Introduction to Planetary Astronomy
Astr 105
Department of Physics at Lehigh University
Fall 2018

Instructor: Gary G. DeLeo

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Text: Introduction to Planetary Science, G. Faure and T. M. Mensing, Springer (2007)

General Course Requirements:

Requirements include: (i) reading assigned materials prior to class, (ii) attending all classes, (iii) completing all assignments on time, and (iv) seeing the instructor if you are having trouble.

Grading:

Your numerical grade will be determined *approximately* as follows:

Exam 1	35%
Exam 2	35%
Homework Problems	15%
Attendance	15%
TOTAL	**100%**

Primary Topics:

Celestial Motions and Celestial Dynamics
Sun, Stars, and Synthesis of the Elements
Condensation of the Solar Nebula and the Formation of Planetary Bodies
Meteorites, Meteoroids, Asteroids, and Comets: Solar System Debris
Earth's Moon
Mercury, Venus, Earth, and Mars: The Terrestrial Planets
Jupiter, Saturn, Uranus, and Neptune: The Jovian (Gas Giant) Planets
Satellites of the Outer Planets
Pluto, Kuiper-Belt Objects

Accommodations for Students with Disabilities:
If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, Williams Hall, Suite 301 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

The Principles of Our Equitable Community:
Lehigh University endorses The Principles of Our Equitable Community… [http://www.lehigh.edu/~inprv/initiatives/PrinciplesEquity_Sheet_v2_032212.pdf]. We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

Other Books on Planetary Astronomy and Related Subjects:

Universe: The Solar System, R. A. Friedman, R. M. Geller, and W. J. Kaufmann III, Freeman, 5th ed., 2014
The Planetary System, D. Morrison and T. Owen, Addison Wesley, 3nd ed., 2003
Planets and Planetary Systems, S. Eales, Wiley-Blackwell, 2009
An Introduction to the Solar System, ed. N. McBride and I. Gilmour, Open Univ., 2003
Worlds Apart, G. J. Consolmagno and M. W. Schaefer, Prentice Hall, 1994
Exploring the Planets, E. H. Christiansen and W. K. Hamblin, Prentice Hall, 2nd ed., 1995
The New Solar System, J. K. Beatty, C. C. Petersen, and A. Chaikin (Ed.), Cambridge, 4th ed., 1999
Planetary Landscapes, R. Greeley, Chapman and Hall, 2nd ed., 1994
Discovering the Solar System, B. W. Jones, Wiley, 2nd ed., 2007
Fundamental Planetary Sciences, J. J. Lissauer and I. de Pater, Cambridge, 2013
Planetary Sciences, I. de Pater and J. J. Lissauer, Cambridge, 2nd ed., 2010
Planetary Science, G. H. A. Cole and M. M. Woolfson, Institute of Physics Publishing, 2002
Encyclopedia of the Solar System, ed. L.-A. McFadden, T. Johnson, and P. Weissman, Academic Press, 2nd ed., 2007
Exploring Planetary Worlds, D. Morrison, Scientific American Library, 1993
Our Worlds, S. A. Stern (with other contributors), Cambridge, 1999
The Planetary Scientist's Companion, K. Lodders and B. Fegley, Jr., Oxford, 1998
The Cambridge Planetary Handbook, M. E. Bakich, Cambridge, 2000
The Planet Observer's Handbook, F. W. Price, Cambridge, 2nd ed., 2000
The Solar System, T. Encrenaz, J.-P. Bibring, and M. Blanc, Springer, 3rd ed., 2004
Physics and Chemistry of the Solar System, J. S. Lewis, Academic Press, 2nd ed., 2004
Worlds Without End, J. S. Lewis, Perseus Books, 1998
Solar System Evolution: A New Perspective, S. R. Taylor, Cambridge, 2nd ed., 2001
Satellites of the Outer Planets, D. A. Rothery, Oxford, 2nd ed., 1999
Rocks from Space, O. R. Norton, Mountain Press, 2nd ed., 1998
Meteorites, ed. B. Zanda and M. Rotaru, Cambridge, 2001
The Cambridge Encyclopedia of Meteorites, O. R. Norton, Cambridge, 2002
Asteroids: A History, C. Peebles, Smithsonian Institution Press, 2000
Astronomy: The Solar System and Beyond, M. A. Seeds, Brooks/Cole, 5th ed., 2006
The Solar System, J. A. Wood, Prentice Hall, 2nd ed., 2000
Planet Quest (Other Solar Systems), K. Croswell, new ed. edition, Oxford, 1999
Introducing the Planets and their Moons, P. Cattermole, Dunedin, 2014

There are many others, especially relating to specific planetary worlds such as the Moon and Mars. These will be referenced in class.

A Few Entry-Level Astronomy Books:

The Cosmic Perspective, J. O. Bennett, M. O. Donahue, N. Schneider, and M. Voit, Pearson, 8th ed., 2016
21st Century Astronomy, L. Kay, S. Palen, B. Smith, and G. Blumenthal, Norton, 4th ed., 2013
Foundations of Astronomy, M. A. Seeds and D. Backman, Cengage, 12th ed., 2012
Astronomy Today, E. Chaisson and S. McMillan, Pearson, 8th ed., 2013
Voyages Through the Universe, A. Fraknoi, D. Morrison, and S. Wolff, Brooks/Cole, 3rd ed., 2005

Final Competencies:

Familiarity with basic dimensions in physics and astronomy, and the telescope in the context of light-gathering power and resolution.

Understanding models that attempt to explain apparent celestial motions, and other observations, such as lunar and planetary phases. Celestial dynamics, including Kepler's Laws, Newton's Laws of Motion, and Gravitation. The orbital motions of planets and natural and artificial satellites.

Basics of light in the context of black-body radiation and spectra, and their applications in astronomy.

The synthesis of elements and the formation of the solar nebula and the solar system. The formation and classification of the sun and other stars. The basics of planet-forming materials (minerals and rocks, and volatiles).

Observations and the classification of meteorites, asteroids, and comets.

The formation of the moon, lunar features and geology, and the formation of those surface features. History of lunar exploration, including robotic and human expeditions.

Features of the terrestrial planets, including surface features and conditions on the surface, atmospheres, and how they are changing and/or have changed over time, and the processes that shaped them. Also, how we learned what we know based on Earth-based observations and robotic missions.

Atmospheric features of the Jovian planets and other planetary features. Also, how we learned what we know based on Earth-based observations and robotic missions.

The natural satellites of the Jovian planets, especially the Galilean satellites of Jupiter and the satellite, Titan, of Saturn.

What we learned about Pluto from the spacecraft, New Horizons.