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Educational, Scientific and
Cultural Organization

IHE DELFT
Institute for
Water Education
in partnership with UNESCO

Study Guide

Academic Programme 2019-2021

(Fieldwork France with LWDFS and UNL guest student groups, on the Gignac Canal Bridge, 2019, Photo: L. Hayde)

Programme Information: **Water Science and Engineering MSc Programme**

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Introduction

The Water Science & Engineering Programme 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.
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.
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 for Food Security 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.

The programme focuses mainly on emerging and least developed countries and is especially suitable for midcareer professionals.

Domain specific framework

The concept of Water Science & Engineering

The concept of Water Science & Engineering is born out of the recognition that the technical and scientific problems related to water are increasingly multidisciplinary and graduates can no longer rely on spending their future working within only one of the traditional disciplines; rather, dealing with even the more technical aspects of water problems requires a mix of disciplines that:

- deal with water fluxes and quality in the natural and human-influenced environment;
- are concerned with different aspects of water resources management and development ;
- explore the natural and anthropogenic influences on the water cycle at various spatial and temporal scales;
- investigate the management and optimization of the human impact on water resources through structural and non-structural measures;
- develop and apply various simulation and predictive models for different phases of the water cycle;
- consider physical and logistical aspects of transport over water; and
- are concerned with protection against water-related natural hazards.

The academic field of Water Science & Engineering

Water Science & Engineering includes a range of science and engineering disciplines related to the aquatic environment. Each discipline represents an established and well-defined academic field for which the objectives are readily obtained from international consensus. Hydrology for example is defined by the International Association of Hydrological Sciences (IAHS); and the fields of Hydraulic Engineering and Hydroinformatics by the International Association of Hydro-environment Engineering and Research (IAHR) and the International Water Association (IWA).

In short, the disciplines comprise:

- Hydrology: an earth system science that deals with the occurrence, circulation and distribution of water and the chemical and physical properties of water in the environment. In addition, it is the science that deals with the processes governing the depletion and replenishment of the water resources of the land areas of the earth, and various phases of the hydrological cycle;
- Hydroinformatics: a discipline which deals with applications of information and communication technologies, advanced risk-based modelling and forecasting tools, system analysis and optimization to all areas of integrated water management and especially to river basins, aquifers, urban water systems, estuaries, and coastal waters; and
- Hydraulic Engineering: a part of Civil Engineering that deals with the application of engineering principles and methods to the control, conservation and utilization of water. This discipline is further divided into Land and Water Development for Food Security, River Basin Development and Coastal Engineering and Port Development.

Objectives of the Water Science & Engineering Programme and intended learning outcomes

The overall objective of the Water Science & Engineering Masters Programme is as follows:
"By the end of the course, students will be able to work in a complex environment, and, by using interdisciplinary approaches, will be able to improve the management of human impacts on water resources, to develop simulation models for various phases of the water cycle, and to develop methods to reduce the impacts of water-related natural hazards".

To be able to work in this complex environment of water resources and to explore natural and anthropogenic influences on the water cycle as well as to develop solutions, scientific knowledge and academic skills are needed from the perspective of civil engineering (Hydraulic Engineering), technology (Hydroinformatics) and earth sciences (Hydrology). Therefore, these fields form the foundation for the Water Science & Engineering Masters Programme. In line with this overall objective, the Water Science & Engineering Masters Programme has the following intended learning outcomes.

Upon successful completion of the Water Science & Engineering Programme, graduates will be able to:

Knowledge and understanding
A. demonstrate knowledge and understanding of hydrological, hydraulic, morphological and environmental processes and phenomena and their inter-relationships;
B. identify and characterize the causes and impacts of water-related problems on society, the economy and the environment;
C. explain the need for integration of monitoring, modelling and information systems to support safe and reliable decision making;
D. demonstrate critical thinking skills, the ability of both independent and team problem-solving and the sense of engineering creativity and design;

Applying knowledge and understanding
E. apply modelling and data management related to hydrological, hydraulic, morphological and environmental processes;
F. conduct research, independently or in a multidisciplinary team, including the formulation of research questions and hypotheses, the selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations
G. support planning, design, implementation, operation and maintenance, and management of engineered measures, of both a constructive and an operational character, aimed at the solution of problems arising from the multiple uses of water;

Making judgements
H. 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;
I. critically judge and evaluate their own work and results, as well as prior research carried out by others;

Communication
J. communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences, making use of appropriate information and communication technologies;

Learning skills

K. demonstrate academic attitude and learning skills (including thinking in multidisciplinary dimensions) to enhance and keep up-to-date the acquired knowledge and application skills in a largely independent manner; and

L. integrate ethical issues encountered in engineering practice and in relation to working in emerging and least developed countries and countries in transition.

The table below shows how the various programme components contribute to the relation between the programme level learning objectives.

Table 1: Relation between programme level learning objectives and programme components

	A	B	C	D	E	F	G	H	I	J	K	L
1. Introduction to water science and engineering	▒	■	▒						■			■
2. Hydraulics and hydrology	■	▒	▒									
3.-7. Specialization modules	■	▒	▒	▒	▒		▒		▒			▒
8. Programme-wide electives	■	▒			▒		▒	▒	▒			▒
9. Fieldtrip/fieldwork	■						▒					
10. Programme-wide electives	■	▒			▒		▒	▒	▒			▒
11. Institute-wide electives	▒	■			▒			▒	▒			
12. Summer courses	■	▒	■		■							▒
13. Groupwork		■	■	▒		▒	▒	■	■	▒		▒
14. MSc proposal preparation				■		■	■	■				■
15. MSc research	■	■	▒	■	■	■	■	■	■	■	■	▒

Key: ■ - objectives of primary focus; ▒ - objectives of secondary fcus

Skills development

Skills development is an integral part of the programme's core learning objectives and activities. The academic and research skills are nurtured throughout the programme. These include, but are not limited to oral expression, reading comprehension, written expression, critical thinking, self-monitoring, coordinating with others, scientific ethics, research skills and information literacy. These activities are well embedded within the core contents of the entire program (Tables 2 and 3), which helps to maintain a strong link between skills and knowledge (theory and application).

Table 2: Relation between skills development and programme components

	Oral expression	Reading comprehension	Written expression	Critical thinking	Monitoring self	Coordinating with others	Scientific ethics	Research skills	Information literacy
1. Introduction to Water Science and Engineering									
2. Hydraulics and Hydrology									
3.-7. Specialization modules									
8. Programme-wide electives									
9. Fieldtrip/fieldwork									
10. Programme-wide electives									
11. Institute-wide electives									
12. Summer courses									
13. Groupwork									
14. MSc proposal preparation									
15. MSc research									

Key: covered well; covered somehow; not covered

Table 3: Explanation and definition of skills used in Table 2

Oral expression	Giving presentations, involvement in discussions, explaining concepts in own words
Reading comprehension	Carrying out exercises, assignments, reading lecture notes, reports, theses, articles
Written expression	Carrying out exercises, assignments, drafting reports, notes, thesis
Critical thinking	Being able to evaluate your work and that of others, making judgments about the value of information and drawing conclusions from data;
Monitoring self	Being able to change behavior to fit a situation;
Coordinating with others	Capacity to follow up tasks, follow through on undertakings, capacity to maintain, balance or restore workflow;
Scientific ethics	- Exercising honest research practices; - Responsible for the activities, subject matter and method of his or her research, as well as for the quality of the results; - Respect the contributions of other researchers and follow standards for authorship and cooperation; - Follow national and international regulations on ethics and safety;
Research skills	Independence – being able to work without close supervision, managing your own time and projects Critical thinking – being able to evaluate your work and that of others, making judgments about the value of information and drawing conclusions from data. Problem solving – working without “a right answer” and devising strategies to work towards a solution Contributing as a professional – presenting work to your peers, managing discussions and defending your position, having the confidence to put forwards ideas to senior staff Initiative – having the confidence to make decisions and act on them, not waiting for approval to do basic tasks, but reporting back responsibly at appropriate times
Information literacy	How to use scholarly information effectively and responsibly? More in particular, an information literate person: - Determines the nature and extent of information needed; - Accesses the needed information effectively and efficiently; - Evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system; - Uses information effectively to accomplish a specific purpose; - Understands many of the economic, legal, and social issues surrounding the use of information, and accesses and uses information ethically and legally;

Curriculum and structure of the Water Science & Engineering Programme

The overall emphasis of the programme is on water sciences, engineering and technology placed in the contemporary context of society, economy and environment. The specializations are structured in a sequential build-up of educational components (incremental learning approach), which allow some interchange of topics and other educational activities among groups of students following one chosen specialization. The programme provides an excellent opportunity for students – although mainly devoted to their selected specialization – to interact with colleagues of other specializations and to share information and learning activities in a multidisciplinary context. Time constraints have required careful choice of compulsory subjects that form the main skeleton of each specialization programme and common subjects and electives to promote inter-specialization thinking and development. The Water Science & Engineering Masters Programme incorporates eight specializations:

- Hydrology and Water Resources (HWR);
- Hydraulic Engineering and River Basin Development (HERBD);
- Coastal Engineering and Port Development (CEPD);
- Land and Water Development for Food Security (LWDFS);
- Hydroinformatics: Modelling and Information Systems for Water Management (HI);
- Sustainable Urban Water Management (SUWM);
- Erasmus Mundus Programme on Flood Risk Management (FRM); and
- Erasmus+ Programme on Groundwater and Global Change (GroundwatCH).

Several tracks of these specializations have been developed as part of educational programmes that lead to a double degree (from IHE DELFT and partner organisation). The figure below gives an overview of the different specializations and double degree programmes. The specializations GroundwatCH and FRM are offered as Erasmus Mundus and Erasmus+ programmes. The LWDFS specialization is, in addition to the track offered in Delft, also organised as a double degree programme with three other partners, i.e. UNL in the USA, and Sriwijaya in Indonesia. HI offers the possibility to start at Universidad del Valle in Colombia. The SUWM specialization in IHE-Delft will work in close collaboration with the Southeast University, Nanjing, China.

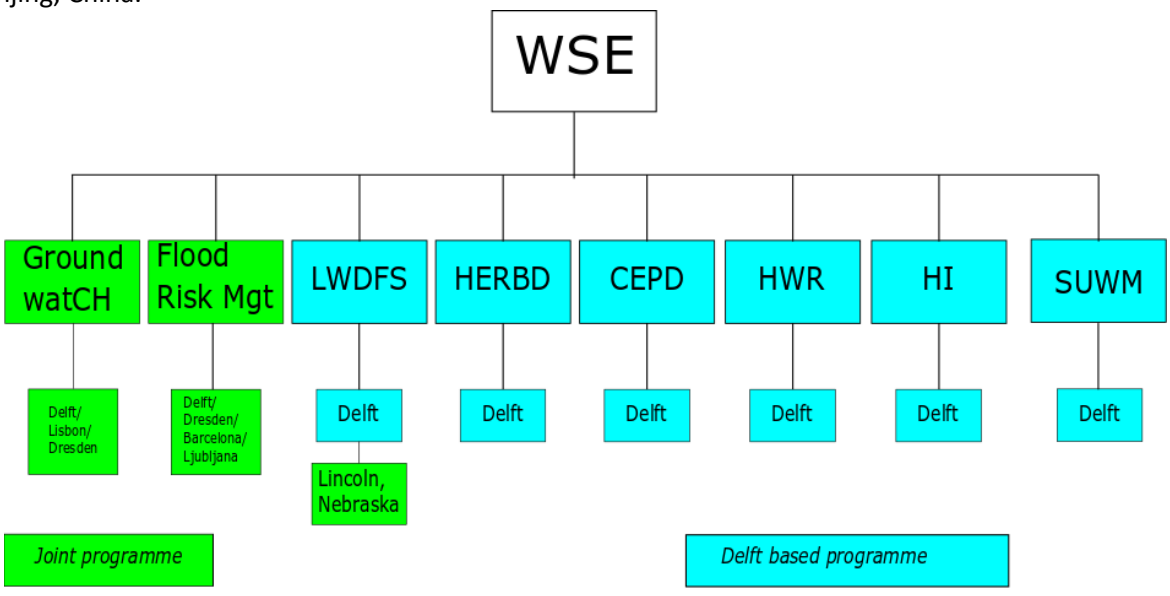

Figure 1: Water Science & Engineering Masters Programme: specializations and double degree programmes

The six Delft-based specializations have four distinct phases:

- a *foundation phase* – in which the foundation to build on is laid, fundamental principles and system understanding as well as key methodologies are introduced, students learn to understand their field of study (Water Science & Engineering) and neighbouring disciplines in a broader context;
- a *deepening phase* – when each student deepens his or her advanced knowledge and skills in their chosen specialization through an incremental learning approach;
- a *broadening phase* – when the student further learns to appreciate the inter-relationship between his or her specialization and the other specializations and programmes through (a) choosing electives offered by the other specializations and programmes, and (b) working collaboratively with his or her fellow students from those specializations and programmes on joint problems; and
- a *research phase* – when the student experiences doing his or her own independent research on a topic that may involve supervision from staff in more than one specialization. This is based on research experiences gained in the earlier parts of the curriculum (modules 1-13). Preparation for this phase begins early in the programme.

