COLLEGE OF CHARLESTON
ASTR 130L–INTRODUCTORY ASTRONOMY II LAB

Instructor: T. R. Richardson

Spring 2017

section L06 Thursdays 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:
Check the web link on the right for the latest listing of my office hours. http://richardsont.people.cofc.edu/trr_hours.html

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. These days it is best to use 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 so please don’t try to leave a message. 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 call will be simpler.

Pre-requisite/Co-requisite:
This lab course is designed to accompany ASTR 130 and that course is a pre-requisite/co-requisite to this lab.

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

Textbook:
The required text is the Astronomy 130 Lab Manual, College of Charleston, Spring 2017 for sections 03. Also bring your lecture text to every lab indicated on the schedule.

Attendance and Makeup Policy:
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 and makeups are not feasible. Special circumstances such as extended illness will be handled on a case by case basis. 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. Please note that according to 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 a 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 of these
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Labs will be selected for a written lab report for which each student will complete a written report on the activity and that report will be due in two weeks from the time of the 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 40%
- Lab average 40%
- Writing assignment 10%
- Formal Lab Report 10%

The grading scale for this course is listed below.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
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<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>C-</td>
<td>69.5 – 72.4</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>
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</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/
Course webpage: http://richardsont.people.cofc.edu/13b_a130_labs17.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:
The list below is your professor's Astronomy Learning Outcomes for this course. 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.
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.
9. Identify a gas by its emission spectrum as shown with a spectrometer.
10. Derive the masses of stars in a binary system from the orbital period and separation of the stars.
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11. Make qualitative statements about a star’s temperature based on its color.
12. 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.
13. 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.
14. Apply the Hubble Classification Scheme to classify spiral, barred spiral, and elliptical galaxies.
15. 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.
16. Estimate the distance to a galaxy from its recession velocity using Hubble’s law.
17. Use the Drake equation to determine a value for the number of intelligent civilizations in our galaxy.

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

1. Distinguish the nature and significance of the following topics studied in astronomy: stars (binary, variable), star clusters, interstellar matter, galaxies and cosmology.
2. Demonstrate how the measurement of light is used to interpret physical characteristics of the universe.
3. Recognize the origins of astronomical objects.
4. Apply physical laws to reveal the nature of astrophysical phenomena.
5. Demonstrate improved teamwork and communication skills.
6. Demonstrate a knowledge of lab safety.

General Education Learning Outcomes:
The following general education learning outcomes will be assessed during this semester in during lab. The assessment will test whether you can:

1. Apply physical/natural principles to analyze and solve problems (This outcome will be assessed in this lab class in a written lab report on the stars of SS Boo. Its weight will be 10 % of your final lab grade.)
2. Explain how science impacts society (This outcome will be assessed in this lab class in a letter-writing assignment to a public official about a science issue related to public policy. Its weight will be 10 % of your final lab grade.)