Astronomy 1001 Lab 118: Exploring the Universe
Tate B29
www.astro.umn.edu/courses/1001

About Me:
Lab Instructor: Jamie Cheshire
Term: Spring 2018
Department: Minnesota Institute for Astrophysics
Email: chesh008@umn.edu (Please contact me if there are any concerns/questions!)
Office Hours: Monday 4:00-5:00 PM, 510-02 Tate Hall
Note: You may attend any TA's office hour. There is a full schedule on the course website.
Assignment Mailbox: tbd

Course Goals and Description:

This syllabus for the lab portion of the 4 credit course AST1001. The lab is designed to introduce students to the observational and analysis 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 analysis techniques used by astronomers to situations in the lab 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 skills in working 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.
- 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, 2017-2018
  ISBN: 9781681355863
  ○ Written by the Astronomy Department so it can only be found at university bookstore. Previous versions from other years are not up to date!
  ○ Information is at https://www.bookstores.umn.edu/textbooks/searchbooks.html

Grading Policy:

• There is NO extra credit. Each lab is worth 20 points. 3 come from an individually graded weekly quiz at the beginning of lab about the pre lab reading for that week while the other 17 points come from the group work on the lab.
• 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 13th).
• Overall the course, 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.

Autofail 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 are late enough to 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!
• 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 January 29th.
• The last day to officially switch lab sections is January 22nd.
  ○ Under exceptional circumstances, it may be possible to switch lab sections after that date; you must make any such arrangements through me.

Moon Observations:

• Write down your 3 repeat observations in your Moon log (pg. 19 of lab manual).
• You must also enter your 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:**

<table>
<thead>
<tr>
<th>Observations</th>
<th>Date</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>February 9th, 3 pm</td>
<td>9 Points</td>
</tr>
<tr>
<td>9</td>
<td>March 9th, 3 pm</td>
<td>26 Points</td>
</tr>
<tr>
<td>15</td>
<td>April 13th, 3 pm</td>
<td>105 Points Total</td>
</tr>
<tr>
<td>(both observations &amp; full project write-up)</td>
<td>(45 for observations, 60 for final report)</td>
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</table>

- 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 on 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 two observing events (weather permitting) on January 25th and 26th at 3PM in Tate 510. I highly encourage attendance because TAs will be available to help with any problems that arise. Going will essentially guarantee an accepted Moon observation so attending both will leave you with only one more observation to get before the first deadline!
- Use only one fist 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. Use a map and compare South with the street you are on. I will also demonstrate how to accurately find South in the second week of lab using Google maps on a phone.

### Lab Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Lab</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>Week 1 – Jan 15</td>
<td>No Lab</td>
<td></td>
</tr>
<tr>
<td>Week 2 – Jan 22</td>
<td>Lab A</td>
<td>Observing the Moon (Jan 25, 26 3PM Observing Events)</td>
</tr>
<tr>
<td>Week 3 – Jan 29</td>
<td>Lab B</td>
<td>Astronomical Distances</td>
</tr>
<tr>
<td>Week 4 – Feb 5</td>
<td>Lab C</td>
<td>Kepler’s Laws (Feb 9 Moon Project Part 1 Due)</td>
</tr>
<tr>
<td>Week 5 – Feb 12</td>
<td>Lab D</td>
<td>Telescopes</td>
</tr>
<tr>
<td>Week 6 – Feb 19</td>
<td>Lab E</td>
<td>Impacts from Space</td>
</tr>
<tr>
<td>Week 7 – Feb 26</td>
<td>Lab F</td>
<td>Extraterrestrial Life</td>
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<tr>
<td>Week 8 – Mar 5</td>
<td>Lab G</td>
<td>Energy Flows (Mar 9 Moon Project Part 2 Due)</td>
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<tr>
<td>Week 9 – Mar 12</td>
<td>No Lab</td>
<td>Spring Break</td>
</tr>
<tr>
<td>Week 10 - Mar 19</td>
<td>No Lab</td>
<td></td>
</tr>
<tr>
<td>Week 11 – Mar 26</td>
<td>Lab H</td>
<td>Atomic Spectroscopy</td>
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<tr>
<td>Week 12 - Apr 2</td>
<td>Lab I</td>
<td>HR-Diagram</td>
</tr>
<tr>
<td>Week 13 - Apr 9</td>
<td>Lab J</td>
<td>History of Matter (Apr 13 Final Moon Project Due)</td>
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<tr>
<td>Week 14 - Apr 16</td>
<td>Lab K</td>
<td>The Expansion of the Universe</td>
</tr>
<tr>
<td>Week 15 - Apr 23</td>
<td>Lab L</td>
<td>Dark Matter</td>
</tr>
<tr>
<td>Week 16 - Apr 30</td>
<td>No Lab</td>
<td></td>
</tr>
</tbody>
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**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](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](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-](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.