COLLEGE OF CHARLESTON
ASTR 130L–INTRODUCTORY ASTRONOMY II LAB

Instructor: T. R. Richardson
Spring 2016

section L01 Wednesdays 7:00–10:00 PM
School of Science and Math Building, Room 241

section L02 Tuesdays 4:00–7:00 PM
School of Science and Math Building, Room 215

Lab Syllabus
ASTR 130L   INTRODUCTORY ASTRONOMY II LAB

Contact Information:
T. R. Richardson: Office Phone:  (843) 953-8071
Office: JC Long room 211 & HWWE 106 Cell Phone: (843) 670-7878
My Lab: Lightsey Center room 351 Email: richardsont@cofc.edu

Office Hours:
The latest listing of my office hours can be found on my faculty web page. See the URL later in this document.

Contacting me:
Contacting me is easy. Email if it is not complicated or time sensitive (i.e. something in the next 36 to 48 hours. Otherwise use the phone. You can try my office but it much is better to call my cell phone. Because of classes and meetings it may be turned off. If I don't answer, text me with your phone number or message. My cell phone for school will not take voice messages, even if it seems to, so please don't try. I will do my best to call you back but I am never "it" when it comes to phone tag. Also don't text me without trying to call first unless you are unable to talk at that time. I choose not to text back and forth when a simple call will settle the matter.

General Education Objectives and Learning Outcomes:
At the end of the syllabus are the departmental general education objectives and learning outcomes for this course. Expect me to direct your attention to specific ones as the course progresses through its topics.

Objectives:
This course is the lab designed to accompany our first semester college physics course. As your instructor views the course, it has certain objectives. This class should:

1. Enhance your observational and analytical skills.
2. Guide you in testing and verifying certain concepts in physics.
3. Enhance your technical writing skills.
4. Enhance both your qualitative and quantitative reasoning skills through weekly practice.
5. Develop better team skills in all of us.
6. Provide you with a pretty good time accomplishing the previous objectives or we have both missed an opportunity here.

Textbook:
The required text is the Astronomy 130 Lab Manual, College of Charleston, Spring 2016 for sections 01 and 02. Also bring your lecture text to every lab.

Attendance:
Attendance in lab is mandatory. One free lab is allowed but discouraged. Since the work accomplished in lab cannot be duplicated outside of the lab environment, and since we have neither the time, space or staff for extensive department wide lab make-ups, attendance at lab is mandatory. Please do not complicate your life by electing an activity or commitment which conflicts with lab meeting times. Doing so will, for the wrong reason, have an adverse effect on your lab grade. Also note that by the faculty rules no professor can require you to miss a scheduled class, such as our lab, to attend some other activity.

If a student attends all labs, then that student’s lowest quiz and lab grades will be dropped in the computation of the final average in lab. That benefit is forfeited with a missed lab. The first absence counts as a drop and the second absence is recorded as a zero for that lab session.

Quizzes:
There will be lab quiz almost every week. The lowest quiz grade will be dropped in the computation of the final grade. If a student is absent from a quiz, that absence might be treated as that student’s dropped grade depending on the circumstances.

Lab Work and Lab Reports:
There will be a designated lab each week designed to help you master concepts considered in the lecture portion of the course. That work is normally completed each week in lab and submitted at the end of lab as a group activity. One or more of
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These labs will be assigned as a lab report lab in which case each student will complete a lab report on the activity and that report will be due the following week at the beginning of lab.

Image Quiz:

There will not be a conventional final exam for this course; however, during one of the last labs, there will be an image quiz covering the semester’s work. This quiz will consist of photographs of astronomical objects studied throughout the semester including the Object of the Night we have at the beginning of each lab. The student will be asked to identify the object’s general type and comment on the important astrophysical aspects of the object shown by the image.

