

**EVOLUTION AND GEOLOGIC TIME**  
**01:460:305 (3 credits)**

**SAS Catalogue:**

Introduction to the concept of deep time and overview of major events in the evolution of life on earth. Evolutionary patterns and processes through the last 600 million years.

**Professor:**

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**Introduction:**

The overall objective of this course is to give students a sound understanding of the concept of Evolution as gained from the study of rocks—what we call the paleontological record. The course will demonstrate and illustrate how today's diversity is linked to biologic events that were initiated billions of years ago. It is designed to give an understanding (through demonstration) of the following:

- 1) the interconnectedness of all living organisms
- 2) the ancient origin of life
- 3) the rise of modern diversity
- 4) the role of mass extinctions in filtering clades and
- 5) that of radiations in determining the successful clades
- 6) the influence of organisms on their environment.

Importantly, evolutionary processes are placed in the context of deep time, plate tectonics, and the geochemical history of the earth, particularly of the early earth. Also, through this course, students will be made familiar with concepts such as adaptation, divergence, convergence and innovation, extinctions, and mass extinctions, concepts that are crucial to understand the environmental problems that societies faces today. Participation of students include 1) two guided visits to the American Museum of Natural History (New York) and the preparation of two scrolls.

## **Syllabus—Course 460-305**

- 1- The scientific Method: an introduction
- 2- Our own home planet today
- 3- Life on earth today
- 4- Discovering time
- 5- Measuring time
- 6- How did the solar system form?
- 7- Why volcanoes and mountains?
- 8- Life on a very young earth
- 9- the origin of life
- 10- The rise of oxygen and the evolution of the eukaryotic cell
- 11- The first animals
- 12- The Cambrian explosion
- 13- Four big steps in the diversification of vertebrates (part 1)
- 14- Four big steps in the diversification of of vertebrates (part 2)
- 15- The radiation of the amniotes (mammals)
- 16- The radiation of the amniotes (dinosaurs)
- 17- The origin of birds
- 18- Plesiosaurs, ichthyosaurs and whales: convergent evolution
- 19- Plant-insect co-evolution
- 20- Mass extinctions
- 21- The rise of humans
- 22- Visit to AMNH
- 23- Visit to AMNH
- 24- General discussion