EESB26

Introduction to Global Geophysics

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COURSE DESCRIPTION:

The course will explore topics such as the Earth's interior structure, magnetic field history, seismology, properties of the mantle and core, sources of internal energy and manifestations of the loss of that energy.

Specific topics will receive more or less attention as the course develops but will include:

- review of observations of the ocean floors

- a description of the current day magnetic field, paleomagnetism, past plate motion

- probing the Earth's interior with seismology, wave types and properties, earthquakes, the density of the interior, the temperature of the interior.

- Sources of heat, how the Earth cools and how the heat is replenished (to some degree).

- Mathematical models of the oceanfloor, its temperature, rate of heat loss and rate of subsidence.

The lecture material will be supported by the textbook The Solid Earth, by Mary Fowler. However, additional material will supplement the material from the text.

Prerequisite:

Completion of both parts of the first year physics program, calculus and a general positive attitude towards mathematical descriptions and investigation of Earth Science. Some previous knowledge of Earth Science is required but this is not a geology course and will not assume a great deal about geology background. However, if you have forgotten the age of the Earth you had better look it up!

LECTURES:

Tuesdays and Thursdays at 11am in room IC320 and IC120, respectively. Tutorials will be held at 2pm Tuesdays in IC120, except in Week 1. Students are

expected to attend all tutorials.

ASSESSMENT:

- A final exam worth 50% of the final mark.

- Four problem sets. Each problem set will be worth 5% of the final mark.

- A term test worth 20% of the final mark.

- A ten minute powerpoint presentation summarizing a research paper you will read after consultation with and approval by the instructor (10%).

REFERENCES:

Besides Fowler's book, the following are useful reading.

Fundamentals of Geophysics, 2nd edition (Lowrie)

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

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

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

LECTURE NOTES:

Notes will be available on line but some figures may be excluded due to copyright issues.

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.