ASTR 329: Introduction to Observational Astronomy
Fall 2026

Territory Acknowledgement

We acknowledge and respect the Lək̓ʷəŋən (Songhees and Esquimalt) Peoples on whose territory the university stands, and the Lək̓ʷəŋən and W̱SÁNEĆ Peoples whose historical relationships with the land continue to this day.

General Course Information

Contact & Office Hours:

Instructor: Dr. Erica Franzmann
Office: Bob Wright Centre A115
Phone: 250-721-7750
Email: efranzmann@uvic.ca
Office Hours: 3 - 4 PM Mondays and Thursdays, or by appointment.
How to Contact: Please contact me via email for questions outside of class or office hours. Please note that unless your message is time-sensitive it is not likely that you will receive a reply after 9 pm. Office hours are, of course, drop-in. If you need to see me outside of office hours please contact me via email first.

When and Where:

Hours: 6:30 - 9:30 PM, Mondays & Thursdays

Course Credit: 1.5
Course Website: https://bright.uvic.ca/d2l/home/485379

The time will be mixed between lecture and lab work. Due to the time slot, if the weather allows we would be able to pivot to using the telescope on the 5th floor. However, if we end up observing it is very likely we will go over time (collecting the necessary calibration frames can take a while). However, it will not be *mandatory* to stay over time.

Course Description:

This course focuses on the acquisition of the skills necessary to plan, obtain, and analyze data from astronomical instruments. Students will learn the details of astronomical data processing and build their own data processing pipelines with Python.

Course Structure

The course consists of two 3 hour time slots per week, which will contain a mix of lecture and lab content. Depending on weather and class progression, we may also be able to use the telescope during class.

Lectures will cover topics and theory relevant to observational astronomy, while labs will provide practical hands-on data processing and analysis based on concepts learned in class. There will be four lab "Projects," with each project having a certain number of in-class lab sessions allocated to it before a lab report is due. In addition, each project will be broken into sub-assignments that will be due at set stages.

Course Materials

Lecture slides and notes will be posted to the Content tab of Brightspace within an hour of the end of class. This will include links to any additional resources discussed in class. Lab exercises will be available prior to the relevant lab.

Topics

The course will cover the following topics (order subject to change)

- Astronomical Image Processing & Calibration
- AstroPy and the FITS format
- Research Databases and Catalogues
- Time and Coordinates
- Probability Distributions and Counting Statistics
- Imaging & Detectors
- Photometry
- Spectroscopy & Spectrographs

And if we have time:

- Fourier Transform and Time Series Analysis
- Atmospheric Turbulence
- Adaptive Optics

Lab Projects

Timelines are rough and refer to approximate length from first lab session to setting a due date for the lab reports.

1. Introduction to FITS and CCD Preprocessing with AstroPy (1 week)
2. Characterizing a CCD (2 weeks)
3. Photometry and the Point Spread Function (4 weeks)
4. Spectroscopy (4 weeks)

Course Outcomes

By the end of the course, you should have experience with collecting optical telescope data and the basic methods by which it is processed and analyzed. You will know where to look to find information on targets and how to find relevant research papers, and will have developed your skills in scientific writing through the composition of lab reports.

Essential Components

In order to pass the course you must:

- Complete and submit four lab reports prior to the final deadline
- Submit a final project and achieve a minimum grade of 50% (10/20 points as defined by the course weighting)

Students who complete these components but have an overall average of less than 50% of the total will receive a grade of F. A failure to submit the final exam by the specified due date will receive a letter grade of N, regardless of their overall average in the course.

Assessments

Lab Projects: 80%

There are four projects with the each contributing thusly:

Lab 1:	10%
Lab 2:	20%
Lab 3:	25%
Lab 4:	25%

Late labs will be accepted for grading up to 48 hours after the initial deadline with a late penalty of 10% per day late.

The final deadline for you to submit any lab reports for credit will be **11:59 pm on December 9**. Concessions for late work will not be provided if you miss this deadline.

