

Week #3 Handout, 2009.09.15

Astronomy 101, Professor Douglas Leonard

Announcements

- **First on-line Reading Quiz due tonight!** The first on-line reading quiz (“Quiz 1”), based on material from your reading for *last* week, is due tonight, Tuesday, September 15, by 11:55 PM. After that time, the reading quiz will no longer be available, and **no late assignments will be accepted for any reason**. If you have not yet registered at the Textbook Web-site (<http://www.ilrn.com>), you must do so immediately! Please see the document, *On-Line Homework and Weekly Reading Quizzes* (in the Course Reader), for all of the details.

- **Reading Quiz solutions available online.** Complete solutions to all reading quizzes are posted to the textbook website ten minutes after the quiz is due, and are called, e.g., “Quiz 1: Solutions”. Note that these are complete, worked-out solutions with explanations, not just answers. You can access these solutions by logging onto the textbook website, clicking on the “Assignment/Tests” tab, and then clicking on either the “Print blank assignment” link or the “Take” button. Clicking on the “Print blank assignment” link produces a pdf file of the solutions that can be printed out. Clicking on the “Take” button allows you to “take” the quiz again, but this time with the solutions included. Note that if you “take” the quiz again, your score does not count; re-taking the quiz is just for your own practice.

The quiz solutions are also available at the course website (<http://sciences.sdsu.edu/~leonard/astro101>) by the end of each week that a quiz is due, and are accessed by clicking on the “On-Line Reading Quiz Solutions” link on the course homepage.

- **Planetarium shows:** As mentioned in last week’s handout (“*Week #2 Handout*”), *optional* planetarium shows continue to be given this week in the astronomy department’s planetarium, Rm. PA 209 (physics-astronomy building). While it is not required that you attend a show, I *strongly encourage* you to take advantage of this opportunity to enhance your understanding of the night sky. Shows last less than 1 hour, and are being given on the following days at the times (fill times in as given in class, or download the updated version of this handout from the course website):

Tuesday, September 15 : 11 AM – 12 PM

Wednesday, September 16 : 11 AM – 12 PM

Thursday, September 17 : 2 – 3 PM

Friday, September 18 : 4 – 5 PM

Since the planetarium can only accommodate 45 students per show, to attend a show *you must first sign up on the sheets* posted on the door to the planetarium (Rm. PA 209). See the *Week 3 Handout* for additional details.

- **Special extra planetarium show during my office hours!** In addition to the planetarium shows listed above, I will personally be giving a “show” in the planetarium during my office hours:

Friday, September 18, 1:00 PM

You do not have to sign up for this show, as it is available *only* to my Astronomy 101 students; just show up (Rm. PA 209). Note that my office hours run from 12:00 - 2:00 on Friday, so if you want to meet me in my office (room P238) before the show, you may do so. The “show” that I will give will be somewhat different from the others during the week that are given by the TAs, and will be focused on understanding the celestial sphere (i.e., the material specifically covered by our course). It will also be quite a bit more interactive, as I will encourage your questions throughout. Note that I will take attendance for the show, and that students who attend will receive the same “credit” for attending (see the Week #2 handout regarding this) that they would for attending any of the other shows; students who attend *both* my show and one of the TA-run shows will be especially noted!

- **Excellent astronomy podcasts available online.** For those who are interested, there is an *excellent* set of astronomy related podcasts available (for free!) at:

<http://www.astronomycast.com/>

These podcasts can also be accessed using iTunes as well: Search on “Astronomy podcast” at the iTunes store, and then click on the top hit, “Astronomy Cast”. A link is also available at the course web-site to them.

The format of each podcast is question and answer, with questions posed by a very interested reporter and answers provided by Prof. Pamela Gay of Southern Illinois University. I have listened to many of these, and have found them to be very informative, and right at the level appropriate for this class. The conversation typically goes beyond what we will have covered in class on a particular topic, and will definitely help to satisfy those of you who leave class with unanswered questions! In this and future reading assignments, I may assign one or more of these podcasts as *optional* listening/reading (note that transcripts are also available at the podcast web-site). *Note that these podcasts will never contain any additional material that you are responsible for that is not also covered by the required reading assignment.* In all likelihood, though, they will help you better understand the material for which you *are* responsible, so I highly recommend them!