The programme has a modular structure with teaching organised into three-week blocks; sometimes two modules are scheduled in parallel for six weeks for didactical and logistical reasons. After a period of two blocks there is a week for examinations. This structure is generally reflected in the Academic Calendar.

Didactical concept

Generally, IHE DELFT follows the T-shape model as a generic competency profile guiding the design of its curricula (see Uhlenbrook and de Jong, 2012, for further details). This model differentiates between cognitive competencies in a certain specialization of Water Science & Engineering (e.g. hydrology; vertical leg of the T) and other cognitive/knowledge competencies in neighbouring fields (e.g. hydraulics, aquatic ecology, land use management etc.) and functional, personal and values competencies and meta-competencies (horizontal bar of the T). It is based on the holistic model of professional competencies by Cheetham and Chivers (1996) and related studies (Oskam, 2009), and proved effective in the water sector (Kaspersma et al., 2012). For the effectiveness of graduates from the Water Science & Engineering Masters Programme as professionals, a variable mix of competencies is required that are developed throughout the curriculum and facilitated by the applied variety of didactical approaches and assessment methods (section 3.2).

The Water Science & Engineering Programme is particularly designed to stimulate active learning within a framework of incremental learning. Each module therefore comprises a balance of formal lectures, supervised and unsupervised workshops, case studies, field trips, field work, individual studies, etc. and self-study by the student. That establishes a foundation for addressing scientific and practical problems in the later stages of the programme. The knowledge and abilities of students are thereby gradually developed, so that both disciplinary knowledge and insights in problem analysis and problem solving, and general academic skills can be deployed to good effect in subsequent groupwork and research thesis studies. The MSc research provides a vehicle through which integration of the programme material is achieved. The MSc thesis part is the culmination of the study, the part where independent thinking and problem-solving is further developed. Students typically take one of the following types of topics:

- a research topic from their own home environment, often in a sandwich programme, where field research and/or data collection is carried out for 2-3 months out of the six months period. Almost by definition these are quite development relevant contributions, and quality is ensured by supervision throughout the project;
- a research topic related to a (larger) research project at IHE DELFT and/or partner organisation (usually in cooperation with PhD or post-doctoral research studies). This allows a close link with the latest research in a certain field; or
- a topic as part of ongoing research or development project at a knowledge institute like Deltares, or at a consultancy or a company, where the student works in a team and gets a unique experience of working in a professional research and/or consultancy environment. Sufficient academic orientation is ensured through co-supervision of IHE DELFT supervisor/mentor throughout the project.

Hydrology and Water Resources (HWR)

Hydrology is the science dealing with the occurrence, transport, and properties of water on the earth, in which the principal attention is directed to continental fresh water resources. Hydrologists are involved in solving numerous problems arising in society and generally work as specialised scientists and professionals within a multidisciplinary setting. Given the broad scope of the subject matter, hydrologists often focus on specific fields but need to have a good foundation in the overall aspects of the discipline itself, as well as a basic overview of concepts and principles of related disciplines. Typical issues and themes that are therefore dealt within the hydrology programme are:

- water cycle and water balances
- hydrological and hydrogeological systems, physical and chemical processes
- relationships with vegetation, landforms, geology, land use and infrastructure
- runoff formation and anthropogenic influences
- water resources assessment, planning and development
- water quality assessment
- water resources management
- hydro- and geo-informatics
- modelling and simulation of rivers, catchments and groundwater systems
- effects of land use and urbanisation
- flood risk, drought, groundwater over-exploitation analysis
- pollution vulnerability and remediation
- statistical methods for rainfall, runoff and groundwater characterisation
- methods and techniques for measurements and data collection, processing and analysis
- reporting and presentation
- independent research, literature study

Short outline of the curriculum

Modules 1 and 2 are combined for all specializations in the WSE programme. The initial specialization modules 3 and 4 introduce the major concepts and principles of hydrology and hydrogeology while moving towards an advanced level of understanding. The important relations and underlying concepts of earth sciences used in hydrology, and the relation of hydrology with the atmosphere and climate are also outlined. Modules 5 and onward deal with specialist issues, including methodologies relating to water quality, data collection, processing and analysis methods, modelling tools and multidisciplinary application aspects. Students can, according to their preference, focus on either surface water hydrology (module 7A), or groundwater hydrology (module 7B). During the summer, the fieldwork provides the opportunity for real-terrain experience. The fieldtrips expose students to a wide range of applications and problems involving hydrology. The group work is aimed at making a comprehensive hydrological assessment using a variety of data from real situations within a team framework. Students can choose the corresponding module 8 and 10 from other WSE specializations, and module 11 is an institute wide elective module. Module 14 deals with research methodology and approach, and offers the students to choose a selected topic on contemporary issues in current research related to hydrology, which are to be reviewed in an in-depth study. Finally, students will prepare a thesis proposal and carry out their thesis research under the guidance of an individual supervisor.

Hydroinformatics – Modelling and Information Systems (HI)

Hydroinformatics uses data systems, simulation modelling and information and communication technology to help in solving problems of hydraulics, hydrology and environmental engineering for optimal management of water-based systems. It provides the computer-based decision-support systems that are revolutionising traditional planning, design and decision-making methodologies in river basin and flood management, urban water and environment. The Hydroinformatics course aims to enrich traditional engineering practice by introducing innovative ICT-based approaches in order to open up for the participants much broader perspectives. Hydroinformatics deals with the dynamics of information flow through the "*data - models - knowledge - decisions - impacts*" chain of tools. To achieve these objectives the Hydroinformatics specialization provides:

- Academic education in fundamental Hydroinformatics. The basic hydraulic, hydrologic, water quality and environmental processes and the fundamentals of information management, data analysis, computer sciences and software engineering. The ways of combining both fields for design and integration of software tools, including Internet-based and mobile computing.
- Education for understanding the two modelling paradigms of 'physically-based (process) modelling' (typically based on partial differential equations describing the water motion) and 'data-driven modelling' (based on statistical and computational intelligence tools). Training in analysis and modelling techniques from both paradigms, including their complementary applications.
- Education for understanding systems analysis, optimisation and training in use of decision support tools and techniques.
- Hands-on training in using and integrating software tools in several application areas: river and flood risk management, urban water systems, groundwater and catchments hydrology.
- Education for understanding the integrative nature of Hydroinformatics and its broader role in society.

Overview of the study programme
The study programme is structured in such a way that several different and interrelated themes are being covered through the introduction, and the extensive use of various modelling, information technology, and decision support tools (Figure 2).

The *Fundamentals, hydraulic, hydrologic and environmental processes* theme groups all the subjects that should be mastered in order to be able to fully assimilate and benefit from the subjects given in the other blocks. A strong emphasis is put on the basic notions of hydraulic and hydrologic processes, water quality and environmental processes, as well as appropriate mathematical techniques and computer manipulation.

The *Data and Information systems, GIS, communications and Internet* theme groups the fundamentals of computer science and software engineering. It includes database and data analysis systems, Geographical Information Systems, and technologies for Internet based communications.

The *Physically-based simulation modelling* theme comprises subjects concerned with the modelling approaches that are based on the description of the various physical water-related processes. It also includes a reasonable understanding of the numerical techniques used in most commercially available models, and the precautions that should be taken in order to ensure good quality modelling solutions.

The *Data-driven modelling and computational intelligence* theme groups all the subjects related to modelling techniques that do not rely on a physical description of the processes involved in the system under study. This includes in particular artificial neural networks, genetic algorithms as well as more classical statistical techniques.

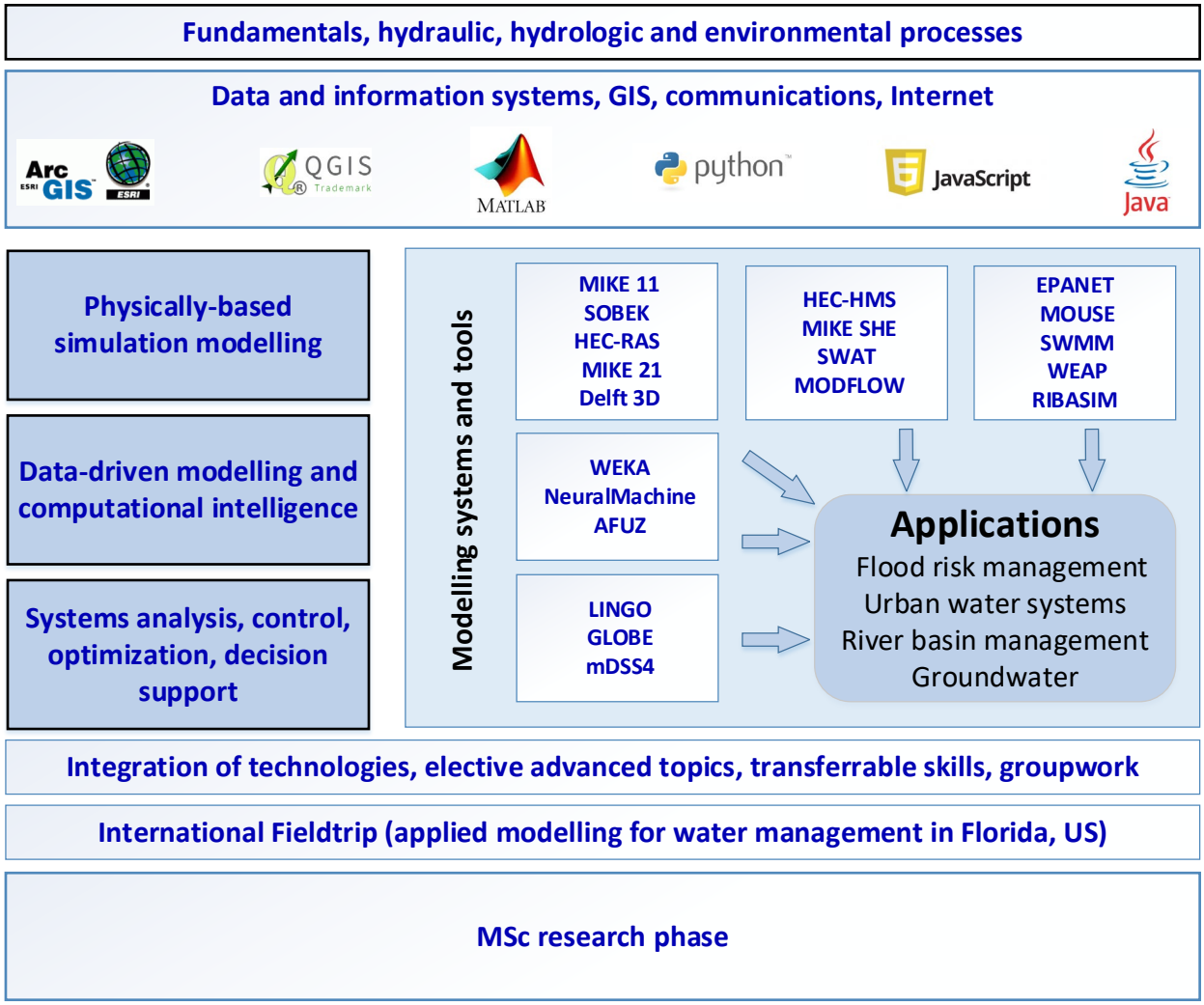

Figure 2: The general thematic structure of the Hydroinformatics specialization

The *Systems analysis, decision support and optimisation* theme combines subjects in basic optimisation techniques, with those on understanding the nature and role of systems analysis in water resources. The concepts of control- and decision support systems are introduced with applications to different kinds of problems in water resources planning and management.
The *Applications* theme includes subjects in which different modelling techniques, and Information and Communication Technologies (ICT) are being applied in a variety of water related areas such as: flood risk management, urban water systems, groundwater and catchment hydrology. Most of the subjects from this theme are common to all participants.

