Exchange programme Vrije Universiteit Amsterdam

Vrije Universiteit Amsterdam - Exchange programme Vrije Universiteit Amsterdam - 2024-2025

Exchange

Vrije Universiteit Amsterdam offers many English-taught courses in a variety of subjects, ranging from arts & culture and social sciences, neurosciences and computer science, to economics and business administration.

The International Office is responsible for course approval and course registration for exchange students. For details about course registration, requirements, credits, semesters and so on, please visit the exchange programmes webpages.

Climate Science

Course Code	AB_1102
Credits	6
Period	P1
Course Level	300
Language Of Tuition	English
Faculty	Faculty of Science
Course Coordinator	dr. N.A.J. Schutgens
Examiner	dr. N.A.J. Schutgens
Teaching Staff	dr. A.G.C.A. Meesters, dr. N.A.J. Schutgens
Teaching method(s)	Lecture, Seminar

Course Objective

This course aims to provide students with an understanding of the basic physical processes that cause or influence climate change in the Earth's atmosphere and ocean.

After following this course you will be able to

- explain what causes current climate change (greenhouse effect)
- explain what is climate sensitivity and how we estimate it
- describe the main uncertainties in our current understanding of climate change
- describe the main circulation patterns in the atmosphere and ocean
- explain the basic physical processes that lead these circulation patterns.
- describe possible future scenarios for climate change
- discuss pros and cons of mitigation strategies

Course Content

The land, oceans and atmosphere form a coupled system that interact to produce climate and weather. This course focuses on the interactions between the land, atmosphere and the oceans and integrates knowledge from past, present and future climate.

The topics are:

- global warming due to greenhouse gases
- global cooling due to aerosol
- feedbacks due to albedo changes or changes in hydrological cycle, etc.
- concept of climate sensitivity
- major circulation patterns in atmosphere and ocean and their interactions
- distinction between climate and weather
- future warming scenarios (climate modelling)
- climate change mitigation strategies

Additional Information Teaching Methods

The course has a study value of 6 EC and has a study load of about 168 hours. The number of hours spent on the 12 lectures totals about 30 hours. The remainder of the time (138 hours) is taken up by three workshops with assignments and the rest available to the student to study the course documents. Presence at the lectures is not mandatory but strongly recommended. Students will be asked to prepare for each lecture by reading material that will be distributed through canvas. Presence at the workshops and submission of the assignments is mandatory. You will also be asked to give a short presentation on climate (change) for your fellow students.

Method of Assessment

Assessment of student performance will be through a written exam at the end of the course. This exam counts for 70% of your grade. The exam consist of open questions and a few calculations (bring your calculator!). Submission of the workshop assignments (mandatory!) account for another 15%. The short presentation also counts for 15%.

Entry Requirements

There are no required subjects prerequisite for this course but we assume that students are familiar with the physical, chemical and mathematical principles as taught in the first year courses ‘Inleiding geochemie (AB_450068), ‘Wiskunde voor Aardwetenschappen' (AB_450063) and ’Global Change' (450007) and the second year course 'Wis- en natuurkunde' (AB_450073).

Literature

We will use a book "Biogeochemical Cycles and Climate" by A.J. Dolman, 2019, Oxford Univ. Press. ISBN 978–0–19–877930–8 DOI: 10.1093/oso/9780198779308.001.0001. This book should be available online to students through the library.

Other reading material will consist of websites and pdfs shared through Canvas.

Additional Information Target Audience

3rd year BSc students Earth Science, Earth, Economics and Sustainability, Future Planet studies (UvA), or other upper level BSc students with a natural science background.

Recommended background knowledge

There are no required subjects prerequisite for this course but we assume that students are familiar with the physical, chemical and mathematical principles as taught in the first year courses ‘Inleiding geochemie (AB_450068), ‘Wiskunde voor Aardwetenschappen' (AB_450063) and ’Global Change' (450007) and the second year course 'Wis- en natuurkunde' (AB_450073).