

# **ASTR 300L: ASTRONOMY LABORATORY**

Duncan Farrah

Fall 2021

Syllabus

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.

## **Practical Details**

- Instructor: Prof. Duncan Farrah
- TAs: Federica Chiti and Kenji Emerson
- Office: WAT 401
- Format: Online Synchronous
- Times: TR 13:30 - 15:30, via Zoom
- Meeting ID and Password: 8088088301 or ifavcr1, 011056

## **Questions?**

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!

## **Course Materials**

For this course, you will need a laptop or tablet running MacOS, Linux (any common flavor), or Windows 10. You will also need a working Python 3 installation. Instructions on how to install Python will be given during the course.

There is no textbook for this course,

## **Course Schedule**

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 - 6: An introduction to Python for astrophysics
- Weeks 7-10: Astronomical imaging
- Weeks 10-14: Astronomical spectroscopy
- Weeks 15-17: Scientific writing: - research articles and peer review

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

## Writing Intensive

This course is designated as a Writing Intensive (WI) course. The written component of this contributes 90

All writing assignments are to be single spaced, 11-point font. They comprise:

- Two project reports presenting results from the Python, Imaging, and Spectroscopy modules.
- One literature review, involving reading and critiquing a published academic paper.
- One peer review exercise, involving reading and critiquing a project report, and providing both oral and written feedback.

Each instance of written work will receive both verbal and written feedback. For the project reports, students will be able to submit drafts prior to the deadline, and receive both verbal feedback (via office meetings outside of regular class time) and written comments with sufficient time to make revisions prior to the deadline for final versions of the reports. In addition, students will receive verbal (during class time) and written feedback on their final project reports as part of a peer review exercise. Finally, students will receive written feedback on both their literature review, and on their written peer review of other student's work.

## Grading

Grading will be based on in-class activities, short assignments, and longer project/lab reports. There will be no exams. The approximate deadlines for the submission of graded work are as follows:

- Project reports will be due at the end of weeks 10 and 14.
- A literature review (of provided papers) will be due at the end of week 15
- Peer review exercises will be due at the end of week 15

After receiving feedback on written work, you may submit a revised version within one week; the revised paper will be used to compute your final grade.

Late submission – Any late submission (homeworks or project) will only be allowed without penalty for officially sanctioned university activities or reasons. Otherwise, half credit will be given up to 48 hours after the due date. Submission beyond 48 hours from the due date will receive zero credit. If you are in any doubt, talk to Dr. Farrah

## 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

## 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.

Violations of the Conduct Code may include:

- **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.
- **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.
- **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.

- **FABRICATION** Fabrication includes making up data and results, and recording or reporting them, or submitting fabricated documents, or attempts thereof.
- **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.
- **COMPLICITY** Complicity includes intentionally helping another to engage in an act of academic misconduct, or attempts thereof.
- **VIOLATION OF UNIVERSITY, COLLEGE, DEPARTMENTAL, PROGRAM, COURSE, OR FACULTY RULES**

The violation of any University, College, Departmental, Program, Course, or Faculty Rules relating to academic matters that may lead to an unfair academic advantage by the student violating the rule(s).

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 use of online testbank answers 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 Duncan Farrah before submitting your work.

## 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.

## 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 Special Note on Title IX

Title IX of the Education Amendments (1972) prohibits discrimination on the basis of sex in any educational program or activity that receives federal financial assistance (20 U.S.C. § 1681(a)). Title IX prohibits sexual harassment. This includes sexual assault, sexual violence, relationship (domestic /dating) violence, stalking or other sexual misconduct. Further details can be found at: <https://manoa.hawaii.edu/titleix/>

The Violence Against Women (VAWA) Reauthorization Act (2013), also prohibits sexual assault, domestic violence, dating violence, and stalking. This federal legislation is sometimes referred to as the Campus Sexual Violence Elimination (SaVE) Act.

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. The University of Hawaii is required by Federal Law to handle such assault cases.

If you or someone you know has been harassed or assaulted, then please contact the UH Title IX coordinator, via: <https://manoa.hawaii.edu/titleix/>

Some external resources on Title IX (their inclusion here is not intended as any form of formal endorsement):

<http://knowyourix.org/>

<http://endrapeoncampus.org/>

<http://survjustice.org/>

<http://clerycenter.org/>

<https://www.notalone.gov/>