In addition, the Hydroinformatics specialization offers the opportunity to participants of other specializations to follow the following modules:

- **River Flood Analysis and Modelling**
- **Flood Risk Management**
- **Hydroinformatics for Decision Support**

The *Integration subjects* theme includes subjects where the participants are expected to combine and synthesise the notions acquired in all the other themes. This includes in particular the groupwork that plays a very important role in the Hydroinformatics programme.

The programme also includes several elective subjects on *special topics*, which can be chosen by the participants depending on their particular interest.

Hydraulic Engineering and River Basin Development (HERBD)

The Hydraulic Engineering and River Basin Development specialization educates engineers involved in design and implementation of projects for sustainable use of river systems and their resources (fresh water, floodplain space and sediments) and further develops the scientific and engineering knowledge in this field of interest through independent research. Nowadays, fresh water resources and floodplain space are limited and therefore of significant value. The pressing need for food, energy, flood protection and domestic and industrial water supply require an efficient use and management of water resources. Traditional river engineering has had serious consequences for riverine ecosystems and land-use, causing damage to flora and fauna and sometimes exacerbating floods and droughts. Based on the sound understanding of physical aspects of river behaviour, planning, design, construction, operation and maintenance, water resources are critically assessed for implementing sustainable water-related infrastructure, tools and management strategies in river basins.

Aims and learning objectives

The aim of the programme is to convey knowledge, concepts, insights and skills that are required for students to function as independent professionals within the field of hydraulic engineering and river basin development and to prepare candidates for further study as part of a research career. This aim has been developed into a set of objectives, which have been transformed to final qualifications that are formulated within a more generic context for the entire Water Sciences and Engineering programme.

The development and management of water resources in a river basin requires a broad approach in which full integration takes place over the entire spectrum of socio-economic and environmental interests. The challenge for water users, planners, policy and decision-makers and engineers is to contribute effectively to meet social and economic goals, maintaining and managing water resources on a sustainable basis and avoiding the physical and social degradation of the environment.

The success of these activities depends on the ability to design river structures for different purposes and on the correct understanding of dynamic river processes. Emphasis will be laid on different scales of water projects (catchments, river stretch and floodplains), river defence works and river management and their environmental compatibility and sustainability. The student has to acquire sufficient knowledge to integrate different relevant interest in hydraulic engineering projects as well as to optimise their multiple uses, operation and maintenance.

The focus of the specialization is on the following main fields of interest:

- *River Dynamics,* this encompasses the study of the way in which water flows in rivers and the consequent transport of sediment and morphological change. The impact of measures to enhance the environment and mitigate damage is considered throughout. In an engineering context the role and design of river intakes and river training works are considered.
- *River Structures* , which is mainly directed to the design of hydraulic structures, by defining sites and designs of reservoirs, dams, intakes, hydropower plants, conveyance systems, etc. Emphasis is given not only to technical aspects but also, in a broader context to managerial, social and environmental questions associated with these engineering works.
- *Flood Risk Management* , which is mainly concerned with the engineering issues, planning, policies and structural/non-structural measures and approaches to cope with floods and mitigate their impacts and consequences.
- *Modelling,* all the above make use of conceptual models which are often computer-based. Modelling is taught both throughout the course and in specific modules. The aim is to allow students to develop as intelligent and discerning users of models in river basin management.

Coastal Engineering and Port Development (CEPD)

The management of risks and resources in coastal areas of the world and the works required for their development, operation and maintenance have gained an increasing importance and complexity due to ever increasing natural and anthropological pressures. In addition to well-proven experiences and technologies adapted to local conditions, they often require innovative and interdisciplinary solutions. Based on considerable experience accumulated worldwide, and under inclusion of modern approaches. IHE DELFT offers a well-balanced and updated curriculum in the areas of Coastal Engineering and Port Development.

Background

Historically several large coastal engineering projects have made the Netherlands famous all over the world. Examples are the enclosing and partially reclaiming of the former Zuyder Zee (1927- 1968), the large multi-purpose project for damming the delta of the rivers Rhine and Meuse, known as the Delta Plan (1958-1986) with the construction of the storm surge barrier in the Eastern Scheldt estuary; a masterpiece of today's coastal engineering both servicing the protection against flooding and the environment. The port of Rotterdam is one of the largest ports in the world and is still expanding today. Maasvlakte II, the outer port of Rotterdam, has been built on newly reclaimed land from the sea. A storm flood barrier in the New Waterway, the entrance to Rotterdam, protects the banks of the tidal branches of the Rhine River.

More recently, The Netherlands, being a lowland country, has focused more and more on adapting to the effect of climate change, especially in the coastal zone. In this regard adaptive and inclusive Coastal Zone management and the conservation of the natural sea defences in The Netherlands are political foci and demand much attention. All of these national and global experience by various Dutch firms, well known for their expertise in coastal engineering and Coastal Zone management, have created a concentration of know-how in The Netherlands. The main objective of this course is to transfer this available knowledge and to demonstrate the applicability of this experience to solve the coastal zone problems of, in particular, developing countries as well as facilitating the exchange of experience among the participants and lecturers from different countries

Organisation

In the modules of the specialization Coastal Engineering and Port Development attention is paid to fundamentals of coastal engineering (tides, waves, currents and sediment transport), and design of coastal structures (dikes, breakwaters, mooring and berthing facilities). Design of the layout of a new ports is a core element of the programme. The physical phenomena of the sea and the coast, in particular coastal dynamics and morphology, are emphasised. The modelling of coastal processes using numerical models is given a proper attention and the effect of climate change and associated risks in coastal zones are discussed. This specialization also includes a module dedicated to challenges in relation to dredging projects in ports and waterways.

Aim

The overall aim of the Coastal Engineering and Port Development programme is to train engineers such that after the programme they are able to solve practical problems in coastal and port engineering. These problems are of relevance for the *future* needs of their countries. Given the need for practical professionals (like designers at a high academic level), this programme is practically oriented.

Approach

In general there are three levels of problems:

I: those that have to be solved by the engineer (or his staff) fully independently;

II: those for which the help of an outside advice (like a consulting engineer) is required;

III: those for which the help of a specialist is required.

Type I problems are the every-day problems of the engineer, for which problems tools are available (like handbooks and simple PC programs). The engineer should be able to define the problem, analyse the problem, solve the problem, completely without any help from other departments, consultants, etc.

Type II problems are the problems at a larger scale, or for which special designs have to be made. These designs or studies are usually made by outside consultants. For these type of problems, the engineer should be able to define the problem, define the terms of reference for a consultant, supervise the study and assess the final report.

Type III problems are the very unusual problems, which cannot be solved by an average consultant. Only a few specialised organisations in the world can do the job. The engineer should know that these advanced techniques exist, which specialised organisations can solve the problem, and how to set-up a supervising structure to supervise this work by a more specialised expert.

Alumni of IHE DELFT master's course are engineers, who can address these three types of problems as outlined above. It should be mentioned that the course is *practically oriented.*

Land and Water Development for Food Security (LWDFS)

Academic domain and normative activities

Central to the educational and research domain of the Land and Water Development for Food Security (LWDFS) specialisation of the Master Programme in Water Science and Engineering (WSE) is the conceptual and practical understanding for sustainable development and management of irrigation and drainage systems and protection of flood prone areas. Developing a multidisciplinary and comprehensive perspective including various institutional, socio-economic, infrastructural and environmental issues is key to addressing the current and foreseen issues in the field of irrigation engineering, land and water development and management. In line with the above premise, the LWDFS specialisation has defined two major normative domains:

- *Irrigation, drainage and flood protection:* measures to improve water management, to enhance crop production and water use efficiency;
- *Interaction land use, water management and flood protection in flood prone areas:* optimization of measures related to man induced changes in land use and climate changes.

Aim

In keeping with the academic domain and normative activities, the overall aim of the LWDFS Programme is to generate new and advance current knowledge and skills with regard to development, management and adaptation of land and water resources for different types of use, with a focus on land use for agriculture. The guiding principle is the development of irrigation, drainage and flood protection infrastructure to meet an agreed level of service for an optimal balance between costs and benefits.

Approach

Given the importance of both technical and non-technical aspects in land and water development and management, the LWDFS Programme courses and research works integrate:

- technology and management capacity;
- technology and society, economy and environment;
- agricultural and civil engineering aspects of development and management.

Content and description

The LWDFS Specialisation consists of a total of 15 modules - most modules have a duration of three weeks. These are categorized as:

- one short IHE-wide introductory module [1 week];
- three common WSE modules (Modules 2A [2 weeks], 2B and 13);
- five specialisation specific modules (Modules 3 to 7);
- three WSE or IHE-wide elective modules (Modules 8, 10 and 11);
- three IHE-wide modules (Modules 12, 14 and 15).

Module 9 consists of an international fieldtrip, which might be undertaken together with one or more of the other WSE specialisations; and a fieldwork part, which is specialisation specific.
Modules 8 and 10 are WSE elective modules while Module 11 is an Institute-wide elective module.
In Module 12 the participant can chose a summer course from different specialisations (institute-wide).
In Module 13 (common WSE), the participants engage in the group work and identify alternative solutions to various land and water development related issues in an integrated manner from the systems perspective in close collaboration with the other WSE specialisation participants.

After successful completion of the above common, specialisation specific and elective modules, the participants undertake individual MSc thesis research for 6 months during Modules 14 (preparation and proposal writing) and 15 (field work, analysis and thesis writing).
The MSc thesis research (Modules 14 and 15) is driven by the following two key objectives:

- To advance the horizon of science and current knowledge and expertise in various technical, socio-economical, environmental and institutional aspects of irrigation engineering, land and water development and management;
- To investigate pragmatic solutions to challenges related to water scarcity, food insecurity, flood risks and fragility of the environment, particularly in the least developed and emerging countries.

