

COURSE DETAIL

EARTH SCIENCE DYNAMICS, CYCLES, AND TIMESCALES

Country

Netherlands

Host Institution

Leiden University College

Program(s)

Leiden University College

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Earth & Space Sciences

UCEAP Course Number

103

UCEAP Course Suffix**UCEAP Official Title**

Earth Science Dynamics, Cycles, and Timescales

UCEAP Transcript Title

EARTH SCI DYNAMICS

UCEAP Quarter Units

4.50

UCEAP Semester Units

3.00

Course Description

This course aims to explore the theme of Earth processes and in particular to address the chemistry and physics based actors in System Earth. This course explores the principal components of System Earth: plate tectonic theory; rocks, water, and weathering; and time scales of System Earth. By going through a selection of calculated examples a deeper understanding of the processes involved is obtained. The course focuses first on the dynamics of planet Earth, the principal building blocks of the solid Earth, and introduces plate tectonic theory as the underlying paradigm; time scales and rates of processes are introduced. The second part of the course first studies carbonate dissolution and the role of atmospheric CO₂ on the pH of natural waters. In the next step the course introduces the anthropogenic factor: the chemical reactions that contribute to the formation of acid rain, and the course proceeds to quantify the effect of acid rain on natural waters. Thermodynamics gives us the tools to quantify chemical reactions. Weathering reactions of basement rock in the acidic environments forms clay minerals. The process of clay mineral formation in turn can be linked to the formation of mineral resources such as bauxite. The final leg of the course introduces isotope geochemistry and its role in quantifying Earth processes: radioactive decay as a tool to measure time and isotope fractionation as a tool to document temperature fluctuations, and thus climate change in the past.

Language(s) of Instruction

English

Host Institution Course Number

4503EES01

Host Institution Course Title

Earth Science Dynamics, Cycles, and Timescales

Host Institution Campus

Leiden University College, The Hague

Host Institution Faculty

Host Institution Degree

Host Institution Department

Earth, Energy & Sustainability

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