

Education and Training Guide 2014

MSc Programmes

PhD Programme

**Postgraduate Professional
Diploma Programme**

Online & Short Courses

Tailor-made Training



UNESCO-IHE
Institute for Water Education

Where the water world meets

A woman wearing a pink and green floral hijab and a grey sweater is smiling and gesturing with her hands over a table. On the table, there are several documents, including a yellow one and a green one with Arabic text. The background is blurred, showing other people in a meeting or conference setting.

UNESCO-IHE offers a wide range of flexible, high quality, specialized educational solutions to respond to the needs of diverse clients from the professional water arena.



FLEXIBILITY

UNESCO-IHE is making efforts to make water education more accessible and affordable for increasing numbers of students. One way the Institute achieves this is increasing the flexibility of educational programmes, by providing increasing numbers of online and short courses. It is possible to earn and collect ECTS credit points for both short and online courses. The ECTS points earned can be saved for up to four years, and add towards a full MSc programme.

In addition, many programmes are offered in collaboration with partner institutes. The resulting joint programmes decrease the amount of time that students have to spend away from their region, are cheaper, and gives them a broader international exposure.



RECTOR'S STATEMENT

The need for a more integrated approach to water and environmental resources management calls for professionals with a high degree of specialization, as well as generalists equipped to lead and manage multidisciplinary efforts, individuals and organizations in the water and environment sectors world-wide. UNESCO-IHE educates professionals to increase their expertise, while gaining insight into the international water arena – making contacts with fellow professionals from around the globe.

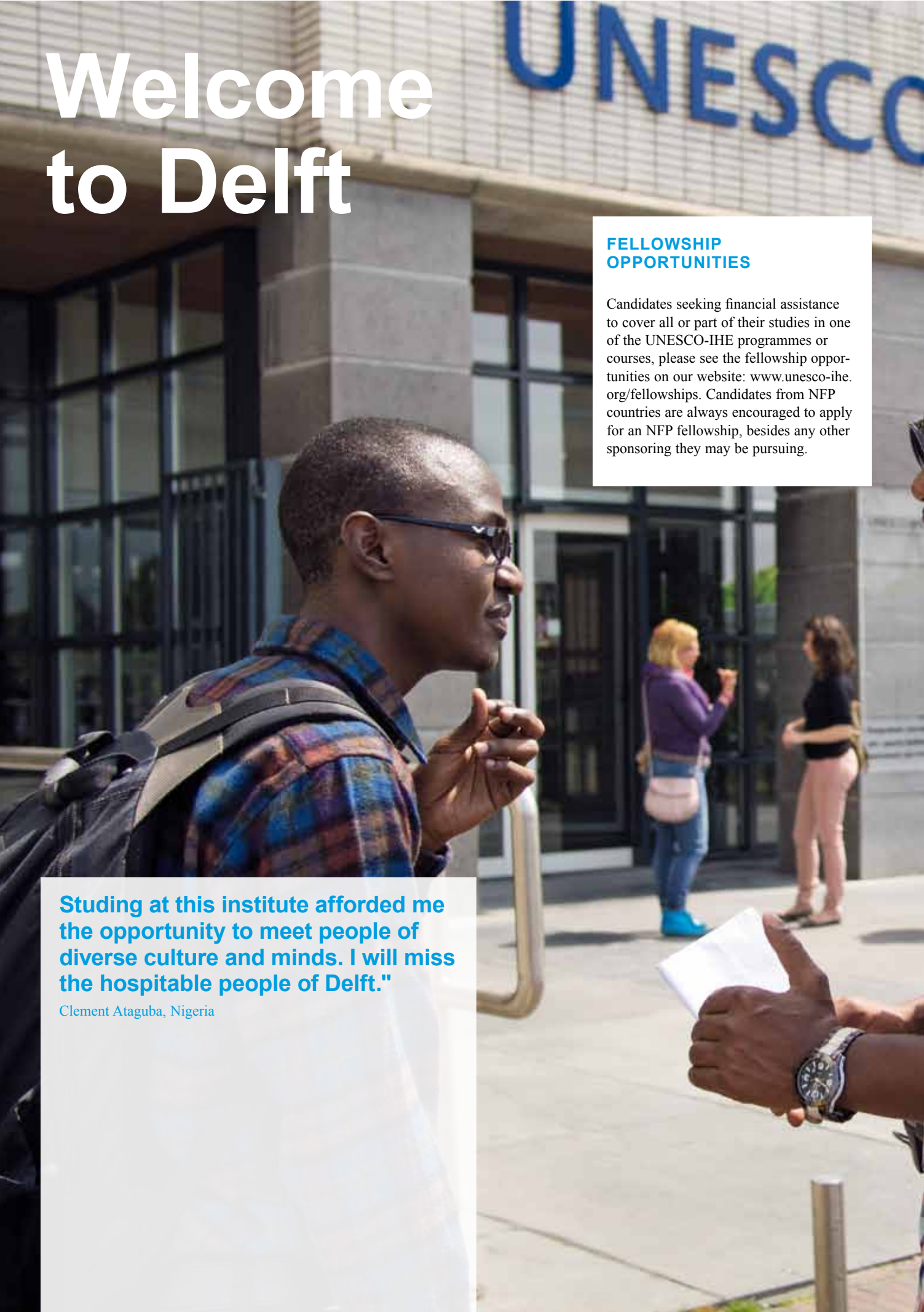
UNESCO-IHE is making efforts to make water education more accessible and affordable for increasing numbers of students, by making its education more flexible. The Institute has made significant investments in developing and conducting educational activities jointly with other academic institutes. Apart from the logistical benefits, a bonus of collaboration is that it allows for the capacity of water education to be further developed worldwide.

UNESCO-IHE trained professionals have access to and are part of a global partnership network, consisting of alumni, guest lecturers, experts and renowned centres of knowledge, together providing a vast source of expertise to draw upon. Since its establishment in 1957, the Institute has trained 14,500 scientists, engineers and decision-makers representing more than 160 countries. Alumni reach senior positions in their home countries and become nationally and internationally recognised experts in their fields of speciality.

I hope to welcome you as a member UNESCO-IHE's growing network of professionals,

Professor András Szöllösi-Nagy, Rector

Welcome to Delft

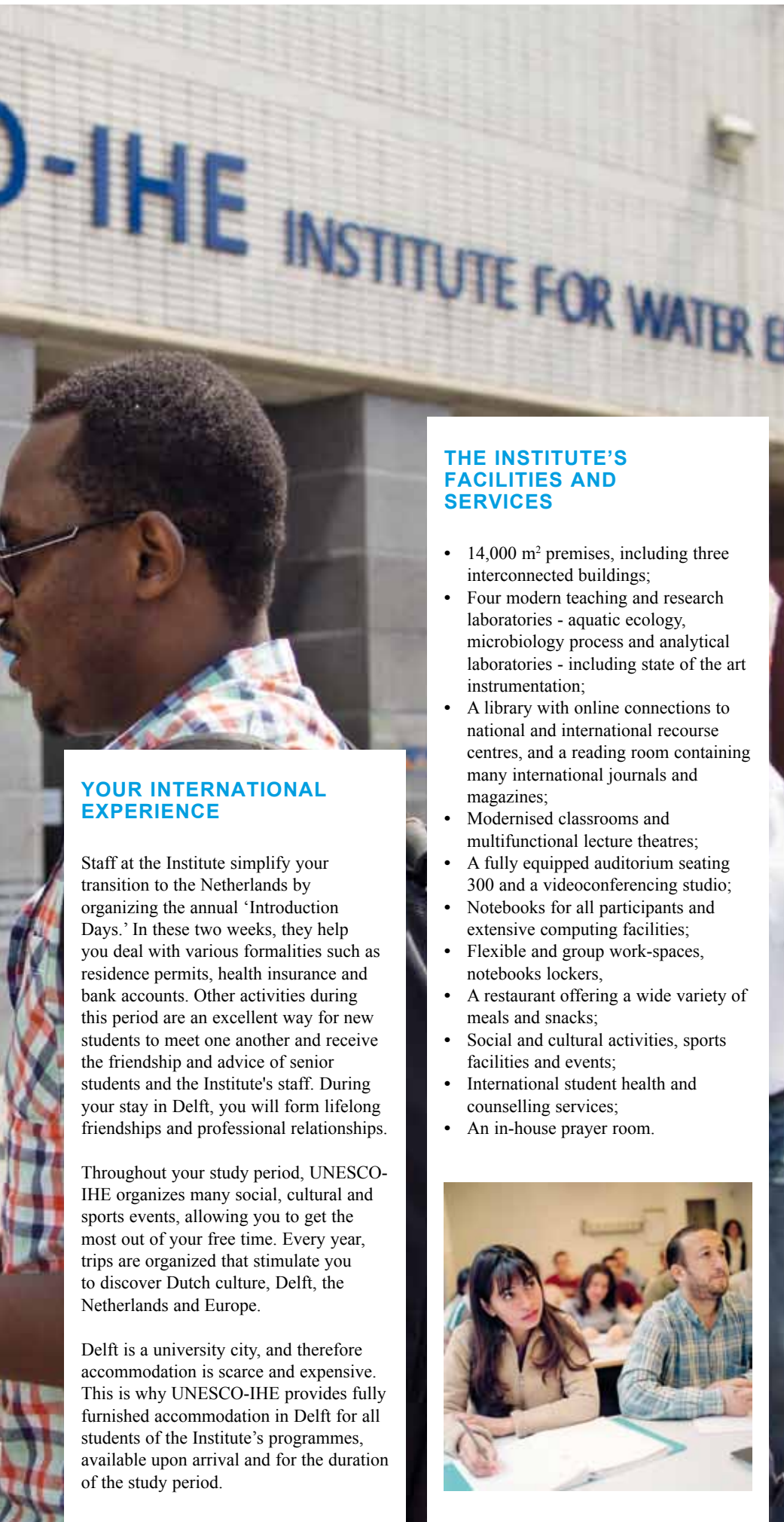
A man with a backpack and glasses is looking towards the UNESCO-IHE building in Delft. The building has large windows and the UNESCO logo is visible on the facade. Other people are walking in the background.