Prior to embarking on their field work (Module 15), the participants follow Module 14 in which they become acquainted with the main drivers and incumbent research priorities as identified, but not limited to, by the WSE Master Programme in general and the LWDFS specialisation in particular. They also acquire valuable skills in problem description, formulating scientific research questions, articulating related research methodologies, literature review, data collection and analyses using pertinent techniques including modelling and presentation of the research findings.
The MSc thesis topics and contents are aligned with the following main research lines under the LWDFS Specialisation:

- **Hydraulic structures and hydraulic systems:**
  - *Hydraulic performance evaluation and modernization of irrigation and drainage systems:* Research focused on various technical approaches and methods for analysing the performance of irrigation and drainage systems and optimising crop, land and water productivities as well as the development of improvised approaches and techniques for modernising irrigation and drainage systems.
  - *Sediment transport in irrigation canals:* Research focused on the analysis of sediment movement in irrigation canals under different conditions and operation rules.
  - *Lessons to learn from historical approach:* As the importance of projects aiming at rehabilitation and/or transformation of existing water infrastructure is increasing, knowing, understanding and learning lessons from the history of such systems and their management are prerequisites for quality design and planning.

- **Environmental impacts of hydraulic works:**
  - *Water saving in irrigation.* Research is focused on improvements in water use in irrigation in light of prevention of environmental degradation.
  - *Interaction between irrigation, drainage and sustainable development.* Research on sustainable exploitation of water resources (surface water and groundwater).

- **Institutional and socio-economic aspects of system management:**
  - *Performance analysis and accountability mechanisms.* Research on institutional and socio-economic aspects of irrigation and drainage system management.
  - *Global future irrigation and drainage needs.* Research on the needs for and potentials of irrigation and drainage in light of food production, sustainable rural development and the development of flood prone areas under the influence of various drivers for global change.

- **Integrated lowland development and management:**
  - *Interaction between land use and flood management.* Research on interaction between land use and flood management in flood prone areas. Economic optimisation in the design, operation and maintenance of water management and flood protection schemes.
  - *Land and water management in tidal lowlands.* Research will focus on how to improve the soil and water management systems including hydraulic structures in tidal lowland in order to improve the water and land productivity and environmental conditions in tidal lowlands.

Sustainable Urban Water Management (SUWM)

The SUWM specialization aims at fostering academic excellence relevant to the Sponge City program (initiation-preparation-implementation-evaluation). It draws upon modern insights on the urban water cycle and sustainable urbanization (such as IWA principles for Water Wise Cities, Water Sensitive Cities and Water Sensitive Urban Design, Sustainable Drainage Systems, etc.) from around the world.

While the sole responsibility of conducting the specialization remains with IHE-Delft, it will work in close collaboration in China with Prof. Dafang Fu of the Southeast University, Nanjing. It will be an 18 month master's programme where students start at IHE, complete the taught part of the masters (year 1) at IHE. The students will select their MSc thesis topic (with close consultation with the Chinese professors (to be selected) as well) at IHE and develop and defence the thesis proposal. At this point, they will return to China (Jiangsu) and will continue the thesis research there with supervision from both IHE-Delft and Chinese professors (to be selected). Ultimate supervisory responsibility will be with IHE-Delft. Upon conclusion of the research (six month period) the students will defend their thesis while in China (Jiangsu), in front of an examination committee appointed by IHE-Delft, according to IHE-Delft rules. The graduation ceremony will be held in Jiangsu with representations of IHE-Delft.

Scope

The essential feature of the SUWM specialization is its focus on the total urban water cycle requiring an integration of multiple disciplines of engineering and environmental sciences. Managing the urban water cycle involves managing water scarcity and water excess concurrently and in an integrated way including water quantity and quality and system resilience. It aims the provision of water services (water security and safety) including the protection of aquatic environments in urban areas. Strong emphasis will be set on integrative elements of the urban water cycle and sustainable interventions spanning across different sub-sectors (e.g. drinking water, wastewater and surface water) and creating synergy and co-benefits.

Following are some salient features of the SUWM

- At the start of the master's course, each student is provided with a personal 'mentor' (IHE staff member) who will guide the student on the various subject choices etc.
- At the start, students will enrol an ongoing, online course titled "Integrative skills for total Urban Water Cycle management". This course provides the integrative elements of the master's programme, throughout the period of the masters. When the senior-batch is doing their master's thesis work, they will still be engaged in this course together with the corresponding junior-batch. This will help the beginner students to be exposed to advance integrative thinking at an early stage.
- The master's thesis will always have two supervisors: one from IHE another from a Chinese university (to be selected). The students are required to provide monthly written progress reports and bi-monthly progress presentations in front of all supervisors (online).

Erasmus Mundus + Programme GroundwatCH (www.groundwatermaster.eu)

The GroundwatCH programme is organized around the following thematic areas:

1. General Hydrogeology;
2. Groundwater Data Collection, Interpretation and Modelling;
3. Climate Processes and Modelling;
4. Integrated River Basin and Water Resource Management;
5. Groundwater and Environmental Impacts;
6. Groundwater, Society and Policies; and
7. Groundwater, Climate and Global Change Impacts and Adaptation.

The students will start the academic year in September at Instituto Superior Técnico in Lisbon, where during the first semester they receive courses addressing core competences in Thematic Areas 1-6, totalling 30 ECTS.

In March of the following year, the students will move to IHE Delft, where they acquire 30 ECTS in the second semester, taking advanced courses within Thematic Areas 2 and 4-7.

Following conclusion of the second semester and the summer break, the students then move to the Technical University of Dresden, where they study during the third semester, obtaining advanced training (30 ECTS) in Thematic Areas 3 and 7, through compulsory teaching modules in climate modelling and groundwater-soil-land-climate feedback mechanisms, as well as a study project. Here the students will also have a number of optional modules from which they can choose two, specialising in a certain direction, depending on their thesis subject.

In March of the second academic year the students will start their thesis study (30 ECTS). Students can conduct dissertation research at any private or public institution, under promotership of a lecturer of a consortium partner institution. Lecturers of both the consortium and associated partner institutions can act as co-promoters.

Balance for MSc dissertation projects amongst partner institutions will be achieved by means of promoting the establishment of joint projects between different members of the consortium.

Flood Risk Management (www.floodriskmaster.org)

The Flood Risk Management (FRM) programme is offered by a consortium consisting of IHE Delft, Technical University of Dresden, UPC Barcelona and University of Ljubljana. The associated partners include European hydraulics laboratories, namely, Danish Hydraulic Institute (Denmark), Deltares (the Netherlands) and HR Wallingford (UK), key national organisations responsible for flood management, including Rijkswaterstaat, Rijnland Waterboard (the Netherlands) and National Research and Development Institute for Marine Geology and Geoecology (Romania). Other associated partners include ICHARM (Japan), Institute of Water and Flood Management (Bangladesh), HydroLogic (the Netherlands), Center for Environmental Studies (USA) and International Association of Hydrological Sciences.

During the 2-year programme students start at TU Dresden, where they complete their 1st semester with 30 ECTS with courses on hydro-meteorological processes and global change and its impact. Then the students move to IHE for their 2nd semester with 30 ECTS where they receive courses on modelling and computer-based tools for planning, forecasting and decision support. Subsequently, the students move to UPC Barcelona to follow part of their 3rd semester with 20 ECTS with courses on hazards due to flash floods, debris flow and coastal flooding. The last part of the 3rd semester is hosted by the University of Ljubljana where students follow courses on spatial planning, and socio-economic and institutional framework of flood risk management to earn 10 ECTS. Each semester provides a number of electives, and there are international fieldtrips. Finally, the students carry out their thesis work (30 ECTS) at one of institutes or with an industrial partner.

The FRM programme is organised based on the following themes:

- Hydro-meteorological processes and global changes
- Monitoring, data management and ICT
- Modelling for decision support
- Fluvial, urban and coastal floods
- Flood hazards and risk assessment
- Socio-economic and institutional framework

Students' mobility is described below:

<table>
<tr><td colspan="12">Year 1</td><td colspan="12">Year 2</td></tr>
<tr><td colspan="6">Semester 1</td><td colspan="5">Semester 2</td><td></td><td colspan="3">Semester 3</td><td colspan="4">Semester 4</td><td></td></tr>
<tr><td colspan="6">30 ECTS</td><td colspan="5">30 ECTS</td><td></td><td colspan="2">20 ECTS</td><td colspan="2">10 ECTS</td><td colspan="5">30 ECTS</td><td></td></tr>
<tr><td>Sep</td><td>Oct</td><td>Nov</td><td>Dec</td><td>Jan</td><td>Feb</td><td>Mar</td><td>Apr</td><td>May</td><td>Jun</td><td>Jul</td><td>Aug</td><td>Sep</td><td>Oct</td><td>Nov</td><td>Dec</td><td>Jan</td><td>Feb</td><td>Mar</td><td>Apr</td><td>May</td><td>Jun</td><td>Jul</td><td>Aug</td><td>Sep</td></tr>
<tr><td colspan="6">TU Dresden</td><td colspan="5">UNESCO-IHE</td><td>Vacation</td><td colspan="3">UPC, Barcelona</td><td colspan="2">Univ. Lubljana</td><td colspan="6">MSc thesis with an HEI or an industrial partner</td><td>MSc exam, graduation</td></tr>
</table>

Semester 1
TU Dresden, Germany
The programme starts with the first semester at TUD, where students take either non-engineering or engineering subjects to complement their background and build a solid foundation for everyone. A fieldtrip to flood-prone areas is organised.

Semester 2
IHE Delft, Netherlands
At IHE Delft the students join IHE's Hydroinformatics programme, focussing on different types of modelling. On real case studies students learn how to apply and integrate various types of modelling and decision support systems. An international fieldtrip is offered as well.

Semester 3
UPC, Spain and University of Ljubljana, Slovenia
During the third semester the students take more specialised modules, such as Debris Flow and Coastal Flooding (including fieldtrips). The last part of the third semester is conducted at University of Ljubljana where the students study spatial planning and socio-economic and institutional frameworks for flood risk management.

Semester 4
Research thesis
During the thesis phase the students, while remaining associated with one partner, may occasionally carry out the research together with an industrial partner (which may be an Associated Member or not).

Double Degree Programme on Advanced Water Management for Food Production (DD-AMWFP)

The first 8 or 9 modules of the programme are identical to the LWDFS programme. Then, until the end of year 1, the student follows coursework at University of Nebraska-Lincoln (UNL), aimed to deepen knowledge on plant-water relations, remote sensing, and advanced irrigation and drainage systems followed by a final exam week. Afterwards the student will write a thesis, and, at the same time, will do more coursework on the human dimensions of Global Water and Food.

United Nations
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IHE DELFT
Institute for
Water Education
in partnership with UNESCO

Study Guide

General information

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1. IHE Delft

1.1 Introduction

IHE Delft continues the work that was started in 1957 when IHE first offered a postgraduate diploma course in hydraulic engineering to practicing professionals from developing countries. Over the years, IHE has developed into an international education institute providing a host of postgraduate courses and tailor-made training programmes in the fields of water, environment and infrastructure; conducting applied research, implementing institutional capacity building and human resources development programmes, participating in policy development, and offering advisory services world-wide.

The Institute has gradually expanded its academic base to include disciplines such as sociology, economics, and environmental and management sciences. The range of activities has broadened accordingly, from identifying solutions to engineering problems to designing holistic and integrated approaches in the development and management of water and environmental resources, and urban infrastructure systems. The services of the Institute now also include integrated water resources management, effective service delivery and institutional reform, all of which aim to enhance full stakeholder involvement, equity, accountability and efficiency in water sector development and management.

The mission of the Institute is to contribute to the education and training of professionals and to build the capacity of sector organisations, knowledge centres and other institutions active in the fields of water, the environment and infrastructure, in developing countries and countries in transition.

IHE is located in Delft, an internationally renowned centre of excellence in civil engineering and in water related sciences. The Delft University of Technology, the laboratories of Deltares, and The Netherlands Organisation for Applied Scientific Research are situated nearby. IHE Delft maintains intensive relations with national and international institutions to ensure a continuous exchange of knowledge and experience.

