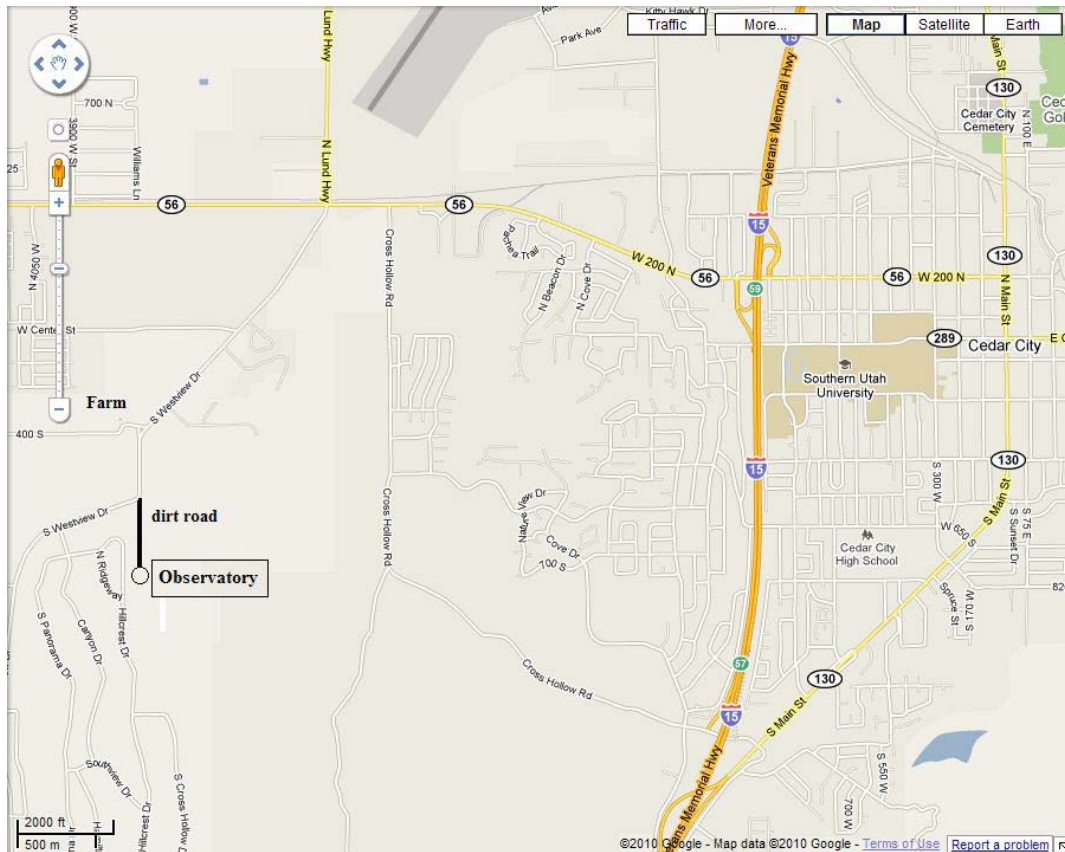


**Before you leave tonight;** sign up for a lab (sub-) section. Factors upon which to base this decision includes transportation (can you car pool?) and schedule conflicts (check now on syllabus).



#### Directions to observatory:

- **West on 200 N/UT-56** (past the university). Continue past I-15, past GenPac (on your left), past Cross Hollow Road. You will see signs for the SUU Farm and the Observatory -- you will want the next intersection. There is now a stoplight at this intersection.
- **Turn left (south) on Westview Drive.** Continue on Westview for about a mile; the road will curve a bit. You will pass the Farm on the right. Before the road makes a sharp right turn, you will see a dirt road going uphill.
- **Continue straight up the hill on the dirt road.** There will be a sign for the Ashcroft Observatory to the left of the road. It's a steep road, so be very careful, especially in adverse conditions. If you are wary of either of you or your vehicle's ability to make it up the hill, then park at the bottom, off to the side, and walk up.
- **Do not run into the gate** if it is closed. Odds are, it will be open, because I will be there.

