PLANETARY SCIENCE & ASTROBIOLOGY TEXTBOOKS

Unfortunately, there is no ideal book for this course, 400-level "Planetary Sciences & Astrobiology". I have highlighted some books that are potentially useful. Lissauer and De Pater (2013) can be considered a comprehensive reference book for the course, although we cover more detail on astrobiology topics. Hartmann's textbook is a very good description of concepts. My own little book is introductory but up-to-date science that can be read cover-to-cover in about 5 hours. The book by Eales is also short enough that you could easily read the whole thing. Scharf's book is excellent where we overlap on topics.

Upper-level (400-500 level, with physics, chemistry, and mathematical depth)

All books in this section contain large amounts of material beyond what can be taught in a quarter. We treat them as reference books and reading material.

1. *Fundamentals of Planetary Science* (2013)
by Jack Lissauer and Imke de Pater. Designed for use at the upper undergraduate level. Covers the material in the course and plenty more. Some parts are difficult for undergrads to follow when equations appear without derivation, requiring prior familiarity with physics. Nonetheless, I have suggested various section of it as recommended reading.

2. *Extrasolar Planets and Astrobiology (2009)* Caleb A. Scharf. This is a well-written book at the right level for this course. It covers several topics that we cover: Solar System formation, exoplanets, habitable zones and an overview of biology. The only reason we don't use this book is because it doesn't cover Solar System planets in any detail. But otherwise, it's excellent.

3. *Planets and Life: The Emerging Science of Astrobiology* (2007) Woody Sullivan, John Barross (Eds.). Aimed at grad students, some individual chapters are useful reading for this course.

4. *Planetary Sciences* (2nd Edition, 2010) by Imke de Pater and Jack Lissauer.
A comprehensive graduate (500-level) textbook.

5. *Physics and Chemistry of the Solar System* (2nd Edition, 2004) by John Lewis.
A comprehensive coverage and very insightful in places. But a lack of conciseness and an idiosyncratic organization make it difficult to follow for some students.

6. *Astrobiology: A Multi-Disciplinary Approach* (2003) by Jonathan Lunine
With a focus on astrobiology, it has more limited coverage of planetary chemistry, geology and atmospheres than needed for our planetary science course.

Mid-level (200-300 level, with chemistry and physics, some mathematics)

1. *Moons and Planets* (5th ed, 2005) William Hartmann.

A well-written book by an established planetary scientist. It's organized by physical topic and largely descriptive with a few boxes for mathematics, but these are fairly limited. If this book only had more mathematics, it might be our set text. It's pricey: ~$140 new on amazon, but used versions are ~$50. Required text in Don Brownlee's ASTR 321 "The Solar System".

2. *Planets and Planetary Systems* (2009) Stephen Eales.
This is a much shorter and more readable book than almost any of the others. It includes some mathematics, including calculus. The coverage is broad and terse.

3. *Planetary Science: The Science of Planets Around Stars* (2002) by G. Cole and M. M. Woolfson.
A format with 12 descriptive chapters (i.e., 200-level) followed by 42 topics concerned with physics (e.g. tidal heating, radiation, orbits). If the 42 topics are used, this book could be classed as an upper-level (400-level) text.

4. *Introduction to Planetary Science: The Geological Perspective* (2007) – Faure and Mensing. Mainly concerned with geology in conceptual terms of physics and chemistry. The mathematics in this book is occasional and very simple.

5. *Worlds Apart: A Textbook in Planetary Sciences* (1994) by Guy Consolmagno, Martha Schaefer.
Written by planetary scientists, this is a good intermediate textbook. It's now a bit dated, however. It also has somewhat limited math.

Low-level (descriptive with no/little mathematics). (100-200 level)

1. *Astrobiology: A Very Short Introduction* (2013) by David C. Catling.
By yours truly. Independent reviewers say that it's a lucid and up-to-date summary of astrobiology and habitability of planets. So, easy background reading for this course.

2. *Universe: The Solar System* (4th ed., 2011) Roger A. Freedman et al.
An excellent descriptive introductory text with minimal math and an accurate summary of the science. Has interesting "caution" boxes on common misconceptions.

3. *The Solar System* (6th ed, 2007) Michael Seeds
Lower level undergrad text with nice color illustrustrations and up-to-date. No math.

4. *The New Solar System* (1998) by J. Kelly Beatty et al.
With chapters written by planetary scientists in each field, this is a very reliable guide, though not up-to-date with the latest discoveries.

5. *Planetary Landscapes* (2nd Ed. 1994) Ron Greeley.
Focuses on planetary surfaces, as the title suggests. Now a little dated.

6. *An Introduction to the Solar System* (2004). Neil McBride, Ian Gilmour

Largely descriptive intro text with the excellent Open University teaching style.

7. *The Planetary System* (3rd Ed., 2002) David Morrison and Toby Owen.
Written by established planetary scientists. For non-science majors.

8. *The Solar System: The Cosmic Perspective* (6th ed., 2009) by Jeffrey Bennett, Megan Donahue, Nicholas Schneider, Mark Voit
For non-science majors, i.e., 101-level.