Review Topics for Exam #2
ASTR 170B1 section 001

Your Professor and Teaching Assistant are anxious to help you during office hours, study and review sessions, and by appointment.

Optional review sessions:
Thursday (October 24) 5:30-7:30 pm in room N210 of Steward Observatory

Exam #2:
Monday (October 28), 10-10:50 am in our classroom, N210 at Steward Observatory
BRING Exam #1: Both the exam and the scratch-off answer sheet.
BRING your CAT card and a pencil and a scratching device (penny, toothpick, etc.)
Format: closed book & closed notes

YOU MAY BRING
a calculator, but most problems will only use round numbers or powers of ten
a handwritten, double-sided sheet of notes on letter-sized paper

The second exam will consist of two parts: A required section emphasizing new concepts discussed since the first exam and an optional “Resurrection Points” section allowing you to earn back questions missed on Exam #1. Each section will consist of 24 questions and a short answer essay question that will also require you to apply all the Daily Skills we have accumulated. The test questions relate primarily to topics discussed in class and emphasized in daily quizzes and homeworks.

The required section will be subdivided into six scientific concepts as follows: Light & Spectra; Telescopes & Observatories; Terrestrial Planets; Jovian Planets; Moons & Rings; Comets & Asteroids. This section will use the “scratch” type of answer sheet that allows you to continue answering a question until you succeed.

“Resurrection Points” gives you the opportunity to earn back points from sections on Exam #1 by allowing you to answer similar sets of questions to demonstrate proper understanding on the concepts on Exam #1. This portion of the exam will use a standard Scantron answer form. You must answer all four questions in any section(s) you choose to improve your score on any (or all) sections from Exam #1. You may also earn back points on the short answer question by correctly answering a similar question. Also, you must turn in Exam #1 (with answer form) if you choose any Resurrection Points.

Suggested study methods:
1. Review and practice all our previous homeworks and quizzes. The solutions will soon be posted online along with follow-up questions to guide your studying.
2. Understand and practice concepts; don’t memorize details. For example, do you really understand what “density” means and how it is measured? Do you really understand the meaning of the term “morphology”?
3. Review all the **Daily Skills** (numerical & communication)
4. Review and practice scientific notation, powers of ten, fractions, percent, exponents

To be successful, study the following topics.

**Light & Spectra:**
- General nature of light
  - Electromagnetic spectrum: wavelength, frequency, energy
  - Speed of light
  - Differences between sound & light
- Inverse-square law: how a light source gets fainter with increasing distance
- What is a “spectrum”?
- Three types of spectra: how is each one produced?
- Light sources
  - Thermal emission
    - Wien's Law
    - Stefan-Boltzmann Law
  - Emission and absorption of spectral lines
- Doppler Shift

**Telescopes & Observatories:**
- What are the advantages of telescopes?
- What determines collecting area?
- How do astronomers collect light (area, exposure time, efficient instruments)
- Advantages of electronic instruments over human eye
- Characteristics of a good site
- Advantages of space-based telescopes vs. ground-based telescopes

**The Planets:**
- Differences between terrestrial and jovian planets
- How can radioactive elements generate heat within a planet?
- How can radioactive elements indicate the age of a rock?
- What is the age of the Solar System?
- What characteristics of a planet allow it to retain or lose its atmosphere?
  - Mass, temperature, escape velocity
- What causes a planet's magnetic field?
- Greenhouse effect
- Impact craters:
  - Kinetic energy
  - Characteristic features (i.e., morphology)
  - Causes
    - Why might these features vary from planet to planet or moon to moon?
- What effects cause erosion on a planet's surface?

**Earth & Moon:**
- Seismology, differentiation
causes of tides
effects of tides: synchronous rotation, internal heating, volcanoes
What "shields" protect life on Earth?
formation of our Moon

**Small Bodies in the Solar System: Moons, Asteroids, Comets:**
cryovolcanism and its causes
Why are some small objects irregularly shaped?
ices & sublimation
phase changes: solid, liquid, gas

**Patterns in the Solar System:**
variation of density with distance from Sun
coplanar orbits
rotation and revolution directions
how these patterns can be explained with the ‘solar nebula’ theory

**Arithmetic Concepts:**
scientific notation
powers of ten
metric system units including prefixes like kilo, nano, milli, kilo, mega, giga, etc.
fractions, ratios, percent

**Understand These Terms:**
radius, diameter, circumference, area, volume
mass, weight, density
astronomical unit (AU)
light-units (e.g., “light year”)
kinetic energy
temperature
angle measurements (degree, arcminute, arcsecond)