from physics will be introduced during the course. *As this is a 4 credit course, you should expect to spend 8-12 hours per week on this course.*

Course Website / Syllabus

The syllabus and all course material/class announcements will be available on the AST 203 Brightspace webpage.

Office Hours

By appointment via email, online.

Textbook

The required text is *Astronomy: A Physical Perspective, 2nd Ed.* by Kutner (Cambridge). This is at the appropriate mathematical level for our course. For a complimentary discussion of the course topics, the recommended text is *Cosmic Perspective: Stars, Galaxies, Universe* by Bennett et al. (Addison-Wesley). Any edition beyond the 4th will work.

Recitation

There is a weekly recitation associated with this course. The purpose of the recitation is to review the lecture material and practice problem solving. *All students are required to attend.*

Homework

There will be 8 homework assignments throughout the course (see the course schedule for due dates). Students will typically have 1 week to complete an assignment. I encourage you to work together and discuss the homeworks as part of the learning process, but note *what you turn in must be your own work. Copying will not be tolerated.*

Homeworks will be submitted via Brightspace. Homeworks are due at the time/date listed on the assignment. Late homeworks received within 24 hours of the due date/time will be assessed a 20% penalty. *No late homeworks will be accepted after that 24-hour window.*

Homework grades will be posted to the Brightspace gradebook approximately 1 week after the due date. Students should report any errors/missing grades promptly. *The lowest two homework scores will be dropped* and the remainder will be averaged to compute your total homework percentage.

Observing Sessions

The monthly Astronomy Open Night series provides (virtual) observing sessions throughout the semester.

Course Materials

The lecture notes used in class complement, but do not replace the course texts. *You are responsible for any information in the assigned readings that is not covered in the lectures. The course notes, homeworks, exams, and solutions are intended for AST 203 students only, and cannot be shared on third-party websites.*

Assigned Reading

Each lecture in the course schedule has chapter numbers listed next to it for both texts—this is your assigned reading. Students are expected to have read the assigned chapters in the required text before the corresponding lecture. Occasionally we will not cover a few sections in a chapter—this will be pointed out in class.

Course Schedule

#	month	day	Kutner Ch.	Bennett Ch.	topic	HW assigned	HW due
1	Aug.	23			Organization	–	–
2	Aug.	25	1–2	1–3, 5	Radiation	1	–
–	Aug.	26			recitation 1		
3	Aug.	30	2	5	Radiation / Spectra	–	–
4	Sept.	1	3,4	5,6	Spectral Lines / Telescopes	2	1
–	Sept.	2			recitation 2		
5	Sept.	6	5	15.1	Binary Stars	–	–
6	Sept.	8	5	15.1	Binary Stars	–	2
–	Sept.	9			recitation 3		
7	Sept.	13	5	15.1 (& 3.3)	Binary Stars	3	–
8	Sept.	15	6	14	The Sun	–	–
–	Sept.	16			recitation 4		
9	Sept.	20	6	14	The Sun	–	3
10	Sept.	22			Bonus material, make-up time.		
–	Sept.	23			recitation 5		
11	Sept.	27	9	14, S4	Main-Sequence & Stellar Structure	–	–
12	Sept.	29	9, 10	14, S4, 17	Stellar Structure / Stellar Old Age	4	–
–	Sept.	30			recitation 6		
13	Oct.	4	9, 10	14, S4, 17	Stellar Structure / Stellar Old Age	–	–
14	Oct.	6	10	17	Stellar Old Age	–	4
–	Oct.	7			recitation 7		
15	Oct.	13	10	18	White Dwarfs / Type II Supernovae	5	–
–	Oct.	14			recitation 8		
16	Oct.	18	11	18	Neutron Stars/Pulsars/Black Holes	6	5
17	Oct.	20	12	18	Close Binaries / Type Ia Supernovae	–	–
–	Oct.	21			recitation 9		
18	Oct.	25	13	15.3	Clusters of Stars	–	6
19	Oct.	27	14	19.2	Clusters/Interstellar Medium	–	–
–	Oct.	28			recitation 10		
20	Nov.	1	14, 15	16	ISM	7	–
21	Nov.	3	15	16	ISM	–	–
–	Nov.	4			recitation 11		
22	Nov.	8			Election day. No class.		
23	Nov.	10	16	19	Bonus Material / Make up time. Project proposals due.	–	7
–	Nov.	11			recitation 12		
24	Nov.	15	17	20	Milky Way & Normal Galaxies	8	–
25	Nov.	17	18	20	Normal Galaxies	–	–
–	Nov.	18			recitation 13		
					Thanksgiving break.		
26	Nov.	29	20/21	22/23	Cosmology	–	–
27	Dec.	1	20/21	22/23	Cosmology	–	8
–	Dec.	2			recitation 14		
–	Dec.	16			Final projects due.		

