

AST 341: Astronomy / Fall 2024 (rev. 1.01; 2024-06-15)

Instructor: Prof. Michael Zingale, ESS 452, michael.zingale@stonybrook.edu

Class Meeting Time/Place: Mon. and Wed., 9:30 am to 10:50 am, location: Melville W4530

Learning Outcomes

Students will study the formation, evolution, and death of stars including their classification scheme; nuclear and neutrino processes; the emission, absorption and transport of radiation; and the stellar atmosphere.

Prerequisite

AST 203, PHY 251/252, PHY 277, MAT 203 or 211 or 307 or AMS 261. It is very important that you have the necessary prerequisites—we will assume a knowledge of mechanics from your physics class. We will also assume basic programming knowledge and the ability to make plots (from PHY 277). Any other material needed from physics will be introduced during the course.

Course Website / Syllabus

The syllabus and all course material/class announcements will be available on the AST 341 Brightspace webpage.

Office Hours

TBD It is not possible to pick office hours that can accommodate the schedule of all students in this class. You are encouraged to contact the instructor to make an appointment outside of these times.

Textbook

The required text is *An Introduction to the Theory of Stellar Structure and Evolution, 2nd Ed.* by Dina Prialnik (Cambridge). This is at the appropriate mathematical level for our course.

Homework

Homework is an essential part of this class. There will be 8–10 homework assignments throughout the course. Students will typically have 1 week to complete an assignment. While it is recognized that students sometimes work together and discuss the homeworks as part of the learning process, *what you turn in must be your own work. Copying will not be tolerated.* If you wrote code as part of your solution, then you need to also include a machine-readable copy of your source code.

Homeworks are due at the time/date listed on the assignment. *Your homework solutions are to be uploaded to Brightspace as a single legible PDF.*

Homework grades will be posted to the Brightspace gradebook approximately 1 week after the due date, with grading comments available in the Brightspace gradebook. Students should report any errors/missing grades promptly.

Late homework policy: there is a *4 day grace period* from the homework due date—you may upload your solutions at any time in time in this window without penalty. After this grace period, the solutions will be posted and no further late assignments will be collected.

AI/LLM/ChatGPT policy: you may *not* use ChatGPT or similar AI / large-language models for the homeworks. This will be treated as an academic integrity violation.

Exams

There is one midterm and a final exam. The final will cover the entire course. For each of the exams, students are responsible for knowing the material presented in the lectures, recitations, assigned as homework, and in the assigned chapters of the text.

Students should not expect that they will be allowed to make up an exam without advanced notice. Reasons for wanting to make-up an exam will be judged on a case-by-case basis. Students wanting to make up an exam must have a *valid* excuse (e.g. athlete in University-related sporting event, jury duty, medical emergency) and notify the instructor *before* the scheduled exam (or as soon as is safely possible afterwards). *No make-ups will be allowed more than one week after the original exam date.*

Final Exam

The final exam will be given at the time and date scheduled by the registrar.

Course Schedule

#	month	day	Prialnik Ch.	topic	HW assigned	HW due
1	Aug.	26	1	Introduction	–	–
2	Aug.	28	2	Equations of stellar evolution	–	–
–	Sep.	2		Labor Day		
3	Sep.	4	2	Equations of stellar evolution	1	–
4	Sep.	9	2	Equations of stellar evolution	–	–
5	Sep.	11	3	Gas and radiation	2	1
6	Sep.	16	3	Gas and radiation	–	–
7	Sep.	18	4	Nuclear processes	3	2
8	Sep.	23	4	Nuclear processes	–	–
9	Sep.	25	5	Equilibrium models	4	3
10	Sep.	30	5	Equilibrium models	–	–
11	Oct.	2	6	Stability	–	4
12	Oct.	7	6	Stability	–	–
13	Oct.	9		Midterm		
–	Oct.	14		Fall break		
14	Oct.	16	7	Stellar evolution	5	–
15	Oct.	21	7	Stellar evolution	–	–
16	Oct.	23	9	More stellar evolution	6	5
17	Oct.	28	9	More stellar evolution	–	–
18	Oct.	30	9	More stellar evolution	7	6
19	Nov.	4	10	Supernovae, pulsars, black holes	–	–
20	Nov.	6	10	Supernovae, pulsars, black holes	8	7
21	Nov.	11	11	SN Ia and NS mergers	–	–
22	Nov.	13	11	SN Ia and NS mergers	9	8
23	Nov.	18	12	Stellar life cycle	–	–
24	Nov.	20	12	Stellar life cycle	10	9
25	Nov.	25	–	Stellar atmospheres	–	–
–	Nov.	27		Thanksgiving break		
26	Dec.	2	–	Stellar atmospheres	–	–
27	Dec.	4	–	Stellar atmospheres	–	10
28	Dec.	9	–	review	–	–
finals	Dec.	11		Final exam (all course material)		

Note: the homework schedule is tentative and subject to change.

Lecture Notes

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 are intended for AST 341 students only.*

Assigned Reading

Each lecture in the course schedule has chapter numbers listed next to it for our text—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 Grade

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

- homework: 60%

- midterm: 20%
- final exam: 20%

Computed this way, the overall course grade will range from 0–100. 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.*

Student Accessibility Support Center Statement

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations 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: <https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities> and search *Fire Safety and Evacuation and 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.