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**Course homepage:**

<http://clusty.ast.villanova.edu/aprsa/?q=oblab2>

Please refer to this web page for most up-to-date information on the course. Test dates, tests and homeworks in pdf format and all other information will be made available in due time.

This course is mandatory for all'y'all astrophysics majors. There is no escape, resistance is futile. So brace yourself and get ready for some fun!

**Course content:**

Dr McCook taught you how to deal with telescopes and acquire your own data. Now it is time to do something with those data. Before we embark on a journey to reducing and analyzing data, however, there is a gap that we need to fill: celestial (spherical) astronomy. No astronomer is complete without a complete understanding of spherical triangles, equatorial coordinates (right ascension and declination), hour angles, etc. No, clicking around Starry Night Pro does not count. We will first learn all the basics necessary to *build* a planetarium program, and acquire bragging rights to predicting when and where a certain object will be on the sky without any computers or calculators, accurately to about 15 minutes. Once we've mastered celestial astronomy, we will get back to our computers and spend the rest of the semester reviewing techniques of image and spectrum analysis. In particular, we will do astrometry (celestial positions), photometry (flux measurements) and spectroscopy (wavelength-dispersed flux measurements) using Image Reduction and Analysis Facility (IRAF). That will be a steep learning curve but it will be highly rewarding once we emerge on the other side! You will be able to both acquire and reduce data for publication quality!

**Course material:**

- **W. Smart, “Spherical Astronomy”** (6<sup>th</sup> Edition, ISBN 978-0521291804)
- IRAF manuals, freely available from <http://iraf.noao.edu/docs/docmain.html>

**Course work and grading:**

Your final grade will reflect your effort, homeworks, test and the data assignments. For the course you are required to do the following:

- every week there will be a homework assigned that is obligatory for everyone. Every homework has 5 questions, with an additional question for extra credit. Each question is worth 10 points, 50 points total + 10 points for extra credit;
- there will be one 1.5-hour test on celestial astronomy. The test will have 5 questions, with an additional question for extra credit. Each question is worth 100 points, 500 points total + 100 points for extra credit;
- there will be three assignments: one for astrometry, one for photometry, and one for spectroscopy. You will use either the data you have acquired in ObLab I, or data that you acquire in the course of this semester, or

publicly available data from other sources. Each assignment is worth 250 points, with 50 points for extra credit;

- occasionally there will be other opportunities given for extra credit, such as an in-depth presentation of research topics and homeworks. Priority will be given to students who demonstrated genuine interest and contribute to in-class discussion. Please see me to find out more about these opportunities.

If you do the math, you will see that homeworks carry 29% of the grade, the test carries 29% of the grade, and the assignments carries 42% of the grade. The grading will be done according to the following breakdown:

0-56%	F	68-72%	C-	84-88%	B
56-60%	D-	72-76%	C	88-92%	B+
60-64%	D	76-80%	C+	92-96%	A-
64-68%	D+	80-84%	B-	96-100%	A

Yes, looks scary. But remember: work hard, work constantly, and seize all the extra credit opportunities, and there should be no reason for alarm. Ultimately, the grade you earn is yours alone, I am just a scribe.

### **Attendance:**

Regular attendance is essential for uninterrupted understanding of course material. Since this course covers a significant amount of content in a not-so-significant amount of time, each missed class will hurt. Really hurt. The topic is not trivial and continuous work is required to remain on top of things.

Please do not miss turning in homeworks and taking the test. If you must miss a test, you must inform me of that in advance, and you must have a written notice excusing your absence. Provided that you follow these rules, I will provide you with a makeup opportunity for the test. Verbal excuses and call-the-health-center-and-you'll-see-I-was-sick-on-the-day-of-the-quiz/test are not admissible. There will be no exceptions. If you do not turn your homework in on time, you can still turn it in within 1 week, but the penalty for late homework will be a 30% grade deduction. In other words: don't miss homeworks. Do them, they really help.

### **The etiquette for using laptops and cell phones in class:**

I have no issues with using computers in the second part of the lab. It will be very detrimental for you if you try to use them for celestial astronomy part. You will be publicly flogged if caught using cell phones in class for texting, facebooking or web surfing.

### **How to reach me:**

I am available for your questions and comments whenever you get a hold of me. I usually lurk on the 4<sup>th</sup> floor Mendel around my office (458c). The best time to catch me is every day between 9am and 6pm except around noon when I'm off to lunch. I am also known to answer e-mails on a regular basis. Or just grab me when I'm making coffee in this room. But you knew all of this already, didn't you?

### **Academic integrity and Special needs:**

Finally, here goes the standard blurb: any violation of the Code of ethics will be grounds for failing the course. Any cheating, copying, duplication of work, etc, will get you into trouble. If you have any concerns whatsoever, come talk to me and I'm sure we'll be able to sort everything out.

Over and out. Let the fun begin! :)