ISP205L
Spring 2006
Supplementary Instructions for SkyGazer Homework Assignments

Updated: 3/23/06

- Use these instructions *along with* the regular instructions found in *Astronomy Media Workbook, Fourth Edition*, by Micheal C. LoPresto.
- You will *not* get the right answers for many of the homework questions unless you follow these special instructions.
- Unless you are specifically told otherwise in the instructions given here, always do all parts of the exercises as described in the Media Workbook, and answer all of the questions in the Results Sheet at the end of each exercise. Tear out and turn in the Results Sheet. You do not need to answer the multiple choice questions or do the open-ended activity.
- All homework assignments are due at the *start* of class. Assignments turned in after that time will receive only half credit.
- Always print (*very* legibly) at the top of each homework page your MSU Net ID. That is the part of your MSU email address that comes before the "@msu.edu", and is the code that Angel uses to keep track of your work.

Week 1 assignment, due week 3. *SkyGazer Activity 1: Introducing SkyGazer.*

- For part 2, set your location to Lansing, and set the time/date to 10:00 PM Standard Time, January 10, 2006.

Week 2 assignment, due week 3.

SkyGazer Activity 2: Motions of the Stars

- Do only Parts 1 and 2.
- Before beginning Part 1, use the list of cities in Control | Set Location to set your location to Lansing.

SkyGazer Activity 3: The Celestial Sphere

- Do only Parts 1 and 3. Skip Parts 2 and 4.
- Even though you were using the same Three Cities exercise for SG2, it is easiest to just to start over again by going back to File | Open Settings | Basics | Three Cities. Set your location to Lansing, and the time to 9PM.
- In Part 1, you can easily find most of the stars on the sky chart by clicking on View | The Brightest Stars, and then on the star name. Markab is in the constellation Pegasus. Not all of these stars are above the horizon.
- Part 3 is important, but many people (including your professor) find the wording to be confusing. You should notice that some reference lines and points move along with you as you change location, and therefore always look the same as seen on the sky chart. Others stay fixed relative to the stars and therefore seem to move along with the stars as you change location. You are asked to circle the lines and points that move along with the stars as you change location.
- After the list of lines and points for you to circle, the last section of text should really have said:
  "The reference markers that *move along with the stars (i.e. are fixed relative to the stars)* as you change location are part of the **EQUATORIAL | ALTAZIMUTH** (circle one) coordinate system. Those that do not move *on the sky map (i.e. that move along with you as you change location)* are part of the **EQUATORIAL | ALTAZIMUTH** (circle one) coordinate system. *A "global coordinate system" is one in which a given star has the same coordinates no matter where you are viewing from, while a "local coordinate system" is one that is defined relative to your current position, so that the coordinates of a given star change depending on your position on Earth.* Therefore, equatorial coordinates are a **GLOBAL | LOCAL** (circle one) system and altazimuth coordinates are **GLOBAL | LOCAL** (circle one)."
  …where the italics mark my modifications to the text. Please mark your answers as if the text in the book were as it is above.

Week 3 assignment, due week 4.

SkyGazer Activity 4: Motions of the Sun

- Do parts 1, 2, 3 and 4.
- Set your location to Lansing, and the the time to March 21, 2005, noon standard time. Use standard time throughout this exercise.
- Part 2. Do only step 1 in the part about the Analemma. Skip steps 2 and 3, so you do NOT need to open the Analemma files.
- Part 3. Step 1: Since you did not open the Analemma files, the only setting you need to change is the date.
- Part 3, step 9: For your southern location, drag the location marker until the latitude box in the Location Panel shows approximately 42° S (near the southern tip of South America).

SkyGazer Activity 5: The Ecliptic

- Do only Part 1.
- Set Location to Lansing, Set Time to March 21, 2005, noon standard time.

No homework assignment for week 4. Study for the StarQuiz and ClickerQuiz that you will take in week 5.

Week 5 assignment, due week 6. *SkyGazer Activity 8: Precession and Proper Motion*

- Do only Parts 1-6. Skip Parts 7 and 8.
- Part 1. When you fill in the table, consider all of the stars which are visible in the small sky chart on the right-hand side of the "Wobble of the Earth" window.
- Part 2. You probably do not have the "Settings" folder that is called for in the exercise. Instead, use "File | Open Settings | Basics | North Pole 3" to answer the questions about when Polaris is closest to the North Celestial Pole. It is easy to do with the display that you have there, which you are already using for the preceding questions.
- In Part 3, the various pointer stars come with a long list of alternate names. In each case, for your answer use the *first* of the names in the list.
- Part 3, step 3. *Hint.* To find the pointer stars in 2800 BC, the first thing you need to do is to locate the pole star in 2800 BC on the sky map. Unfortunately, you can only run the clock back as far as 2000 BC. But the former pole star that you are looking for is one of the bright stars along the stick figure of the constellation Draco. If you set the clock's time step to 50 years and watch the sky chart as you run time back to the 2000 BC limit, it will be pretty obvious which bright star is moving towards the pole. If you click on that star, its data panel will come up and you can verify that it is the correct star. Then see which two stars in the Big Dipper do the best job of pointing at that former pole star.
- Part 4, last step. The file "Settings | Age of Aquarius" does not exist, so skip this step.
- **READ THIS BEFORE DOING PART 6:** So far we have looked at changes in the positions of stars in the sky that are due to the various motions of the Earth. But the stars themselves, including our Sun, are moving through our Galaxy, all with slightly different motions from each other. This causes the positions of the stars as seen on the sky to gradually change with respect to each other. This is called "Proper Motion". The nearby stars appear on average to move across the sky most rapidly (i.e. to have the largest proper motions), just because they are nearby. There are also a few stars which are on orbits through our Galaxy which are radically different than the Sun's, and they have large proper motions for that reason. Barnard's Star is an example.
- Part 6, step 1: After opening the "Barnard's Star" file, click on Chart | Star Symbols | Very Bright. Otherwise, Barnard's Star will be too faint to see on some displays, and you will be very puzzled about what is going on.
- Part 6: Stop after step 4. The files for "Motion of Wolf 359", "Proper Motion", "Red Dwarf Ross 154" are not present on the SkyGazer CDs. Since you do not need to do Parts 7 or 8, you are done.