FELLOWSHIP OPPORTUNITIES

Candidates seeking financial assistance to cover all or part of their studies in one of the UNESCO-IHE programmes or courses, please see the fellowship opportunities on our website: www.unesco-ihe.org/fellowships. Candidates from NFP countries are always encouraged to apply for an NFP fellowship, besides any other sponsoring they may be pursuing.

Studying at this institute afforded me the opportunity to meet people of diverse culture and minds. I will miss the hospitable people of Delft."

Clement Ataguba, Nigeria



DELFT



Delft is a city of great charm, and UNESCO-IHE is located in its 17th century historical city centre. It has tree lined canals, beautifully kept monuments, historic squares - some with terraces, quaint shops and art galleries. It is also the city of the famous Delft Blue ceramics, the renown painter Vermeer, and has close historical ties to the Royal House of Orange.

Since Delft is a university city, there are plenty of cultural events to be enjoyed throughout the year, as well as museums and theaters. There is also an abundance of cafés and restaurants, catering to every taste and making time spent away from your studies an experience within itself.

Water has always played an important role in Delft's history and continues to do so today. Therefore, it is no surprise that many water engineering and technology related organizations have chosen Delft as their home base. UNESCO-IHE maintains close working relationships to various Delft-based research and education institutes, the Delfland Water Board, the municipality of Delft, and many Delft-based and Dutch water initiatives.

Delft is well connected to the Dutch public transport system, making The Hague, Rotterdam, Schiphol International Airport and Amsterdam easily accessible. It is a great location from which to explore other places of interest, both within the Netherlands and throughout Europe.

THE INSTITUTE'S FACILITIES AND SERVICES

- 14,000 m² premises, including three interconnected buildings;
- Four modern teaching and research laboratories - aquatic ecology, microbiology process and analytical laboratories - including state of the art instrumentation;
- A library with online connections to national and international recourse centres, and a reading room containing many international journals and magazines;
- Modernised classrooms and multifunctional lecture theatres;
- A fully equipped auditorium seating 300 and a videoconferencing studio;
- Notebooks for all participants and extensive computing facilities;
- Flexible and group work-spaces, notebooks lockers,
- A restaurant offering a wide variety of meals and snacks;
- Social and cultural activities, sports facilities and events;
- International student health and counselling services;
- An in-house prayer room.



YOUR INTERNATIONAL EXPERIENCE

Staff at the Institute simplify your transition to the Netherlands by organizing the annual 'Introduction Days.' In these two weeks, they help you deal with various formalities such as residence permits, health insurance and bank accounts. Other activities during this period are an excellent way for new students to meet one another and receive the friendship and advice of senior students and the Institute's staff. During your stay in Delft, you will form lifelong friendships and professional relationships.

Throughout your study period, UNESCO-IHE organizes many social, cultural and sports events, allowing you to get the most out of your free time. Every year, trips are organized that stimulate you to discover Dutch culture, Delft, the Netherlands and Europe.

Delft is a university city, and therefore accommodation is scarce and expensive. This is why UNESCO-IHE provides fully furnished accommodation in Delft for all students of the Institute's programmes, available upon arrival and for the duration of the study period.

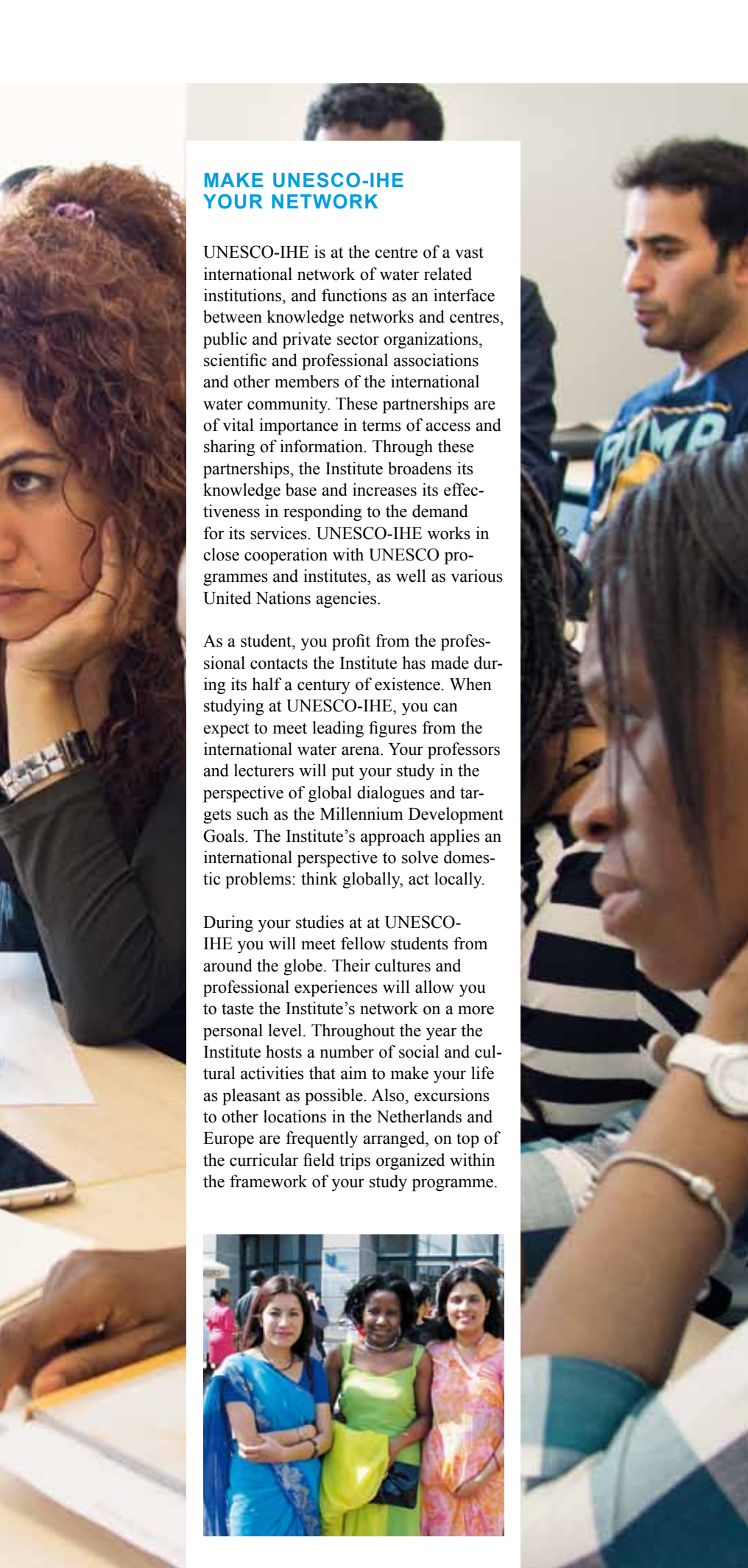
UNESCO-IHE a Network for Life



Certainly it is UNESCO-IHE that gave me the technical background to assume my new duties as Water Minister of my country. It was a great honour for me that the day I took my oath to be able to say that I am a UNESCO-IHE Alumnus! I will do my best to make IHE proud of me, and to use this position for the good of my people, especially those in need.”

Luis Angel Montenegro, Nicaragua

Today, several Ministers and Deputy Ministers, heads of international organizations, and top professors and scientists around the globe are UNESCO-IHE graduates.



MAKE UNESCO-IHE YOUR NETWORK

UNESCO-IHE is at the centre of a vast international network of water related institutions, and functions as an interface between knowledge networks and centres, public and private sector organizations, scientific and professional associations and other members of the international water community. These partnerships are of vital importance in terms of access and sharing of information. Through these partnerships, the Institute broadens its knowledge base and increases its effectiveness in responding to the demand for its services. UNESCO-IHE works in close cooperation with UNESCO programmes and institutes, as well as various United Nations agencies.

As a student, you profit from the professional contacts the Institute has made during its half a century of existence. When studying at UNESCO-IHE, you can expect to meet leading figures from the international water arena. Your professors and lecturers will put your study in the perspective of global dialogues and targets such as the Millennium Development Goals. The Institute's approach applies an international perspective to solve domestic problems: think globally, act locally.

During your studies at UNESCO-IHE you will meet fellow students from around the globe. Their cultures and professional experiences will allow you to taste the Institute's network on a more personal level. Throughout the year the Institute hosts a number of social and cultural activities that aim to make your life as pleasant as possible. Also, excursions to other locations in the Netherlands and Europe are frequently arranged, on top of the curricular field trips organized within the framework of your study programme.