Evaluation

In addition to the final report, each project will be broken down into a series of “checkpoint assignments” that will be due at certain points before the final lab report. These are designed to help guide you through the analysis and serve as an opportunity to get incremental feedback as you work through the project. These assignments will not receive a formal grade at the time of submission, but the collection will be evaluated holistically when you submit your final report and will count toward your project grade. Specifics will be posted for each project individually.

Final Exam: 20%

The final exam will be a take-home exercise modelled around the theme of constructing a research proposal for a modern observatory and what analysis you could perform with the data. More specific details on which observatory, the tools to use, and potential targets will be given out in earlier in the term so that you can begin to prepare. Like with the labs there will be preparatory checkpoint assignments.

You are welcome to use your own notes, research and the course resources while completing your exam. However, you will not be permitted to collaborate with other students during the exam. The exam will be distributed and submitted through Brightspace.

Communication

It is your responsibility to regularly check the course Brightspace page, as well as the inbox of the email address you have provided to Brightspace. These are the only methods I have to contact you.

Teaching and Assessment Modality

Lectures and Labs will be delivered face to face. You will require regular access to a computer outside of the lab (the lab classroom is a computer lab). We will have Linux laptops available on loan. Contact me if you need one.

Learning and Teaching Technologies

The ASTR 329 Brightspace page will function as the course website. Lab reports will also be submitted to the appropriate boxes on Brightspace.

There are two different ways that you can access and complete the lab work:

1. Use a personal computer to access the lab server (limpkin) through VNC (will likely require using the UVic VPN and installing a VNC viewer, but otherwise minimal)
2. Install Python & other necessary software on your personal computer

You may use whichever approach you prefer. Information on both approaches is available on Brightspace. We will be using Jupyter mainly as a local IDE rather than as a cloud-based hub.

Statement on Generative AI Use

There are certain skills that you are expected to develop during this course. Relying too heavily on Generative AI Tools (GAITs) can prevent you from developing them. Additionally, since these tools hallucinate and are typically designed to flatter you, you cannot trust them to give you accurate answers. Please do not get in the habit of outsourcing your thinking!

You **CANNOT use GAITs to:**

- Generate code from scratch
- Compose, write, or rewrite the written portions of any work submitted for grading and/or feedback
- Summarize your research sources and generate notes for you
  - The main reason for this is that these summaries are often superficial or even incorrect about the content of sources and/or their conclusions.

You **CAN use GAITs**:

- To *assist* with debugging your code. However, I would prefer that you get help from me or a classmate instead.
- As a STARTING POINT for finding research sources. However, if you use these sources you must find and read them yourself and not rely on generated summaries.
  - **Preferred alternative:** Start with **SIMBAD** or **ADS/SciX**. Even sources cited in Wikipedia articles are a better starting point for inquiry than having a GAIT find sources that may or not be relevant (or even exist).

If you involve GAITs in work you submit for feedback **you must declare that you used it and document the process.**

As an addendum to this statement: **I (Erica) have not and will not be using GAITs to produce course materials, provide feedback, or evaluate student work.**

Academic Integrity

Students are required to abide by all academic regulations set as set out in the University calendar, including standards of academic integrity. Violations of academic integrity (e.g. cheating and plagiarism) are considered serious and may result in significant penalties. UVic Libraries has resources on **how to properly cite information**.

University Statements and Policies

Attendance and Absences

Medical documentation for short-term absences is **not required** as of the Spring 2021 term (approved by Senate). **Attendance is important.** Students who can not attend due to illness are asked to notify their instructors immediately. If illness, accident, or family affliction causes a student to miss the final exam or to fail to complete any assignment by the end of the term students are required to submit a **request for academic concession**. Policies regarding undergraduate student academic concessions and deferrals are also detailed on the **Undergraduate Academic Calendar**.

Important Academic Dates and Deadlines

September 22 - Last day for 100% tuition reimbursement from dropped courses
September 25 - Last day for adding first-term courses
September 30 - Tuition deadline & National Day for Truth and Reconciliation (holiday)
October 12 - Thanksgiving (university closed)
October 13 - Last day to drop courses for 50% tuition fee
October 31 - Last date to withdraw without penalty
November 9 - 11 - Fall break
December 7 - Last day of classes
December 10 - First day of exams