1.2 MSc Degree Programmes

The backbone of the Institute are the postgraduate programmes in the fields of:

- Environmental Science
- Urban Water and Sanitation
- Water Management and Governance
- Water Science and Engineering
- Sanitation

Each year, these programmes are attended by hundreds of engineers, chemists, biologists, earth scientists, and other professionals from all over the world. The graduates are awarded a Master of Science degree. The programmes are subject to accreditation under Dutch law.

1.3 Research and PhD Programmes

IHE Delft carries out scientific research, often in co-operation with universities and research institutes in developing countries. A number of positions are available for PhD research.

The PhD programme has a nominal duration of 4 years and can be carried out either in Delft or in a sandwich construction. The PhD degrees are awarded by IHE Delft together with a Dutch university. Candidates should preferably hold an IHE Delft MSc degree, but an equivalent degree from another reputed university may also be acceptable.

1.4 Organisation

The Rectorate of the Institute consists of a Rector, a vice rector Academic Affairs and a Business Director.

There are three academic departments:

- Water Science and Engineering
- Environmental Engineering and Water Technology
- Integrated Water Systems and Governance

These departments have one or more chair groups in major fields, led by a professor, who is assisted by academic staff and research fellows.

Process management support units and an education bureau provide administrative support.

Besides the academic staff of IHE Delft, education is provided by selected guest lecturers, who are experts employed by universities, research institutes, government agencies, consulting firms, international organisations, etc. in the Netherlands and abroad.

2 Programme framework

2.1 Introduction

The Institute offers the following Master of Science degree programmes:

- the master programme in Sanitation;
- the master programme in Environmental Science;
- the master programme in Urban Water and Sanitation;
- the master programme in Water Management and Governance; and
- the master programme in Water Science and Engineering.

Each programme has several distinct specialisations, in which students follow a curriculum best suited to their preference. Some specialisations are offered jointly with one or more partner institutes in the world. Details of each programme and its (joint) specialisations are given in the programme descriptions of the study guide.

2.2 Academic Regulations

The *Examination Regulations* describe the precise details of how examinations are assessed and marked, the procedures and rules for re-examinations, procedures for appeal, and which results are required for awarding the Master of Science degree.
Special examination regulations are drafted for the joint specialisations.

Students are strongly advised to familiarise themselves with these procedures at an early stage during their study.

2.3 Structure of the Programmes

All Delft based curricula follow a modular structure.
The Delft-based curricula of the MSc Programmes consist of a Taught Part and a Thesis Research Part. A module consists of a teaching period (usually 3 weeks) and an exam period. Modules may be shared between or among specializations and/or programmes.

The Thesis Research Part consists of modules on research methodology and MSc proposal drafting and defence, followed by a period of six months of individual research and writing of the thesis. The MSc thesis is defended publically at the end.

The curricula of the joint specialisations consist of modules offered at IHE Delft and courses at the partner institutes.

2.4 Final Qualifications

Each programme specialisation has a set of final qualifications that state the knowledge, insight and skills achieved by students who successfully complete the programme. A distinction is made between discipline-specific qualifications, which are required by the field of study, and general academic skills, which are expected from university education graduates.
Similarly, each module of the curriculum has a set of learning objectives, which detail the specific outcomes if the student completes that part of the programme. The individual topics in the modules usually aim to achieve a further detailed subset of the module learning objectives.

2.5 Curriculum Information

All components of the curriculum are described in the module plans of the study guide providing the following information:

the name and code of the module;
the learning objectives;
the pre-requisite knowledge or skills;
the study load hours and credit points;
the lecture, exercise and examination contact hours;
the nature and weights of the examination parts;
the responsible lecturers/examiners;
a concise description of the contents and working methods; and
the required and recommended literature, and other materials.

2.6 Instructional Methods and Didactic Approaches

To deepen and broaden student's knowledge and to create an openness towards 'lifelong learning', all the teaching at IHE Delft is 'learner-centered' and interactive. Students are stimulated to actively process the theory. This means that teaching and learning are based on the constructivist approach, whereby new knowledge is integrated into existing knowledge of the student. Students are invited and stimulated to share and use their professional experiences in the class room.
All education activities are conducted using a combination of lectures, exercises, assignments and assessments.
Lectures serve one or more of the following functions:

- to impart information;
- to introduce and explore a topic;
- to build-up complex structures step-by-step;
- to clarify and illustrate concepts and ideas detailed in the literature or lecture notes; and
- to provide a framework for further independent study and reading.

An exercise takes one of the following forms:

- a design or practical exercise;
- a computer or other workshop;
- a laboratory session;
- a fieldwork or fieldtrip; and
- a group work discussion.

Assignments are carried out independently by the students and consist of all required activity to:

- study or practice the lecture material;
- prepare a report, thesis or presentation;
- work out the results of an exercise;
- conduct an experiment or test;
- prepare for an examination; and
- conduct a research or other study.

2.7 Assessments

Assessments serve to test if and how far students have achieved the learning objectives of a module, and ultimately those of the programme itself. The assessment for a module may consist of multiple parts. For example, a combination of a written or oral test and one or more assignments to be handed in separately. Examination work can also be produced by (small) groups of students working together on an assignment, e.g. the group work report.
Assessment of examination material is carried out by appropriate examiners, which are usually the involved lecturers. Students who successfully complete a module will be granted the credit points for that module. Fieldtrips may require active participation instead of an examination in order to receive the credit points.

For each assessment, students are informed about the results via e-mail. When all assessments have been passed, the student has successfully completed the so-called programme examination and will be awarded the degree.

2.8 Study Load

All scheduled education activity taking place in the presence of a lecturer or an assistant is designated as contact time. All other time spent by students in relation to the study programme is designated as independent study time. The study load for (a part of) a programme is the cumulative contact time and independent study time that is nominally required to successfully complete that (part of the) programme. Study load is expressed in whole ECTS credit points, where one ECTS credit point is equivalent to 28 working hours.
The study load credits for a curricular activity indicate the notional time spent by an average learner to achieve the required outcomes for that activity, as specified by the learning objectives. The nominal time expenditure for a 5 ECTS credit points module is therefore 140 hours.
Where study load involves scheduled class-based activity, one lecture period is taken equal to two hours of contact time.

2.9 Planning and Scheduling

Education activities taking place inside the Institute are, in principle, scheduled into 'periods' of two hours each, for which the following times are available:
Period 1 08:45 – 09:30 and 09:45 – 10:30
Period 2 10:45 – 11:30 and 11:45 – 12:30
Period 3 13:45 – 14:30 and 14:45 – 15:30
Period 4 15:45 – 16:30 and 16:45 – 17:30
Throughout the academic year, the student will receive the following information and materials:

- schedules of the education activities;
- required lecture notes, textbooks and other course-related material;
- announcements of assessment planning details; and
- statements on assessment results and study progress.

2.10 Participation in coursework and lunch seminars

Active participation and attendance by students is required for all curricular activities on the schedule. Special attention is required for lunch seminars. During the academic programme lunch seminars are organised focussing on a specific topic. Participants are required to attend these seminars as well Students have to inform their programme coordinator as early as possible when they are not able to attend a scheduled programme activity.

2.11 Evaluation of the Programme by Students

As part of the quality assurance procedures of the Institute the programmes are routinely evaluated in order to obtain feedback from the students regarding the quality of the content and the performance of the lecturers. The evaluations are based on a module questionnaire, which the students complete in separate class sessions. The questionnaire asks the students to provide a rating for achievement of the learning objectives, the study load feasibility, the contents of the subject matter, the balance between the various working and examination methods, the quality of the lecture materials, and the presentation by the lecturers. Furthermore, additional written comments and an overall rating for the module may be provided.
The module evaluations are carried after the examination, but before the results have been announced. Students can also request to address specific programme related issues in a group or individual discussion with the involved coordinator or lecturers.

Feedback on the programmes from the students is much appreciated. The Institute uses the results of the evaluations to improve the academic programmes where necessary, in order to maintain high standards of education.

3 Regulations

3.1 Examination regulations

See for the Examination regulations the separate part of the study guide.

3.2 Library regulations

Fair use of on-line information resources at the IHE Delft Library.

The IHE Delft Library Services provides access to a large number of on-line information resources and databases. Access to these resources is provided to all computer users within the premises at Westvest and through remote authentication via the IHE Delft portal. By using these on-line resources you agree with the following conditions:

1) Systematic downloading of electronic journals articles using manual means is permitted only within reasonable amounts; no more than 50 downloads per user within 24 hours.

2) Programmatic downloading / 'web crawling' is not allowed. In addition to systematic downloading of files manually, the use of a spider (web crawler), the intention of which is to programmatically download data within a specific website, is prohibited.

3) Copyright/reproduction. It is prohibited to reproduce entire or parts of publications in your own publication without the consent of the publisher. You are obliged to provide a correct source reference of all of the material at all times.

4) Selling and providing material to third parties is strictly forbidden. The re-sale of material purchased subject to license to third parties is prohibited; this applies both within and outside of the Institute for which the materials have been purchased.

5) Permanent archiving. Large-scale archiving is not permitted on the local servers or your hostel personal computer nor is the continued use of these servers as an archive, in collaboration with third parties or otherwise. The temporary storage of archive material for personal use is permitted for a period not longer than 120 days.

6) Making changes to an original work. Infringing upon an original work by merging various original texts into a document or by amending original texts is prohibited. Processing materials in such a way is an infringement upon the copyright that is held by the publisher or the author him/herself.

Infringement of one or all of the above mentioned stipulations will be considered as academic misconduct and will result in disciplinary measures, which will be proportionate to the seriousness of the infraction. The Rector will decide upon the disciplinary measures which will be taken. These measures may include temporary or permanent suspension from attending class.

3.3 Code of conduct

THE RECTORATE OF IHE Delft

- In consideration of the need for rules and regulations concerning the safety and the proper use of the buildings, grounds and facilities of IHE Delft by students and visitors;
- In accordance with article 7.57h and article 9.2, first paragraph, of the Higher Education and Scientific Research Act of the Netherlands;
- Having heard the Student Association Board;

RESOLVES to establish the following Regulations:

Article 1 Definitions

1.1 WHW	Higher Education and Scientific Research Act of the Netherlands (Staatsblad Bulletin of Acts and Decrees 1992, 593);
1.2 the Rector:	the rector of IHE Delft
1.3 the Rectorate:	the rector, the deputy rector Academic affairs and the business director
1.4 Central services department	the central services department of IHE Delft
1.5 Facilities	the institute buildings, the interior and equipment as well as rented office and accommodation facilities
1.6 Buildings	the buildings of IHE Delft, located at Westvest, Delft
1.7 Student	anyone who is enrolled at IHE Delft for the purpose of education provided by IHE Delft and who uses the educational and examination facilities of IHE Delft for this purpose;
1.8 Visitor	anyone who is not a student nor is employed by IHE-Delft as referred to in article 1.1 of the Collective Labour Agreement (CAO) for Dutch Universities.

Article 2 Compliance requirement for rules, guidelines and instructions

2.1 Any student or visitor making use of the grounds, buildings or facilities of IHE Delft is required to comply with all rules, instructions and/or directions issued by the Rectorate and delegated staff with regard to maintaining order and proper social conventions of the host country within the buildings and on the grounds. According to the in the institutes code of undesirable behaviour the following is considered to be undesirable behaviour: sexual harassment, aggression, or violence, both verbal and non-verbal towards course participants, staff, visitors or contracted staff. Furthermore all participants, staff, visitors and contracted staff are to observe and comply with the rules and regulations with regard to appropriate and legitimate use of the facilities of IHE Delft scrupulously and without delay, and is required to deport him or herself such that:

a. he or she does not cause direct or indirect damage to IHE Delft or to other persons who are present on the grounds or in the buildings of IHE Delft or who make use of the facilities of IHE Delft, nor that he or she causes nuisance or annoyance;

b. he or she does not infringe on the rights of IHE Delft or of other persons who are present on the grounds or in the buildings of IHE Delft or who make use of the facilities of IHE Delft;

c. he or she does not act contrary to statutory obligations;

d. he or she does not act contrary to appropriate and proper social conventions with regard to people or property.