UNESCO-IHE ALUMNI COMMUNITY

After graduation, as an alumnus, you have access to and remain part of the largest global partnership network of water professionals in the world. This network also consists of guest lecturers, experts and renowned centres of knowledge, together providing a vast source of expertise to draw upon. UNESCO-IHE will continue to facilitate the communication between you, your former classmates, and the Institute. You will have lasting access to the alumni website to – among others – update your data, look for colleagues worldwide, access the Institute-produced theses, and share information. Also, you will receive news about the Institute and the water sector on a regular basis through e-newsletters and the bi-annual UPDATE Magazine. Alumni are invited to join a Netherlands' Alumni Association in their country, independent associations where you can meet fellow alumni and enjoy social and professional activities.



With a UNESCO-IHE degree you will have made a major step in your professional career. Many alumni reach prominent positions in which strategic, managerial, policy and decision-making components become major responsibilities of their functions. You will - over time - wish to keep your skills and knowledge up-to-date, to stay in tune with changing professional demands. To cater to this need, the Institute's refresher seminars are held annually in different continents, covering themes of direct relevance to these regions. Also, alumni are entitled to discounts on the tuition fee for attending UNESCO-IHE short and online courses, and purchasing publications.

MSc Programmes

UNESCO-IHE offers four accredited International Master of Science programmes, with a total of 16 specializations. The MSc programmes are meant for professionals that want to deepen their expertise, and in the meantime wish to gain substantial insight into the global water agenda. Studying at UNESCO-IHE means making contacts with fellow professionals from around the world.



ERASMUS MUNDUS

For the latest and in-depth information on these programmes, including content and tuition fees please see our website:

www.unesco-ihe.org/master

MSc PROGRAMMES

In these programmes, a mix of modern knowledge transfer methods is used, including lectures, workshops, role-plays, video, internet, study tours, and field visits. Your professional vision will develop as you exchange knowledge in an international atmosphere, learning from best practices in various regions of the world. You are encouraged to develop an integrated approach in your work with the aim of achieving sustainable solutions, taking into account the multidisciplinary aspects of challenges you may encounter during your career. This means that the up-to-date knowledge you acquire during your studies will be directly applicable to solve current problems in your home countries. Special attention is paid to local conditions that will invariably influence your decision making process.

The Delft-based MSc specializations **Db** start in October and take 18 months, of which the first year consists of taught modules that are given at UNESCO-IHE in Delft. After successful completion of the taught modules, the student does individual research for a six-month period. The research deals with a practical or theoretical problem and may be carried out in collaboration with an organization outside the Netherlands, for example in the home country. Often, field data collection, laboratory or computer analysis work are part of the research. Research is always completed with a thesis and a public presentation of results.

The so-called joint programmes **J** are MSc specialisations developed with and offered in collaboration with renowned partner institutes. These joint programmes have varying start and end dates, and part of the programme is given at a partner institute, often in another country/continent. See the world map for an overview of partner institutes worldwide.



JOINT PROGRAMME PARTNERS

MSc PROGRAMME IN ENVIRONMENTAL SCIENCE

Environmental Planning and Management		Db
Environmental Science and Technology	J	Db
Environmental Technology and Engineering	J	Db
Environmental Technology for Sustainable Development	J	
Limnology and Wetland Management	J	
Water Quality Management		Db

MSc PROGRAMME IN URBAN WATER AND SANITATION

Sanitary Engineering	J	Db
Urban Water Engineering and Management	J	
Water Supply Engineering	J	Db

MSc PROGRAMME IN WATER MANAGEMENT

THEMATIC PROFILES	Db
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Water Conflict Management

Water Quality Management

Water Resources Management

Water Services Management

MSc PROGRAMME IN WATER SCIENCE AND ENGINEERING

Ecohydrology	J	Db
Flood Risk Management	J	Db
Hydraulic Engineering and River Basin Development		Db
Hydraulic Engineering - Coastal Engineering and Port Development	J	Db
Hydraulic Engineering - Land and Water Development	J	Db
Hydroinformatics - Modelling and Information Systems for Water Management	J	Db
Hydrology and Water Resources	J	Db

Joint programmes offered under the European Erasmus Mundus framework.

For extra information on these programmes, please see pages 14-23.

ACADEMIC QUALITY AND ACCREDITATION

UNESCO-IHE MSc degrees are legally accredited, and students awarded this degree are eligible for admission to PhD programmes all over the world. UNESCO-IHE uses the European Credit Transfer System, in which each credit point is equivalent to 28 study load hours. The Delft-based UNESCO-IHE specializations are 106 credit points in total.

The Institute's academic staff is composed of established international professors and lecturers. A pool of guest lecturers and partners from UNESCO-IHE's global network provide additional scientific expertise in the various areas of specialization and bring in case studies in which the theory is brought into practice.

PhD Programme

A woman with curly blonde hair, wearing a white lab coat, is holding a small, clear plastic test tube with a blue cap. She is looking at the test tube with a focused expression. In the background, other people in lab coats are working at computer monitors in a laboratory setting. The overall scene is brightly lit and professional.

The PhD Programme leads to a deepening of a field of specialization. PhD fellows do scientific research, often with conclusions that directly influence their region. At UNESCO-IHE, more than 135 PhD researchers from around the world are brought together to participate in problem-focused and solution-oriented research on development issues, resulting in an inspiring research environment.

PhD PROGRAMME

Conducting research at UNESCO-IHE is a unique experience. You work together with other researchers – including around 20 post-docs, 135 PhD fellows, and 200 MSc students from different countries – all dealing with topics related to water and the environment. This results in a vibrant, multicultural and multidisciplinary research atmosphere. You participate in problem oriented research with relevance for development, by joining an existing research programme or by defining your own research topic within UNESCO-IHE's strategic themes. As a PhD fellow at the Institute, you benefit from the possibility of linking MSc research to your own.

Through your research, you address the global water agenda, and solve problems relevant to the water and environment sectors world-wide, as a contribution to the Millennium Development Goals and other mandates from the international community. You will often do so in collaboration with the Institute's vast network of research institutions throughout the world.

PhD research is often carried out in the 'sandwich' model. Preparation and final reporting – the first and last portion of the programme – are carried out in Delft, while actual research is done in the fellow's home country, under co-supervision of a local institute. Regular contacts with the promotor are maintained through annual visits and long-distance communication. This enables researchers to employ solutions directly to problems in their geographical region.

UNESCO-IHE's PhD degrees are awarded jointly with a university. The degrees are highly valued and fully recognised in all parts of the world. The nominal time span of a PhD programme is four years.



UNESCO-IHE is a member of the Research School for Socio-Economic and Natural Sciences of the Environment (SENSE). This Dutch research school focuses on both the natural sciences and socio-economic fields of environmental research. SENSE is accredited by the Royal Netherlands Academy of Sciences (KNAW), and brings together excellent academic research groups from nine universities and research centres.

Research is conducted by the following academic departments and chair groups:

ENVIRONMENTAL ENGINEERING & WATER TECHNOLOGY

Pollution Prevention & Resource Recovery

Sanitary Engineering

Water Supply Engineering

INTEGRATED WATER SYSTEMS & GOVERNANCE

Hydroinformatics

Knowledge & Capacity Development

Water Governance

Water Management

WATER SCIENCE & ENGINEERING

Aquatic Ecosystems

Coastal Systems, Engineering & Port Development

Flood Resilience

Hydrology & Water Resources

Land & Water Development

River Basin Development

Online and Short Courses

A close-up photograph of two young people, likely students, sitting at a desk. The person on the right is a young woman with dark, curly hair, wearing a light grey t-shirt with 'MOUNT VERNO' printed on it. She is smiling broadly and looking at a smartphone held by the person on the left. The person on the left is a young man with dark hair, wearing a white shirt with blue stripes on the sleeve, looking down at the phone. In the background, another person wearing a bright pink shirt is partially visible, holding a pen. The overall atmosphere is collaborative and positive.

UNESCO-IHE is making efforts to make water education more accessible and affordable for increasing numbers of students. One way the Institute achieves this is increasing the flexibility of educational programmes, which includes providing increasing numbers of online and short courses.

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ONLINE COURSES

UNESCO-IHE offers high-quality online courses in some of the topics of high interest in the water sector. The innovative delivery format makes learning exciting, flexible, interactive and efficient. It allows participants to learn from different locations at their convenience and to immediately apply the newly acquired knowledge to their working environment. The online courses are beneficial to professionals working in public and private institutions, NGOs, and academic institutions, and are ideal for professionals with jobs and families, who want to upgrade their skills from the comfort of their home or office.

The online course's total study load is 140 hours, over the period in which the online course is given. A four month course thus takes around 8 hours of work per week. The guidance by lecturing staff during these online courses is intensive, and there are many opportunities to get feedback from and interact with fellow participants.

The Moodle based UNESCO-IHE eCampus is used to disseminate training material and for communication. It contains lecture notes and technological learning tools such as presentations, videos featuring case studies from various countries, interviews with experts, quizzes and audio material as well as a discussion area where both fellow participants and lecturers can meet each other. All courses run completely via eCampus, but course materials can be sent on CD as well. In some cases lectures and question-and-answer activities will be held through videoconferencing sessions.

For extra information on these online courses, including dates, please see page 24.

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SHORT COURSES

UNESCO-IHE conducts a wide range of short, intensive and highly specialized courses which are aimed at upgrading and refreshing the knowledge and skills of mid-career and senior experts. They are meant for professionals - or groups of professionals - with a specific area of interest, and a limited amount of time.