Week 6 assignment, due week 7. *SkyGazer Activity 9: Phases of the Moon*

- Do all parts of the activity.
- Part 2. For the crescent and gibbous phases, use the days when the Moon would be as close as you can get it to positions 2, 4, 6 or 8 in Figure 9-4. We will allow +/- 1 day for acceptable answers, since these phases are not as well defined as the others.

(this exercise continues on next page)

- Part 3. The Media Workbook instructions tell you to use the star Menkar. However, depending on details such as the format of your computer screen, Menkar is not always labeled. So instead, set the time step to 1 day, then single step forward 2 days. The bright star Aldeberan should now be to the lower right of the moon. If you don't see it, use the "-" key to zoom out a step or two. A zoom setting covering about 15 to 20 degrees is what you want. Now answer the questions in the workbook, using Aldeberan instead of Menkar.
- Part 3: For the Original Date, give the date *after* you have stepped forward the two days.
- Part 3: For the date of the next time Aldeberan is in the frame, use the day when Aldeberan is closest to the Moon. If you reach April 15, 2001, you have gone too far.
- Part 3. Where it says "phase and age that are the same as the original date", give the date when the phase is the same as the starting phase. The age may be a day different than it was originally, because it is rounded to the nearest day on both occasions.

Week 7 assignment, due week 8. *SkyGazer Activity 12: The Inferior Planets*

- No special instructions. Do the full exercise.

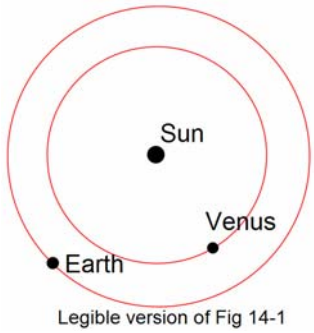
Week 8 assignment, due week 9. *SkyGazer Activity 13: The Superior Planets*

- Do the full exercise.
- Part 2. Set your starting date to be September 1, 2005.
- Part 4. Use the starting date (Nov. 17, 2002) that comes up when you load the "Mars in Retrograde" file.

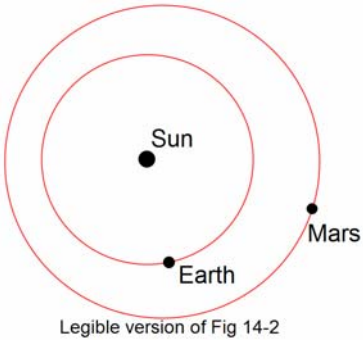
No homework assignment for week 9. Study for the StarQuiz and ClickerQuiz that you will take in week 10.

Week 10 assignment, due week 11. *SkyGazer Activity 14: Observing the Planets*

- Do the full exercise.
- Part 1. A legible version of Figure 14-1 is shown at the right. Don't worry if your overall view of the solar system is rotated relative to the one shown in the figure. All that matters is that the relative positions of Earth, Venus and the Sun are the same as in the figure.
- Part 1. It will help if you click "control/define horizon", then select "Translucent" and "Show Cardinal Points". Set the time step to 10 min and change time in single steps until Venus rises.
- Part 2. In addition to following the instructions in the book, go to the Planet Panel and select the Sun, so that it will appear on the screen. Also… start from the default date that comes up when you load the "Planet Orrery" file.
- Part 5. A legible version of Figure 14-2 is also given here.
- SKIP PART 6. The file "Herschel Discovers Uranus" does not exist.
- Part 7. The "Venus Transit of 1769" is in the "Demo" folder (the "Settings" folder does not exist).
- Part 7. Use the default location (near New Zealand) to work out the duration of both transits. Measure the transit duration as starting at the time that the Left Hand edge of Venus crosses the Left Hand edge of the Sun, and ending when the Right Hand edge of Venus reaches the Right Hand edge of the Sun. Try to measure each point to the nearest minute. You have the advantage of being able to run time forward and backward as many times as you want, and you do not have to contend with the shimmering caused by the Earth's atmosphere. Capt. Cook and friends only got one shot at it, and found out that it was very hard to do.



Legible version of Fig 14-1



Legible version of Fig 14-2

Weeks 11-13 assignments.

These do not use the Media Workbook or Skygazer. The assignments will appear on Angel a week before they are due. You will receive an email (sent to your msu.edu email address) announcing each assignment as it becomes available.