#### Grading:

- **Lab Sessions:** There are 7 class labs. Tonight counts as one; the other 6 will happen every two weeks. Come to your scheduled lab night. **Bring your lab manual, your Observation Journal, spare paper, and a writing utensil to each lab.**

- **Missed lab sessions** may be made up by attending on a different lab night (either the same night on the off week, or another night). This is best done with the prior permission of the lab instructors. Due to the fickle nature of the weather, we may not be doing the same lab exercise as the one you missed, and you cannot duplicate a lab you've already done. There are also a make-up lab night at the end of the semester (week before finals) if you have been unable to make up your missed lab night before then.
- **Lab exercises** are turned in before you leave lab that night: data, sketches, observations, answers to all questions.
- **Do At Home Labs:** There are 3 lab projects that you will work on outside of lab time throughout the semester. More information about them is available in the lab manual. **Be sure to note due dates for all of these take-home labs.**
  - **Observation Journal:** Bring this each week. Start now. Due on the last lab night.
  - **Tracking the Sun:** A.k.a., "sun pictures". Start now. Due on the last lab night.
  - **Research Project:** Propose by 3<sup>rd</sup> lab night, turn in and present on last lab night.
- **Constellation Quiz:** First clear lab night after Constellations lab.

#### Live Friendly:

- **Car Pool:** We don't have *that* much parking space at the top of the hill.
- **Dress warm:** Even if it was warm during the day, it will get colder than you think at night. We will be spending a lot of time outside; wear good shoes, jacket/coat, hat, long pants, and gloves.
- **Quiz each other:** Practice learning constellations, discuss/make Moon observations, etc.

#### Weather:

- Unless it is physically dangerous for you to reach the observatory, **we will always have lab**, even if it is overcast and/or raining. We have indoor labs for the latter. If the sky is clear, we will have an outdoor lab.
- **In the event of lab cancellation** (due to snow/ice on the hill), I will post a notice on the Canvas calendar and send an update via Twitter (**profchisholm**).

#### Basic Observations:

- **Angular sizes** (at arm length): pinky = 1 degree, 3 center fingers = 5 degrees, across closed fist = 10 degrees, stretched index to pinky = 15 degrees, stretched pinky to thumb = 25 degrees
- **Altitude:** Angle measured from horizon ( $0^\circ$  Al) to zenith ( $90^\circ$  Al). Analogous to latitude on Earth.
- **Azimuth:** Angle measured clockwise from due North ( $0^\circ$  Az) through due East ( $90^\circ$  Az) through due South ( $180^\circ$  Az) through due West ( $270^\circ$  Az) back to due North again ( $360^\circ = 0^\circ$ )

**The Earth's position and motions:**

- **Earth rotates on its axis** which causes things to rise and set.
  - Sun, Moon, stars.
  - What stars can you actually see?
  - North Celestial Pole (NCP) -- stationary point in sky (Polaris, the North Star)
  - Some stars "up" longer than others.
  - Some stars always "up" (circumpolar), some never "up" (below horizon).
- **Earth revolves around sun** which makes different stars visible at night during each season
  - Summer constellations vs. Winter constellations
- **Earth is tipped on its axis** which gives rise to seasons
  - Sun is up longer when tipped toward than when tipped away (try it).
  - Sun's position in sky different when tipped toward than when tipped away (try it).
  - Why does this cause seasons?
  - Also effects where Sun rises and sets on horizon.