Short courses are from 1 to 3 weeks in length. The focus and content vary from specialized and technical matters to challenges and approaches in management. Didactical methods used in these short courses include lectures, individual or group exercises in the classroom, behind the computer, or in the laboratory. Fieldwork, excursions and field visits to relevant institutions often are a part of a short course, allowing the participants to come into contact with practical examples of the theory offered. Though case studies, role-play and workshops, content is made more interactive, and experience that the participants already have is shared.

For extra information on these short courses, including dates, please see page 25.



It is possible to earn European Credit Transfer System (ECTS) points for several online and short courses. For the latest information on earning ECTS points, including regulations and costs, please refer to our website (link below). The following discounts on the tuition fee of online and short courses are offered:

- 30%: UNESCO-IHE alumni
- 30%: UNESCO-IHE G-POWER partners
- 10%: UN family staff members
- 10%: groups of 5 or more (provided that the courses start at the same time and a group application has been sent)

Candidates from Netherlands Fellowship Programmes (NFP) countries are always encouraged to apply for an NFP fellowship for online and short courses.

See www.nuffic.nl for the eligible countries list, the procedure and the deadlines. Be informed that you need academic admission acceptance from UNESCO-IHE before you can apply for an NFP fellowship.



Tailor-made Training



UNESCO-IHE tailor-made training is designed for clients whose staff require tuition on specific topics or seek to develop a common knowledge base to address challenges ahead. The focus of the courses can be technical, managerial, strategic or operational, depending on the client's priorities.

TAILOR-MADE TRAINING

Tailor-made training caters directly to client needs. This means they can be organized for groups of various sizes, from one or multiple organizations, sectors or regions. They can be designed to upgrade knowledge and skills, introducing new technologies, or strengthen sector performance, to name but a few options. The trainings can vary in length and depth, ranging from a course lasting several days, to a tailored MSc programme in which regular components are mixed with case studies and modules requested by the client.

Tailor-made training can be delivered on-site or using UNESCO-IHE in Delft as a base, or a combination of the two. A mixture of training instruments are utilised in creating tailor-made trainings, including lectures, workshops, group work, presentations, role-plays, case studies and study tours to project sites throughout Europe or the region where the training takes place.

A few examples of tailor-made training are presented here. For more examples, please see the website (link below). If you request information on how UNESCO-IHE could be of service to your organization, please contact UNESCO-IHE's liaison office. Their contact information is also available from the website.

UNESCO-IHE introduces the new Postgraduate Professional Diploma Programme (PPDP) in Sanitation and Sanitary Engineering. The programme disseminates sanitation and sanitary engineering knowledge and know-how to professionals who do not have the means, time or interest to pursue an MSc degree in Sanitation and Sanitary Engineering, or who already have an MSc Degree in a related field and wish to specialize professionally.

Postgraduate Professional Diploma Programme

POSTGRADUATE PROFESSIONAL DIPLOMA PROGRAMME

The programme consists of a sequence of four or five online courses, regular short courses or a combination of both. The ECTS points vary from 3 to 6 per course. The minimum study load for obtaining a diploma is 20 ECTS, which equals a workload of 560 hours. The online courses can be followed part-time, without interrupting a day-time career. To ensure that the programme fits the personal circumstances of the applicant, courses will be selected and a personal study plan will be designed in collaboration with a study advisor. The total duration of the programme depends on this study plan and varies between 1.5 to a maximum of 4.5 years.

Participants select among three clusters of courses leading to three different tracks:

Sanitation Track (S)	Sanitary Engineering Track (SE)	All Round/Generalist Track (M)
14 ECTS from sanitation courses + 6 ECTS from any other course on the list.	14 ECTS from sanitary engineering courses + 6 ECTS from any other course on the list.	10 ECTS from sanitation courses + 10 ECTS from sanitary engineering course.

Online Courses offered by UNESCO-IHE as part of the PPDP (duration varies between 12 to 18 weeks)

	Track	ECTS
Ecological Sanitation	S	5
Solid Waste Management	S	5
Governance of Decentralised Sanitation	S	5
Sanitation-Related Urban Groundwater Pollution	S	4
Grey Water Management, Treatment and Use	S	3
Faecal Sludge Management	S	5
Problem Based Learning in Sanitation	S/SE	5
Biological Wastewater Treatment: Principles, Modelling and Design	SE	6
Industrial Resource Management and Cleaner Production	SE	5
Constructed Wetlands for Wastewater Treatment	SE	5
Industrial Effluent Treatment	SE	5
Modelling Sanitation Systems	SE	5
Urban Drainage and Sewerage	SE	5
Urban Water Systems	SE	5
Urban Flood Management & Disaster Risk Mitigation	SE	5
Experimental Methods in Wastewater Treatment	SE	5

Study Information Practical Information

-  Delft-based MSc specialization
-  Joint programme
-  Joint Erasmus Mundus programme

MSc PROGRAMME IN ENVIRONMENTAL SCIENCE

Provides professionals with the skills necessary to contribute, directly or indirectly, to the conservation and prudent use of natural resources for the benefit of society.

SPECIALIZATIONS

- Environmental Planning and Management
- Environmental Science and Technology
- Environmental Technology and Engineering
- Environmental Technology for Sustainable Development
- Limnology and Wetland Ecosystems
- Water Quality Management

The unsustainable management of natural resources hampers human development and exacerbates inequalities in wealth and welfare. Pollution, the depletion of natural resources and the disintegration of ecological functions are matters of local, regional and global concern. Economic development and rising living standards in the developing world contribute to the urgency of these important issues. It is not surprising, therefore, that the management of our precious water resources, environmental conservation, sustainable development and the alleviation of poverty are high on the agenda of global concerns.

It is now widely acknowledged that, to prevent the continued degradation of the environment and consequent damage to human society, interactions between man and the environment have to be sustainable. Sustainability depends on a delicate balance between use and conservation of our environmental resources. The challenge to sustainable development is to stimulate further expansion of living standards worldwide, while minimising and counteracting the negative impacts on the environment.

To find sustainable solutions and improve the quality of human life, we must first understand the processes that sustain natural systems, how these systems function and how they interact with one other and with human society. The Environmental Science programme equips professionals with the necessary capacities, by offering a systems approach, which investigates subsystems and their interactions at global, regional and local scale, without losing sight of the overall picture. The programme balances a thorough knowledge of the disciplines taught and the added value of bringing these disciplines together in one coherent programme.

Aim of the Programme

The aim of the Environmental Science programme is to provide professionals with the knowledge and skills necessary to contribute, directly or indirectly, to the conservation and prudent use of natural resources for the benefit of society. Successful students will develop the capacity to carry out independent scientific and technical research and assessments on environmental issues. They will also learn to analyse and assess environmental systems and problems; be able to propose sustainable solutions to environmental problems; and contribute to the development of policies and strategies for environmental planning.



SPECIALIZATION IN ENVIRONMENTAL PLANNING AND MANAGEMENT

You will be given the skills and know-how for strategic development, policy-making and decision-making for water quality management in urban and rural environments.

Prospective Students

The programme is intended for mid-career professionals with an interest in environmental sciences and in maintaining environmental integrity in relation to human development.

Learning Objectives

After successfully completing this specialization, graduates will be able to:

- Use scientific data and results as a basis for policymaking;
- Analyse the complex and dynamic interactions between humans and their environment;
- Understand the role of governmental policy (at municipal, provincial, national, regional and global levels) in order to achieve sustainable development;
- Apply professional techniques and procedures for environmental planning;
- Apply principles of environmental policymaking, environmental legislation and institutional arrangements;
- Contribute to the development of environmental policy plans at various levels (company, municipality, national and international).

Db

SPECIALIZATION IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY

You will be introduced to research and development leading to technologies that address environmental problems, and learn to interact with stakeholders, managers and policy makers for appropriate remedial actions.

Prospective Students

Environmental Science and Technology is intended for mid-career professionals with an interest in environmental sciences and in maintaining environmental integrity in relation to human development.

Learning Objectives

After successfully completing this specialization, graduates will be able to:

- Design, organize and conduct scientific environmental research, and contribute to the development of innovative technologies for solving environmental problems;
- Analyse dynamic interactions in complex human environment systems;
- Formulate data requirements and data collection strategies and design, and apply conceptual and computational models for a better understanding of these systems;
- Provide scientific advice for policy development and decision making.

Db **J** This specialization is also offered as a joint programme, given with Universidad Del Valle, Colombia. See our website for specific information on the partner, programme structure and admission procedure of this option.

SPECIALIZATION IN ENVIRONMENTAL TECHNOLOGY AND ENGINEERING

You will learn to apply and develop environmental technologies, with a strong focus on multidisciplinary and problem-based technology development.

Environmental Technology and Engineering offers a wide range of optional study fields in an international environment, and intensively promotes networking and exchange of knowledge and experience between different nationalities.

Prospective Students

Environmental Technology and Engineering is geared towards students that are interested in deepening their knowledge on the application of environmental technologies.

Learning Objectives

Successful graduates will be qualified for a professional career in:

- The private sector (environmental technological applications in different domains);
- Research sector (applied research at universities or research institutions, or in-company research);
- The public sector (consulting in local, regional and (inter)national administrations, defining and implementing environmental policy for sustainable development).

J  This specialization is a joint programme offered under the European Erasmus Mundus framework with Ghent University, Belgium, and Institute of Chemical Technology Prague, Czech Republic. See our website for information on the partners, programme structure and admission procedure.

