

#### IMPORTANCE OF HYDROINFORMATICS

Hydroinformatics uses data processing, modelling, artificial intelligence, systems analysis, and information and communication technology to ensure better management of water-based systems in the view of global changes and climatic uncertainties. Main application areas are: flood risk and river basin management, urban water (e.g. in the context of “smart cities”), environment. New remote sensing products, sophisticated modelling tools, web-based platforms, GIS, optimization systems, are used at all levels of management and operations. Nowadays no project can be executed without these. There is a growing need for professionals and managers to work with these technologies and tools.

#### PROGRAMME WITH A DIFFERENCE

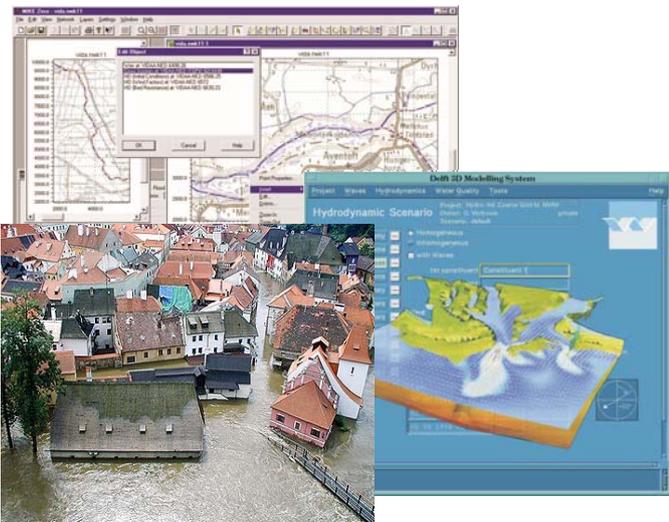
This MSc programme provides not only fundamental knowledge, but also training in application of modelling, IT, artificial intelligence, decision support tools, developing software, interaction with experts from various countries, possibilities to do MSc research with leading consultancies. This leads to the ability to solve real problems, and opens a range of future career opportunities. Participants often say that “the course opened up new horizons in my professional life”.

#### EMPLOYMENT OPPORTUNITIES

Hydroinformatics graduates are in high demand, and find jobs in various international consulting companies, river basin and urban water authorities, governmental agencies. They are valued for their problem-solving attitude, ability to apply sophisticated computer-based tools, to write useful computer codes, and for the good professional English. Due to the high level of this study, many graduates continue with PhD studies.

#### TUITION FEES AND FELLOWSHIPS

18-month MSc Programme tuition fee is €21,942 (please check the website [www.un-ihe.org](http://www.un-ihe.org)/tuition-fees for the latest information). Living costs are approx. €950 a month. On fellowships: [www.un-ihe.org](http://www.un-ihe.org)/fellowships.



#### WHO SHOULD APPLY

The course is designed for graduates in civil or environmental engineering or a related discipline, and water professionals (engineers and scientists), decision-makers and others involved in water management, particularly those who would like to learn how to develop, integrate and apply the modern computer-based techniques and tools for modelling, intelligent data analysis and decision making.

Fundamentals, hydraulic, hydrologic and environmental processes

Data systems, remote sensing, GIS, cloud computing, software engineering

Tools • ArcGIS • Matlab • Java  
• QGIS • Python • JavaScript, PHP

Physically-based  
simulation modelling

• SOBEK • MIKE 11  
• RIBASIM • HEC-HMS  
• Delft 3D • HEC-RAS  
• SWAT • MIKE 21  
• EPANET • MIKE SHE  
• MOUSE • MODFLOW  
• SWMM • WEAP

Artificial Intelligence  
and Data-driven  
modelling

• WEKA  
• NeuralMachine  
• Python SciKit-Learn

Systems analysis,  
control, optimization,  
decision support

• Python toolboxes  
• LINGO  
• GLOBE  
• mDSS4

with applications to:

- flood risk management
- urban water systems
- river basin management
- coastal systems
- groundwater
- environmental systems

Integration of technologies, elective advanced topics, transferrable skills

MSc research project

#### PROGRAMME STRUCTURE

The 18-months programme leads to the degree of Master of Science in Water Science and Engineering, with the specialization in Hydroinformatics. There is the 12-months taught part (including a fieldtrip to Florida), followed by the 6-months research project resulting in a thesis, when participants are working at IHE or other institutions in the Netherlands or abroad.

#### TOPICS OF SOME COMPLETED MSC STUDIES

- Application of machine learning techniques to flood forecasting in the upper reach of the Huai river, China
- Genetic algorithms in optimal management of storage areas for flood risk reduction using detailed spatial data: case study in Huai River, China
- Decision Support System for The European River Flood Occurrence and Total Risk Assessment System
- Optimal Reservoir Control, Dong Nai River Basin, Vietnam
- Flood Inundation Mapping Using Global Datasets: Wangchu Basin, Bhutan
- Modelling of water quality in Taihu Lake, China
- Uncertainty in modelling of water distribution networks for demand management and leakage control
- Web-based Decision Support System using WEAP Water Allocation Model for Coello Basin, Colombia
- E-Aid: Smartphone and Web Applications for Community-Based Disaster Management in Accra, Ghana
- Bridging the Gap between Communities and Responding Institutions During Flood Events
- Application of global datasets and data assimilation to a distributed hydrological model in the Canadian Sub-Arctic

#### ABOUT IHE DELFT INSTITUTE FOR WATER EDUCATION

Since its establishment in 1957, IHE Delft has been a world-leading post-graduate education and research institute, with highly qualified staff. More than 23000 professionals from more than 162 countries have been trained, and more than 130 PhD students graduated. It has strong links with the Dutch water sector, Delft University of Technology (TU Delft), Deltares, DHI, HR Wallingford and other institutions. IHE Delft provides a pleasant, multi-cultural atmosphere. English is spoken widely in the Netherlands, and Delft provides a unique opportunity for anyone who wants to enjoy the social and cultural attractions of Europe during excursions and study tours.