

Observational Astronomy

Astronomy 25

Dr. Mitch Haeri

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Monday, 7-11 p.m.

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Office hours: Monday 2-4, and by appointment

1. Course Description

This laboratory course is an introduction to observational astronomy with an emphasis on techniques used to observe and study celestial objects which include the moon, planets, sun, stars, and deep sky objects. Students will use college owned telescopes and observatory to find and study a variety of celestial objects.

2. Course Objectives

- Learn the basic function and use of astronomical instruments
 - Telescopes, spectroscopes, and CCD cameras
- Learn the constellations visible during the semester
- Learn the use of the celestial sphere and the equatorial coordinate system to find celestial objects
- Learn how observational astronomers study celestial objects
 - The Moon, planets, stars, star clusters, nebula, and galaxies
- Use school owned instruments to gather basic data on astronomical objects
 - Distance and size of planets, Size of lunar craters, temperature of stars, separation of binary stars, and structure of galaxies.
- Learn methods used by observational astronomers to study the birth and death of the universe (cosmology).

3. Prerequisites: None

4. Required material

-Observational Astronomy Lecture Notes and labs (on web site)

<http://www.saddleback.edu/mse/astronomy/Mitch/mhaeri.html>

It is the student's responsibility to download the PDF files from the web site.

- Norton's Star Atlas 2000 (available in the bookstore)

- Warm clothing

5. Optional material

- Binoculars
- Folding Chair (especially helpful on field trips)
- Telescope (if you have one, and want to bring it observing, see me)

6. Grades

The course grade is based on several lab reports, attendance, and two tests. The breakdown is as follows:

Midterm.....	20%
Labs.....	55%
Attendance/Participation.....	10%
Sky Quiz and Formal Lab.....	10%
Final.....	25%

Attendance and participation are a crucial part of the grade since some labs will not require a write-up. No make-up exams are given.

7. Make-up Lab policy

Students should avoid missing labs performed off-site or which involve the use of school-owned equipment. However, in the event such labs are missed for what ever reason, make-up labs will be handed out the last week of class (before the final exam). These make-up labs are due the night of the final exam. It is the student's responsibility to track missed labs. This policy is also in effect for the weekend field trip.

The student can only make-up two labs.

8. On-Site Labs (Notes and Reminders)

- Smoking is not permitted on the roof of the sm building while we are observing.
- All college rules and policies are in effect on all field trips (Ortega and Anza Borrego).

9. Off-Site Labs (Notes and Reminders)

- As a courtesy to other people, smoking is not permitted near the telescopes.
- College policy does not allow students to bring guests on official college field trips.
- Student's who drive themselves are responsible for paying the required parking and camping fees. Please observe all park regulations and note the maximum cars allowed at each campsite.
- Every attempt is made to predict weather conditions at the site. However, these weather predictions are approximate at best. We may experience overcast skies at the site. In this event, we will wait for a reasonable time for the skies to clear. If the skies do not clear, the class will be dismissed. The "reasonable" time will depend on the current weather conditions.
- These are official College field trips. All College rules and policies that apply in the classroom also apply in the field. **Consumption or possession of alcoholic beverages is against College policy.**

10. Lab format

In this course we will perform several labs. The student is responsible for accurately recording all observations and summarizing her/his findings in a formal write-up. Each student in a lab group is responsible for preparing their own lab write-up. The write-up should include the following:

1.0 Purpose:

This section includes a brief description (1-2 sentences) of the lab purpose. What are we trying to measure or prove?

2.0 Theory

Give a brief description of the theory (if any) involved for this particular lab.

3.0 Procedure

In your own words, describe the procedure of this lab with sufficient detail to allow duplication by a colleague. The student shall take notes on the lab procedure while executing the lab.

4.0 Data

This section should include all of the measured values. Do not include any calculations here.

5.0 Results and analysis

This section includes any values calculated from data, graphs, and answers to questions. This section should also include any quantitative errors calculated from known or previously measured values.

6.0 Conclusion

The conclusion is the most important section of the lab write-up. This section provides a brief overview of the entire lab. The conclusion should address the purpose of the lab - did you do what you started out to accomplish? Do your results support the theory? If not, why?

7.0 Errors

This section should summarize your procedural errors which could have introduced some inaccuracies in your results. Examples of such errors are poor reflexes, poor seeing conditions, etc...

8.0 Improvements

Recommend any procedural improvements which will better the accuracy of your measurements.

Observation Astronomy (Haeri) Course Outline

Week	<u>Topics</u>	<u>Lab</u>
1/11	Introduction Constellations	Viewing from the sm roof
1/18	Holiday	Telescope use, sm roof
1/25	Constellations	
2/1	Telescopes	Observe constellations from sm roof
2/8	Telescopes	Field of view (sm roof); weather dependent Construction of a refracting telescope (room)
2/15	Holiday	Field of view (sm roof); weather dependent Construction of a refracting telescope (room)
2/22	Equatorial Mounts	Celestial Sphere
3/1	Equatorial Mounts (cont.)	Setting Circles
3/8	Midterm	
3/15	Spring Break	
3/22	Distance to Stars	Reduce data indoor
3/29	Deep Sky Objects	Make-up lab
4/5	Field trip	Observe deep sky objects
4/12	Planetary orbits	Distance and size of planets
4/19	Planets	Reduce data for distance and size of planets
4/26	Moon	Lunar lab
5/3	Cosmology	No Lab
5/10	Final Exam	7:30 to 9:30
5/17	Final Exam	7:30 to 9:30