Astronomy 109, Astronomy Laboratory
Fall 2014, Section 11 Lab Syllabus
Sched #: 20318

Meeting Time: Wednesday 6:00 pm – 8:40 pm
Meeting Location: PS-256

Instructor: Susan Kurth
Office: PA-228
Email: susan.kurth27@gmail.com
Phone: 619-987-1313

Office Hours: Wednesday 4pm-6pm in PA-215A

Course Website: http://blackboard.sdsu.edu

Text (required): Astronomy 109 Lab Manual $30 purchased at Bookstore

Prerequisite: Astronomy 101 (or currently enrolled)

Other Requirements: scientific calculator, paper, pencil, pen (no red ink)

Class Description:
Each class meeting we will complete one lab from the Astronomy 109 Lab Manual. The tentative schedule is shown on page 3 of the syllabus, however it is subject to change last-minute. We will not follow the order of the lab manual. You are required to read the lab introduction and background for the corresponding lab before each class so you are prepared to complete the lab.

“Demonstration of astronomical principles through observations with astronomical instruments and analysis of astronomical data. A nighttime field trip to Mount Laguna Observatory is required.”

Lab Format and Grading:
Each lab must be written in your own words, however you are encouraged to work in groups of no more than 3 people. Follow the instructions in the manual and complete all questions. Be sure to show ALL work and box your answers. If you work with others, list their names on your lab.

Once you complete the lab, you are required to write a one-paragraph conclusion/summary of your lab write-up. Briefly discuss the following topics:
• Most important: What background information did you learn in the beginning of class?
• 2nd Most important: What did you do in the lab? How did you do it?
• In what way did this lab contribute to your understanding of astronomy?
• What will you take away from this lab?
• What did you like or dislike about the lab?

Once your lab write-up is completed, tear the whole lab out of your notebook and turn it in to me. Please take off the frillies! You are free to go after you turn it in. No late labs will be accepted.

**Attendance and Tardiness**
Attendance is absolutely mandatory for all lab meetings. If you are absent for more than 3 classes, you will receive an automatic fail. You can make-up ONE lab in this class. Make-ups are not allowed for the course projects (MLO and APOD). Arrangements must be made with me for the make-ups.

I will take attendance at each lab. If you are consistently late to lab then points will be deducted from your grade.

**Grading**
Each lab is worth 50 points: 40 for your lab and 10 for your conclusion/summary. Things I will be looking for while grading your labs include:
• Show all steps in your calculations and box your answers
• Include units when writing down each answer
• Be sure to keep all writing and work neat and organized

You can make-up one lab but you must email me so we can set up a time for you to make up the lab, most likely during my office hours.

Your total grade will be out of 800 points. The grading scale is shown below. There will be NO Rounding. NO EXCEPTIONS.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>93-100%</td>
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<tr>
<td>A-</td>
<td>90-92.99%</td>
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<tr>
<td>B+</td>
<td>87-89.99%</td>
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<tr>
<td>B</td>
<td>83-86.99%</td>
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<td>B-</td>
<td>80-82.99%</td>
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<td>C</td>
<td>77-79.99%</td>
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<tr>
<td>C-</td>
<td>73-76.99%</td>
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<tr>
<td>D+</td>
<td>67-69.99%</td>
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<tr>
<td>D</td>
<td>60-66.99%</td>
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<tr>
<td>F</td>
<td>0-59.99%</td>
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</table>

**Class Projects**
Astronomy Picture of the Day (APOD): NASA hosts a website that posts a different astronomical picture every day. The image topics range from planets, stars, and eclipses, to star clusters, large galaxies, and planetary nebulae. For this project, you will choose one of these images, research the image, write a paper about what you learned from your research (1000 words), and give a 3-5 minute presentation.
displaying the image and what you learned about it. The project is worth 100 points: 70 for the paper and 30 for the presentation. For more information on this project see Lab 10 in the lab manual. The APOD website is:
http://apod.nasa.gov/apod/archivepix.html

Field Trip to Mount Laguna Observatory: As part of Astronomy 109, students are required to attend a field trip to San Diego State University's Mount Laguna Observatory (MLO), a professional astronomical observatory at which SDSU’s faculty and students conduct research. MLO is located in the Cleveland National Forest, about 1 hour east of SDSU’s campus. Attending the field trip is a requirement for the course, and students are responsible for their own transportation. Prior to attending the field trip, all attendees must fill out and sign the "Warning, Waiver, and Release of Liability" form contained in the back jacket of the lab manual and turn it in to the lab instructor. Additional information about the trip is contained in the lab manual on the form “Mount Laguna Observatory Field Trip Potential Risks and Dangers” that is also in the back jacket of lab manual. In a few weeks more information about the trip will be given to you.

