

## Astronomy 101

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Discover the cosmos – planets and moons, nebulas and galaxies, black holes and dark matter. This course lays the groundwork for a basic understanding of the cosmos – from the Moon to the Big Bang – and answers some basic questions.

We will start with our local universe – the night sky, which is how we see the Universe.



Topics:

- Stars and constellations visible by eye
- Changing phases of the Moon
- The Sun’s changing position in the sky through the year
- How and why the sky changes from season to season
- Periodic sky spectacles – eclipses, comets, auroras and meteor showers



This image of a distant galaxy is a gigantic city of stars that lies far from planet Earth. Galaxies are the basic building blocks of the Universe, and current estimates are that billions exist, each with millions or billions of stars. Topics:

- Types and structure of galaxies
- Our Milky Way Galaxy, Earth’s location within and our view from the inside
- Closest neighboring galaxies – the “Local Group”
- Galaxies across space
- Colliding galaxies – including one with our Milky Way Galaxy

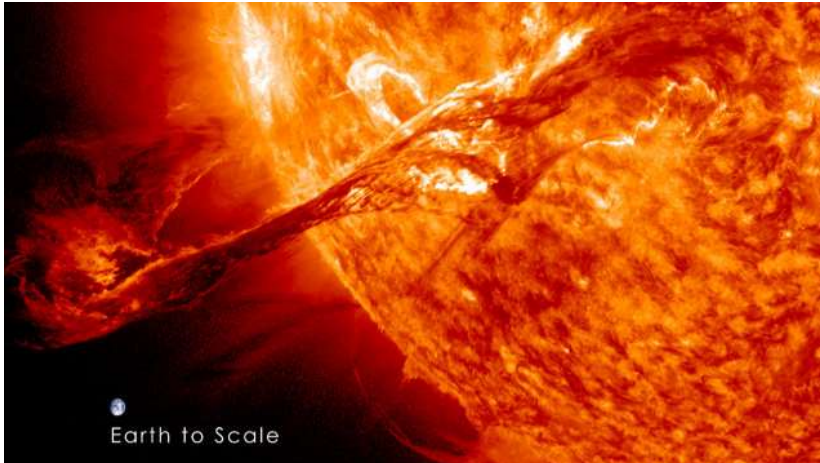
We will also investigate closer to home, exploring our Moon, the nearby planets and their intriguing moons.



Topics:

- Recent visit to dwarf planet Pluto and the latest images
- What does it mean to be a dwarf planet
- Close-up views of each planet in our Solar System and many of their moons
- Moons with volcanoes, geysers and underground oceans
- Places in our Solar System where other life may exist

We will explore stars and the closest one, our own Sun, how they came to be, how they live their lives, and how they all die. We will see what powers our Sun and what its future holds.



Topics:

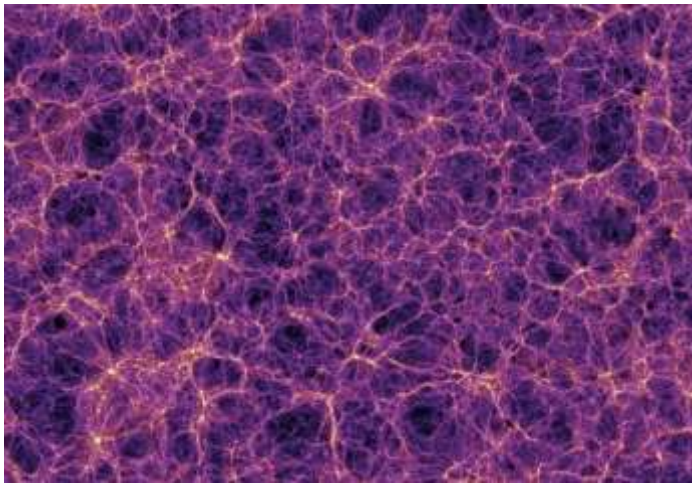
- Star birth and death
- Supernovas and black holes
- Star colors and temperatures
- Variety of nebulas – some are stars in the making, some are stars that have died
- Relative sizes of stars and how they compare to our Sun
- Our Sun's energy source and its future
- Sunspots, solar storms and eclipses



Thousands of “exoplanets” – planets beyond our own Solar System – are now known to exist. Discover how we find these distant worlds and whether any might be other Earths. Topics:

- The increasing number of exoplanets
- Techniques astronomers use to find these distant worlds
- The variety of worlds being found
- Recent discovery of a nearby – and potentially Earth-like – exoplanet

We will demonstrate the scale of objects and distances in space and try to grasp the truly immense size of the cosmos. We will explore the latest mysterious forces underlying our Universe – dark matter and dark energy – their origin and make-up unknown even though they compose the vast majority of the Universe.



Topics:

- What is the Universe? Is ours unique? Are there others – the multiverse?
- The leftover glow of the Big Band still visible today
- The cosmic web (pictures above)
- Theories about the ultimate fate of the Universe

Along the way, we'll feature some historic vignettes that have formed our understanding about the Universe. Topics:

- Ancient sightings of supernovas
- Historic meteor storms
- Discovery of our ever-expanding grasp of the extent of the Universe

We will also feature the best celestial images from observatories around the world and above, including those from the Hubble and James Webb Space Telescopes.



And most importantly, we look forward to answering questions you have about the cosmos – what do you want to know more about? What mysteries mystify you?