

**University of Toronto at Scarborough  
Department of Physical and Environmental Sciences**

## **EES A06: Introduction to Planet Earth**

**Winter 2019**

**Professor Nick Eyles**

### **Structure of the course**

This course consists of 12 weekly lectures. It involves a mid-term and final exam (each worth 30%) and completion of 10 online modules involving self-assessment questions (40%).

### **Introduction**

Despite what it may appear at times in lectures, this is not a course about motorcycles but is an introductory geoscience course aimed at anyone in the sciences or humanities. If you do like motorcycles so much the better. As a geologist I do a lot of fieldwork in various parts of the globe and I often use two wheels instead of four. If you want to know more about me and what I do I have added a file to go with this course outline. For me life is a journey to see as much of the planet as possible; the idea behind this course is simply to share what I have learned, liked or disliked, with you all in the hope you will begin your own journey.

In this course, you will learn how our planet 'works' by virtual visits to countries in very different geologic settings and by meeting some of the peoples that live in dangerous areas affected by earthquakes, tsunamis and volcanic eruptions. We will examine how the planet formed and has evolved in the ancient past, how we determine the age of ancient rocks and events and the nature of changing paleoenvironments on the planet over its long 4.5 billion year history. The course will conclude with a brief review of the geologic history of Canada, the importance of natural resources to our economy, and some of the environmental problems facing our country and world. Simply put, if everyone rode a motorcycle we'd all be better off.

## **What is geology? Not just rocks**

The scientific study of planet Earth is the subject of the discipline called Geology sometimes called Earth Science or Geoscience. The science began as a distinct discipline and profession in Ancient Egypt (many geologic terms are thousands of years old) but became globally important in the early 19<sup>th</sup> century primarily concerned with finding mineral resources such as coal and metal ores for the Industrial Revolution. It subsequently became a pillar of 19<sup>th</sup> century science by demonstrating the great age of the Earth ('deep time'). This thinking underpinned Darwin's recognition that organisms have evolved through time.

The emphasis on finding scarce resources in a growing and increasingly urban world still continues. Geology is also concerned with exploring Earth history and the history of life on earth, and increasingly dealing with emerging environmental issues especially the impacts of climate change and urbanization and the study of scarce water resources. This is a field called 'Environmental Geoscience' which is the focus of a Specialist Undergraduate Program within the Department of Physical and Environmental Sciences (DPES) and a 12 month all-course M.Env.Sc program.

There is a shortage of suitably qualified environmental geoscientists in Canada. The profession requires well-trained individuals and offers many diverse opportunities for a career.

## **Course content summary**

Planet Earth formed about 4.56 billion (4,560,000,000; abbreviated to Giga annum or Ga) years ago by condensation and accretion of dust and planetary debris. The oldest rocks on Earth are dated at about 4.2 Ga suggesting that continents had already formed. The oldest bacterial life forms occur about 3.5 Ga and an oxygenated atmosphere developed. Life has evolved through time.

way in which planet Earth functions however and there is increasing recognition of so-called *vertical tectonics* involving giant mantle plumes of hot rock, and the outpouring of enormous volumes of magma (flood basalts, supervolcanoes etc.) when these plumes reach



5) The Atrium of the



**Enjoy the course  
wondrous planet that we are lucky to be alive on!**

Nick Eyles

January 2019