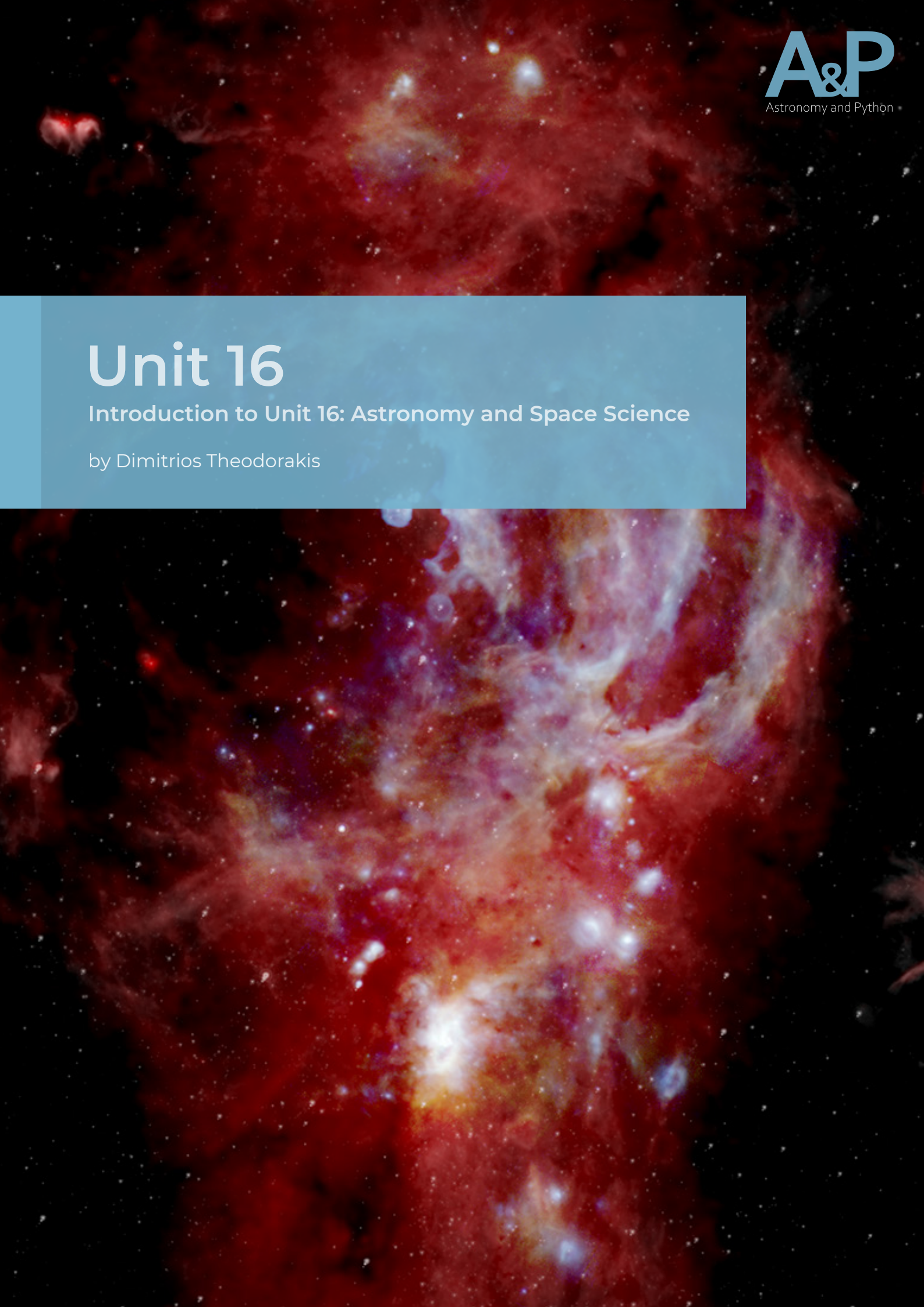


A&P
Astronomy and Python

Unit 16

Introduction to Unit 16: Astronomy and Space Science

by Dimitrios Theodorakis

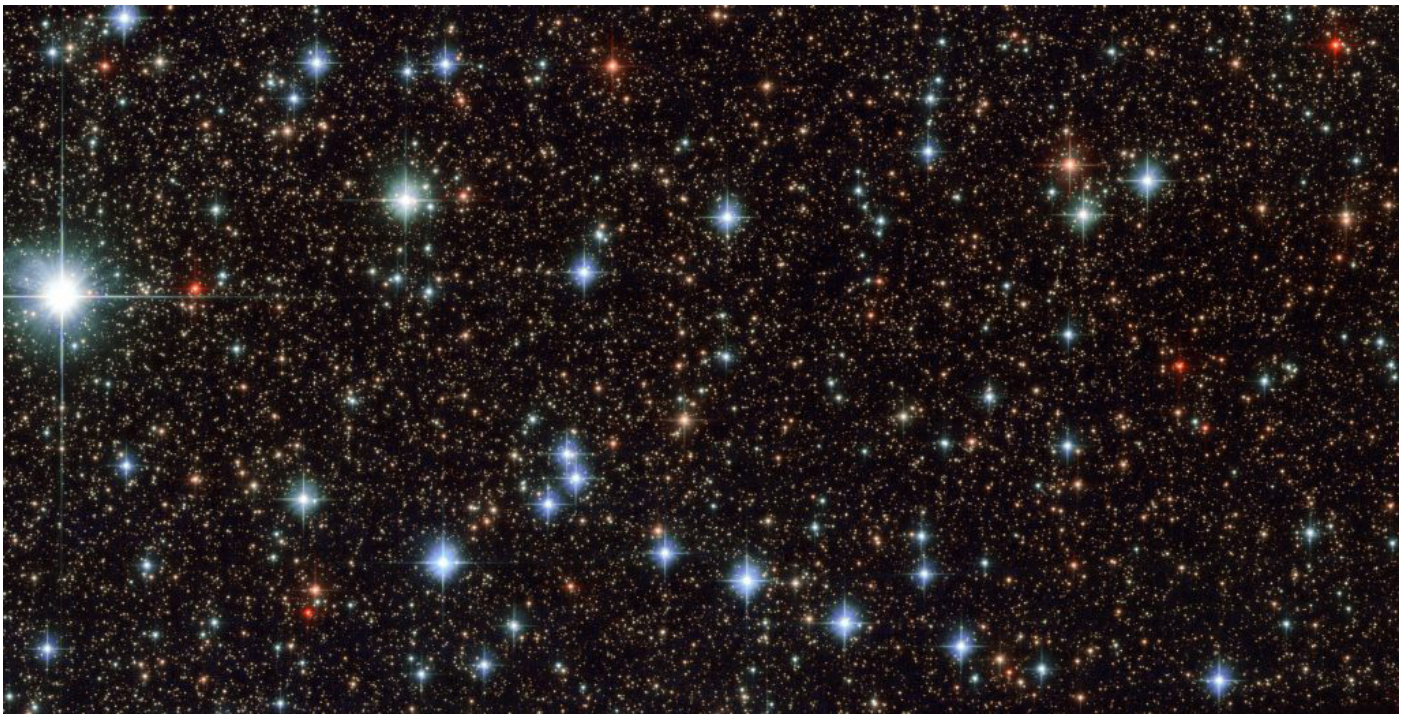
Welcome to Unit 16: Astronomy and Space!

This unit will introduce you to the wonders of space, from the workings of our solar system to the edge of the known universe. You will learn about the latest astronomical research and fundamental ideas that underpin astronomy and space science. As part of this unit you will make your own observations of the night and daytime sky. We will also explore humankind's effort to explore space and venture to Mars. By the end of the unit you will appreciate why astronomy and space are so important.

