

Mason Online Astronomy 112 Course Preview Transcript

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Have you ever looked at the sky at night and searched for Mars, Jupiter, or Saturn? Have you watched the transit of Venus? Would you like to know more about our Solar System and the Universe?

Welcome to Astronomy 112. This course offers a unique opportunity to study the Solar System using high tech online tools. In our journey through the Solar System you will learn how to use real scientific data of the sun, planets, and asteroids that various organizations have posted on the web and combine the data with your own observations.

What does an online astronomy lab look like? Astronomy 112 is organized into eleven weekly learning modules. At the end of each module, you'll submit a report about your findings for grading. Instead of having only 3 hours of class to complete a lab exercise, you have an entire week.

You may ask yourself, what can I expect to learn about the Solar System in an online lab course? Well let's have a brief look at the learning modules.

After a short orientation you will do your first lab exercise - The Solar System Walk. You will build a model of the Solar System on campus, close to your home, or in your living room. In module 2 you will be introduced to the celestial sphere, using Stellarium, a planetarium software. You will study finding an object in the sky and how astronomers use different coordinate systems to communicate the position of a star, planet, or asteroid. You will also learn about planetary motion, orbits, and the transit of Venus.

Astronomers use telescopes for observing the sky. Telescopes are light collecting instruments consisting of mirrors and lenses. You will investigate the nature of light with web based simulations and finally simulate a telescope.

Maybe you have heard about power outages caused by solar storms. In module 6 you will analyze real data gathered by two NASA spacecraft, participate in a citizen science project, and create a space weather forecast.

In 2030 humankind will have an opportunity to send the first humans to Mars. What does it take to go there? And where will we land? Using mapping software to explore the surface of Mars, you will select a landing site for the next scientific mission to the Red Planet.

Have you ever heard of near earth objects – asteroids, comets – that come close to earth? In module 9 you will investigate the likelihood of a collision of an asteroid with earth. Finally, in module 10, we will look at planets of other star systems. Will you find life on those planets? You will learn about the conditions that need to be met for life to evolve.

Now let's look at an example by looking closer at module 2. When you open "Navigating the Sky with Stellarium" you will first find a brief description of the learning goals and a list of steps you need to complete before submitting your assignment. Now let me show you the pre-lab reading. The pre-lab reading contains basic background information.

In this case, it provides a description of coordinate systems, such as the horizon system and the equatorial coordinate system. When we scroll down the handout, you will see some definitions. For example, the horizon system has two coordinates – altitude and azimuth. Altitude is the elevation of an object above the horizon. The azimuth is the angle counted from due north to east. We will use these coordinates to find the Northern Star in our example. After having become familiar with the theory, you can take a quiz to verify your understanding of the material.

Now, let's open the actual lab handout. In the main handout you will find a description of the procedures and observations you are tasked with. For example, one of your tasks is to find Polaris and to record its coordinates. How are we going to find Polaris? Let's open Stellarium and look north. Polaris is the Northern Star. Using the horizon system we can determine its altitude. The altitude is also related to the latitude of your location. But how? It is your turn now to find the answer.

Finally, at the end of the lab exercise, you have two practice problems. You are lost in the middle of an ocean with no GPS receiver and with only your boat and the stars in the sky. Of course, you have taken Astronomy 112 at George Mason University, and therefore, you easily find your position and your way home. You record all answers in a report and submit it on Blackboard in an assignment dropbox.

All modules are structured in the same way and we constantly work to improve this course to better accommodate your learning needs. Space is the final frontier for humankind, and this astronomy lab will help you better understand your home, our Solar System.