

# **ASTR 300L: ASTRONOMY LABORATORY**

Duncan Farrah

Fall 2022

Syllabus

## **OVERVIEW**

- Time: TR 13:30 - 15:30
- Location: WAT 415 (Elevator to 4th floor, turn left, door on the right near the end of the corridor)
- Course materials: on Laulima.
- Instructor: Duncan Farrah, [dfarrah@hawaii.edu](mailto:dfarrah@hawaii.edu)
- TAs:
- Office hours: scheduled as needed
- Astronomy TAs are also available to help you. Communal Astro TA office hours will be announced shortly
- Prerequisites: ASTR 210 or ASTR 242

## **COURSE DESCRIPTION**

This course is an introduction to the analysis methods used in astronomy, with emphasis on the fundamental nature of experimentation, and cross-disciplinary approaches to examining data.

For questions about class administration, grading, policies, procedures, and practical matters, first read this document carefully. If your question/issue is still not resolved, then contact Dr Farrah or the TA .

For science questions, come to Dr. Farrah's or the TA's office hours. Office hours are especially useful if you run into any difficulties following the material or keeping up with assignments – we're here to help!

## **SCHEDULE OF TOPICS**

The course will consist of four modules, each introducing a core element of data analysis in the (astro)physical sciences: The approximate schedule is as follows:

- Weeks 1 - 3: The basics of Python
- Weeks 4-7: Astronomical imaging
- Weeks 8-12: Astronomical spectroscopy
- Weeks 13-16: Advanced topics

The content and duration of these modules are subject to change if necessary.

## ASSESSMENT

Grading will be based on in-class activities, short assignments, and longer project/lab reports. There will be no exams.

## STUDENT LEARNING OUTCOMES

By the end of this course you will be able to:

- Develop simple Python scripts to process astronomical data
- Use Python to apply statistical analyses and visualizations to astronomical data
- Process and analyze astronomical imaging and spectroscopy to extract scientific information
- Produce reports with a level of rigor and clarity suited to a scientific journal
- Write coherent and compelling proposals to use scientific facilities for research
- Evaluate and assess the written work of others, and provide constructive feedback

## EQUIPMENT AND MATERIALS

You will need a laptop or tablet running MacOS, Linux (any common flavor), or Windows 10. You will also need a working Python 3.0 or later installation.

There is no textbook for this course,

## ATTENDANCE

This class will involve activities and discussion during regular class hours. Therefore, attendance and participation are extremely important!

Unexcused absences: I will NOT take regular attendance. However, I will know if you are absent regularly by your missed in-class work and quizzes.

Excused absences: Absences due to personal or family emergencies or academic activities may be excused. If you know in advance that you will miss a class, you must contact me before that class. Do NOT wait until the next class. I will arrange some way for you to make up the missed activities or provide an alternate assignment. If you do not contact me in advance, your absence will count as unexcused unless a true emergency prevented you from reaching me.

## SPECIAL ACCOMMODATIONS

There are two resources available for students who may require special accommodations; the KOKUA Program, and the Counseling and Student Development Center.

The KOKUA program (<http://hawaii.edu/kokua/>) is the UH Mānoa office for students with disabilities. They serve undergraduate, graduate and professional students with learning, physical, psychiatric and other documented disabilities. Students with special needs or circumstances who have not already done so should contact the KOKUA program as soon as possible. Students who have accommodations from the KOKUA program should contact Dr. Farrah as soon as possible. In general, if you are a student with special needs or circumstances, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please make an appointment to see Dr. Farrah as soon as possible during office hours. All discussions will be treated with the strictest confidence.

The Counseling and Student Development Center (<http://www.manoa.hawaii.edu/counseling/>, (808) 956-7927 ) offers counseling services to students no matter what is troubling them. These services include individual counseling, group counseling, couples therapy, and career counseling. If you are feeling stressed or overwhelmed, or struggling to deal with events in your personal or family life, then the CSDC is here to help. Feeling stressed and overwhelmed when you first come to university, or even after having been here for a few years, is common, and there are people and resources to help you through. Steps can also be taken to help minimize the impact of life events on academic performance. Counseling sessions are treated in the strictest confidence. If you wish, you can also discuss anything along these lines with Prof. Farrah, again in strict confidence

## THE UH STUDENT CONDUCT CODE

The purposes of the University of Hawaii are to give thorough instruction, conduct research and disseminate knowledge in and of branches of advanced learning as prescribed by its Board of Regents. The University is committed to ensuring a safe, civil, learning and working environment in which the

dignity of every individual is respected. All members of the University community—students, faculty and staff - share responsibility for its growth and continued welfare.

Choosing to join the University community obligates each student to abide by this code of conduct. By enrolling in the University, students accept the responsibility to become fully acquainted with the University's regulations and to comply with the University's authority. The University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to respect the rights, privileges, and property of others; and to observe national, state, and local laws and University regulations.

