EXCHANGE STUDY PACKAGE
WATER ENGINEERING & MANAGEMENT

The exchange package "Water Engineering & Management" is divided into five different courses, where you have an option to choose 2 out of the 3 courses in the second half of the semester. During the first half of the semester you will pay attention to mathematical physics and different modelling approaches, techniques and applications. With this knowledge and these insights you are able to use models for specific problems and you will understand the relationship between physical process and water engineering and its mathematical description. In the second half of the semester you can choose between: River Dynamics, Integrated Water Management, and Hydraulic Engineering. In the course "River Dynamics" you will get insight in the characteristics an dynamic behaviour of rivers using physical-mathematical models. The course "Integrated Water Management" focuses partly on process management in the context of water-related issues and partly on urban water management. "Hydraulic engineering" focuses on the understanding and computation of the technical aspects of hydraulic structures, such as flood defences, locks or tunnels.

WHAT IS AN EXCHANGE STUDY PACKAGE?

Exchange Study Packages are balanced, coherent, well-structured, and self-contained sets of courses at a final Bachelor year academic level. Choosing one of these packages means you do not have to worry about selecting the right courses or managing your calendar to fit all of your classes. Simply apply for a package that suits your academic background and interest to be ensured of a well-balanced exchange programme, often consisting of 30 EC. These packages are generally accessible to students who have successfully completed the first two years of their Bachelor programme.

EXCHANGE STUDY PACKAGE

First half of semester

Mathematical Physics of Water Systems (7,5 EC)

This course deals with the aspects of mathematical physics that are commonly encountered in "Water Engineering and Management". It gives an introduction to differential problems, conservations laws, principles of mathematical physics (relaxation, growth, oscillations, advection, diffusion, wave phenomena), complex numbers, role of nonlinearities, classification of partial differential equations, numerical schemes using finite differences. The general objective is to understand the relationship between physical process and water engineering and its mathematical description using differential problems.

Tools for Water Policy Analysis (7,5 EC)

This course will address the broad theme of modelling development and use to support water policy making processes. The extent to which models can discern alternative measures form the philosophical starting point to the design of such tools. During the course different modelling approaches, techniques and applications will be explored. Practical examples are taken from river studies such as the Nile, Rhine and Meuse, with applications related to drought and flood risk. After finishing this course, you are able to select the appropriate models for specific problems and apply these in policy analysis studies.

Water is being depleted many, many times faster than nature can replenish it.

Second half of semester
Choose 2 of 3 options:

1.River Dynamics (7,5 EC)
This course consists of two parts: "Shallow water flows" (3 EC) & "Transport processes and morphology" (4,5 EC). In "Shallow Water Flows" steady and unsteady river flows are discussed with topics such as backwater curves, flood waves, tidal flows. Case studies from river management will be used to illustrated flow phenomena and the influence of human interventions. In "Transport Processes and Morphology" transport processes of dissolved substances and sediment, and erosion / sedimentation (morphological) processes are discussed, as occurring in rivers. It is aimed at understanding and modelling of spreading of suspended sediment, bed load of sand or gravel, erosion or sedimentation of the bottom (morphology). In both courses, insight is obtained in the characteristics and dynamic behaviour of the 1-d river system using physical-mathematical models. You will work with the practical software for 1-d river flows and morphology (SOBEK) which is applied to a particular morphological river problem.

2.Integrated Water Management (7,5 EC)
Integrated water resources management poses a complex goal: to manage water systems with respect to their quantity, quality, ecology, to satisfy the many functions for usage that may be conflicting. This course begins with an introduction of process management approaches where specific attention is given to multi-actor's processes and stakeholder participation. Part of the course is devoted to develop the project in which a process is to be designed for handling a concrete complex water management issue. Students organize in 'consultancy firms' invited by the lecturer as 'decision maker from a water board' to submit a proposal for moderating this process. The submitted proposals are presented to and defended for a 'commission of the water board' and discussed amongst groups. The second part of the course focuses on urban water management.

3.Hydraulic Engineering (7,5 EC)
Hydraulic engineering contains the knowledge on the design, construction and maintenance of works and systems that are designed in answer to community needs for infrastructure that has to deal with water in all kind of ways. During this course you get acquainted with various hydraulic constructions and you will gain knowledge of what the use of hydraulic constructions is. Using dikes, locks and dunes as examples, materials, failure mechanisms and calculation techniques will be introduced. Furthermore, the design and construction of several special structures will be introduced, such as tunnels, storm surge barriers and harbours. The focus of the course is on the understanding of computation of the technical aspects of flood defences.

Detailed Learning Goals of all the courses can be found in the Osiris Course Catalogue.

MORE INFORMATION
TUITION FEES
To be paid at home institution.

ADMISSION CRITERIA
Two years of Bachelor-level in Civil Engineering or equivalent.

STUDY LOAD
30 EC

START
Spring Semester

For more information about this Exchange Study Package, contact the Departmental Exchange Coordinator of the **Faculty of Engineering Technology**
utwente.nl/go/exchange-coordinators