SPECIALIZATIONS MSc PROGRAMME IN ENVIRONMENTAL SCIENCE

SPECIALIZATION IN ENVIRONMENTAL TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT

You will be introduced to research and development leading to technologies that address environmental problems, and learn to interact with stakeholders, managers and policy makers for appropriate remedial actions.

Prospective Students

This specialisation is intended for mid-career professionals in, for example, the fields of nature and environment, pollution prevention and control, public works, and sustainable development.

Learning Objectives

After successfully completing this specialization, graduates will be able to:

- Deal with environmental issues such as wastewater treatment and management, solid waste, air pollution and industrial and hazardous waste treatment and management;
- Find sustainable solutions for environmental issues without compromising economic development.
- Provide scientific advice for policy development and decision-making.

J This specialization is a joint programme offered with the Asian Institute of Technology. See our website for specific information on the partners, programme structure and admission procedure of this option.

SPECIALIZATION IN LIMNOLOGY AND WETLAND MANAGEMENT

You will learn about the structure and functioning of aquatic and wetland ecosystems for their management and wise use, and learn how to interact with stakeholders, managers and policy makers for the development of best practices.

Prospective Students

This specialization is intended for mid-career professionals with a background in biological or environmental sciences, and with a special interest in one of the following topics: aquatic ecology, limnology, wetland ecosystems, or aquatic resources management.

Learning Objectives

After successfully completing this specialization, graduates will be able to:

- Demonstrate and apply an understanding of the physical, chemical and biological structure and associated processes of inland aquatic ecosystems;
- Design sampling strategies for cost-effective effective monitoring of aquatic ecosystems, and to support clearly stated policy objectives;
- Understand the relationship between pressures from catchment land use, invasive species and fisheries exploitation, and the ecology of lakes, rivers and wetlands;
- Integrate potentially conflicting stakeholder objectives for the sustainable use of lakes, rivers and wetlands.

J This specialization is a joint programme given with BOKU: University of Natural Resources and Life Sciences, Austria, and Egerton University, Kenya. See our website for specific information on the partners, programme structure and admission procedure of this option.

SPECIALIZATION IN WATER QUALITY MANAGEMENT

You will be introduced to WQM in the catchment, urban and rural environments, and provided with the technical knowledge and management skills for decision-making and environmental planning.

Prospective Students

This specialization is intended for mid-career professionals in technical as well as management positions, with responsibilities or specific interests in water and environmental science and in maintaining environmental integrity in relation to human development.

Learning Objectives

After successfully completing this specialization, graduates will be able to:

- Identify the water quality impacts of human activities on aquatic ecosystems, as well as alternative remedial actions, under different levels of environmental stress and in different socio-economic contexts;
- Explain principles, concepts and instruments of the main national and international water and environmental laws, and common and desired institutional and management arrangements;
- Successfully interpret, design and optimize water quality monitoring and assessment schemes in the watershed, for example, by using statistical and modelling tools.
- Critically analyse and evaluate alternative water quality management programmes in the watershed under different socio-economic and legal contexts, in a flexible way and often under data-poor conditions;
- Conduct - either independently or in a multidisciplinary team - appropriate research in the field of water quality management, including the formulation of research questions and hypotheses, the selection and application of adequate research methodologies and techniques, and the formulation of well-founded conclusions and recommendations.

Db

MSc PROGRAMME IN URBAN WATER AND SANITATION

Educates professionals in the fields of water supply, sanitation and integrated urban engineering, particularly in urban areas.

SPECIALIZATIONS

Sanitary Engineering

Urban Water Engineering and Management

Water Supply Engineering

Recent decades have witnessed an increasing rate of urbanisation, particularly in developing regions and in countries in transition. About 80% of the world's mega-cities can be found in these regions. During the next two decades the world's population is expected to double. The high concentration of people in urban areas will place enormous pressure on the local environment and on available resources. It will also generate ever-higher, sometimes conflicting demands on services such as water supply and sanitation. At the same time, under decentralisation policies, the responsibility for delivering such services will be increasingly delegated to lower levels of government that are often ill equipped for this challenge in terms of financial and human resources.

Aim of the Programme

The MSc Programme in Urban Water and Sanitation educates professionals in the fields of water supply, sanitation and water engineering and management, particularly in urban areas.

Once they have successfully completed this programme, graduates can place their profession in the wider social, economic and environmental contexts of urbanisation and municipal water and infrastructure services provision. They will also be able to contribute to the development of innovative approaches to the provision of sustainable and equitable municipal water, sanitation, environmental and infrastructure services in developing and transition countries.

SPECIALIZATION IN SANITARY ENGINEERING

You will learn to deal with wastewater and sludge treatment process operation, maintenance and design, including urban drainage and sewerage, centralized and decentralized systems and land-based and engineered treatment plants.

Prospective Students

This specialization is designed for professionals interested in achieving and maintaining the environment and public health. It is particularly relevant to BSc-level engineers who are involved in (or wish to become involved in) the provision of sanitation services. Typical students include civil, process, chemical and sanitary engineers, being professionals from (wastewater) authorities, water and environment ministries, private companies, academia, NGOs and city and municipal authorities.

Learning Objectives

After successfully completing the Sanitary Engineering specialization, graduates will be able to:

- Understand and explain the role of sanitation in the urban water cycle and its relation to public health and environment;
- Develop rational approaches towards sustainable wastewater management via pollution prevention, appropriate treatment, and resource recovery and re-use at both centralised and decentralised levels;
- Understand the relevant physical,

chemical and biological processes and their mutual relationships within various sanitation components;

- Define and critically analyse, assess and evaluate various urban drainage and sewerage schemes, and wastewater, sludge and solid waste treatment process technologies;
- Analyse, synthesise, integrate, interpret, and discuss scientific and practical information in the context of preparing research and engineering projects including preparation of master plans, feasibility studies and preliminary designs;
- Apply modern tools for technology selection and to model sanitation components;
- Identify, develop and conduct independent research including field work, and laboratory research;
- Contribute to the development of innovative approaches to the provision of adequate and sustainable sanitation services in developing countries and countries in transition.

Db J This specialization can also be taken as a Double Degree programme. One of these is offered with Kwame Nkrumah University of Science and Technology, Ghana, the other with Universidad Del Valle, Colombia. See our website for specific information on the partner, programme structure and admission procedure of these options.

HYBRID MASTER SPECIALIZATION IN SANITATION AND SANITARY ENGINEERING

The Hybrid Master Specialization combines face-to-face and online mode of delivery and can be carried out in a part-time arrangement where the student can do part of the study in his or her home country. The hybrid specialization consists of a sequence of online courses (and/or modules offered by the regular Sanitary Engineering (SE) specialization in Delft or double degree SE specializations in Columbia and Thailand) and a thesis (research) part that is identical to the existing Delft-based SE specialization. Students enrolled in the hybrid masters have a choice to complete a thesis at UNESCO-IHE or at the premises of one of our partners (AIT Thailand, KNUST Ghana, and UNIVALLE Colombia). The total duration of the hybrid master depends on the individual study plan and varies between 1.5 to a maximum of 4 years.

More information: unesco-ihe.org/hybridmasc

SPECIALIZATIONS

MSc PROGRAMME IN

URBAN WATER AND SANITATION

SPECIALIZATION IN URBAN WATER ENGINEERING AND MANAGEMENT

You will learn to deliver both water and wastewater services within the context of the urban water cycle, covering both technical and management aspects.

Prospective Students

This specialization is intended for professionals from urban water and wastewater authorities, urban development ministries/authorities, water and environment ministries, private companies, academia, NGOs and city and municipal authorities dealing with or interested in water and sanitation services and managing the urban water cycle.

Learning Objectives

Graduates of the Urban Water Engineering and Management specialization will:

- Understand the urban water cycle and its water system components, their characteristics and functioning within greater urban infrastructure systems;
- Understand urban water management problems including ability to: identify water systems' demand; deal with climatic and hydrologic uncertainties and/or extremes; institutional limitations; and work within a data-constrained environment;
- Be able to make appropriate and critical use of methods, techniques and tools necessary to monitor, analyse and design urban water systems including water supply infrastructure, drinking water treatment and distribution, wastewater collection, treatment, transport and disposal systems and drainage systems;
- Understand water infrastructure/asset planning, financing and management, and utility management;
- Be familiar with the concept of integrated water resources management (IWRM) and its application to a variety of water management problems at the urban catchment scale.

J This specialization is a joint programme offered with the Asian Institute of Technology, Thailand. See our website for specific information on the partners, programme structure and admission procedure of this option.

SPECIALIZATION IN WATER SUPPLY ENGINEERING

You will learn to deal with technical aspects of drinking water treatment and distribution in an integrated way, paying attention to the choice of technologies and tools, ranging from low-cost to advanced options.

Prospective Students

This specialization is designed for mid-career engineers working in water supply companies, municipal assemblies, government ministries and consulting companies dealing with water collection, storage, treatment, transport and distribution.

Learning Objectives

After successfully completing the Water Supply Engineering specialization, graduates will be well equipped to understand:

- The structure of drinking water supply systems, including water transport, treatment and distribution;
- Water quality criteria and standards, and their relation to public health, environment and urban water cycle;
- Physical, chemical and biological phenomena, and their mutual relationships, occurring within water supply systems;
- Water quality concepts and their effect on treatment process selection;
- The interaction of water quality and the materials being used;
- Hydraulic concepts and their relationship to water transport in treatment plants, pipelines and distribution networks;
- The importance and methods of operation and maintenance of water supply systems;
- Options for centralised and urban systems versus decentralised and rural systems;
- Water supply engineering within a watershed context;
- Define and evaluate project alternatives on basis of chosen selection criteria;
- Design and rehabilitate raw water abstraction, transport, treatment and distribution processes and systems;
- Use statistical and modelling tools for simulation, prediction of performance and operation of water supply system components.