The University views the disciplinary process as a learning experience which aims to promote growth and understanding of one's responsibilities and privileges within the University environment. To this end, the disciplinary process attempts to balance an understanding and knowledge of students and their needs with the needs of the academic community. Pursuit of a college education provides an opportunity for exploration of new ideas, experimentation, self-examination, formation of new relationships, and development of ideals and direction. However, the University does not absolve students from accepting responsibility for their behavior in their pursuit of a college education. Rather, it reaffirms the principle of student freedom that is coupled with an acceptance of responsibility for one's actions and the consequences of such actions.

1. **CHEATING** Cheating includes the intentional use of unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise, or attempts thereof.
2. **PLAGIARISM** Plagiarism includes the copying of the language, structure, programming, computer code, ideas, and/or thoughts of another and passing off the same as one's own original work, or attempts thereof.
3. **FALSIFICATION** Falsification includes the statement of any untruth, either verbally or in writing, with respect to any element of one's academic work, or attempts thereof.
4. **FABRICATION** Fabrication includes making up data and results, and recording or reporting them, or submitting fabricated documents, or attempts thereof.
5. **MULTIPLE SUBMISSION** Multiple submission involves the submission for credit—without authorization of the instructor receiving the work—of substantial portions of any work (including oral reports) previously submitted for credit at any academic institution, or attempts thereof.
6. **COMPLICITY** Complicity includes intentionally helping another to engage in an act of academic misconduct, or attempts thereof.

While everyone understands what the conduct code means on quizzes and exams, there is confusion on what it means for homework. Students are encouraged to work together on homework, but your write-ups and web submissions must be independent. Copying, whether by hand or cut-and-paste on your computer constitutes cheating.

The best way to ensure you understand the assigned material is to split off from the group when writing up or submitting your answers. If you copy text or other information from any source for any reason, you must include a citation to that source

When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult with Prof. Farrah before submitting your work.

## DISCRIMINATION AND HARASSMENT

The diversity of students and staff that contribute to this class is a core strength that is critical to its educational mission. Every member of the class is expected to contribute to an inclusive and respectful culture. Dimensions of diversity can include sex, race, age, national origin, ethnicity, gender identity and expression, intellectual and physical ability, sexual orientation, income, faith and non-faith perspectives, socio-economic status, political ideology, education, primary language, family status, military experience, cognitive style, and communication style. The individual intersection of these experiences and characteristics build to form a valuable and positive educational environment. If there are aspects of the design, instruction, and/or experiences within this course that result in barriers to your inclusion or accurate assessment of achievement, please notify Dr. Farrah as soon as possible. Any student who believes they have been subject to discrimination or harassment on any of these grounds should contact the relevant university body. A complete listing is available at: <http://manoa.hawaii.edu/dps/support.html>. They may also contact Dr Farrah.

## A NOTE ON TITLE IX

UHM is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. If you or someone you know experiences any of these, UHM has staff and resources on campus to support and assist you. Staff also can direct you to resources in the community. Here are some:

If you wish to remain ANONYMOUS, speak with someone CONFIDENTIALLY, or would like to receive information and support in a CONFIDENTIAL setting, contact the Counseling & Student Development Center: (808) 956-7927 or [manoa.hawaii.edu/counseling/](http://manoa.hawaii.edu/counseling/)

Other resources:

- Office of Gender Equity: (808) 956-9499 or [geneq@hawaii.edu](mailto:geneq@hawaii.edu)
- Lesbian, Gay, Bisexual, Transgender, Queer (LGBTQ+) Center (808) 956-9250 [manoa.hawaii.edu/lgbt](http://manoa.hawaii.edu/lgbt)
- Respondent Support (808) 956-4392 [PAUs@hawaii.edu](mailto:PAUs@hawaii.edu)
- Student Parents at Manoa (SP@M): (808) 956-8059 [manoa.hawaii.edu/studentparents/](http://manoa.hawaii.edu/studentparents/)
- UH Confidential Advocacy: (Natalia Villegas) (808) 341-4952 or [nataliat@hawaii.edu](mailto:nataliat@hawaii.edu)
- University Health Services Manoa: (808) 956-8965 or [hawaii.edu/shs/](http://hawaii.edu/shs/)

If you wish to REPORT an incident of sex discrimination or gender-based violence including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence or stalking as well as receive information and support, contact:

Dee Uwono  
Director and Title IX Coordinator

Hawaii Hall 124  
2500 Campus Road  
Honolulu, HI 96822  
(808) 956-2299  
t9uhm@hawaii.edu

As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. Although the Title IX Coordinator and I cannot guarantee confidentiality, you will still have options about how your case will be handled. My goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need. For more information regarding sex discrimination and gender-based violence, the University's Title IX resources and the University's Policy, EP 1.204, go to: <http://www.manoa.hawaii.edu/titleix/>