Lab Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Lab Title</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 27</td>
<td>Syllabus Day &amp; Lab 1: The Size of the Earth</td>
<td>50</td>
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<tr>
<td>September 3</td>
<td>Lab 2: The Rotation of the Sun</td>
<td>50</td>
</tr>
<tr>
<td>September 10</td>
<td>Lab 3: The Celestial Sphere</td>
<td>50</td>
</tr>
<tr>
<td>September 17</td>
<td>Lab 4: Kepler’s First Law – The Elliptical Orbits of Planets</td>
<td>50</td>
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<td>September 24</td>
<td>Lab 15: The Moon</td>
<td>50</td>
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<tr>
<td>October 1</td>
<td>Lab 5: Kepler’s Third Law and Jupiter’s Moons</td>
<td>50</td>
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<tr>
<td>October 8</td>
<td>Lab 6: Measuring Distance with Parallax</td>
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<tr>
<td>October 15</td>
<td>Lab 7: An Exploration of the Properties of Light and Atoms</td>
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<td>October 22</td>
<td>Lab 12: The Hertzsprung-Russell Diagram</td>
<td>50</td>
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<td>October 29</td>
<td>Lab 8: A Universe of Galaxies and Dark Matter</td>
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<td>November 5</td>
<td>Lab 9: The Age of the Universe</td>
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<td>November 12</td>
<td>Lab 14: Distances to Cepheid Variable Stars</td>
<td>50</td>
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<tr>
<td>November 19</td>
<td>Field Trip to Mount Laguna Observatory (weather permitting)</td>
<td>50</td>
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<tr>
<td>November 26</td>
<td>Thanksgiving Break – No Class!!!</td>
<td>0</td>
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<tr>
<td>December 3</td>
<td>Final Lab – Not in lab manual</td>
<td>50</td>
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<tr>
<td>December 10</td>
<td>Last Day of Class: APOD Presentations</td>
<td>100</td>
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<tr>
<td>December 17</td>
<td>Make Up Lab Day, Optional Office Hours</td>
<td>TOTAL 800</td>
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Final Exam
No final exam! 😊

Questions?
Questions are always welcome and encouraged! Feel free to come to my help room hours, stop by my office, send me an email, or even call me if you have any questions. It’s better to ask for help than to be stuck!
Student Learning Objectives
Upon completing this course, students should be able to:
1. Explain the process by which humans first correctly deduced the size and shape of the Earth.
2. Research an astronomical topic of your choice and display understanding of your topic in both an oral presentation and a written paper.
3. Describe the phases of the moon, and explain why the moon cannot always be seen at night.
4. Apply scientific problem solving abilities to other academic areas.
5. Determine their rough latitude on Earth's surface at any time through careful observation of the nighttime sky.
6. Convince a fellow student who has never taken an astronomy class that it is possible to determine the precise distance to a nearby star through the careful analysis of its location in the sky over the course of a year.
7. Present the currently favored scientific theory for what the ultimate fate of our universe will be, and outline the astronomical observations upon which the theory is based.
8. Read and comprehend articles concerning astronomy that appear in the popular press, and participate in discussions about them.
9. Describe at least three major areas in which our astronomical knowledge is known to be incomplete.

The Role of Astronomy 109 in San Diego State University's General Education Program
This course is one of nine courses that you will take in General Education Foundations. Foundations courses cultivate skills in reading, writing, research, communication, computation, information literacy, and use of technology. The furthermore introduce you to basic concepts, theories and approaches in a variety of disciplines in order to provide the intellectual breadth necessary to help you integrate the more specialized knowledge gathered in your major area of study into a broader world picture.