Db J This specialization can also be taken as a Double Degree programme. One of these is offered with Kwame Nkrumah University of Science and Technology, Ghana, the other with Universidad Del Valle, Colombia. See our website for specific information on the partner, programme structure and admission procedure of these options.

MSc PROGRAMME IN WATER MANAGEMENT

Imparts knowledge and skills needed to develop, implement and critically evaluate water management policies and strategies in order to foster inclusive and sustainable use of water and achieve effective governance of water systems.

THEMATIC PROFILES

Water Conflict Management

Water Quality Management

Water Resources Management

Water Services Management

Many regions of the world are increasingly facing challenges when it comes to managing water, and the nature of these challenges differs from one location to the next. It may relate to having too little water while water demands are growing (water scarcity), too much water (flooding), and water of poor quality rendering it unfit to sustain aquatic ecosystems and/or containing the provision of water to people, industry and agriculture. Addressing these challenges requires that water managers apply an integrated and interdisciplinary approach, involving hydrological, biophysical, chemical, social, economic, institutional, legal, policymaking and planning aspects. The MSc Programme in Water Management provides such an integrated and interdisciplinary approach. This innovative programme brings together the scientific study of water management with training in professional skills tailored to the needs of the students. Throughout the programme students are encouraged to study water management from a multi-disciplinary perspective and to seek integrated solutions.

The MSc programme in Water Management starts with a foundation phase, in which students are familiarized with the interdisciplinary character of the water management domain. This common part of the programme includes subjects on integrated approaches in water management, key biophysical, chemical and hydrological processes, water governance and water economics. After the foundation phase the students compose a personal

portfolio that reflects their educational and professional background as well as career ambitions. As part of the portfolio students will determine their personal study profile for the remaining part of the programme, with guidance by a dedicated mentor and, if applicable, in consultation with their employer. The study profiles can be fully tailor-made based on a broad range of available courses or follow one of the thematic profiles. The thematic profiles include profiles that focus on water resources management, water quality management, water services management and water conflict management (see below for details). The programme culminates in a six months MSc research and thesis writing phase in line with the selected study profile.

Once they have successfully completed this programme, graduates will be able to:

- Describe and predict for a given water resources system the main hydrological, hydraulic, chemical and ecological processes and how these processes are dynamically linked with human activities, including land use and water service provision.
- Critically evaluate technical and institutional water system interventions (e.g. projects, programmes, policies, agreements) through analysis of implications for the water system, its users and their interrelations at various spatial and temporal scales.
- Conduct, independently or in a multidisciplinary team, academic research and clearly and systematically describe the rationale for an integrated and interdisciplinary approach for managing water systems.

THEMATIC PROFILE ON WATER CONFLICT MANAGEMENT

You will study the management of water resources conflicts focusing on negotiation, mediation and decision-making processes in order to prevent, manage and resolve water conflicts and stimulate collaboration at various spatial levels.

Prospective Students

The thematic profile is designed for water managers as well as for institutional, legal and international relations experts and (social) geographers interested in local, national and international water management. Graduates typically are employed by river basin organizations, public and private water utilities, municipalities, ministries, international organizations, law firms, NGOs and academia.

Learning Objectives

After completing the water conflict management thematic profile, graduates will be able to:

- Describe for a given water resources system the interplay between the main biophysical processes and social dynamics, in analyzing, anticipating, preventing and managing conflicts.
- Describe and explain the main concepts and instruments for analysing and influencing formal and informal arrangements over water for collaboration, including policies, laws and institutions, and by adopting a historical perspective.
- Explain the key concepts for integrated, multidisciplinary and interdisciplinary analyses of water systems and describe the challenges of such approaches at sector, intersectoral and transboundary levels.
- Name and critically discuss theories, concepts and tools of conflict management and cooperation building techniques in the context of natural resources and water in particular.

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THEMATIC PROFILES MSc PROGRAMME IN WATER MANAGEMENT

THEMATIC PROFILE ON WATER QUALITY MANAGEMENT

You will study the water quality impacts of human activities on aquatic ecosystems, as well as possible remedial actions, considering different levels of environmental stress and in various socio-economic contexts.

Prospective Students

The thematic profile is designed for engineers and natural scientists responsible for or involved in planning, developing and implementation of water quality policies, strategies and programmes. Affinity with chemistry and biology is required for this thematic profile. Graduates typically are employed by river basin organizations, ministries, consultancy firms, NGOs and academia.

Learning Objectives

After completing the water quality management thematic profile, graduates will be able to:

- Describe, model and predict for a given water resources system the main hydrological, hydraulic, chemical and biological processes and how these processes are dynamically linked with aquatic ecosystems as well as with human activities such as land and water use and pollution.
- Describe and explain the main concepts and instruments for analysing and influencing formal and informal arrangements for water quality management, including policies, laws and institutions, and by adopting a historical perspective.
- Explain the key concepts for integrated, multidisciplinary and interdisciplinary analyses of aquatic ecosystems and describe the challenges of such approaches.
- Describe concepts to determine the value of water for various uses and users in (amongst others) economic and ecological terms and explain how these concepts can be used in water resources planning at various spatial and temporal scales.

Db

THEMATIC PROFILE ON WATER RESOURCES MANAGEMENT

You will study water availability in connection to water use, and seek to develop alternative land use and water allocation policies, including legal and institutional arrangements from the local watershed to the basin scale and beyond.

Prospective Students

This profile is designed for engineers, natural scientists and managers responsible for planning, developing and implementing water resources projects and programmes. Affinity with quantitative methods, such as statistical analysis, is required for this thematic profile. Graduates typically are employed by river basin organizations, ministries, consultancy firms, NGOs and academia.

Learning Objectives

After completing the water resources management thematic profile, graduates will be able to:

- Describe, model and predict for a given water resources system the main hydrological, hydraulic, chemical and ecological processes and how these processes are dynamically linked with human activities, including land and water use.
- Describe and explain the main concepts and instruments for analysing and influencing formal and informal arrangements over water, including policies, laws and institutions, and by adopting a historical perspective.
- Explain the key concepts for integrated, multidisciplinary and interdisciplinary analyses of water systems and describe the challenges of such approaches.
- Describe different concepts to determine the value of water for various uses and users in (amongst others) economic and social terms and explain how these concepts can be used in water resources planning at various spatial and temporal scales.

Db

THEMATIC PROFILE ON WATER SERVICES MANAGEMENT

You will study the provision of water and sanitation services as well as the management of related infrastructure and critically review institutional and financial instruments and business models considering different socio-economic contexts.

Prospective Students

The thematic profile is designed for broad range of professionals from various academic backgrounds active in the water services sector and involved in the planning, developing and managing of water supply and/or sanitation policies, strategies and programmes. Graduates typically are employed by public and private water utilities, municipalities, consultancy firms, NGOs and academia.

Learning Objectives

After completing the water services management thematic profile, graduates will be able to:

- Describe for a given water resources system the interplay between the main biophysical processes and social dynamics, in analyzing service delivery modalities.
- Describe and explain the main concepts and instruments for analysing and influencing formal and informal arrangements concerning water supply and sanitation services, including policies, laws and institutions, and by adopting a historical perspective.
- Explain the key concepts for integrated, multidisciplinary and interdisciplinary analyses of water services management and describe challenges of providing water supply and sanitation services at different levels (from global to local).
- Summarize the current debates relevant for water supply and sanitation services, using institutional and management theories from different academic disciplines (e.g. economics, public administration, sociology, political science, law).

Db

MSc PROGRAMME IN WATER SCIENCE AND ENGINEERING

Focuses on the understanding, management and development of water resources and water flows and quality in the natural and human-influenced environment, while addressing the multidisciplinary character of human activities dealing with water.

SPECIALIZATIONS

Ecohydrology

Flood Risk Management

Hydraulic Engineering and River Basin Development

Hydraulic Engineering - Coastal Engineering and Port Development

Hydraulic Engineering - Land and Water Development

Hydroinformatics - Modelling and Information Systems for Water Management

Hydrology and Water Resources

The specializations within this programme explore natural and anthropogenic influences on the water cycle, from the perspectives of civil engineering, technology and earth system sciences. They are of direct relevance to sustainable development because they prepare graduates to improve the sustainable management of human impacts on water resources, design simulation models for various phases of the water cycle, and contribute to the development of integrated solutions for reducing the impact of water-related natural hazards and other water issues.

Aim of the Programme

The programme aims to deepen the knowledge, insights and skills for Hydraulic Engineering (part of Civil Engineering and covering the disciplines River Basin Development, Land and Water Development and Coastal Engineering and Port Development), Hydroinformatics (a technology oriented discipline) and Hydrology (an earth system science). These different fields are complementary and ensure exposure of the student to a large variety of water issues from different perspectives, and the ability to develop sustainable solutions for complex water problems. Graduates are able to work in professional

water sector environments that require academic skills. Graduates who obtain very good study results are eligible to undertake a PhD in an appropriate water science or engineering field.

