

Astronomy 1001 Lab 103: Exploring the Universe

Monday 11:15 AM – 1:10 PM, Tate Hall Room B27

www.astro.umn.edu/courses/1001

About Me:

Lab Instructor: Mike Makmur
Term: Spring 2019
Department: Minnesota Institute for Astrophysics
Email: makmu002@umn.edu
(Please contact me if there are any concerns/questions!)

Office Hours: Wednesdays 2:30 PM - 3:30 PM, Tate Hall 510-02
Note: You may attend any TA's office hours. There is a full schedule on the course website.

Assignment Mailbox: AST 1001 box (standalone cabinet near Tate B85), slot 103

Course Goals and Description:

This syllabus is for the lab portion of the 4 credit course, AST1001. The lab is designed to introduce students to the observational and analytical techniques used by astronomers. Students will also explore a wide variety of physical phenomena seen here on Earth, as well as in space. The lab will reinforce the physical concepts taught in the lecture portion of the class as well as challenge students to apply what they've learned to a number of issues related to how we as a society interact with our environment here on Earth.

Course Outcomes:

As a result of this lab, students will be able to:

- Apply observational and analytical techniques used by astronomers to situations in a laboratory setting
- Discuss the factors related to our society's relationship with the Earth/environment
- Solve simple mathematical problems related to data and physical processes
- Demonstrate the ability to think critically about physical phenomena
- Develop their ability to work cohesively in a group

Student Expectations:

- All work, except for quizzes, will be done in groups. Each student is required to be fully engaged and contributing to the group work. No work may be done as an individual.
- Read the prelab introductions thoroughly **before** coming to lab — you will be held accountable for this information on the quiz!
- Bring your calculator, lab manual, and textbook (at least one text per group)!

Instructor Expectations:

- I will assist you in completing the lab. I will often do this by asking your group leading questions, as opposed to giving answers.
- Labs and quizzes will be graded and handed back the following week.
- Moon observations will be reviewed promptly and feedback will be given on how to fix problems that arise.

Texts:

Your lecture instructor will give you information about the required textbook for lectures. For labs, you are required to have the following text, starting at the first lab.

- Exploring The Universe: Ast 1001/1011h Lab Manual, 2018-2019
ISBN: 978-1-68135-938-0
 - Written by the Astronomy Department, so it can only be found at the university bookstore. **Previous versions from other years are not up to date!**
 - More information at <https://bookstores.umn.edu/my-course-materials>

Grading Policy:

- There is **NO** extra credit. **Each lab is worth 20 points.** These points are split between a quiz on pre-lab reading at the beginning of lab (3 points) and the turned-in group work on the lab (17 points). If the sum of these two is a fraction, it will be rounded up.
- The Bell Museum planetarium visit is worth 20 points (see below for details).
- In total the Moon project is worth 140 points (see below for more details about the Moon project).
 - 9 points for the first observation deadline.
 - 26 points for the second observation deadline.
 - 45 points for the final observation deadline.
 - 60 points for the final report (This is due the same day as the final observation deadline, **April 26th**).
- The course overall, including lecture, is graded out of 1000 total points.
 - If you have questions about the grading, you must ask your lecturer; each lecture has somewhat different grading procedures.
- Plagiarism or cheating will be dealt with using the full sanctions endorsed by the Office of Community Standards.

Auto-fail policy:

- If you miss 50% of the points on the labs, **you will automatically fail AST1001.**
- If you miss 50% of the points on the Moon project, **you will automatically fail AST1001.**

Tardy/Absence Policy:

- If you are late by less than 5 minutes you will likely miss the quiz, which will lose you 3 points. More points will be lost depending on how late you are.
 - I understand the campus is large and for some it will be tough to get to lab on time if you have class directly before lab. If this is the case contact me via email or during lab and we will work something out.
- If you miss significant group work, you will not be allowed to stay for the lab.