This course is one of four Foundations courses that you will take in the area of Natural Sciences and Quantitative Reasoning. Upon completing Natural Science Foundations courses in physical sciences, life sciences, and a lab, you will be able to: 1) explain basic concepts and theories of the natural sciences; 2) use logic and scientific methods to analyze the natural world and solve problems; 3) argue from multiple perspectives about issues in natural science that have personal and global relevance; 4) use technology in laboratory and field situations to connect concepts and theories with real-world phenomena. Upon completing a Foundations course in Quantitative Reasoning you will be able to: 1) apply appropriate
computational skills and use basic mathematical concepts to analyze problems in natural and social sciences; and 2) use methods of quantitative reasoning to solve and communicate answers to real-world problems.

Field Trip to Mount Laguna Observatory

- **Trip Information:** As part of Astronomy 109, students are required to attend a field trip to San Diego State University’s Mount Laguna Observatory (MLO), a professional astronomical observatory at which SDSU’s faculty and students conduct astronomical research. MLO is located in the Cleveland National Forest, about 1 hour East of SDSU’s campus. Attending the field trip is a requirement for the course, and students are responsible for their own transportation. Participants are required to be registered SDSU students or appointed faculty or staff. Prior to attending the field trip, all attendees must fill out and sign the “Warning, Waiver, and Release of Liability” form contained in the back jacket of the Lab Manual, and turn it in to the lab instructor. Additional information about the trip is contained in the Lab Manual, on the form “Mount Laguna Observatory Field Trip Potential Risks and Dangers” that is tucked into the back jacket of the manual.

- **Purpose of trip:** While at MLO, students will have the unique opportunity to see deep space objects through a large telescope, and observe the night sky from a very dark location.

- **Instructional outline of trip:** Students assemble in the parking lot of MLO at the time and date indicated by the lab instructor. A Teaching Associate will walk students up to the Visitor’s Telescope, where they will be able to view deep-sky objects. There will be at least two Teaching Associates available to assist students. While waiting to look through the telescope, additional activities may be provided to students by the Teaching Associates (e.g., finding constellations, identifying the Milky Way, observing planets, spotting satellites, etc). At the conclusion of the telescope viewing, all students will be escorted down to the parking lot by a Teaching Associate, where they are to leave the Observatory. No students may remain at MLO after the Teaching Associates have departed.

- **Health and safety instructions:** MLO is considered an extension of the main SDSU campus; hence, the SDSU Student Code of Conduct applies at MLO, and MLO is a drug and alcohol-free workplace. Students are to bring a small flashlight, and are to remain on designated paths and roads at all times. Personal injury from falls, or scrapes and cuts from tree limbs and brush, can easily result from taking cross-country shortcuts. It can get quite chilly up at the Observatory in the evenings, and so all students are advised to dress very warmly — e.g., heavy jacket, long pants, socks and shoes (open-toed shoes are strongly discouraged); gloves and a hat are also recommended. Smoking and campfires are prohibited. Additional safety instructions are found in the “Mount Laguna Observatory Field Trip Potential Risks and Dangers” form that is tucked into the back jacket of the lab manual.

- **Emergency contact information:** SDSU public safety – (619) 594-1991.
Cheating and Plagiarism
Consistent with University policy, cheating and plagiarism are not tolerated in Astronomy 109. As defined by SDSU’s General Catalog, “Plagiarism is formal work publicly misrepresented as original.” Plagiarism and cheating are theft. Remember you are encouraged to work together on laboratory assignments but the words that you write in your lab reports must be your own. If you copy more than 4 words in a row from any source (including the World Wide Web or your lab partner), you are committing plagiarism. If plagiarism or cheating is deemed to have occurred on a lab report or project, the following steps will be taken:

1. A “0” will be given for the assignment grade.
2. An “Academic Dishonesty Incident Report” will be submitted to the Center for Student Rights and Responsibilities. This action is required by Executive Order 1006, which “mandates faculty to report all incidents to the Center for Student Rights and Responsibilities.”
3. The incident will be investigated by the Student Conduct Administrator who “determines whether it is appropriate to charge a student with violation of the Student Conduct Code.” Details in the judicial process (and the potential results, including “severance from the University”) can be found at the Center for Student Rights and Responsibilities web page: [http://csrr.sdsu.edu/index/html](http://csrr.sdsu.edu/index/html).

Classroom Safety
For all information concerning safety in the classroom, please read the information contained at San Diego State University’s “Emergency Preparedness” website: [http://bfa.sdsu.edu/emergency/](http://bfa.sdsu.edu/emergency/).

Students with Disabilities
If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.