3C37 Introductory Notes

The introductory lecture begins with a handout giving details of the lecturer, address, phone number etc, and a general introductory talk on the contents of the lecture course, the split between course work and exam, the philosophy behind the way the examination is structured etc. Also details of where to hand in course work and details of the course books etc.

- Course text - John S. Lewis "Physics and Chemistry of the Solar System" Academic Press ISBN 0124467423
- Useful background, though with no mathematical content - J.Kelly Beatty and Andrew Chalkin, editors, "The New Solar System" CUP. There was a 3rd edition in 1990 but I am not sure this is still in press. Borrow from the library.
- Of peripheral interest for parts of the course - Stuart Ross Taylor "Solar System Evolution" CUP 1992
- ditto, for the magnetospheres/solar wind parts of the course - Kivelson and Russell "Introduction to Space Physics" CUP 1995

Syllabus

- Origin of the Solar System and brief histories of the planets
- Age of the solar system
- Abundance of the elements and distribution in the solar system
- Distribution of bodies throughout the solar system
- The solar wind and the interplanetary medium
- Interaction of the solar wind with solar system bodies
- solar system bodies
- Tides and tidal dissipation: The Roche Limit
- Radioactive decay - heating and dating
- Determining the internal structure of bodies from satellite data
- Remote sensing of solar system body surfaces
- Origin of the earth-moon system
- Interiors of the terrestrial planets
- Atmospheres of the terrestrial planets
- The gas giants: chemical and physical make-up
- The gas giants: thermal balance and atmospheres
- Physics of ice, icy satellites and ring systems
- Comets and their significance: the Oort cloud and the Kuiper Belt
- Asteroids: their composition and distribution in time and space
- Meteors and meteorites

We **don't** do in detail the work covered by other UCL courses:

- Geology of planets (surface morphology, craters)
- Sun as a star (Physics and evolution of stars)
- Solar Physics in detail (though there is some overlap with Sun as the origin of the solar wind)

There is some overlap with courses "Physics of the Earth" and "Planetary Atmospheres"

We start the course by looking at a table of the basic parameters of solar system morphology, such as that in Beatty and Chaikin (pp289-291), or the tables that appear in Chapter III (General Description of the Solar System) in Lewis.

We note similarities and differences, and trends. Similarity of the inner planets in density and size (the "terrestrial planets"), and the different order of size anderent order of size and density of the outer planets. Pluto and Mercury both anomalous in several senses. Note generally planets and their satellites orbit and spin in the same direction and roughly the same plane. This plane is also more or less the equatorial plane of the sun. We discuss Bode's "Law" and what other rules about planetary size and distribution might be considered to be laws and what just general trends. We will come back to all of these points in more detail as we go through the course. Quick resume of Kepler's Laws and Newton's Laws (including his law of gravitation).