University of California, Santa Barbara

Astronomy 2
Spring 2012

Prof: R Antonucci
Office: Broida 2015K
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Astro 2 Syllabus

Lectures: T R 2:00- 3:15 BRDA 1640

Discussion: M 6:00- 6:50 BSIF 1217 (Enrollment code = 02881)
R 5:00- 5:50 BSIF 1217 (Enrollment code = 02899)

Office Hours:

Prof: R. Antonucci	M 12:00–1:30pm; TH 11:00–12:30pm	Broida 2015K	ski@physics.ucsb.edu
TA: Eric Langman	M 10:00-12:00pm; F 3:30-4:30pm	PSR	elangman@physics.ucsb.edu
Grader: Andy Seber			aseber3792@gmail.com

The class is worth four credit hours and will take considerable time and effort on your part! Help is always available from your TA and from me. Come by any time, but we are only guaranteed to be in our offices during office hours or for appointments. We both check our email often, so please use that channel for help as well.

Course information, homework solutions, practice exams, etc. will be posted on our website, http://web.physics.ucsb.edu/~astro2/s2012/. This website is very important and should be visited often.

Astro 2 is a continuation of Astro 1, and Astro 1 is the only prerequisite. However, Astro 2 is a little more sophisticated since now you're used to the type of data and the thought processes in science in general and in Astronomy in particular. The topics are shown in the (very approximate) schedule below. As you may know, there have been many breakthroughs in astronomy in the past few years, particularly in cosmology, and we will examine them carefully. It's very unlikely you can understand the material in this course without coming to virtually every class! Also, we will have occasional in-class quizzes which will count towards your grade. Finally, I'll ask you to write a question and turn it in at the beginning of each lecture.

For the majority of the course we will study the last few chapters of Universe, 8th edition, by Freedman and Kaufmann. We will also use some handouts.

Homework will be assigned each Tuesday, to be handed in the following Tuesday. Deposit your papers in the marked locked BOXES at the back of the classroom. We will attempt to post solutions on our class website very soon after an assignment is due. We will also attempt to

return your graded papers within one week after the due date. Papers can be picked up in the SLOTS with the first letters of the last names indicated – they are also at the back of the classroom. No late homework will be accepted except in the case of a family emergency. You may work together on assignments, but you must write them up entirely on your own. If your paper is very similar to your friend's, neither will get credit.

Grading will be based 25% on homework, 25% on the midterm, 35% on the final, 10% on in-class quizzes, and 5% on your daily questions. Final will be Tuesday, June 12 from 4-7 pm.

Finally, please give me your suggestions as the quarter progresses! I can't always tell what problems students are having.

APPROXIMATE SYLLABUS
(Don't be alarmed if we deviate)

Important: Read all "Cosmic Connections" boxes in all the covered chapters.

Date	
Tue April 3	Enriched background from Astro 1: Read assigned sections – see attached.
Thr April 5	"
Tue April 10	"
Thr April 12	Telescopes: Angular resolution and Sensitivity: Ch 6 intro, Sec 3, 4, 6, 7.
Tue April 17	General Relativity and Black Holes Ch 22 - all
Thr April 19	The Milky Way, Dark Matter. Ch 23 - all.
Tue April 24	The Great Debate about extragalactic Nebulae, other galaxies
Thr April 26	Present knowledge about Dark Matter. Gravitational microlensing. Weakly Interacting Massive Particles.
Tue May 1	The Supermassive Black Hole at the very center of the Milky Way galaxy. Binary stars with stellar-mass black holes.
Thr May 3	Other Galaxies. Expansion of the Universe. Ch 24 - all. Galaxy clustering and evolution.
Tue May 8	Discovery of Quasars, Radio Galaxies and Seyfert Galaxies. Ch 25, Sec 1, 2, 3.
Thr May 10	The geometrical Unified Model for Quasars and Active Galactic Nuclei.
Tue May 15	Radio jets and Superluminal Motion. Supermassive Black Holes as nuclear power sources - Accretion Disks. Ch 25, Sec 4, 5, 6.
Thr May 17	Midterm.
Tue May 22	More on Supermassive Black Holes.
Thr May 24	Start Cosmology: The Cosmic Microwave Background.
Tue May 29	The Dark Matter skeleton of the Universe. Shocking new Discovery: the acceleration of the Universe. Ch 26 - all.
Thr May 31	"The First 3 Minutes" Inflation, matter-antimatter asymmetry, creation of the light elements. Ch 27 - all.
Tue June 5	"
Thr June 7	Read an amazing research paper: "Evidence for a black hole from high rotation velocities in a sub-parsec region of NGC4258," *Nature* **373**, 127 – 129, (1995). doi:10.1038/373127a0

Tues June 12	**Final Exam from 4 – 7pm**

You've all taken slightly different versions of Astro 1 at various times in the past. We will spend two or three classes on an enriched and rapid review of the chapters before Ch 25. This handout tells you IN GENERAL TERMS which parts of these earlier chapters will be required for a proper understanding of Astro 2. You don't have to remember everything. Some re-reading, some reminding in class, and help outside of class time will be available.

Old Reading from Astro 1 (Including all "Cosmic Connections")

Chapter
1 ALL
2.1 - 2.5
4.4 - 4.8; Box 4.2, 4.3, 4.4 (we'll discuss Box 4.4 in class)
5 ALL (we'll cover Box 5.4 in Class)
6.3, 6.4, 6.6 and 6.7, all of which we'll discuss in class.
16.1 - 16.5; Box 16-1
17.1 - 8; Boxes 17-1, 2 and 4
18.1 - 2; Box 18-1
19.1 - 6
20 - 1, 3 - 10
21 - 1, 2
22 ALL

Astro 2: How to Get an A in this Class

1. TEXTBOOKS: Read the indicated sections of the textbooks carefully. Just SKIMMING the sections BEFORE class will help you understand the lectures. You can save the careful reading for after class if you prefer. Follow the reading advice on the syllabus closely.

2. TURN IN EVERY HOMEWORK: There are no extensions on the HW, unless you have a family emergency or illness. It really hurts your average to miss a HW and get a zero on it.

3. GO TO SECTION, GET HELP: Sections provide major help with homework. Outside of office hours, you can get help from the instructor by email, telephone, and individual appointments. Hints are just an email message away. Our TA will also answer questions by email or during his office hours.

4. GO TO LECTURE: Often in class I'll show you a multiple-choice qualitative question and ask you to vote on the answers. Then you will have a chance to discuss it with your neighbors and vote again. More than half of these questions will appear on the exams, so you'll go into the exams knowing many questions in advance.

5. REVIEW THE HOMEWORK: When I make up test questions, I use the HW for inspiration for many of them; that is, many are slight modifications (and usually simplifications since test time is tight) of HW questions. So if you go into the tests with a good understanding of all the HW questions, you'll have a huge advantage.

6. TAKE PRACTICE TESTS: We'll post practice tests on the website, and go over them in review sessions (depending on demand). When you take a practice test, give yourself the same time limit as for the actual test. If you are unsure of the reasoning on any problems from the previous year's test, please get help on it.