

Online course W12
The Planets

Astronomy & Earth and Planetary Science
Summer session C (8 weeks)
Instructor: Burkhard Militzer

Week 1 **Our place in the Universe** (Chapter 1)

L1 Introduction; tour of the solar system;
 outstanding questions; why study other planets?

L2 The scale of the universe; powers of ten: Grapefruit Sun.

Discovering our solar system (Chapters 2 and 3)

L3 Observing the night sky and the moon; rotation

L4 Copernican revolution; What is science? A hypothesis?
 Uncertainty

Week 2 **Forces, motion, energy, gravity** (Chapter 4)

L5 Kepler's and Newton's laws, forces, energy

L6 Conservation laws, orbits, tides

Light, and seeing the solar system; formation of solar system (Ch 5-8)

L7 Properties of light; spectroscopy; Doppler effect and thermal
 emission

Week 3 **Terrestrial planets** (Chapter 9.1, 9.2, 9.3, 9.5)

L8 Birth of solar system, formation of planets, age of solar system

L9 Surfaces

L10 Interiors

Week 4 **Earth** (Chapter 9.6)

Midterm #1 (online)

G1 Guest lecture I: Roland Burgmann (EPS)
 “Earthquakes in Your Backyard”.

G2 Guest lecture II: Bruce Buffet (EPS)
 “‘What drives the Earth Dynamo”

Week 5 **Mars** (Chapter 9.4)

L11 Mars

Terrestrial Atmospheres (Chapter 10)

L12 Strata and heating

L13 Greenhouse effect and global warming

Week 6 **Jovian Planets** (Chapter 11)

L14 planets’ interior structure and evolution

L15 moons of giant planets

Small objects in the solar system (Chapter 12)

L16 Asteroids and Comets

L17 Pluto and Kuiper Belt

Week 7 **Extrasolar planets** (Chapter 13)

L18 exoplanets part I

L19 exoplanets part II

G3 Guest lecture III: Paul Kalas (Astronomy)
 “‘The first image of an extrasolar planet”

Week 8 **Sun and Big Bang** (Chapter 14)

L20 Our Sun and stellar evolution

L21 The big bang, fate of the solar system

Life in the solar system (Chapter 24)

L22 On Life I: DNA, origins, and the meaning of it.

L23 On Life II: Drake equation, SETI and interstellar travel

Final Exam (written exam, to be taken on campus or with one of the proctoring services that are available nation wide.)