Grading:

The final average in this course is found using the following proportions:

- Weekly quiz average 35%
- Lab average 35%
- Astro image test 15%
- Gen Ed Assessment 10 points

The grading scale for this course is listed below.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>92.5 – 100</td>
</tr>
<tr>
<td>A-</td>
<td>89.5 – 92.4</td>
</tr>
<tr>
<td>B+</td>
<td>87.5 – 89.4</td>
</tr>
<tr>
<td>B</td>
<td>82.5 – 87.4</td>
</tr>
<tr>
<td>B-</td>
<td>79.5 – 82.4</td>
</tr>
<tr>
<td>C</td>
<td>77.5 – 79.4</td>
</tr>
<tr>
<td>C-</td>
<td>72.5 – 77.4</td>
</tr>
<tr>
<td>D+</td>
<td>67.5 – 69.4</td>
</tr>
<tr>
<td>D</td>
<td>62.5 – 67.4</td>
</tr>
<tr>
<td>D-</td>
<td>59.5 – 62.4</td>
</tr>
<tr>
<td>F</td>
<td>0.0 – 59.4</td>
</tr>
</tbody>
</table>

Disabilities and SNAP:

If your situation springs under the guidelines of the programs in the SNAP office, please come to my office so we can talk about how to handle your particular situation. This class is SNAP friendly but sooner is better than later if we have to arrange accommodations.

The College Honor Code:

Every society has its rules that help that society to function. The College Honor Code contains some of the rules all of us are expected to follow for the years we are together here. Every individual has rules of their own to guide their life. Make your rules consistent with the College Honor Code and trust that I have done the same. A link to the portion of the College Honor Code relevant to our class is on our course page.

Online Resources:

My webpage: [http://richardsont.people.cofc.edu/](http://richardsont.people.cofc.edu/)
Course webpage: [http://richardsont.people.cofc.edu/08_a130_f15.html](http://richardsont.people.cofc.edu/08_a130_f15.html)

The course web page is the source for assignments, updates and supplemental material. The above page has links to the semester schedule. I suggest checking that page the week before each lab. There are links on that page to other lab resources. If you lose track of the schedule web page, a link to it is available among your course links on the OAKS server.

Astronomy Learning Outcomes:

After the successful completion of this class, the students will be able to:

1. Design experiments and carry out measurements based on the guidelines supplied by the instructor or a lab manual.
2. Collect meaningful data and tabulate it with units while applying appropriate significant figures.
3. Use software (Microsoft Excel or Open Office) to tabulate results, plot graphs and report observations.
4. Estimate uncertainties associated with measurements made in lab.
5. Discuss experimental results and compare the results with accepted values.
6. Draw conclusions from observations and measurements.
7. Prepare a lab report following the guidelines given in the instructor’s online resources.
8. Apply appropriate methods of safely handling equipment and performing laboratory procedures.
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9. Identify a gas by its emission spectrum as shown with a spectrometer.
10. Verify the law of reflection and use Snell's law to quantify refraction in transparent media.
11. Derive the masses of stars in a binary system from the orbital period and separation of the stars.
12. Make qualitative statements about a star’s temperature based on its color.
13. Plot a star's position on the Hertzsprung-Russell (H-R) diagram given its spectral class and absolute magnitude and use that position to estimate its temperature, radius, and mass.
14. Use filtered images of a nebular region to (a) discriminate between reflection, emission, and dark nebula, (b) find and identify Bok globules and (c) show how interstellar dust clouds affect stellar colors and brightness.
15. Apply the Hubble Classification Scheme to classify spiral, barred spiral, and elliptical galaxies.
16. Verify Hubble’s Law and determine Hubble’s constant by using data from the NASA NEDS database for a selection of galaxies provided to them.
17. Estimate the distance to a galaxy from its recession velocity using Hubble’s law.
18. Use the Drake equation to determine a personal value for the number of civilizations in our galaxy.

General Education Objectives:

To successfully complete this course the student is expected to demonstrate competence (through quizzes and tests) by being able to:

1. Apply physical/natural principles to analyze and solve problems.
2. Explain how science impacts society.
3. Distinguish the nature and significance of the following: instruments used in astronomy, stars (binary, variable), star clusters, interstellar matter, galaxies and cosmology.
4. Demonstrate how the measurement of light is used to interpret physical characteristics of the universe.
5. Recognize the origins of astronomical objects.
6. Apply physical laws to reveal the nature of astrophysical phenomena.

General Education Learning Outcomes:

The following general education learning outcomes will be assessed during this semester in both lecture and lab. The assessment will test whether you can:

1. Apply physical/natural principles to analyze and solve problems (This outcome will be assessed in the lab class by writing a report on one of the labs during the semester. It will count as 10 points of your final lab grade.)
2. Explain how science impacts society (This outcome will be assessed in the lecture class using an assignment involving writing a letter to a public official about a physics-related current event. It will count as 5 points of your final lecture grade.)