**The Moon's position and motions:**

- **Moon circles** the Earth, as the Earth circles the Sun.
  - **Phases of the Moon** are due to the relative position of the three.
    - Determines shape of visible Moon, time of moonrise and moonset.
  - Moon popsicles.
- 

## Do At Home Labs

- **Observation Journal:** Not just for the Moon.
  - This is your observation journal. Record any astronomical observation you like (shooting stars, planets, comets, etc.). The constellations we learn do not count, though other stars/galaxies/etc. you find do.
  - You can paste in your Sun photos (see below) as you go along, or do them all at the end of the semester (reserve 12-15 pages for this).
  - Try to find the Moon **once every day/night**.
  - **Record** the date, time, phase, and location (altitude and azimuth) of the Moon.
  - Include a **sketch** of the moon, showing its phase, orientation, and any surface features you can see.
  - As the semester progresses, start to see if there are any **patterns** to the Moon's position, phase, etc. (Hint: there are some). Formulate a **question** based upon this that a fellow student could answer with their Moon journal.
  - **Bring your journal to every lab night**. I will sign it and give you extra points for bringing it. If you forget it, you will lose points.
  - **Record all observations in your lab journal**, not on loose paper. Do not paste in later.
  - **Start this lab immediately**, as you cannot travel backwards in time to make them up.

- **Thou shalt not fake thine data.** Being astronomically minded, we can spot this very well.
- **An ordinary grade** on this project will consist of an average of three observations per week (with sketches and the above data) and a single question you've come up with. A superior grade will have more than this; an inferior grade will have less than this.
- The Observation Journal is turned in **on the last night at the Observatory.**
  
- **Tracking the Sun:** In this lab, you will see how the position of sunrise and sunset changes with the season, keeping a photographic record of sunrises or sunsets (you choose which).
  - **Select Observation Spot** by your first lab meeting. It should have a wide, unobstructed view of the eastern (for sunrise) or western (for sunsets) horizon.
  - **Bring a photo** taken from this spot to the last lab meeting -- this first one need not be of the Sun. This need not be a hardcopy; you can just bring your camera/phone and show me.
  - **Take a photo** of the Sun rising or setting from your spot **every week**. Take several, to ensure that you have one that is neither too bright nor too dim.
  - **Estimate azimuth** of the Sun's position where it crosses the horizon, and **record the time** you took your picture.
  - Take your photo from **the exact same location** every week. Seriously, feet in *exactly* the same spot every time.
  - **Start this lab right away** in order to get a sufficient number of weeks' worth of photos.
  - Eventually, print & attach all **12-15** photos into your Moon Journal. Complete the data table, and answer all questions.
  
- **Observational Research Project:** In this lab, you will gain personal observational knowledge of some astronomical object/phenomena of your choosing.
  - **Pick a subject** by the 3<sup>rd</sup> lab night: Sun, Moon, Planets, Comets, Meteors and so on, and what about your object(s) you will observe.
  - Make a series of observations, either repeated dense observations over a day or more sporadic observations over weeks. Keep all data in your Observation Journal.
  - Instructor will check your progress on subsequent lab nights.
  - Analyze your data for patterns and create a graphical representation of your data.
  - Present your project to the rest of the class on our **final lab night**.

## **Parting Words:**

### **Thou shalt not fake thine data**

### **Thou shalt not copy data from thine neighbor**

This falls under the jurisdiction of the SUU Academic Dishonesty policy. No points in this Gen Ed class are worth you sacrificing your integrity and self-respect. Do these projects honestly -- do not make things up, do not copy from others, do not copy down numbers from a computer program (due to the surrounding mountains, the times of our sunrise and sunset are different than published versions). These are to be your actual, genuine and honest observations about the universe. We, as astronomers, are aware that weather sometimes hampers observations, but with some planning and foresight on your part, you have ample time to collect all of the required data for this course. You, as astronomy students, are encouraged to compare drawings and photographs with each other, talk about your observations, and so on, but you may not "share" observations, numbers, drawings, photographs, etc.

As noted in the syllabus, responding to academic dishonesty is at the discretion of the Professor (that's me), and can include punishments up to a failing grade and dismissal from the class. Dire consequences.