

ASTR 350L - STELLAR ASTROPHYSICS LAB

Fall 2025

Instructor: David Jones (dojones@hawaii.edu)

Class: M 5:30 – 8:20, STB 206

Office Location: IfA 212 or [Zoom](#)

Office Hours: 9-10 AM on Fridays in STB 219 (Prof. Drakos' office, unless otherwise noted).

UH Description of Course: *“A laboratory course in experimental astrophysics where students obtain data of stars, star clusters, and star-forming regions with small, portable telescopes and UH Hilo telescope on Maunakea. Data acquisition takes place throughout the semester whereby students learn how to troubleshoot equipment and develop technical skills. Weekly laboratory projects use data obtained with telescopes, cameras, and spectrographs and solidify theoretical concepts presented in ASTR 350 Stellar Astrophysics.”*

Website: Google Classroom will be used for all announcements, homework, and course resources. The invite link is [here](#).

Software (preliminary list):

- [Anaconda python](#) with the following installed packages: **Astropy**, **Photutils**
- **DS9**

Goals: The overall learning goals of this course are:

1. Understand how to obtain and analyze multiple types of astronomical data.
2. Understand the evidence for core concepts in stellar physics, using data.
3. Learn the basics of science writing.
4. Understand the peer review process.
5. Gain experience in coding techniques applied to data reduction and statistical analysis.

Grading: The grade breakdown is listed below.

75% - Labs Every two weeks

- Five lab reports, due approximately every two weeks.

20% - Observing Proposal Early December

- Students will design and write their own telescope observing proposal.

5% - Time Allocation Committee Dec. 8th

- Feedback on class observing proposals.

Assignments will be posted at least two weeks in advance on Google classroom. Typically, labs will take approximately two weeks and be due by end of day Sunday (if the class prefers a different day/time, we can possibly adjust). Late assignments will not be graded unless there are exceptional circumstances. No extensions will be granted within 48 hours of the deadline.

Tentative Project Schedule:

Week 1 (Aug. 25)	Fitting Spectral Energy Distributions
No class – Labor Day (Sep. 1)	
Week 2 (Sep. 8)	Fitting Spectral Energy Distributions
Week 3 (Sep. 15)	Measuring Accretion and Outflows in Young Stars
Week 4 (Sep. 22)	Measuring Accretion and Outflows in Young Stars
Week 5 (Sep. 29)	Stellar Interiors with Asteroseismology
Week 6 (Oct. 6)	Stellar Interiors with Asteroseismology
Week 7 (Oct. 13)	Star Clusters and the HR Diagram — Observing at HP
Week 8 (Oct. 20)	Star Clusters and the HR Diagram — Data Reduction
Week 9 (Oct. 27)	Supernova Discovery (Part 1)
Saturday, Nov. 1	UH88 Observing Night #1
Week 10 (Nov. 3)	Supernova Discovery (Part 2)
Week 11 (Nov. 10)	Star Clusters and the HR Diagram — Photometry
Friday, Nov. 14	UH88 Observing Night #2
Week 12 (Nov. 17)	Writing an Observing Proposal
Week 13 (Nov. 24)	Optional – Thanksgiving week
Week 14 (Dec. 1)	Writing an Observing Proposal
Week 15 (Dec. 8)	Time Allocation Committee Meeting

Class Observing Nights: The class will observe two first-half nights on the UH 88-inch telescope during the semester. These are scheduled for Saturday, November 1st and Friday, November 14th (I’m sorry about the weekend dates!). We will meet as a class in the evening (beginning ~4 PM and continuing until approximately midnight) and observe together to take data that we will later use for class projects. If there are any conflicts, please let me know as soon as possible. Note that I might cancel the second of these nights, but I’m leaving it on the schedule in case of poor weather or other issues on the first night.

Time commitment: As this is a two-credit class, I am planning projects that will take ~3-6 hours per week outside of class in addition to the focused in-class work. Please note that for a projects-based class like this one, it’s especially important that you’re able to put in the work early and don’t save it until the day before.

The Ka’ao Framework: The Ka’ao framework originates from the structure of Hawaiian mo’olelo, and has a lot of similarities to the typical structure of a scientific report. As I’m participating in the UH Hilo’s Hawaiian faculty development program, Uluakea, I’m going to try to work this framework into the structure of our lab reports this year. The elements of lab reports will be:

- **Hua:** Catalyst, goals, objectives.
- **Ha’alele:** Preparation. What do we need, what data exists.
- **Huaka’i:** The journey; obstacles. Here, analysis procedures.
- **Ho’ina:** Knowledge sharing with your community. For us, this will be similar to a “results” section, but we will also use it to connect to the scientific literature (astronomers’ community knowledge). **At least**

a couple citations to the scientific literature are required. What you write here will also form the basis for class discussions following the report deadline.

- **Hā'ina:** Reflecting on and evaluating the process.

You may also notice that I'm going to try my best to incorporate Hawaiian star names in the lab work. Thank you for trying something new!

Extra Credit Opportunities:

- **Community Work Day:** This class will include a community work day on Maunakea with either the Maunakea Forest Restoration Project. This is intended as a way to engage in caring (mālama 'āina) for the space from which most of our data is collected. We'll work together to coordinate dates on the first day of class — I'm hoping for October 18th. This will be worth 10% extra credit on the supernova discovery lab.
- **Outreach:** One of the principles of the Ka'ao framework is knowledge-sharing with our communities. You're encouraged to find ways to share your knowledge with this semester at least once through, e.g., stargazing nights, Astronomy on Tap, AstroDay west, tutoring, or anything else you can think of. "Community" here can be the department, the university, or the public at large — as long as its knowledge that's useful or interesting to the community you're serving. "Knowledge" can include astronomical knowledge, but also anything else you've learned from your P&A courses (coding, writing, math, etc.). This will be worth 10% extra credit on the end-of-semester observing proposal. I will do my best to keep you informed about opportunities as they arise; you're also required to get your outreach plan approved by me ahead of time.

Accommodation: Any student with a documented disability who would like to request accommodations should contact the Student Services Center — E230, 932-7623 (V), 932-7002 (TTY), uds@hawaii.edu — as early in the semester as possible.

Academic Honesty: Students are strongly encouraged to familiarize themselves with the [Student Code of Conduct for UH Hilo](#). Working together as a group on the labs is encouraged. However, copying will not be accepted. Similarly, copying code from the internet or generative AI will not be accepted. Students found cheating on any assignment will be given an automatic score of zero for that work.

Advising Statement: Advising is designed to help students complete the requirements of the university and their individual majors. Students should consult with their advisor at least once a semester to decide on courses, check progress towards graduation, and discuss career options and other educational opportunities provided by UH Hilo. Advising is a shared responsibility, but students have final responsibility for meeting degree requirements.

Classroom Etiquette: This is mainly common sense. Make sure that all cell-phones are silenced, be on time for lecture, and be kind to each other!

Code of Conduct: Current, up to date statements regarding ITS, Disability Services, Advising, Academic Integrity, Kilohana Academic Success, Student Conduct, Mental Health, Students of Concern, and Title IX/EEO can be found at <http://go.hawaii.edu/zAf>.