

## OLLI Course Bio

Prof. Basri taught in the Astronomy Dept. at UC Berkeley for 35 years. His favorite classes were the introductory courses for non-majors and small freshman seminars. He enjoys making science accessible to the general public, and has been given the Sagan award for this talent.

Title: Planets!                      Time: Wednesdays 2-4pm, April 1 - May 6, 2020

The Earth wasn't called a planet until Copernicus. Now Pluto is struggling to remain a (dwarf) planet. What defines a planet? How do they appear, live, and die? Direct exploration of other planets started 60 years ago, exoplanets (around other stars) were first discovered 25 years ago (garnering the 2019 Nobel Prize), and it has only been a decade since we have understood that most stars have planetary systems. Many of those systems turn out to be quite different from ours. I will describe the progress we have made, how we have made it, and what we have learned about planets, ending with the question of whether there is life on other planets.

While no reading is required for this course, there is a very helpful free online book called "Astronomy" that is written at an appropriate level and has some relevant material. Go to the link below and click on the "Contents" button. You can then easily navigate to each of the sections that are listed below to the right of topics. A few YouTube episodes are listed, and more will be added to the syllabus (and shown) as we go along.

[https://cnx.org/contents/LnN76Opl@18.1:\\_45u6lpQ@7/Introduction](https://cnx.org/contents/LnN76Opl@18.1:_45u6lpQ@7/Introduction)

## Syllabus

<b>Week 1</b>	What is a Planet?	
1.1-1.3		
	Cosmic objects: planets, stars, galaxies	1.6
	Historical and popular notions of "planet"	
2.2-2.4		
	Sizes and shapes of planets	
	Orbits of planets	

3.1-3.4

Belts of planetesimals  
How small or big can a planet be?  
Pluto to brown dwarfs  
Toward a rational definition of "planet"

Further reading in an article by me: <http://w.astro.berkeley.edu/~basri/defineplanet/Mercury.htm>

**Week 2** The Birth of Planetary Systems

The interstellar medium: site of star formation

20.1-2

Gravity and Angular Momentum: the main players 21.1  
The Role of Magnetic Fields  
Disks: a pervasive structure 21.3  
Observations: Ongoing star formation  
Accretion and Aggregation in Disks  
Oligarchic formation of Terrestrial Planets  
Formation of Giant Planets

**Week 3** Our Solar System - A Brief Tour

The Earth as a Planet

Chap. 8

Terrestrial Planets: Venus and Mars

Chap. 10

Cratered Worlds: Moon(s) and Mercury

Chap. 9

Planets without Surfaces

Chap. 11

Neptune and Uranus

Jupiter and Saturn

Rings and Moons

Chap. 12

**Week 4** The Search for Other Planets: Worlds A-Plenty!

21.4

Watching a Star's Motion

The 2019 Nobel Prize

	Watching a Star's Brightness: Transits Imaging Planets Around other Stars Observations: Planets are Everywhere The Next Steps	21.5
<b>Week 5</b>	The ExoPlanetary Zoo Hot Jupiters Super-Earths and Mini-Neptunes Earth-sized planets The Structure of ExoPlanetary Systems The Structures of Exoplanets The Atmospheres of Exoplanets Can Planets Die?	21.6
<b>Week 6</b>	Life in the Universe	
Chap. 30	The Structure and Power of Stars The role of stellar mass; the Lives of Stars	22.1
22.4-5	Considerations for Habitability Are Planets in Habitable Zones Habitable? How Many Planets have Life? How Many Planets have Civilizations? The Search for Life on other Planets	
30.3-30.4		