

## PHYS 1304 Final Review Sheet

The final for this course will be very similar to the midterm as far as style is concerned. You will have 3 hours to complete the test though it is unlikely it will be required. You will also be able to bring a single page “cheat sheet” with you. The final focuses on the second half of the semester, but concepts from the first half of the semester can appear on it. For example, you shouldn't be surprised to find problems involving kinetic energy, angular momentum, etc. The problems can technically come from anything we have covered in the book or in class. The list of topics below is intended to help direct your studying. I do not promise that it includes everything that will be found on the exam though I will generally strive to make that the case.

A big part of what I will be testing with the final is your understanding of the processes that shape planets and your ability to apply the basic concepts to new situations. Some of that application will be done through actual mathematical arguments, other parts will be more conceptual “what if” type questions. It is also critical that you know how we know various things about the Solar System and our own planet.

**Solar System Basics** – You need to understand the basic layout of the Solar System, what components are in it, and the general properties and trends of the bodies in orbit around our Sun.

**Star and Planet Formation** – You need to understand our current model of how stars and planets form. You should be able to explain how this model fits the observations of our own Solar System. Disk formation is a major part of the theory of how planets form. You should understand why a disk forms and be able to provide a mathematical basis for this and extend “what if” scenarios dealing with planet formation. Your explanations need to take into account the nature of orbits as discussed in the first half of the semester.

**Terrestrial Geology** – Know the various geological processes and what determines how significant each one is for a terrestrial planet. You should also know how these various processes have manifested on the terrestrial bodies in our Solar System and be able to extend logical arguments to other hypothetical bodies that might be found around other stars. Understand the special nature of the geology of the Earth. Know how plate tectonics can form various features on the Earth's surface.

**Terrestrial Atmospheres** – Understand how the temperatures of planets are determined and how the atmosphere can alter that. You should know the basic structure of the Earth's atmosphere and how that is different from the atmospheres of Mars and Venus along with why they are different. Understand the histories of the climates of the terrestrial planets and why those histories are the way they are. To be able to do that you need to know the basic gain and loss processes for atmospheres as well as the factors that are significant for climate change. You should know the features of the Earth's atmosphere and how our climate has been able to remain stable for so long (the carbon cycle).

**Jovian Interiors and Atmospheres** – You should understand the basics of the Jovian planets and what their interiors are like. Be able to explain why there are differences in both the interiors and visible exteriors of the Jovian planets. You should be able to describe why we see different cloud layers and perhaps even draw a figure explaining it.

**Jovian Moons and Rings** – You should know the largest moons of the Jovian planets and some of their main features. Be able to explain why so many of the Jovian moons are geologically active despite the fact that none are significantly larger than Mercury. For the rings, know what the rings of the 4 Jovian planets are like. You should know roughly what rings are. Know roughly what resonances are and how they are significant for rings, moons, and other bodies.

**Small Bodies** – You need to know the three main populations of small bodies in our Solar System, their properties, and roughly why they are where they are. Know how these small bodies fit into our model of Solar System formation. You need to understand the role of impactors in the history of our Solar System and what role they can play in the present. Be able to do calculations related to impactors.

**Extrasolar Planets** – Understand the nature of the planets we have found outside of our Solar System and how we have found them. You should know exactly what different detection methods tell us about these planets. Know the types of modifications that have to be made to the nebular model to explain the extrasolar planets that we have found.

**Life** – You need to know the rough history of life on Earth. Understand the nature of the geological record and how it tells us about the history of life. You need to know how life has altered the Earth. Know what bodies in our own Solar System are candidates for harboring life and why we think this. Also know how we are likely to determine if there is life on other planets.