

# GEO 446: Geophysics

## Fall, 2012

August 30, 2012

### **Grading policy**

1. Homework - 40%
2. Midterm -30%
3. Final presentation - 30%

### **Syllabus**

#### **Planetary physics**

Accretion and differentiation of planets, energetic of planet formation, structure of Earth's interior, thermal evolution of the Earth, physics of magma oceans.

#### **Geodynamics**

Heat transfer, continental and oceanic geotherms, mantle adiabats, thermal structure beneath subduction zones, heat and mass transfer by plumes, thermal convection, connection between convection and plate tectonics.

#### **Gravity**

Gravitational field due to a point mass and a sphere, moment of inertia, gravity anomalies, isostasy.

#### **Rock and mineral physics**

Creep of crystals, viscoelastic behavior of Earth materials, wave propagation through minerals, wave propagation in heterogeneous media.

#### **Seismology**

Mechanisms of Earthquakes, seismic reflection and refraction.

## Geomagnetism

Variations and reversals of the Earth's magnetic field, elements of dynamo theory.

## References

1. **Geodynamics, 2nd Ed. D.L. Turcotte and G. Schubert (2002), Cambridge University Press.**
2. Mantle Convection in the Earth and Planets (2001), G. Schubert, D. Turcotte, P. Olson, Cambridge University Press.
3. Solar System Dynamics (2005), C.D. Murray and S.F. Dermott, Cambridge University Press.
4. Introduction to the Physics of the Deep Interior of the Earth (2000), Jean-Paul Poirier, Cambridge University Press.
5. The Magnetic Field of the Earth (1998), R.T. Merrill, M.W. McElhinny, P.L. McFadden, Academic Press.
6. Introduction to Applied Geophysics (2006), H.R. Burger, A.F. Sheehan, C.H. Jones, W.W. Norton and Company.
7. Planetary Sciences (2001), I. de Pater and J.J. Liassauer, Cambridge University Press.
8. Physics of the Earth, 3rd Ed., F.D. Stacey, Brookfield Press.

## Absence policy

Regular attendance and participation in this class is the best way to grasp the concepts and principles being discussed. However, in the event that a class must be missed due to an illness, the policy in this class is as follows:

1. For every medically necessary absence from class (lecture, recitation, or lab), a reasonable effort should be made to notify the instructor in advance of the class. When returning to class, students must bring a note identifying the date of and reason for the absence, and acknowledging that the information in the note is accurate.
2. If a student is absent more than 3 time(s), the instructor may require documentation signed by a health care professional.
3. If a student is absent on days when tests are scheduled or papers are due [or other such events as specified in the syllabus] he or she is required to notify the instructor in advance, and upon returning to class, bring documentation of the illness, signed by a health care professional.

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.shc.umd.edu>.