The unit focuses on 5 big ideas:

1. **How has our understanding of the universe changed over time?**
2. **Appreciate our place in the universe and that of our cosmic neighbours.**
3. **How do scientists observe the universe?**
4. **Understand the fundamental theories and laws that govern the universe.**
5. **How can humans explore space and colonise Mars?**

Each big idea aligns with each of the four parts of the unit with the first big idea appearing across all four parts. In part A we will focus on the solar system and its workings. In part B we will look at how telescopes are used and make our own observations. In part C we will look at space flight and what it takes to be an astronaut. Finally, part D sees us looking at the fundamental theories and ideas that underpin astronomy.



Front Cover Image: SOFIA image of the centre of the Milky Way, NASA/SOFIA/JPL-Caltech/ESA/Herschel, see more here.
Above: Hubble ACS image of part of the Sagittarius constellation, ESA/HUBBLE & NASA.

The important stuff:

Before each lecture you will have a short article to read based on the next lesson. Use that time to prepare your notes using the Cornell note taking method. Your notes will be periodically checked. Keep them in the folder you have been provided with.

There will be several lessons dedicated to working on assignments. This does not mean you can do nothing at home. Deadlines are deadlines DO NOT miss them.

In part B you will be making your own observations at school and at home. You MUST attend one of the school night-time observing sessions to pass the unit.

The scheme of lessons and objectives has been shared with you. If you miss any lessons it is your responsibility to catch up before the next lesson.

The reading list:

- Openstax Astronomy Textbook
- An Introduction to Modern Astrophysics, By Carroll and Ostlie
- Fundamental Planetary Science, By Lissauer and Pater
- An Introduction to the SOlar System, By Rothery, McBride and Gilmour

- Finding Our Place in the Universe, By Hélène Courtois
- Packing for Mars, By Mary Roach
- A Brief History of Time, By Stephen Hawking
- 100 Things to See in the Night Sky, By Dean Regas
- Cosmos, By Carl Sagan
- Hyperspace: A Scientific Odyssey Through Parallel Universes, Time Warps, and the Tenth Dimension, By Michio Kaku

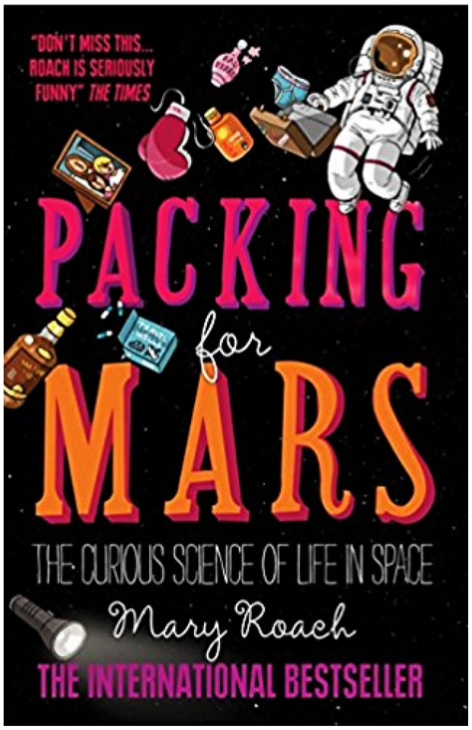


Image: Packing for Mars,
By Mary Roach and Oneworld Publications

The coding element:

Some of the activities for this course will be online and coding based. These are in the Python programming language and assume little prior knowledge. Coding is vital in science for data analysis and it will allow us to analyse astronomical data in the classroom.