In particular, this programme provides the education to:

- improve the management of water resources through assessing and monitoring their condition and vulnerability to hazards;
- sustain economic development by better flood and drought protection, risk management and hazard reduction, in an era of global climate change;
- improve environmental and public health through pollution prevention;
- sustain and improve water supply, power generation and agriculture through integrated water resources management;
- improve food production by developing, operating, maintaining and optimising water-related infrastructure;
- sustain economic growth through the development of coastal and riparian zones; and
- manage and control water systems in an integrated and sustainable way, with stakeholders, through the development of technologies to simulate such systems.

SPECIALIZATION IN ECOHYDROLOGY

You will be provided with knowledge and understanding of the hydrological and ecological processes that together support the resilience of aquatic ecosystems, and how these processes can be harmonized with engineering infrastructures to sustain aquatic ecosystems and minimise environmental degradation.

Prospective Students

This Joint Erasmus Mundus programme is for students who aim to have a broad vision of the processes occurring in the river basin and in the coastal regions, and who use advanced tools such as numerical models, decision support systems and geo-processing and analysis tools. This programme is open to students with a BSc in biology, ecology, geosciences, environmental sciences, limnology, oceanography, marine sciences, civil engineering or related subjects.

Learning Objectives

Graduates of this Joint Erasmus Mundus programme will be equipped with the scientific knowledge to understand the different spatial and temporal scales (from catchment to molecular levels and from paleo to present conditions) acting on aquatic ecosystems and their effects on freshwater and marine ecosystem dynamics and resilience. They will have learnt to:

- Develop a holistic perspective of aquatic ecosystem functioning to support the design and implementation of creative solutions, based on the use of natural ecosystem functions and processes in freshwater and coastal areas;
- Be able to develop the research and applications required to support and implement conservation and adaptation measures for the sustainable management of aquatic environments;
- Use advanced tools in the planning, conceptualisation and design phases of ecohydrologic projects;
- Develop decision support systems for community policy;
- Become able to create an interface between researchers, stakeholders and decision makers.



This specialization is a joint programme offered under the European Erasmus Mundus framework with University of Algarve, Portugal; University of Kiel, Germany; University of La Plata, Argentina, and University of Lodz, Poland. See our website for information on the partners, programme structure and admission procedure.

SPECIALIZATIONS

MSc PROGRAMME IN WATER SCIENCE AND ENGINEERING

SPECIALIZATION IN FLOOD RISK MANAGEMENT

You will develop scientific and engineering knowledge needed to reduce the human and socio-economic losses caused by flooding while at the same time taking into account the social, economic, and ecological benefits from floods and the use of flood plains or coastal zones.

Prospective Students

This Joint Erasmus Mundus programme is open to students with a BSc, preferably in civil or environmental engineering, but otherwise in geosciences, environmental sciences, limnology, oceanography, geography, geology or natural resources.

Learning Objectives

Successful students of the Joint Erasmus Mundus programme in Flood Risk Management will have:

- A broad and cross-boundary scientific knowledge on flood risk management;
- A comprehensive knowledge base and understanding of the current theory and practice relating to flooding and flood management;
- The fundamental knowledge leading to the understanding of socio-economic issue related to flooding;
- A broad scientific knowledge about conservation, restoration and management measures to overcome challenges imposed on water by humans and by climate change;
- An extended knowledge on a basin-wide approach to flood risk management.

 This specialization is a joint programme offered under the European Erasmus Mundus framework with the Technical University of Dresden (Germany), Barcelona Tech (formerly Technical University of Catalonia) (Spain) and University of Ljubljana (Slovenia).

More information on the partners, programme structure and admission procedure is available at www.floodriskmaster.org.

SPECIALIZATION IN HYDRAULIC ENGINEERING AND RIVER BASIN DEVELOPMENT

You will develop scientific and engineering knowledge needed to design and implement projects for sustainable use of river systems and their resources, learning about the design of hydraulic structures, modeling of the river, and flood management for different scales of water projects (catchments, river stretches and floodplains).

Prospective Students

Students may want to follow this specialization if they wish a career in government services, consultancy, or education and research institutes. Students typically have a BSc degree in civil engineering with a hydraulic engineering background, and have worked for at least three years after graduation in professional practice or in a university or research environment in the field of river engineering and river basin development. Knowledge in mathematics, statistics and physics is a prerequisite. Computer literacy is a valuable asset.

Learning Objectives

After successfully completing the specialization, graduates will be equipped to:

- Understand physical processes and natural phenomena in river basin systems, the effect of human interference in river basins, such as river structures and training works, and the management of floods and droughts;
- Master the major hydraulic methodologies and applications for the design of (large) river structures and river modelling techniques with regard to data collection, processing and analysis;
- Evaluate and analyse river basin systems and processes at a wide range of scales for the purpose of water resources, including morphological assessments, impact analysis of hydraulic structures and natural hazards assessment and mitigation taking into account relevant aspects of environmental, economical and social planning and management;
- Design and conduct hydraulic research, experiments and tests for both practical and scientific purposes;
- Have the skills to apply and integrate relevant concepts and methodologies in the area of hydraulic, hydrological and geotechnical engineering and research as well as applying computational principles within the context of hydraulic engineering.

SPECIALIZATION IN HYDRAULIC ENGINEERING - COASTAL ENGINEERING AND PORT DEVELOPMENT

You will be taught the technical background and practical skills to plan, model, design and manage coastal engineering and port development projects, and learn to analyse coastal problems and conceive appropriate solutions.

Prospective Students

Students typically have a BSc degree in civil engineering or a related field and a hydraulic background. He or she has worked for at least three years in professional practice or at a university or research establishment, and is eager to acquire practical skills and knowledge to solve engineering and coastal zone / port management problems. A future career may be in government services, consultancy, or education and research institutes.

Learning Objectives

Upon successful completion of this specialization, graduates will be able to:

- Explain hydraulic and morphologic coastal processes and nautical and logistic aspects as well as their interactions with near shore and offshore structures;
- Apply state-of-the-art coastal engineering design techniques to advance the needs of society for infrastructure and a safe environment;
- Evaluate and implement coastal engineering solutions in a multidisciplinary and interdisciplinary environment;
- Develop strategies to cope effectively with problems related to natural coastal hazards (e.g. flooding, oil spill) and shoreline erosion problems incorporating the tension between anthropogenic coastal developments and natural coastal processes;
- Apply hydraulic, nautical, logistic and economic theories in the planning and design of coastal and ports layout and port logistics.

 This specialization is also offered as a joint programme given with Hohai University, China. See our website for specific information on the partner, programme structure and admission procedure of this option.



SPECIALIZATION IN HYDRAULIC ENGINEERING - LAND AND WATER DEVELOPMENT

You will learn to plan, design, operate and maintain land and water resources and water-related infrastructure, emphasising on the modernisation of irrigation, drainage and flood protection schemes in rural and urban settings, and land use with emphasis on agriculture.

Prospective Students

The land and water development engineer is concerned with the development, adaptation and management of land and water resources for the different types of land use, with a focus on agricultural purposes. The typical student has a BSc degree in agricultural or civil engineering with a hydraulic background, and has worked in professional practice or in a university or research environment in irrigation, drainage or land and water development for at least three years. The participant is eager to acquire practical skills and knowledge to solve engineering, and water management or flood protection problems.

Learning Objectives

Graduates who have successfully undertaken this specialization will be equipped to:

- Engage in or advise developers, system managers and water users on the participatory development and management of irrigation, drainage and flood protection schemes for their planning, design, implementation, operation and maintenance, financing and performance assessment;
- Identify cross-sectoral linkages of land and water development with wider aspects of society, economy and the environment;
- Use the latest concepts and theories of irrigation, drainage, flood protection, land reclamation and consolidation technologies for sustainable development;
- Assess and evaluate alternative land and water development options for areas under different land uses and assess their technical, economic, institutional and environmental feasibility;
- Use latest hydraulic engineering and hydrological methods to apply in planning, design and implementation of irrigation, drainage and flood protection schemes, independently or in a multidisciplinary team.

Db J Alternatively, this specialization can be taken as a joint programme. Agricultural Water Management for Arid and Semi-Arid Climates is given in collaboration with Haramaya University, Ethiopia. Agricultural Water Management for Enhanced Land and Water Productivity is offered with Asian Institute of Technology, Thailand. Integrated Lowland Development and Management Planning is given with Sriwijaya University, Indonesia and Advanced Water Management for Food Production is given with the University of Nebraska-Lincoln, USA. See our website for specific information on the partner, programme structure and admission procedure of these options.

SPECIALIZATION IN HYDROINFORMATICS - MODELLING AND INFORMATION SYSTEMS FOR WATER MANAGEMENT

You will be able to solve problems of hydraulics, hydrology and environmental engineering for better water management using simulation modelling and IT. You will also get acquainted with models applied to water-based systems, learn to design and integrate decision support systems, and develop skills to provide expert advice to managers and users of advanced tools.

Prospective Students

Hydroinformatics engineers participate in defining, building and supplying the tools that enable decision-makers to manage aquatic resources and the environment. They work with engineers, scientists and people from other interest groups. This specialization is designed for hydraulic, environmental and water resources engineers from universities, consulting firms, research institutes, water boards and other government agencies. The typical participant uses or advises others in the use of mathematical models and hydroinformatics systems for planning, designing or managing the aquatic environment.

Learning Objectives

By the end of the course graduates will:

- Have a good understanding of the fundamentals of a range of physical processes, advanced modelling techniques and information technology for water management;
- Be able to select and use simulation models applied to water-based systems in a wide variety of hydraulic, hydrologic and environmental engineering situations;
- Be able to use current software tools, and know their advantages and limitations;
- Know how to design, develop and integrate decision-support systems and tools;
- Be able to provide advice to managers and users of advanced tools;
- Understand and practice collaborative work, making use of Internet-based platforms.

