

# PHYD26

## *Planetary Geophysics*

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### **COURSE DESCRIPTION:**

This course investigates the physical processes occurring in planets and moons. Specific topics will vary but will be related to:

- evolution of terrestrial objects (e.g. planets, moons)
- planetary heat sources & thermal evolution (e.g. convection and its surface manifestations)
- effects of high temperature and pressure in planetary interiors (e.g., phase changes, stress-strain relationships)
- planetary structure and global shape (e.g. gravity, rotation, composition)
- regional effects on topography (e.g., lithospheric elasticity)

Research articles and a focus on numerical modelling studies will be used to illustrate recent advances in the field.

Prerequisite:

Knowledge of PDEs, vector calculus & Newtonian mechanics. No previous knowledge of Earth or planetary science required.

### **LECTURES:**

Fridays at 11am and 1pm in room MW262 (one hour each). Tutorials will be held most weeks and will be at 2pm Fridays in MW262.

### **ASSESSMENT:**

- A final exam worth 60% of the final mark.
- Four problem sets. Each problem set will be worth 5% of the final mark.
- A literature report (7 page limit) on a subject to be agreed upon with the instructor. This could be something as simple as a review of three (or more) papers on a common topic (e.g., analyses of elasticity of the Martian lithosphere).

10% of the final mark will come from this report.

- A twelve minute powerpoint presentation on the findings of the literature report followed by three minutes of questions (10%).

### **REFERENCES:**

There is no required text for the course. Readings will be from the current literature and review articles. However, if you are interested in relevant texts, some are listed below.

*Mantle Convection in the Earth and Planets* (Schubert, Turcotte & Olson, 2001).

*Geodynamics, 2nd or 3rd edition* (Turcotte & Schubert, 2001).

*Hydrodynamic and Hydromagnetic Stability* (Chandrasekhar, 1961).

*Physics of the Earth, 4th edition* (Stacey and Davis, 2008)

*Planetary Sciences* (De Pater & Lissauer, 2001)

### **LECTURE NOTES:**

In addition to the material delivered in class some material will be posted online.

### **OFFICE HOURS:**

Please arrange appointments by e-mail or phone.

Due dates and times will appear on the assignment handouts. Late assignments will be penalized by 20% per day (weekends included). Assignments must be handed in on the day they are due. Electronic submissions are not permitted unless authorized in advance.