2.2 It is prohibited to wear clothing that covers the face or to wear other clothing and/or accessories that severely interfere with communication between teaching staff and students or between students themselves or between members of the teaching staff. When sitting an examination it is prohibited to wear clothing that covers the face or to wear other clothing and/or accessories that severely limit the ability to establish the identity of the person in question.

2.3 The Head of the Central Services department may, on behalf of the Rectorate, issue instructions and directions for the purpose of ensuring the smooth and proper use and functioning of buildings and grounds of IHE Delft entrusted to him/her.

Article 3 Disciplinary Measures
The Rectorate may take the following measures against any student or visitor who fails to comply with the contents of these Regulations, with due observance of the procedure described in these Regulations:
a. excluding the student or visitor from the buildings and grounds of IHE Delft or from one or more parts of IHE Delft, with the provision that a student may only be excluded from buildings or grounds in whole or in part for a period not to exceed one year;
b. excluding the student or visitor from the use of the facilities of IHE Delft;
c. fining the student if such fine has been agreed on or follows from the statute;
d. issuing a written reprimand;
e. retribution for damages to properties and or facilities.

Article 4 Exclusion Order by the Rectorate
4.1 The Rectorate may immediately issue an exclusion order for the buildings or grounds, or for parts of those buildings or grounds, to a student or visitor who commits an infringement on these Regulations or the rules referred to in article 2, or it may issue an exclusion order for the institute facilities.
4.2 Anyone who is subjected to measures as referred to in the first paragraph will be given the opportunity for a subsequent hearing as soon as possible by or on behalf of the Rectorate if this was not previously possible due to the urgent nature of the matter at hand.
4.3 The exclusion order will contain at least the following:
a. an indication of the buildings and/or grounds or the parts of the buildings and/or grounds of IHE Delft and/or the facilities or use of the facilities of IHE Delft to which the exclusion order applies;
b. the duration of the exclusion order;
c. the reasons for the exclusion order;
d. any conditions which will result in the effectuation of the exclusion order in case of noncompliance.

Article 5 Termination of the exclusion order
5.1 The Rectorate may, of its own accord or in response to a request by a person who is subject to a disciplinary measure in the form of an exclusion order as referred to in these Regulations, choose to terminate the exclusion order or alter its scope before it has elapsed if there is sound reason to do so according to the judgement of the Rectorate.
5.2 The Rectorate may attach special conditions to the termination or alteration of the exclusion order.
5.3 If in the judgment of the Rectorate the person subject to the exclusion order, and on behalf of whom a proposal to terminate said order has been forwarded, has not met the special conditions set by the Rectorate, then the original exclusion order will once again be put into force; the period of time that has passed since the termination or alteration of the exclusion order will not be deducted from the originally specified period in this case.

Article 6 Entry into force
These Regulations enter into force on October 1st 2007
Article 7 Method of Citation
These Regulations may be cited as “Regulations for the use of buildings, grounds and facilities by students and visitors of IHE Delft”. Approved in the rectorate meeting of September 25th 2007

3.4 Plagiarism

NOTE: FAILURE TO COMPLY WITH THE TERMS OF THIS SECTION COULD JEOPARDISE YOUR DEGREE. PLEASE READ AND DIGEST CAREFULLY.

It is very important that all students understand IHE Delft rules about plagiarism.

Students sometimes break these rules unintentionally because they do not realise that some of the ways in which they have incorporated other people's work into their own, before they came to IHE Delft, may be against the rules here.

At the beginning of the programme, and before submitting any assessments, you will be required to agree to an 'own work declaration'. You will also be invited to give consent for the scanning of your work by plagiarism detection software. Work cannot be submitted unless these conditions are agreed to.

What is plagiarism?

Plagiarism is the practice of taking someone else's work or ideas and passing them off as one's own. This act is considered as academic fraud. When there is a strong presumption of plagiarism, whether occurring during the course of the study or after the completion of the study, cases will be investigated by the Examination Board. The Examination Board shall examine the cases of alleged plagiarism on their individual merits. After examining all the evidence, the Examination Board shall establish whether plagiarism and implicitly fraud has been committed. When fraud has been established the offender will be given the mark of 1.0 for the examination work.

Plagiarism detection

IHE Delft uses a computer program called Turnitin ® to assist with the detection of plagiarism. The plagiarism detection service is an online service that enables IHE Delft and its staff to carry out electronic comparison of students' work against electronic sources including other students' work. Turnitin ® works by executing searches of the World Wide Web, and extensive databases of reference material, as well as content previously submitted by other IHE Delft students.

Each new submission is compared with all the existing information. The software makes no decisions as to whether a student has plagiarised, it simply highlights sections of text that are duplicated in other sources. All work will continue to be reviewed by the course coordinator.

Once work has been submitted to the system it becomes part of the ever growing database of material against which subsequent submissions are checked.

The software is used as a tool to highlight any instance where there is a possible case of plagiarism. Passages copied directly or very closely from existing sources will be identified by the software and both the original and the potential copy will be displayed for the examiner to view. Where any direct quotations are relevant and appropriately referenced, the examiner will be able to see this and will continue to consider the next highlighted case.

Citing references

The key to avoiding plagiarism is to make sure that you give correct references for anything that you have taken from other sources to include in your academic work. This might include, for example, any ideas, theories, findings, images, diagrams or direct quotations that you have used. At IHE Delft the house style for references is based on the Hydrogeology Journal output. If you take any material word for word from another source, it is essential that you make it clear to your reader that this is what you have done.

If you take material from another source, change a few words and then include the reference you may still have committed a plagiarism offence because you have not made it clear to your reader that you have essentially reproduced part of the original source. You should either express the ideas fully in your own words and give the reference or else use clearly labelled direct quotes. Bear in mind that if you include too many direct quotes in your work this may reduce your grade, as the marker will find

it difficult to see evidence of your own understanding of the topic. You must also include a bibliography and references section at the end of your work that provides the full details of all of the sources cited within the text. You should be aware that, for work done in other subject areas, you might be expected to use a different referencing system.
The process of referencing may seem rather complicated and arbitrary, if it is new to you, but it should begin to make more sense as you progress through your studies. In order to assess your work and to give you useful feedback your marker needs to have a clear sense of what ideas you have developed for yourself and what comes from elsewhere. To be fair to all of the students on the course it is important that each student is given grades that accurately reflect their own efforts. As you learn to produce work at a Master standard, you are developing the skills that will allow you to participate within wider communities of scholars. In these communities new knowledge and understanding is often developed by building on the work of others. By properly acknowledging earlier work you give credit where it is due and help to maintain the integrity and credibility of academic research in this area. Clear referencing also allows readers to learn about the wider literature through your work. It is often the case that understanding the ways in which particular scholars have contributed to the development of the literature makes it much easier to make sense of the current state of play.

Team work, accidental and self-plagiarism plagiarism
Students sometimes wonder where to draw the line between discussing their ideas with their peers (which can be an excellent learning experience) and unacceptable collusion. The time to be particularly careful is when you are preparing work for assessment. You need to be certain that the work you submit represents your own process of engagement with the task set. You may get into difficulty if, for example, reading another student's plan for their work influences you, or if you show them your plan. Assisting another student to plagiarise is a cheating offence.
In addition to giving references for all of the materials that you have actually included within your assignments, it is important to appropriately acknowledge other sources of guidance you have used when preparing your work.
Accidental plagiarism is sometimes a result of a student not yet having fully come to terms with how to study effectively at university. For example, the ways in which students take their notes sometimes makes it difficult for them to later distinguish between verbatim quotes, paraphrased material and their own ideas. A student may also plagiarise unintentionally because they have been feeling daunted by a piece of work and so have put it off for so long that they have had to rush to meet the deadline. If you think these kinds of wider issues may be relevant to you then you should contact your module coordinator.

Plagiarism guide's references
The following sources were used in the development of the plagiarism guide:
Blum, S. D. (2009). My word! : plagiarism and college culture. Ithaca: Cornell University Press.
Carroll, J. and Appleton, J. (2001). Plagiarism: A Good Practice Guide. Oxford: Oxford Brookes University and Joint Information Systems Committee
Eisner, C., & Vicinus, M. (2008). Originality, imitation, and plagiarism : teaching writing in the digital age. Ann Arbor: University of Michigan Press.
Sutherland-Smith, W. (2008). Plagiarism, the Internet and student learning : improving academic integrity. New York: Routledge.
Harvard University Guide to Plagiarism
http://isites.harvard.edu/icb/icb.do?keyword=k70847&pageid=icb.page355322
Purdue University Writing Lab
http://owl.english.purdue.edu/
University of Princeton Academic Integrity
Site http://www.princeton.edu/pr/pub/integrity/pages/plagiarism/
University of Teesside Plagiarism Guidance http://dissc.tees.ac.uk/Plagiarism/Plag-4.htm

4 Facilities

4.1 Location

The IHE Delft buildings and facilities are located on a single compound at the Westvest 7 in the centre of Delft. The buildings provide an efficient atmosphere for optimal learning and creativity, direct communication with lecturers and other staff, as well as meeting with fellow students. The building is open during the following times:
Monday to Friday 07:30 – 20:00
Saturday 08:00 – 12:30

4.2 Student Affairs (office)

The Student Affairs office provides non-academic support to students. The SA office takes care of student applications and student registration. The new students are also assisted with formalities such as applications for residence permits, insurance, bank accounts, and fellowship issues. Housing arrangements in one of the hostels are being made immediately upon arrival.
Throughout their study period, students can contact the staff during office hours for information or questions related to health, religion or other issues related to the student's wellbeing. Personal matters can be discussed with the student counsellor and will be dealt with strictly confidential.
During the entire academic year, SA organizes a number of social and cultural activities including the weekly movie night, social evenings and the annual Christmas dinner. Other activities include cultural excursions to interesting cities and places in the Netherlands and other countries in Europe. Furthermore, the students are given opportunity to actively practice sports on a regular basis. From October to May, the Institute arranges accommodation in Delft for such sports as soccer, volleyball, basketball and badminton. The SA office organizes sports events and tournaments, in which the teams can compete internally, but also against players from other international institutes.

4.3 Student Association Board

The Student Association Board (SAB) is composed of representatives who are elected by the students in annual elections that take place several weeks after the opening of the academic year.
The SAB provides a forum through which students can share their experiences, problems and general issues on study-related matters. If necessary, the SAB will bring these matters forward in discussions with the executive levels of the Institute. The board can be contacted directly via its members or the general e-mail address sab@unesco-ihe.org. The SAB closely co-operates with the Student Affairs office in organizing social and sporting events.

4.4 ICT services

IHE Delft provides modern computing (IT) facilities for education and research. A local wired- and wireless network is available in the building. Through the network all computers have access to a fast Internet connection. Besides that, participants have unlimited access to Internet in all hostels provided by IHE Delft.
All desktop and laptop PCs are Intel based with Microsoft Windows operating system. The laptop PC will be provided in order to get access to the IT facilities.
The laptop is on loan for use during studying at IHE Delft. At the end of the study, the institute offers the possibility to buy the laptop. The contract given clearly states the terms and conditions for borrowing the laptop. Bringing one's own laptop is allowed; however, laptops other than the IHE Delft laptop might not give access to all the required IT-facilities and might not be supported by IT-service desk.
A wide range of software packages is available, ranging from standard PC-software, like Microsoft Office (Word, Excel, etc.) to special modelling software used for the education programmes. Upon registration you will receive an IHE Delft e-mail account which enables you to make use of all relevant

computing facilities at the Institute.. A web-based E-learning and collaborative system is accessible for all participants to exchange learning information and documents.
For specific applications during the thesis study, it may be possible to use specialist software packages on the laptop PCs. This is, however, dependent on the particular type of licence agreement that the Institute has with the supplier. Enquiries for specific software should be made at the computer helpdesk.