Reading Guide and Homework Assignment (Second On-Line Reading Quiz Due: Tuesday, September 22, 11:55 PM)

This week, we finish up Chapter 1, and begin Chapter 2 of your textbook. The reading from Chapter 2 complements the largely descriptive lectures by presenting the material in a somewhat more mathematical manner. While the lectures focused on gaining an understanding of the *concepts*, this reading will help you get a more quantitative understanding of the mathematics underlying the physical relationships that were described to you in class. Note again that, in all assignments, “Text” refers to the course text, *Voyages To the Stars and Galaxies*, whereas “On-line tutorial/reading quiz” refer to the course content available at the on-line textbook web-site (<http://www.ilrn.com>).

1. **Text — Chapter 1, Section §1.2.4: Hipparchus and Precession.**

Read here about how, in 150 BC, the astronomer Hipparchus determined that the location of the Celestial Poles was changing slowly over time.

2. **Text — Chapter 1, Section §1.3: Astrology and Astronomy.** [Note: When an entire section of the text is assigned – e.g., “§1.2” – this means to read all subsections of the section (e.g., in this case, §1.3.1, 1.3.2, and 1.3.3, in addition to the introductory material before §1.3.1 on p. 31).]

We only discussed this material briefly in class, and it concerns the relationship between *astronomy* and *astrology*: the study that assumes, and attempts to interpret, the influence of the heavenly bodies on human affairs. The bottom line: while astronomy and astrology had common origins, today they are two very different fields of study.

3. **Text — Chapter 1, Section §1.4: The Birth of Modern Astronomy.**

Read here about the bold, heliocentric hypothesis of Copernicus, and the pioneering telescopic observations of Galileo. All of this material was thoroughly covered in class.

→ *Optional Astronomy Podcast*, from Astronomycast.com: Episode 57: *Jupiter’s Moons*, available at <http://www.astronomycast.com/>, as well as through iTunes. Want more details about Galileo’s discovery of Jupiter’s 4 major moons and the latest on the other ~ 60 moons discovered since his time? This podcast is for you! It starts with a good historical introduction to Galileo’s original discovery, and then proceeds to discuss the latest discoveries about the moons, going into significantly more depth than was covered in class this week (we’ll return to discuss Jupiter’s moons in more detail in class during Week 5). Again, listening to these podcasts is completely OPTIONAL.

4. **On-line tutorial:** On the “Tutorial: Chapter 1” section of the textbook website, work your way through the *Astronomy Exercises* entitled: “Parallax I” and “Galileo’s Experiment”. The first exercise demonstrates how the *apparent* position of a foreground object (a “spacecraft”) appears to change as the location of the observer (the Earth) changes. The second exercise demonstrates the effect that *air resistance* has on the time it takes objects to fall to the ground. Remember Galileo’s conclusion: In the absence of air resistance, all objects would fall to the ground at the same rate.

5. **Text — Chapter 2, Section 2.1:** *The Laws of Planetary Motion.*

This section focuses on Johannes Kepler and his discovery of three important laws of planetary motion. It also provides some background concerning his relations with the great Danish observer, Tycho Brahe. The *concepts* underlying the laws that Kepler discovered were described in class in some detail; in your text, the description of them is given a bit more quantitatively. We'll add this math in next week in class.

6. **Text — Chapter 2, Section §2.2.1 and 2.2.2:** *Newton's Laws of Motion and Interpretation of Newton's Laws.*

Here you read about Newton's Three Laws of motion, as encapsulated in his masterwork, *The Principia*. Note that we may have only covered the first *two* of Newton's laws in class thus far, so this reading may forge ahead a little bit.

7. **On-line reading quiz (Due: 11:55 PM, Tuesday, September 22):** Take this week's *reading quiz* by clicking on the "Quiz 2" assignment at the on-line textbook web-site. The Reading Quiz will become available to you at 12:05 AM, Wednesday, September 16. It consists of 10 multiple choice questions. **You must complete this on-line quiz by 11:55 PM Tuesday, September 22.** As always, you may take the quiz twice.



(From the basement of the Museum of Science, in Florence, Italy)