ASTR 1010 Exam #1 (Sections 1.1 - 4.4 + p 101-104 celestial coord.) Sept 22, 2011
This summarizes most, but not necessarily all, topics that will be on the exam

* What are stars, planets, the solar system, galaxies, and the universe. Milky Way.
* Approximate size scales (grapefruit analogy); what are astronomical unit and light year.
* Approx. number of stars in the Milky Way. Recognize Earth is not sitting still in space.
* The observable universe. How big/old is it. How do we know this.

* How are stars in a constellation related. How many official constellations are there.
* Number of arcminutes and arcseconds in a degree. Zenith and horizon.
* Celestial sphere, celes. equator, and celes. poles. Ecliptic. Circumpolar stars.
* Cause of stars' apparent rotation around poles. Why is Polaris a special star.
* Why whether a star is visible depends upon latitude (not longitude) and time of year.
* Why do the Earth's north and south poles have 6 months of day/night each year.
* How to estimate time of day based on where on Earth you are.
* What causes the seasons. How much is the Earth's tilt. Tilt is relative to what.
* Why does the angle of the incoming light make a difference. the Zodiac.
* Summer and winter solstices, spring and fall equinoxes. What are they.
* the Zodiac. What is precession. How has precession affected the astrological signs.
* Names for and progression of the lunar phases. Basic cause. Waxing vs. waning.
* Moon's orbital period. Why is the lunar cycle 2 days longer. Always see same side.
* Relation between lunar phase and the time of day the moon is observable from Earth.
* What is an eclipse. Solar and lunar types. Why sometimes partial or total.
* Why are solar eclipses sometimes annular; approximate angular size of moon and sun.
* Phase of moon required for each. Why are they not seen every new/full moon.
* Five easiest to see planets. Why was their motion hard to explain by early observers
* Why do planets appear to exhibit retrograde motion.

* Ptolemy - geocentric solar system model. How did it explain retrograde motion.
* Copernicus - sun centered model; why did it not work much better.
* Tycho Brahe - precise observations; Kepler - Laws of planetary motion.
* What are Keper's 3 Laws (and what do they mean).
* Galileo - what objections to Sun-centered model did he help overcome; know 4 things he observed with telescope to accomplish this; when did he do this (early 1600s)
* What makes something a scientific theory/hypothesis. Astronomy vs. astrology.
* right ascension, declination.

* Speed, velocity, acceleration; what is the "acceleration of gravity". What does it mean.
* Newton's 3 laws: constant velocity unless …, F=ma, action/reaction forces.
* Mass versus weight. Apparent weightlessness. Why do objects (e.g. moon) stay in orbit.
* Conservation of momentum, angular momentum, and energy (different types of energy)
* What is temperature a measure of. Importance of $E=mc^2$. Energy - mass equivalence.
* Law of Gravitation. How the force changes with mass and/or distance (center-to-center)
* how does weight depend upon gravity