4.5 General Facilities in the Building

In the reception area of the building, students have their own locker for the distribution of schedules, lecture notes and other study-related papers, and private mail. Two monitor screens opposite the reception desk are regularly updated with news or information on events taking place at IHE Delft.
The restaurant provides a wide variety of reasonable-priced multicultural meals and beverages during lunchtime. The meals can be paid using the bank-card or cash. Coffee, tea and soft drinks can be obtained from machines throughout the day.
The building houses a number of fully-equipped lecture rooms and theatres, which can accommodate groups of all sizes from 15 to 300 persons. Rooms for facilitating computer classes and workshops are present and can be used freely by students outside class hours.
Furthermore, the Institute has its own printing and reproduction facilities and also contains an in-house distance learning and video conferencing centre. Photocopy services are available to students.
In the building also a meditation room is available, which is located on the third floor.

4.6 IHE Delft Library and Information Services

IHE Delft's Library provides access to over 35,000 printed titles, among which the complete collection of IHE Delft Master thesis and PHD dissertations. Furthermore the collection contains over 8.000 online journals. The online journals collection is accessible on the network at the Westvest premises or through remote authentication through the portal. For more information please visit the Library's Internet page http://www.un-ihe.org/library
The library is open to all IHE Delft participants and staff, and to visitors by appointment.
The services provided by the library include lending out books, requesting articles and other materials through the inter-library loan system and providing assistance in searching the electronic catalogue.

Membership
Upon registration participants receive a registration card which can also be used to borrow items from the library collection.

The catalogue
The library collection is accessible through an electronic catalogue, WorldCat Discovery as well as the IHE Institutional Repository.
WorldCat Discovery and the IHE Repository's end-user experience is designed for smart phones, tablets and workstations and allows the IHE Library to showcase its printed and digital collections.
Borrowing library items
A maximum of ten items may be borrowed from the library at any one time. The maximum loan period is 21 days, renewable up to a maximum of 42 days. Renewals can be made online, http://www.un-ihe.org/library by using the borrower information function within WorldCat Discovery. Please note that the loan period can be extended only if the items have not already been reserved by another person.
Reference works, MSc theses, bound and non-bound periodicals and materials bearing a green sticker may not be borrowed, however most of these materials are digitally available. By using their library card to borrow items from the library, borrowers agree to be responsible for those items, including the cost of replacing lost or damaged items.

Opening Hours
Reference desk and books depot
Monday-Friday 09:00–17.30

Reading Room
Monday-Friday 09:00-20:00

Please note that the Library opening hours are subject to change. Visit the Library webpage for regular updates. For further information please contact the library reference desk.
Email: library@un-ihe.org
Tel: +31 (0)15 215 1878
Fax: +31 (0)15 212 2921

4.7 Laboratories

Modern educational and research laboratories are available in the fields of chemistry, process technology, microbiology, aquatic ecology and soil science. A wide range of standard analytical tests can be performed for chemical, physical and microbiological water, air and soil quality analyses.
Elemental analyses, various kinds of microscopy and analytical techniques such as spectrophotometry, gas- and ion chromatography, and atomic absorption can be carried out. A wide range of laboratory and bench-scale reactors, temperature and light controlled growth chambers, and various constant temperature rooms are available for research in one of the departmental research programs, including waste water management using aquatic macrophytes and wetlands, the adsorption and/or (an-)aerobic degradation of micro pollutants, self-purification in drains and filtration. Through close co-operation with the Delft University of Technology and other educational and research institutions, research possibilities are quite extensive.
In addition to the in-house facilities, the laboratory has a range of instrumentation and equipment available for field instruction and for conducting hydrological or environmental field experiments and measurements.

4.8 Study Materials

Study materials such as textbooks, lecture notes and hand-outs are provided by the Institute.
Students receive the lecture notes either on paper in their personal locker or via the electronic repository 'eCampusXL', before the start of the involved lecture series. Additional material (on paper or electronically) can be provided by the lecturers in the form of hand-outs. Also other materials, such as for example PowerPoint presentations or exercise materials used by the lecturers, can be accessed or downloaded from the electronic repository. Reference works are available from the Institute library or the library of the Delft University of Technology (see above).
Students can login to the electronic repository from any location via the Internet web page located at http://ecampusxl.unesco-ihe.org
Students are expected to bring in other materials, such as electronic calculators and language dictionaries on their own account.

4.9 English support courses

The official language at IHE of all courses, lecture materials and assessments is English.

Introduction
A variety of academic writing courses are offered to students during the first 12 months of study. Students are allocated a place on these courses according to their language level, not

their specialization. Writing courses are available from 'lower-intermediate' to 'advanced' level, consisting of about 20 hours contact time. These courses run parallel to scheduled lectures, and are not limited to one programme specialization or module.

Placement Test for everyone

Every student must take the English Placement Test. Based on the result, the student may be required to follow an academic writing course. Placement tests are held in October and January. Participants with weakest English skills are strongly advised to take the test in October, as they will receive support courses first. All remaining participants will be tested in January. Places on writing courses are allocated according to the student's placement test score. A student cannot join a writing course unless s/he has taken the placement test.

Students whose test score is at A1, A2 or B1 level CEFR (The Council of Europe's *Common European Framework* of Reference for Languages is a basis for recognising language qualifications. A1-A2 = Basic; B1-B2 = Intermediate; C1-C2 = Advanced), are obliged to attend a support course: attendance is required. Students whose test score is B2 are strongly recommended to attend a course. If students who score B2choose to take a support course, regular attendance is required. Those with score levels C1 and C2 are exempt from academic writing courses.

Scheduling and attendance

Academic Writing courses are given throughout the year, with the first courses starting in October and the last courses ending in August/September. Students are assigned a course based on their Placement Test performance.

English support courses usually consist of about 20 hours contact time, approximately 13 or 14 lectures. English support courses are always scheduled at the following times:

Tuesdays 3.45pm-5.30pm

Thursdays 8.45am-10.30am

Occasionally classes are given on Saturday mornings. In special cases, evening classes may be necessary.

A Certificate of Attendance will be provided on completion of an academic writing course, provided attendance requirements have been met. If a student does not turn up for the allocated course without giving notification of absence, s/he forfeits their place on the course. An alternative course is not provided.

Summary descriptions of writing courses:

1.First Steps in Academic Writing: lower intermediate

Based on textbook '*First Steps in Academic Writing*', Longman

This course provides low-intermediate students with essential tools to master basic academic writing. It focuses on paragraph organization, sentence structure, and grammar. Students are guided through the writing process to produce well-organized, clearly developed paragraphs.

Simple explanations are supported by clear examples to help students through typical rough spots, and numerous practices help students assimilate each skill.

2.New Headway Academic Skills: intermediate

Based on textbook *'New Headway Academic Skills',* Oxford University Press

This course combines reading, writing, and study skills, and is suited to those who have reasonable English but have not studied for a while. It aims to refresh and consolidate existing language through practice, as well as to learn new language. There is guided writing practice and relevant grammatical structures are explained. In addition, skills and strategies which develop good vocabulary learning and recording are included.

3.Academic Writing: upper intermediate

Based on textbook '*Focus on Academic Skills for IELTS'*, Pearson-Longman
· Focuses on academic writing skills
· Includes vocabulary building and reading techniques relevant to research.
· Specific writing skills include: collocations; useful phrases and language of research; the language of change (increase, decrease, etc); interpreting and comparing information from diagrams; presenting arguments and opinions; justifying solutions (modal verbs, conditionals) and much more to improve academic writing.
· Life-long learning. This textbook offers systematic preparation for the IELTS exam, hence it can help any student who wishes to gain this internationally-recognised certificate, or improve their existing score.

4.Advanced Academic Writing: advanced
Based on textbook '*Academic Writing, A Handbook for International Students*' Routledge
Specifically aimed at improving key academic writing skills, this is a very practical and thorough course. Three main areas are covered:
The Writing Process – from making an outline to proofreading;
Elements of Writing – writing skills such as making comparisons, describing results and paraphrasing;
Accuracy in Writing – to improve common problems, e.g. articles, passives, prepositions.

The above courses follow a workshop approach and are designed to provide maximum hands-on practice. There is a strong emphasis on collaborative writing activities for students, with the lecturer adopting the role of facilitator.

5.MSc Thesis Writing: for all participants. A reader is provided.
In August/September a series of lectures is given, open to all MSc participants, on thesis writing. The lectures aim to make participants aware of the conventions and structures used to write a proposal, literature review and thesis, and how to present their judgements in a persuasive and reasoned argument. Topics will include proposal writing, literature review, thesis chapters, argument structure, paragraph writing, editing skills, etc.

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Study Guide

Academic calendar

Academic programme 2019 - 2021

IHE DELFT - Academic Calendar 2019/2021

YEAR 1																																																
		2019											2020																				fieldtrip			2020								Groupwork			2020	
		October		November				December					January				February				March					April				May				June					July				August				Sept	
Terms			Term 1			Term 2			..	Term 3					Term 4			..	Term 5			Term 6			..	Term 7			Term 8			..	Term 9			Term 10			Term 11			..	T12	Term 13			..	
Week		42	43	44	45	46	47	48	49	50	51	52	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Mon		14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	03	10	17	24	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15	22	29	06	13	20	27	03	10	17	24	31
Tue		15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	03	10	17	24	31	07	14	21	28	05	12	19	26	02	09	16	23	30	07	14	21	28	04	11	18	25	01
Wed		16	23	30	06	13	20	27	04	11	18	25	01	08	15	22	29	05	12	19	26	04	11	18	25	01	08	15	22	29	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	02
Thu		17	24	31	07	14	21	28	05	12	19	26	02	09	16	23	30	06	13	20	27	05	12	19	26	02	09	16	23	30	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	03
Fri		18	25	01	08	15	22	29	06	13	20	27	03	10	17	24	31	07	14	21	28	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04
Sat		19	26	02	09	16	23	30	07	14	21	28	04	11	18	25	01	08	15	22	29	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15	22	29	05
Sun		20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	02	09	16	23	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05	12	19	26	02	09	16	23	30	06
Credits			1E	4ECTS		5 ECTS				2x5 ECTS								2x5 ECTS								2x5 ECTS							5 ECTS			2x5 ECTS							1E	5 ECTS				
Modules			M1	M2a		Module 2b				Module 3					Module 4				Module 5			Module 6				Module 7			Module 8				Module 9			Module 10			Module 11				M12	Module 13				

YEAR 2																																		
		2020																	2021															
		September				October				November				December					January				February				March				April			
Terms		Term 14					T15	Term 1			Term 2			..	Term 3				Term 4				..	Term 5			Term 6			..	Term 7			T8
Week		37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Mon		07	14	21	28	05	12	19	26	02	09	16	23	30	07	14	21	28	04	11	18	25	01	08	15	22	01	08	15	22	29	05	12	19
Tue		08	15	22	29	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	02	09	16	23	02	09	16	23	30	06	13	20
Wed		09	16	23	30	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	03	10	17	24	03	10	17	24	31	07	14	21
Thu		10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	04	11	18	25	01	08	15	22
Fri		11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15	22	29	05	12	19	26	05	12	19	26	02	09	16	23
Sat		12	19	26	03	10	17	24	31	07	14	21	28	05	12	19	26	02	09	16	23	30	06	13	20	27	06	13	20	27	03	10	17	24
Sun		13	20	27	04	11	18	25	01	08	15	22	29	06	13	20	27	03	10	17	24	31	07	14	21	28	07	14	21	28	04	11	18	25
Credits		9 ECTS						36 ECTS																										
Modules		Module 14						Module 15																										

= Second attempt modules 9/10/11

= Third attempt: BUT NOT 9/10/11

= Third attempt: ONLY for modules 9/10/11

= Submission date for MSc thesis

Legend

= Opening academic year

= Week one

= Freetime

= Holiday

= MSc diploma awarding

= Lecture period

= Msc thesis writing

= Examination week

= Summer course

= MSc diploma awarding *(prev year)*

Christmas: Dec 25-26 2019

Good Friday: April 10, 2020

Easter: April 12-13, 2020

Kingsday: April 27, 2020

Liberationday: May 5, 2020

Ascencion: May 21, 2020

Pentecost: May 31- June 1, 2020

Christmas: Dec 25-26, 2020

Good Friday: April 2, 2021

Easter: April 4-5, 2021

Kingsday: April 27, 2021

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Study Guide

Examination regulations

Academic programme 2019 - 2021

United Nations
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of UNESCO

Education and Examination Regulations 2019– 2021

For:

- the Master Programmes in
    a. Urban Water and Sanitation
    b. Environmental Science
    c. Water Management and Governance
    d. Water Science and Engineering
- short and online courses which are part of these programmes (starting between 17 Oct 2019 and 16 Oct 2020)
- Graduate professional diploma programmes
- Become effective per October 18, 2019

Approved by the Rectorate of IHE Delft,

Table of Contents

Chapter 1. Definition of terms

The following terms are defined in the context of these regulations:

Act: the Higher Education and Scientific Research Act (*Wet op Hoger Onderwijs en Wetenschappelijk Onderzoek*);

Assessment: is the evaluation of a student's achievement on a course or topic. Assessments can have different formats, such as (written and oral) examinations, assignments, presentations etc.

