AST 112: Astronomy Lab

Spring 2025

Instructor Information

Instructor: Béla Arwen (Email: bela.arwen@stonybrook.edu)
Course Supervisor: Prof. Jin Koda (Email: jin.koda@stonybrook.edu)

Class Information

Dates: Tuesdays
Time: 6:30 PM - 9:20 PM
Classroom: Physics A-131

Béla's Office Hours:	Wednesdays	1:00 PM - 2:00 PM
(in Physics C-115)		
Prof. Koda's Office Hours:	Mondays	3:00 PM - 4:30 PM
(in ESS 455)	Thursdays	10:00 AM - 11:30 AM

Course Description

This course offers an introduction to observations and measurements in astronomy. Students will conduct astronomical measurements using basic instruments such as a quadrant, cross-staff, spectrometer, and telescope. They will analyze their data, explore how key quantities and associated errors are derived from the measurements, and learn proper reporting methods. While most experiments take place indoors in a classroom setting, some activities involve outdoor observations. This course does not count for astronomy major credit.

Course Objectives

1. Students will become familiar with key techniques, instruments, and measurement methods used by both historical and modern astronomers in their research.
2. Students will engage in guided observational sessions using the on-campus telescope to view celestial objects, gaining hands-on experience in astronomical data collection.
3. Students will develop skills in analyzing and interpreting astronomical data.

Reference Textbook

No textbook is required. All course materials will be provided through Brightspace one week prior to each lab.

Instruction Material & Software

Lab instructions will be distributed on Brightspace one week before each experiment. Students are expected to review the material in advance to prepare for the lab session.

Software: A basic scientific calculator or any software capable of performing trigonometric calculations will suffice. Students may plot data manually using graph paper or utilize a computer (either personal or of the university) for data analysis and graphing.

Lab Notebook or Computer: Students are required to maintain a lab notebook (preferably with graph paper) for recording measurements during lab sessions. Alternatively, data may be recorded digitally on a laptop or tablet.

Grading

There will be 12 labs in total (see schedule below), 4 of which will be "observational." Observational labs are weather-dependent, and scheduling may be adjusted accordingly.

The course grade will be determined as follows:

Lab reports: 10 points each, totaling 120 points

No additional points will be offered under any circumstances. **There is no exam.** Grade challenges must be submitted within one week of the grade being posted. No changes will be made to grades after this period, regardless of the reason.

Contingency Plan for Observational Labs: If persistent poor weather prevents the completion of both telescope experiments, the second-to-last class meeting will serve as a buffer. If the second telescope lab is delayed until this date and the weather remains unfavorable, the lab will be canceled with no replacement experiment. **In such cases, grading will be adjusted accordingly, ensuring that students are not penalized for the cancellation.**

Labs & Reports

Some weeks we will conduct typical laboratory activities (including some observational weeks), while other weeks will include a small in-class problem set. Each lab or problem set will have a corresponding **report or assignment that must be submitted no later than the beginning of the next lab session**.

- Each lab report is worth 10 points.
- **Late reports submitted within 24 hours** of the deadline will incur a 20% penalty.
- **Reports will not be accepted after the 24-hour late submission window.**

Submission Guidelines:

- All reports must be submitted as a PDF via Brightspace.
- Reports can be handwritten and photographed or typed on a computer.
- **In-person submissions will not be accepted.**

Collaboration Policy:

- Labs are completed in groups, and group members will share data and may collaborate on analysis.
- However, **each student must write and submit their own original lab report. Neither of the copied nor original reports will receive points.**
- A grading rubric outlining the required layout and content will be provided.

Moon Lab

The Lunar Characteristic lab consists of a class lecture followed by semester-long individual activities outside the class meetings. It is worth 10 points. This lab requires a semester-long planning by students at the beginning of semester. Be aware that **students can lose the full 10 points if they do not plan in advance.** An instruction will be provided in class.

Outside Lab

This course includes occasional outdoor activities, such as observing with the Mt. Stony Brook telescope, which are subject to weather conditions. As a result, the topic of a lab experiment may change with short notice. If an observing lab is rescheduled, students should be prepared to complete the next scheduled lab in its place. Students are required to regularly check Brightspace for updates, announcements, and any last-minute changes to the schedule.

Attendance

This is a lab course. Each class begins with a brief instruction on the day's experiment, followed by lab itself for which all the data collection will be expected to be completed within that class period. It is essential that students arrive on time and do not miss the introductory instruction. **Students who are not present at the start of class may be marked as absent and may forfeit the full 10 points for that day's experiment.**

Make-up Policy

Due to limited time in the semester, missed labs cannot be automatically rescheduled. Students should not expect a make-up lab to be granted under normal circumstances.

If exceptional situations arise (e.g., valid medical absences, jury duty, military service), students must notify both the instructor **and** course supervisor via email **before the scheduled lab date** to request permission to miss the lab. Requests made after a missed lab will be evaluated on a case-by-case basis, and students must provide official documentation (e.g., a doctor's note, jury duty notice, or military service order) to support their absence.

There will be only **one time slot** available for a make-up lab during the semester. Students may miss no more than one lab under any circumstances, as additional missed labs will result in zero points. The make-up lab will replace the grade for the missed lab.

Brightspace

All students are required to regularly monitor Brightspace for updates and changes to course information, including the syllabus. All course documents and report scores will be posted there on a regular basis. **Any rescheduling or changes to the course schedule will also be announced on Brightspace.**

Schedule

The following is a tentative schedule. Due to the observational nature of astronomy, any observing labs are weather-dependent. If an observing lab is rescheduled, students should be prepared to complete the next scheduled lab in its place. **Students must also be ready for sudden observing sessions as opportunities arise.** This will be discussed in greater detail later.

Date	**Lab Topic**
Jan 28	No Lab
Feb 4	Overview & Math Review
Feb 11	The Cross Staff and Parallax
Feb 18	Observing Lab: Lunar Characteristics (Moon Lab)
Feb 25	Lenses and Telescopes
Mar 4	Solar System, Kepler's Laws, Mass of Jupiter and Saturn
Mar 11	Observing Lab: Telescope Usage
Mar 15 - Mar 23	*Spring Break*
Mar 25	Observing Lab: Planets
Apr 1	Luminosity, Brightness, and Distances
Apr 8	Stellar Properties, the HR Diagram
Apr 15	Observing Lab: Spring Constellations
Apr 22	Stars, Light, and Spectra
Apr 29	Hubble's Law and the Age of the Universe
May 6	Make-up Lab Date

Changes to the Syllabus

Every effort will be made to adhere to the course schedule; however, unforeseen events (e.g., bad weather) may require changes to the syllabus. It is the students' responsibility to regularly check Brightspace for updates. Any changes will be announced through course announcements on Brightspace.

University Policies:

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 the 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 Statement

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 is 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 dis- honesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html.

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 Student Conduct and Community Standards 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.

Academic Dishonesty

Any form of academic dishonesty, including cheating and plagiarism, will be reported to the Academic Judiciary. All parties involved (both the copier and the person who produced the original work) will be held accountable for any instance of plagiarism or dishonesty.

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 https://www.stonybrook.edu/commcms/registrar/calendars/religious_holidays.php2025 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.