Making up missing work:

- If you cannot attend our lab section you may attend another TA's lab during that week, if they have room. **You must email both me and that TA to arrange this.** This "make-up" lab must be completed the same week! Other sections can be seen on the course website.
- If you cannot attend another lab section contact me during the same week as our lab and we will see if some arrangements can be made.
- Failing to do a lab results in a score of 0 for that week.

Course Registration Deadlines:

- The last day to drop this course without a "W", or withdrawal, on your transcript or to change your grade base is February 4th.
- The last day to officially switch lab sections is January 28th.
 - Under exceptional circumstances, it may be possible to switch lab sections after that date; you must make any such arrangements through me.

Bell Museum Planetarium Visit:

- You are **required*** to attend one of the custom shows in the Planetarium of the Bell Museum on the St. Paul Campus.
- The shows will cover material related to the Moon Project, as well as motions of the Sun, stars, and planets.
- Pick up your ticket during the first lab, have it stamped at the show, and return it the next week in lab.
- Available shows are: Feb 5, 5–6pm; Feb 5, 6–7pm; Feb 8, 5–6pm; Feb 8, 6–7pm; Feb 13, 5–6pm. You must arrive **at least 10 minutes early**, or you will miss the show.
- Transportation information is available on your ticket.

*If you cannot attend any of the shows, you must complete an alternate assignment, which will involve making your own visit to the Earth/Space Gallery at the Bell Museum, and submitting a report by Feb 28. Make arrangements with your TA.

Moon Observations:

- Write down your 3 repeat observations in your Moon log (pg. 14 of lab manual).
- You must also enter your 3 measurements and averaged observation online at z.umn.edu/moon within 72 hours (3 days) of taking it.
- You are welcome to work together with other students when you take your Moon observations. However, it is essential that you make your **own individual measurements and record only your own individual measurements**.
- The computer automatically checks for errors. I will also check for errors and cheating. **Cheating is very easy to catch!** Measurements cannot be changed once entered but math errors may be fixed.
- **Cheating is very easy to catch!!!**
- Observations must be made at least **12 hours** apart.

To achieve full credit on the Moon project:

- Write observations in the hard copy Moon-log (We need these to help diagnose any problems that arise. I will do spot checking of the logs, so make sure they are current.)
 - A copy of your logs must be turned in at each deadline
- **Enter observations online within 72 hours** of observation date. Each student only gets **one pass** on this rule!
- Have all calculation fields completely green (after getting help, as needed).
 - Tip: You can click on the box to get a description of the box and common mistakes made.
- Complete the required number of observations by the dates listed below
- Turn in a **photocopy** of the full final observational project and logs in the assignment mailbox by date listed below
- Don't procrastinate! **Bad weather, or a new Moon, will not be an excuse for lack of observations.**

Moon Project Due Dates:

3 observations	February 22nd, 3 pm	9 Points
9 observations	March 25th, 3 pm	26 Points
15 observations + full project write-up	April 26th, 3 pm	105 Points Total (45 for observations, 60 for final report)

- For each deadline, observations must be entered online as well as recorded in the Moon logs which must be turned in by **3pm on the due date**.

A quick comment about the Moon project:

The Moon project is an alternative to weekly homework or a research paper and is likely a type of assignment which you've never done before. In the beginning it will require some extra time as you learn how to accurately measure the Moon's position in the sky. Your first few measurements will likely have some problems. However, don't stress too much over making mistakes. By the end you'll be an experienced observer and the measurements will be much easier! In order to be successful it is recommended you take at least one observation during the first week so there's time to work through these problems.

Tips on making Moon measurements:

If you are having trouble with the measurements, *contact me* and we can set up an appointment to take a look at what could be causing your troubles. Notice that in order to realize you are having trouble, you need to make an observation! It is hard (impossible) to help someone with no observations!

