Term 2

ESSC2010 Solid Earth Dynamics
Have you ever wondered why and where earthquakes and volcanos happen? Do you want to learn how to tell the differences between fool’s and real gold in a rock? Are you interested in a geological adventure in Hong Kong’s GeoPark or a journey to the centre of the Earth (using earthquake waves)? You will get all these knowledge and experience in ESSC2010 Solid Earth Dynamics. This introductory course offers comprehensive and insightful surveys on fundamental phenomena, processes, and principles of the solid earth system under the scientific framework of plate tectonics.

ESSC3100 Structural Geology is an intermediate level ESSC course. It trains students to recognize different lithological units and their geometries in three dimensions (3D), and understand the related tectonic environment and formation mechanism. Class lectures introduce geological structural features in 3D manner, basic skills of map reading and interpretation. Field projects are real case study of local field observation and description, techniques of field data acquisition and analysis, sample collection, and geological map compilation.

ESSC3220 Atmospheric Chemistry is a study of the composition of the atmosphere, the sources and fates of gases and aerosols (or particulate matter, PM) in air, and changes induced by natural and anthropogenic processes. It has received great attention since many environmental issues such as ozone hole, greenhouse gases, and air pollution involve gases and aerosols. Atmospheric chemistry not only focuses on the photochemistry of the constituents of air, but also studies the formation of aerosols, dispersion of gases and aerosols, and biogeochemical cycles. It is a multidisciplinary study that helps students to better understand our environment through broad thinking.

ESSC3600 Ecosystems and Climate
Most of us are aware of how different life forms adapt to the environment and climate they live in. This course, however, focuses on the opposite question: do living organisms actively modify the world around them? Here you will learn the various interesting ways through which different life forms (mostly plants and microbes, a little bit on insects and marine animals) interact and shape their environment and climate, both physically and chemically. Simple mathematical and computer models will be used to illustrate the emerging interrelationships between life and climate. We will also ask important questions such as how we should better manage ecosystem resources to better mitigate climate change and pollution. This course will not only be crucial for students in the atmospheric and climate sciences, but also highly relevant for students in the biological and physical sciences who are interested in the basics of ecohydrology, biogeochemistry and ecosystem ecology.

ESSC4140 Seismology
Seismology covers two major topics: the physics of earthquake and how seismic waves propagate in the Earth. The latter is the best way to explore our planet interior, as we are limited to a shallow depth to directly sample the Earth. In-depth knowledge of wave propagation and inverse problem will be introduced. Earthquake physics is to
explore under what conditions earthquakes may occur, which are critical to mitigate earthquake hazard.

**ESSC4520 Numerical Methods and Modeling for Earth System Science**
Those interested in seeing how mathematical, computational and numerical modeling principles can be applied to addressing environmental, geophysical and climate problems, or those who ever wonder what "modeling" is all about, don't miss this course! Some background in basic programming or computation is preferred; you're encouraged to come to discuss with Dr. Andie Au-Yeung if you're concerned about your background.

**Summer Term**

**ESSC4160 Marine Geology and Geophysics**
More than 70% of the Earth’s surface is covered by ocean. The seafloor contains critical information to understand how our Earth evolves. To explore the seafloor and subsurface structure, specific techniques such as marine geophysical methods must be used. In this course fundamental knowledge of marine geophysics will be introduced in term of how to investigate marine geology so as to better understand the evolution of the Earth. This course will also include field trips to Zhoushan, Zhejiang in collaboration with Zhejiang University, complementing classroom lectures.

If you have any questions about any of ESSC courses, feel absolutely free to contact Prof. Amos Tai (amostai@cuhk.edu.hk).