The powerpoints and other resources:

Finally, all the resources for this course will be shared with you.
The latest versions of all resources can be found at:
GitHub.com/AstroDimitrios/Astronomy

A - The Solar System

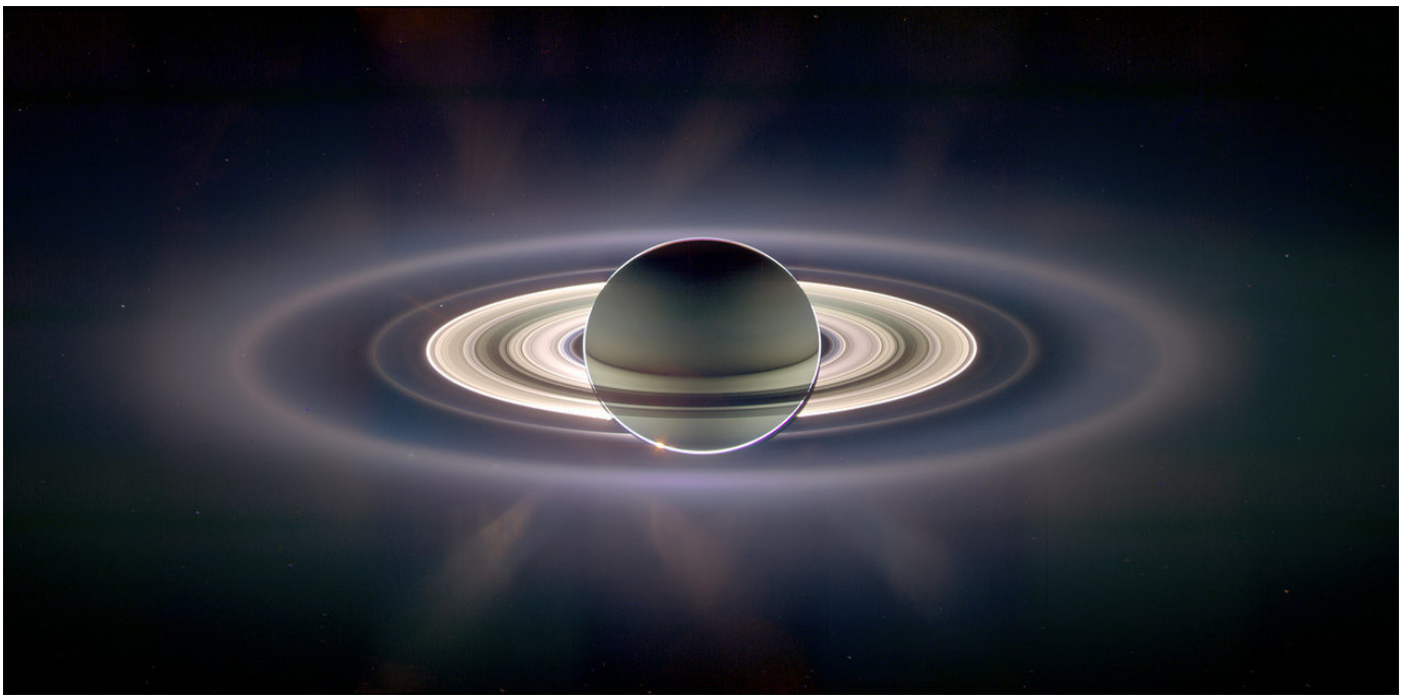
Learning Objective: Construct and communicate a model of our universe from small to large scales.

In this first part of the unit you will learn all about our sun, the eight planets (and Pluto), plus the myriad of other objects that make up the solar system.

There are four assessments for part A:

A1 - The Sun report
A2 - The Earth, Moon, and Sun system presentation
A3 - Planetary info cards
A4 - Solar system objects poster

The OpenStax Astronomy chapters 1, 4, and 7-15 will help you with your learning for part A.



Credit: NASA/JPL/Space Science Institute

The image above shows Saturn's rings backlit by the Sun. The colours in the photo have been exaggerated. Read more about this image: NASA Feature: Put a Ring On It

Part A Objectives:

1. Describe the features and characteristics of the Sun
2. Explain the relationship between the Earth, Moon, and Sun
3. Identify characteristic features of the planets
4. Describe the features of other solar system objects

For a full breakdown of learning objectives and to find the most relevant OpenStax Astronomy chapter see the Unit Objectives and Unit SoLs files respectively.