- There will be observing events (weather permitting) on **Monday, February 11th, and Tuesday, February 12th, both at 4:00 PM in Tate 510** (office hours location), and lasting about an hour. We will be able to go onto the roof of Tate to make observations, while TAs assist and answer questions. Because TAs will be available to help with any problems that arise, attendance is highly encouraged. Going will essentially guarantee an accepted Moon observation! If you attend both, you'll only need one more observation for the first deadline.
- Use only **one fist** (the **same one** you measure during the first day of lab) while doing the measurement by using your other open hand to mark your fist location on the horizon while shifting your fist over.
 - When you use your other hand to mark your fist spot, place your open hand below your fist so that your marking hand does not "eat" part of the angle you are measuring.
- While moving your fist over, you should rotate your whole body rather than just move your fist over. This keeps the distance from your eye to your fist constant, and therefore the angular size of your fist constant.
 - For example, if the Moon was exactly East then you should start by facing South. By the time your fist gets over to the Moon your whole body should also be facing East.
- **Do not use a compass on your phone or other electronic device to find South.** The wires, electric lines around you warp the Earth's magnetic field which will throw off your compass. Using a phone **to look at a map** is fine, the best way of finding South being to compare your location on the map with the street you are on. It might also be useful to use the Mall, which runs directly North-South (with Coffman at the South end). I will also demonstrate how to accurately find South in the second week of lab using Google maps on a phone.

Lab Schedule:

Week 1 – Jan 21	<i>No Lab</i>	
Week 2 – Jan 28	Lab A	Observing the Moon
Week 3 – Feb 4	Lab B	Astronomical Distances
Week 4 – Feb 11	Lab C	Kepler's Laws
Week 5 – Feb 18	Lab D	Telescopes (Feb 22 Moon Project Part 1 Due)
Week 6 – Feb 25	Lab E	Impacts from Space
Week 7 – Mar 4	Lab F	Extraterrestrial Life
Week 8 – Mar 11	Lab G	Energy Flows
Week 9 – Mar 18	<i>No Lab</i>	<i>(Spring Break)</i>
Week 10 – Mar 25	Lab H	Atomic Spectroscopy (Mar 25 Moon Project Part 2 Due)
Week 11 – Apr 1	Lab I	H-R Diagram
Week 12 – Apr 8	Lab J	History of Matter
Week 13 – Apr 15	Lab K	Expansion of the Universe
Week 14 – Apr 22	Lab L	Dark Matter (Apr 26 Final Moon Project Due)
Week 15 – Apr 29	<i>No Lab</i>	
Week 16 – May 6	<i>No Lab</i>	

University of Minnesota Policies

Scholastic Dishonesty

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code:

http://regents.umn.edu/sites/regents.umn.edu/files/policies/Student_Conduct_Code.pdf) If it is determined that a student has cheated, the student may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: <http://policy.umn.edu/education/instructorresp>.

The Office for Community Standards has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty:

<https://communitystandards.umn.edu/avoid-violations/avoiding-scholastic-dishonesty>. If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class-e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

Sexual Harassment

"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy:

<http://regents.umn.edu/sites/regents.umn.edu/files/policies/SexHarassment.pdf>

Equity, Diversity, Equal Opportunity, and Affirmative Action

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy:

http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity_Diversity_EO_AA.pdf.

Disability Accommodations

The University of Minnesota views disability as an important aspect of diversity, and is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

- If you have, or think you have, a disability in any area such as, mental health, attention, learning, chronic health, sensory, or physical, please contact the DRC office on your campus (UM Twin Cities - 612.626.1333) to arrange a confidential discussion regarding equitable access and reasonable accommodations.
- Students with short-term disabilities, such as a broken arm, **can** often work with instructors to **minimize** classroom barriers. In situations where additional assistance is needed, students should contact the DRC as noted above.
- If you are registered with the DRC and have a disability accommodation letter dated for this semester or this year, please contact your instructor early in the semester to review how the accommodations will be applied in the course.
- If you are registered with the DRC and have questions or concerns about your accommodations please contact your (access consultant/disability specialist).

Additional information is available on the DRC website: UM Twin Cities -

<https://diversity.umn.edu/disability/> or e-mail UM Twin Cities - drc@umn.edu with questions.

Mental Health and Stress Management

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: <http://www.mentalhealth.umn.edu>.

Academic Freedom and Responsibility

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.*

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the TA, instructor, the Department Chair, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.