Db J This specialization can also be taken as a joint programme. One of these is offered with Hohai University, China, another with Universidad Del Valle, Colombia, and the third with Ain Shams University, Egypt. See our website for specific information on the partner, programme structure and admission procedure of these options.

SPECIALIZATION IN HYDROLOGY AND WATER RESOURCES

You will deal with surface and groundwater, addressing both water quantity and quality, learning to understand human influences on the hydrological system, and apply tools, such as modelling, for the proper integration of hydrological knowledge and analysis in water resources planning and management.

Prospective Students

The target group for this specialization are people aiming to work in river basin management, prediction and mitigation of floods and droughts, water resources assessment (quantity and quality), water supply, hydropower, land use and development, environmental survey and planning, and other related fields.

Learning Objectives

Graduates who have undertaken the Hydrology and Water Resources specialization will:

- Have an in-depth understanding of theories and concepts in surface and subsurface hydrology, the physical, chemical and biological interactions between the hydrosphere, the lithosphere, the biosphere and the atmosphere.
- Have a thorough awareness of natural and human-induced variations of hydrological systems.
- Be aware of the importance of hydrology to society, the relationship of hydrology and other disciplines such as ecology, meteorology and climatology.
- Be able to co-operate within a multidisciplinary and interdisciplinary framework with due consideration of ethical and social aspects related to the application of their knowledge and skills.
- Have a good knowledge of the literature and contemporary research questions in hydrology.

Graduates will be able to:

- Apply and integrate relevant physical, chemical, applied mathematical, computational and earth-scientific principles and concepts.
- Master the major hydrological methodologies and applications with regard to water quantity and quality, including techniques for data collection, processing and analysis, and the application of catchment hydrological modelling and aquifer modelling techniques.
- Analyse and evaluate hydrological systems and processes at a wide range of scales in both space and time for the purpose of water resources assessment, natural hazard assessment and mitigation, and environmental planning and management.
- Use information and communication technology within a hydrological context.
- Design and conduct hydrological research and experiments for applied or scientific purposes, independently or within a team.

Db J This specialization is also offered as a joint programme, given with Hohai University, China. See our website for specific information on the partner, programme structure and admission procedure of this option.

ONLINE COURSES 2014

Biological Wastewater Treatment: Principles, Modelling and Design	06/Jan/14 – 06/Jun/14
Urban Drainage and Sewerage	06/Jan/14 – 09/May/14
Flood Modelling for Management	03/Mar/14 – 10/May/14
Integrated Coastal Zone Management	03/Mar/14 – 07/Jul/14
Integrated River Basin Management	03/Mar/14 – 07/Jul/14
Service Oriented Management of Irrigation Systems	03/Mar/14 – 07/Jul/14
Water and Environmental Law and Policy	03/Mar/14 – 23/Jun/14
Water Quality Assessment	03/Mar/14 – 07/Jul/14
Cleaner Production and the Water Cycle	05/May/14 – 05/Sep/14
Ecological Sanitation	05/May/14 – 05/Sep/14
Modelling Sanitation Systems	05/May/14 – 05/Sep/14
Constructed Wetlands for Wastewater Treatment	01/Sep/14 – 05/Jan/15
Environmental Flows	01/Sep/14 – 05/Jan/15
Industrial Effluent Treatment	01/Sep/14 – 05/Jan/15
IWRM as a Tool for Adaption to Climate Change	01/Sep/14 – 05/Jan/15
Governance of Decentralised Sanitation	01/Sep/14 – 05/Jan/15
Public and Private Partnerships	01/Sep/14 – 05/Jan/15
Solid Waste Management	01/Sep/14 – 05/Jan/15
Decision Support Systems in River Basin Management	15/Sep/14 – 08/Dec/14
Water Transport and Distribution	19/Sep/14 – 19/Feb/15

SHORT COURSES 2014

Coastal Systems	13/Jan/14–31/Jan/14
Surface Water Treatment I	13/Jan/14–31/Jan/14
Water Economics	13/Jan/14–31/Jan/14
Asset Management	10/Feb/14–28/Feb/14
Negotiation and Mediation for Water Conflict Management I	10/Feb/14–28/Feb/14
Port Planning and Infrastructure Design	10/Feb/14–28/Feb/14
Surface Water Treatment II	10/Feb/14–28/Feb/14
Water Quality Assessment	10/Feb/14–28/Feb/14
Water Resources Assessment	10/Feb/14–28/Feb/14
Anaerobic Wastewater Treatment	03/Mar/14–07/Mar/14
Coastal and Port Structures	03/Mar/14–21/Mar/14
Constructed Wetlands for Wastewater Treatment	03/Mar/14–21/Mar/14
Data Driven Modelling and Real Time Control of Water Systems	03/Mar/14–21/Mar/14
Environmental Engineering	03/Mar/14–21/Mar/14
Groundwater Resources and Treatment	03/Mar/14–21/Mar/14
Managing Water Organizations	03/Mar/14–21/Mar/14
Negotiation and Mediation for Water Conflict Management II	03/Mar/14–21/Mar/14
Resource Oriented Wastewater Treatment and Sanitation	03/Mar/14–21/Mar/14
Tracer Hydrology and Flow Systems Analysis	03/Mar/14–21/Mar/14
Water and Environmental Policy Making	03/Mar/14–21/Mar/14
Environmental Monitoring and Modelling	31/Mar/14–17/Apr/14
Environmental Planning and Implementation	31/Mar/14–17/Apr/14
Financial Management of Water Organisations	31/Mar/14–17/Apr/14
Groundwater Data Collection and Interpretation	31/Mar/14–17/Apr/14
Hydrological Data Collection and Processing	31/Mar/14–17/Apr/14
Nanotechnology for Water and Wastewater Treatment	31/Mar/14–11/Apr/14
River Basin Modelling	31/Mar/14–17/Apr/14
Service Oriented Management of Irrigation Systems	31/Mar/14–17/Apr/14
Water Resources Planning	31/Mar/14–17/Apr/14
Water Transport and Distribution	31/Mar/14–17/Apr/14
Advanced Water Treatment and Re-use	21/Apr/14–09/May/14
Cleaner Production and the Water Cycle	21/Apr/14–09/May/14
Integrated Coastal Zone Management	21/Apr/14–02/May/14
Integrated Hydrological and River Modelling	21/Apr/14–09/May/14
International Port Seminar	21/Apr/14–09/May/14
Introduction to River Flood Modelling	21/Apr/14–09/May/14
Modelling Wastewater Treatment Processes and Plants	21/Apr/14–09/May/14
Urban Flood Management and Disaster Risk Mitigation	21/Apr/14–09/May/14
Water and Environmental Law	21/Apr/14–09/May/14
Wetlands for Livelihoods and Conservation	19/May/14–06/Jun/14
Applied Groundwater Modelling	10/Jun/14–27/Jun/14
Aquatic Ecosystems: Processes and Applications	10/Jun/14–27/Jun/14
Flood Risk Management	10/Jun/14–27/Jun/14
Industrial Effluent Treatment and Residuals Management	10/Jun/14–27/Jun/14
Public-Private Partnerships in the Water Sector	10/Jun/14–27/Jun/14
River Restoration and Rehabilitation	10/Jun/14–27/Jun/14
Urban Water Systems	10/Jun/14–27/Jun/14
Water Treatment Processes and Plants	10/Jun/14–27/Jun/14
Design of Hydropower Schemes	23/Jun/14–27/Jun/14
Advanced Water Transport and Distribution	30/Jun/14–18/Jul/14
Data Analysis and Modelling for Aquatic Ecosystems	30/Jun/14–18/Jul/14
Decentralised Water Supply and Sanitation	30/Jun/14–18/Jul/14
IWRM as a Tool for Adaptation to Climate Change	30/Jun/14–18/Jul/14
Solid Waste Management	30/Jun/14–18/Jul/14
Urban Water Governance	30/Jun/14–18/Jul/14
Water Resilient Cities	30/Jun/14–18/Jul/14
Watershed and River Basin Management	30/Jun/14–18/Jul/14
World History of Water Management	01/Sep/14–05/Sep/14
Small Hydropower Development	08/Sep/14–19/Sep/14
Spate Irrigation and Water Management under Drought and Water Scarcity	08/Sep/14–19/Sep/14
GIS and Hydrological Modelling	15/Sep/14–26/Sep/14
Morphological Modeling Using Delft3D	15/Sep/14–19/Sep/14
New Data Sources to Support Flood Modelling	15/Sep/14–19/Sep/14
River Basin Modelling using SWAT and PCRaster	15/Sep/14–19/Sep/14
Membrane Technology in Drinking and Industrial Water Treatment	06/Oct/14–10/Oct/14
GIS and Remote Sensing Applications for the Water Sector	27/Oct/14–07/Nov/14
Where there is little data: How to estimate design variables in poorly gauged basins	03/Nov/14–14/Nov/14

UNESCO-IHE is the largest international post-graduate water education facility in the world. The institute confers fully accredited MSc degrees and promotes PhDs. Since 1957 the Institute has provided post-graduate education to more than 14,500 water professionals from 160 countries, the vast majority from the developing world. Over 135 PhD fellows are currently enrolled in water-related research. The Institute carries out numerous research and capacity development projects throughout the world.

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