



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](#).

Water Management in the Netherlands

Course Code	AB_450085
Credits	6
Period	P2
Course Level	300
Language Of Tuition	English
Faculty	Faculty of Science
Course Coordinator	dr. H. de Moel
Examiner	dr. H. de Moel
Teaching Staff	dr. M.P. Bokhorst, dr. H. de Moel
Teaching method(s)	Seminar, Written partial exam, Computer lab, Excursion

Course Objective

The Netherlands faces increasing sea-levels, more heavy rainfall events, and more frequent droughts. At the same time, our cities are expanding, and socioeconomic activities continue to concentrate in areas which are vulnerable to the effects of climate change. How did the Netherlands deal with these complex challenges in the past? And how do we find solutions for a climate-robust future?

The aim of this course is to gain insight into water management in the Netherlands and how climate change, land use changes, and population growth influence policies and practices. Special attention will be paid to the Delta Programme, which aims to protect the Netherlands against floods, ensure freshwater supplies, and to climate-proof the country's spatial planning. To better understand the water management practices, the course covers the key characteristics of the hydrological system in the Netherlands.

By the end of this course, the student is able to:

1. Describe key characteristics of the Dutch hydrological system, and explain which factors played a key role in the changes and development of the hydrological system.
2. Evaluate and explain the impact of climate change on the Dutch hydrological system.
3. Explain the main principles of the Dutch water management, and its key topics and issues, but also to critically reflect upon the chosen strategies.
4. Reproduce the different components of the Delta Programme, and critically reflect upon the rationale behind the adaptation strategies and the trade-offs between adaptation decisions.
5. Review the scientific literature in order to investigate a key issue related to water management in the Netherlands, and present the main finding in a poster presentation.

Course Content

De lectures provided by the (guest-)lecturers include the following content:

1. History of the Dutch landscape and water management practices in the last 2000 years
2. Drainage and groundwater systems, in connection with geology and land use.
3. The climate in the Netherlands and its influence on the hydrological systems
4. The effects of climate change in the Netherlands, including the impact on the climate extremes, the hydrological system, and implications for water management.
5. The history and current evolution of the Delta Programme
6. Flood safety: past, current and future coastal and riverine water safety management
7. Freshwater: past, current and future freshwater management
8. Spatial adaptation: Linking solutions for flood safety and freshwater to spatial planning.

The lectures start with providing the student with knowledge on the Dutch hydrological system, the processes important in the water system and which parameters play a key role. We will focus on the influence of climate change on the hydrological system and water management practices throughout the course. We will discuss water management practices in detail, focusing on the three main aspects of the Delta Programme: flood safety, freshwater, and spatial adaptation. We will discuss past and current bottlenecks as well as solution strategies. Several guest lectures will be provided by professionals from the water sector.

In addition to the lectures, there is an excursion day, during which we visit the Waterboard Rijnland. During this day, the students will learn about water management and hydrological aspects in practice. During the excursion day, we will stop at several points to highlight key aspects of the system.

The students will make a poster in A0 format (in groups of 2 or 3), addressing a topic related to water management in the Netherlands. The students will use scientific literature and reports as the basis for the poster, and will pay attention to the structure, layout, style, content, and presentation of the poster. After the posters are approved by the lecturers, the students will present them in a 5 minute pitch to their fellow students and to the lecturers.

Additional Information Teaching Methods

Teaching is provided in (hands-on) lectures by lecturers and guest-lecturers (~40 hours). The main content of the course is provided in the lectures, and therefore attendance is highly recommended. Literature is provided for self-study and preparation for the lectures (~95 hours). The excursion (~10 hours) and poster presentations (~30 hours) are mandatory components of the course.

Method of Assessment

Assessment is done through one exam at the end of the course (65%), and grading of the assignment that runs over the duration of the course, including a poster session at the end (35%).

Literature

1. Rijkswaterstaat (2019) Water management in the Nederland. 49 pages.
2. Delta programme (2015) Working on the delta – the decisions to keep the Netherlands safe and liveable.
3. Delta programme (2021) to be published in September 2021
4. Puijenbroek (2015) Evaluation of Water Framework Directive metrics to analyse trends in water quality in the Netherlands. Sustainability of Water Quality and Ecology 6,pp 40-47.
5. Dutch Water Authorities (2017) Water Governance – The Dutch Water Authority Model.
6. Jeuken et al. (2012) Balancing supply and demand of fresh water under increasing drought and salinization in the Netherlands. Report Knowledge for Climate.
7. De Vries, J.J. (2007). Groundwater, Geology of the Netherlands, Royal Netherlands Academy of Arts and Sciences, 295–315.
8. KNMI (2014): KNMI'14: Climate Change scenarios for the 21st Century – A Netherlands perspective; by van den Hurk et al., Scientific Report
9. WR2014-01,KNMI, De Bilt, The Netherlands. www.climatescenarios.nl

A more detailed reading list will be provided on Canvas

Additional Information Target Audience

Bachelor students: Aardwetenschappen, Aarde, Economie en Duurzaamheid, Future Planet Studies, Biologie, and Science, Business & Innovation