FOCUS:  Lectures from Star Systems: 2016_11_01: Telescopes and Spectrometers ONWARD
You will need to know the major historical figures from the first half of the semester, the Newton’s Law of Gravitation and Kepler’s Laws, and understand the nature of light, emission spectra, absorption spectra, blackbody spectra and the structure of a telescope.

UNDERSTAND:
Know, identify, characterize, and name major geologic or atmospheric features on the planets and major moons (Moon, Phobos, Deimos, Io, Europa, Ganymede, Callisto, Titan, Enceladus, Triton).
- On our own Moon you should be able to find the Sea of Tranquility (and know that that is where Apollo 11 (the first manned mission to the surface of the Moon) landed), as well as the craters Tycho and Copernicus. You should know that Taurus-Littrow was a vast canyon on the Moon visited by Apollo 17.
- You should know the largest mountains, volcanoes and canyons on the Earth, Venus, and Mars and name some of the prominent volcanoes on Io (Tvashtr Catena or Dazhbog and Zal Patera). You should be able to identify on a map or images Olympus Mons on Mars as well as the three volcanoes from the Tharsus Plateau: Arisia Mons, Pavonis Mons, Ascreaus Mons, as well as Valles Marineris. Venus has Maat Mons, Maxwell Montes, and Dali Chasma. The tallest cliffs in the solar system, Verona Rupes, reach 3-6 miles high and are on Uranus’ moon Miranda.
- You should have some idea of which planets have solid surfaces, which have atmospheres, their basic compositions, and basic temperatures (not exact numbers).
- You should be able to recognize photographs of the major planets and the moons listed above taken from telescopes, satellite or probe images, or images from the surface.
- Even though you won’t be asked to identify images of them, you should know the names of Uranus’ and Pluto’s major Moons, as well as some of the other moons of Saturn. The fact that Uranus’ moons are named after Shakespeare characters. Pluto’s known moons are Charon, Styx, Nix, Kerberos, and Hydra. Know also that Pluto is considered to be a Kuiper Belt object and not a planet. Some of Saturn’s notable moons that we can see through our telescope are Enceladus, Dione, Rhea, Tethys, and Titan. Mimas is also easily identified.
- Know that Venus has undergone a runaway greenhouse effect and understand what this means. Know how Earth’s climate is changing today. Know how Mars’ climate is today and how it was different in the past and why we currently think this is.

Understand the life cycle of a star, where its energy comes from and how this affects its, life, temperature, and luminosity.

Know the basic structure of our solar system and its general size. What is a planet? What is an asteroid/meteor/meteorite? What is a comet? What is the Kuiper Belt? What is the Oort Cloud?

Know the different methods for detecting planet orbiting other stars. What are these star systems like?

HELPFUL STUDY QUESTIONS:
Which of the planets and major moons have volcanoes, canyons, mountains or cliffs? Can you name any of them?

Which planets or moons have people been to? Know how many people have walked on the Moon, and the names of at least two of them. Which planets or moons have we landed robotic explorers or probes on?

What is Mars like today and how was it different in the past?

Which planets have rings? What are rings made of? How big are they?
Which terrestrial planets and moons have an atmosphere? What are these atmospheres like?

Which terrestrial planets and moons have liquid above or below the surface? What kinds of liquid are present on these moons/planets? Which have water ice? Which have water volcanoes or geysers? Which have liquid nitrogen geysers? Which have methane/ethane rivers, lakes and seas?

Which terrestrial planets and moons have the possibility for life? Where might life live?

What are the processes that shape a terrestrial planet’s surface and what geologic features can they create?

What factors affect whether a planet has a magnetic field? What is an aurora and how is it related to magnetic fields?

Which planet is Earth’s “twin”? How is it similar and how is it different? Why is it so hot there?

What is a Kuiper Belt object? Why is Pluto no longer a planet? Can you name any other Kuiper Belt Objects?

How does the length of a star’s life depend on its mass, temperature and luminosity?
What is our sun like? What is the temperature in the core? On the surface? Why is the Sun yellow? What is its spectral type? How long is its expected lifetime?

What is the greenhouse effect? Is it always a bad thing? What are we doing to the greenhouse gases in Earth’s atmosphere? What effect may this have? What is a run-away greenhouse effect? Which planet has already suffered from this?

What is the weather like on Venus? On Mars? On Titan? On Triton? Can you identify images from the surfaces of the ones we have landed robots on?

What is a sunspot? What is a solar flare? What is the Solar Wind? What are the major components of Space Weather?

What is a hot Jovian (hot Jupiter)? A super-terran (super-Earth)? A sub-Neptunian?

Which worlds have surfaces shaped by liquids? And what kinds of liquids are they?

What does the Habitable Zone refer to?
Could life exist on a world outside of the habitable zone? If so, how?