

AST 2011: Descriptive Astronomy Laboratory

Instructor: Kraig Andrews

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Office: Room 124 Physics Building

Office Hours: 2-3pm Mondays, or by appointment

Meeting time: 3:00pm – 4:50pm Mondays

Required Materials: AST 2011 lab manual (available on Blackboard), Stellarium software (free for desktop, ~\$2 for smartphone/tablet version)

Optional Materials: Star and Planet Locator (available in the Bookstore)

The lab manual will be posted on Blackboard as individual PDF files, usually the Friday before the experiment is to be done. Unless otherwise notified, **it is your responsibility to download and read the lab materials before coming to class.** In addition, it is your responsibility to print off all materials before coming to class.

Departmental Lab Supervisor: J. Scott Payson
166 Physics

Astronomy Lab Faculty Coordinator: Prof. Ed Cackett, ecackett@wayne.edu
337 Physics

Course Summary

This lab course uses experiments to help understand some of the main concepts discussed in the lecture course, AST 2010: Descriptive Astronomy.

Learning Objectives

By the end of the course, students should be able to:

1. locate the positions of stars and planets in the sky at any given date and time and understand how the positions change throughout the year.
2. make measurements with a spectroscope of atomic emission lines
3. apply the Doppler effect to determine the Earth's orbital velocity
4. use a solar telescope to observe sunspots on the Sun
5. determine the ages of star clusters using the Hertzsprung-Russell diagram
6. measure the current expansion rate of the Universe (Hubble's constant)

Lab Schedule

Week	Date	Experiment	Report Due
1	1/12	NO LAB	
2	1/19	NO LAB	
3	1/26	Lab orientation, Intro to Home Exercise 1 & SkyMaps	2/2
4	2/2	Planetarium	2/9
5	2/9	Planetary Orbits	2/16
6	2/16	The Spectroscope	2/23
7	2/23	Earth's Orbital Velocity	3/9
8	3/2	NO LAB	
9	3/9	Turn in HE 1, Intro to Home Exercise 2 & Angles and Parallax	3/23
10	3/16	NO LAB (Spring Break)	
11	3/23	Solar Astronomy	4/6
12	3/30	NO LAB	
13	4/6	The H-R Diagram and Star Clusters	4/13
14	4/13	The Hubble Constant	4/20
15	4/20	Turn in HE #2	

Home Exercises

There are two experiments that require you making naked eye observations of the night sky. Since this cannot be done during most lab classes these are assigned as home exercises.

Home Exercise 1: Naked Eye Observations of Stars, Constellations and Planets is due on 3/9

Home Exercise 2: Naked Eye observations of the Moon requires observing the phase of the moon over a one month period. It is due on 4/20

Grading Policy

Each lab and exercise is worth up to 10 points. There are 8 in-laboratory experiments, a Planetarium visit and 2 Home Exercises for a total of 11 assignments requiring a lab report. Your lowest grade from the 11 reports will be dropped. Therefore, your final grade will be out of 100, with letter grades assigned following:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
90- 100	85- 89	80- 84	75- 79	70- 74	65- 69	60- 64	55- 59	50- 54	45- 49	40- 44	<40

Assignments

- Unless otherwise noted, all labs are due one week after assigned, and will be due at the **beginning** of class.
- Any assignment submitted more than 15 minutes after the beginning of class is considered late. Each day an assignment is late, one point will be deducted from that assignment. Weekends and any day that the university does not hold classes will not count for this rule.
- Assignments will be accepted in person during lab meetings, or in person at my office. **Do not count on submitting an assignment at the lab instructor's office unless you have made an appointment.** Assignments can be safely submitted to the Physics Dept. Office, right across the hall from the lab room. Give your assignment to one of the office staff and tell him or her your lab instructor's name. S/he'll date stamp it and get it to the correct mailbox. **Under no circumstances will a lab instructor accept emailed labs, labs slipped under an office door, or by any method other than those listed as acceptable.**
- There are no make up labs (the grading scheme allows you to miss one lab without being penalized). If you miss a lab, you **may** be permitted to attend one of the other lab sections (mine or another Teaching Assistant's) that week. Talk to your lab instructor if you want to try to set this up. **There are no guarantees.**

Lab Report

Even though you will be working with at least one other student in the laboratory in most of the experiments, your lab report must be your own work. If members of a group turn in lab reports that are identical or show convincing evidence of plagiarism, **all of those reports will receive a score of zero.**

Lab reports should be prepared with care and thought. Handwritten reports are **NOT** acceptable. Type your report or prepare it using a word processor. Unless otherwise notified, all reports should include:

- Title and experiment number
- Your name and your lab partners names
- Introduction: A brief discussion of the lab's purpose and methods
- Data: An organized presentation of all data and observations made during the lab.
- Results: A summary of the lab's results and **answers to all lab manual questions.**
- Conclusion: Briefly discuss your results. Do they agree with your expectations, or with established results? If not, what may have been the source(s) of the error?

If you have a data sheet, a plot, a graph, or anything else that was part of the lab manual and you filled it out, it must be included in your lab report. You don't have to submit all of the pages of your lab manual. For example, if you fill a table in your lab manual with data, you can simply turn that in as your data sheet – but you must submit your data.

Some labs may not require all of these parts, and your lab instructor will let you know if any of the requirements aren't needed. Otherwise, assume you need to do all of it.