

# AST 2011: Descriptive Astronomy Laboratory

**Instructor:** Rachael Merritt

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**Office:** Physics 160

**Office Hours:** By appointment (send me an email!)

**Meeting time:** Tuesdays, 1:00pm – 2:50pm

**Classroom:** Physics 134

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

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

The lab manual will be posted on Blackboard as individual PDF files. They will become available after the previous week's lab session. Unless otherwise notified, **it is your responsibility to download, print and READ the lab materials before coming to class.** You will **not** be able to print the lab manual during class.

**Departmental Lab Supervisor:** J. Scott Payson, ac2723@wayne.edu  
166 Physics

**Astronomy Lab Faculty Coordinator:** Professor 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	1/10	NO LAB	N/A
2	1/17	NO LAB	N/A
3	1/24	Lab orientation, Sky Maps Introduction to Home Exercise #1	1/31
4	1/31	Planetarium	2/7
5	2/7	Planetary Orbits	2/14
6	2/14	The Spectroscope	2/21
7	2/21	Earth's Orbital Velocity	3/7
8	2/28	NO LAB	N/A
9	3/7	Angles and Parallax Home Exercise #1 Due, Introduction to Home Exercise #2	3/21
10	3/14	NO LAB (Spring Break)	N/A
11	3/21	Solar Astronomy	3/28
12	3/28	The H-R Diagram and Star Clusters	4/11
13	4/4	NO LAB	N/A
14	4/11	The Hubble Constant	4/18
15	4/18	Home Exercise #2 Due	N/A

## Syllabus Quiz

To ensure that you have read the syllabus in detail, there will be a syllabus quiz given on Blackboard – **this must be completed by the end of Week 2: Friday, January 20, 2017**. Since we do not meet for the first two weeks, completing this will count for your course participation. **If you do not take the quiz, you will not be confirmed as participating in the course.** The quiz does not count towards your grade, but you must score 4/5 - you can take the multiple-choice test as many times as you like.

## 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

Due Date: **March 7**

Home Exercise 2: Naked Eye observations of the Moon

Due Date: **April 18**

## Grading Policy

Your grade will consist of your lab reports, weekly quizzes, and participation. Each lab and exercise is worth up to 10 points. There are 8 in-laboratory experiments, a Planetarium visit, and two Home Exercises for a total of 11 assignments requiring a lab report. Your lowest grade from the 11 reports will be dropped. There will be a quiz at the beginning of each lab session, worth 3 points each. You can also earn 2 participation points per lab session.

**Lab Reports – 10 points each x 10 = 100 points**

**Quizzes – 3 points each x 10 = 30 points**

**Participation – 2 points each lab session x 10 = 20 points**

Therefore, your final grade will be out of 150 points, 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 (Physics 135), 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. Please send an email if you want to try to set this up. **There are no guarantees.**
- Graded lab reports will be returned at the following lab session.

### Lab Reports

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. 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?

**The introduction and conclusion must be typed.** The answers to the end of section questions must also be typed. 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. As long as your handwriting is legible, you will not be required to type out your data. You do not 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 all of your data.

**PLEASE DO NOT TURN IN LAB MANUAL PAGES THAT DO NOT HAVE DATA ON THEM.**

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

### **Email**

Email will be our most commonly used mean of communication outside of class. Please keep in mind that emails to your professors and TAs are professional correspondence and should be treated as such. **Rude or improper emails will not be answered.** Please use AST2011 in the subject line of any email you send to me. Please allow me 24 hours to respond to your email. All emailing must be done using your @wayne.edu account.

### **Student Disability Services**

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services ([studentdisability.wayne.edu](http://studentdisability.wayne.edu)) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313- 577-3365 (TTY: telecommunication device for the deaf; phone for hearing impaired students only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.