Exams

There are no exams in this course.

Final Project

In place of an exam, students will submit a final project. The project will involve one or more of the following:

1. An analysis of a public astronomical data set to address a relevant scientific question and a report of the results.
2. A demonstration of an astronomical computation or body of library code relevant to astronomy.
3. A review article (in the style of Scientific American or similar) on the current state-of-the-art in one or several of the topics covered in this course.
4. Astronomy outreach / public engagement on a topic covered in this course. Acceptable items could include a series of short (2-5 minute) introductory videos; lesson plans and/or labs for a high-school unit; a series of 5-10 short Tik-Tok

style explainers; a long-form blog post in the style of astrobites covering a recent paper or papers on a topic covered in the course.

5. A review of the major engineering requirements, subsystems, and design of a NASA great observatory or equivalent ground-based telescope system.

An extensive list of possible topics under the above will be distributed during the term. Students must choose a topic / project and submit a brief (one to two paragraph) proposal for instructor approval by Nov 10.

Extra Credit

There will be one opportunity for extra credit during the semester. Students can pick an “astronomy current event” related to this course (e.g. new results from the Cassini mission, discovery of a new exoplanet, ...) and present a 2–3 slide / 5 minute summary of the result at the beginning of a class meeting. *Don't wait until the end of the semester! To allow for scheduling, no new requests for extra credit will be accepted during the last 2 weeks of class.* No more than 2 presentations per class will be scheduled. Topics and timeslots are on a first-come-first-served basis. *You must let the instructor know a week in advance that you wish to present, and submit the topic for approval.* Successful presentations will get 2 points of extra credit added to their final course grade. A PDF of the slides must be sent to the instructor at least 24 hours in advance of the presentation.

Course Grade

The final grade will be based on the homeworks, midterms, and final exam using the following weighting:

- homework: 70%
- final project: 30%

Computed this way, the overall course grade will range from 0–100. Any extra credit points (up to 2 total) will then be added. Letter grades will be based on a standard grade scale (i.e. an overall score > 90/100 would be an A– or better). However, if necessary, a curve will be applied to the overall course grade, considering the overall performance of the class. Students who wish to discuss their grades or class performance should see the instructor in person. *For privacy reasons, grades will not be discussed via e-mail or phone.*

Student Accessibility Support Center Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/disabilities>.

Academic Integrity

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Electronic Communication

Email to your University email account is an important way of communicating with you for this course. For most students the email address is 'firstname.lastname@stonybrook.edu'. *It is your responsibility to read your email received at this account.* For instructions about how to verify your University email address see this:

<http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo>

If you choose to forward your University email to another account, we are not responsible for undeliverable messages.

Religious Observances

See the policy statement regarding religious holidays at http://www.stonybrook.edu/commcms/provost/faculty/handbook/employment/religious_holidays_policy.php

Students are expected to notify the course professors by email of their intention to take time out for religious observance. This should be done as soon as possible but definitely before the end of the 'add/drop' period. At that time they can discuss with the instructor(s) how they will be able to make up the work covered.