Blind marking: the student information is hidden from the examiner while they are marking the examination;

Co- mentor: a staff member from an external institute or different chair group within IHE Delft involved in the daily direction of a student during the MSc thesis research phase;

Degree: a degree as stipulated in article 7.10a. of the Act;

Double (multiple) degree programme: a master programme offered by multiple institutes of higher education leading to multiple degrees;

Diploma: a written proof of evidence as stipulated in art 7.11 of the Act that a student has passed all programme requirements;

Diploma supplement: a written document as stipulated in art 7.11/4 giving information about nature and content of the programme and the results obtained by the student for each component of the programme;

ECTS: the European Credit Transfer and Accumulation System: a standard for comparing the study attainment and performance of students of higher education across the European Union and other collaborating European countries;

Examination: an assessment for a part of the module as stipulated in art 7.10/1 of the Act;

Examination Board: the committee as stipulated in article 7.12 of the Act;

Academic Appeals Board: the committee as stipulated in article 7.60 of the Act;

(External) Examiner: a person who sets and marks examinations to test students knowledge or proficiency

Fraud: a deception deliberately practiced in order to secure unfair or unlawful gain;

Joint programme: a master programme offered by two or more institutes of higher education leading to a joint or multiple degree(s);

Mentor: staff member involved in the daily direction of a student during the MSc thesis research phase;

Module: a self-contained programme unit with specified learning objectives, as stipulated in article 7.3 of the Act; can also be offered as a short- or online course.

Module plan: a document describing a.o. the learning objectives, content, didactic methods and assessments. Modules plans are part of the study guide;

Observer: a person who is present at an oral examination in order to monitor and listen to what happens;

Online short course: a module offered as an online certificate course;

Peer review: is the evaluation of work by one or more people of similar competence to the producers of the work (peers);

Plagiarism: the practice of taking someone else's work and passing them off as one's own;

Practical: a practical educational activity as stipulated in article 7.13, paragraph 2, clause d of the Act, taking one of the following forms:

- the writing of a report or thesis;
- producing a report, study assignment or design;
- conducting a test or experiment;
- performing an oral presentation;
- participating in groupwork, fieldwork or a fieldtrip;
- conducting a research assignment; or
- participation in other educational activities that aim to develop specific skills;

Programme evaluation: the formal evaluation of the student performance before graduation (in the Act: *examen*);

Study Guide: a reference document for a specific programme containing generic and programme specific information, which students need to know throughout their programme;

Short course: a module offered as a face-to face certificate course;

Student: a person who is registered in a study programme and sits for assessments;

Supervisor: (associate) professor responsible for the work of student during the MSc thesis research phase.

Taught part: part of the study programme consisting of taught modules and courses (modules 1 – 13);

Transfer of credit points: the procedure of granting credits to a student for studies completed at another institute;

Research part: part of the study programme consisting of an individual research work by the student leading to a MSc thesis, based on an approved research proposal (modules 14 and 15).

Chapter 2. General Information

Article 1 Scope of the regulations

1.1 The present regulations apply to the education offerings and examinations within:

I. the Master programmes in:
   i. Urban Water and Sanitation
   ii. Environmental Science
   iii. Water Management and Governance
   iv. Water Science and Engineering

II. Short and online courses which are part of these master programmes

III. Graduate Professional Diploma Programmes (GPDP)

referred to hereafter as 'the programmes'.

The programmes are executed by the IHE Delft Institute for Water Education, Delft, the Netherlands, referred to hereafter as 'the Institute' and several partner institutes in various countries.

1.2 For the following 3 specialisations, leading to a joint degree, separate examination regulations apply:
- Urban Water Engineering and Management (UWEM);
- Limnology and Wetland Management (LWM);
- International Master of Science in Environmental Technology and Engineering (IMETE);

1.3 In case a joint specialisation (see art. 1.4) leads to a double or multiple degrees, the rules and regulations of the partner institute will be applicable for those parts of the programme organised and implemented by the partner.

1.4 These regulations apply to the following Master of Science programmes and specialisations:

1. Urban Water and Sanitation programme:

Specialisation	Offered by	Type of degree
1. Water Supply Engineering	IHE Delft	IHE Delft degree
2. Sanitary Engineering	IHE Delft	IHE Delft degree
	• IHE Delft • Universidad de Valle, Cali, Colombia	Double degree
3. Urban Water Engineering and Management	• IHE Delft • Asian Institute of Technology, Thailand	Joint degree

2. Environmental Science programme:

Specialisation	Offered by	Type of degree
1. Environmental Science and Technology	IHE Delft	IHE Delft degree
2. Environmental Planning and Management	IHE Delft	IHE Delft degree
3. Applied Aquatic Ecology for Sustainability	IHE Delft	IHE Delft degree
4. Limnology and Wetland Management	• IHE Delft • BOKU - University of Natural Resources and Life Sciences, Vienna, Austria	Joint degree

	• Egerton University, Egerton, Kenya	
5. Environmental Technology and Engineering (Erasmus Mundus programme)	• IHE Delft • Ghent University, Belgium, • University of Chemistry and Technology (UCT), Czech Republic.	Joint degree

3. Water Management and Governance programme:

Specialisation	Offered by	Type of degree
1. Water Management and Governance	IHE Delft	IHE Delft degree
2. Water Cooperation and Diplomacy	• IHE Delft • Oregon State University, USA • UPEACE, Costa Rica	Multiple degree

4. Water Science and Engineering programme:

Specialisation	Offered by	Type of degree
1. Hydrology and Water Resources	IHE Delft	IHE Delft degree
2. Hydraulic Engineering - River Basin Development	IHE Delft	IHE Delft degree
3. Coastal Engineering and Port Development	IHE Delft	IHE Delft degree
4. Land and Water development for Food Security	IHE Delft	IHE Delft degree
	• IHE Delft • University of Nebraska -Lincoln, USA	Double degree
5. Hydroinformatics- Modelling and information systems for water management	IHE Delft	IHE Delft degree
	• IHE Delft • Escuela Colombiana de Ingeniería Julio Garavito, Bogotá, Colombia	Double degree
6. Flood Risk Management (Erasmus Mundus programme).	• IHE Delft • Technische Universität Dresden, Germany • Universitat Politècnica de Catalunya, Spain • University of Ljubljana, Slovenia	Multiple degree
7. Groundwater and Global Change - Impacts and Adaptation (Erasmus Mundus programme).	• IHE Delft • TU Dresden, Germany • University of Lisbon, Portugal	Multiple degree
8. Sustainable Urban Water Management	IHE Delft	IHE Delft degree

5. Graduate professional diploma programmes:

Name	Offered by	
Sanitary Engineering	• IHE Delft	Diploma
Sanitation	• IHE Delft	Diploma
Water Supply Engineering	• IHE Delft	Diploma
Water and Wastewater Treatment Technology	• IHE Delft	Diploma
Urban Water Networks and Floods	• IHE Delft	Diploma
Cleaner Production and Residuals Management	• IHE Delft	Diploma

Article 2 Aim of the programmes and courses

2.1 The aim of the master programmes is for students to acquire knowledge, insight and skills that are required for them to function as independent professionals within their field of study and to be appropriate candidates for further study towards a research career.

2.2 The final qualifications of the master programme graduates are listed in Appendix A.

2.3 The aim of a short course or an online course is for students to acquire knowledge, insight and skills of a particular field of study.

2.4 The aim of the GPDP is to convey to the students the knowledge, insight and skills of a particular field of study and consists of a number of online modules, regular master modules or a combination of both.

Article 3 Full-time/part-time

3.1 The master programmes and short courses are offered on a full-time basis.

3.2 Online courses are offered on a part-time basis.

3.3 The GPDP are offered on a part-time basis.

3.4 The official language of all courses, lecture materials and assessments is English.

Chapter 3. Content of the Programme

Article 4 Constitution of the specializations and joint specializations

4.1 The constitution of each programme specialization and diploma programme is described in the study guides of IHE Delft (and the partner institutes in case of joint or double / multiple degree programmes)

4.2 The learning objectives of all modules (face to face and online), the content and assessment methods are described in the module plans.

Article 5 Participation

5.1 The attendance and active participation of students is required for all scheduled curricular activities, examinations and the practicals of the programme in which they are registered.

Chapter 4. Assessments

Article 6 Timing, formats and duration of assessments

6.1 Assessments tests whether a student has met the learning objectives.

6.2 A module is assessed through (a combination of) written and/or oral examinations, assignments and presentations as described in the module plans of the study guide.

6.3 The sequence of the modules and its assessments will take place according to the order described in the study guide.

6.4 During the taught part of the first academic year, students in the MSc programmes have 3 attempts to pass all modules. A 4th attempt is allowed for maximum 1 module, to be taken before the end of January during the second academic year.
If a student fails the 4th attempt, he / she can still submit his/her MSc thesis, but can not defend it. After a successful resit of the failed module during the next academic year, the student is allowed to defend his / her thesis.

6.5 The date and time of the written and oral assessments are announced in the programme schedules. Written and oral assessments take place during the examination periods indicated in the academic calendar.

6.6 If a student of a short or online course has indicated the wish to take part in the assessment, he/she is advised to consult the applicable course coordinator for the exact method and timing of the assessment. Written and oral assessments for short and online course participants (NB: This applies to participants who paid for doing assessments) are normally held at the end of the short course (during the scheduled exam week). In agreement with the course coordinator the assessment can be postponed with max 4 weeks.

6.7 The format for the final assessment of a short course can deviate from the assessment format for the corresponding module.

6.8 The duration of a written examination may not exceed three hours and is scheduled to take place in a morning or afternoon session. In case the examination consists of two or more different parts, a break of 15 minutes is allowed, provided that all examination work of the first part(s) is collected by the invigilators before the break.

6.9 In the case of a combination of oral and written assessments of a module during the examination week, the maximum total duration of the combined examination shall not exceed three hours.

6.10 Deadlines for submission of assignments are set by the examiner. The latest moment is the examination week following the module.

Article 7 Re- assessments

7.1 Re-assessment consists of re-taking one or more failed assessments as described in the assessment part of the module plan, as is required to achieve a successful module result.

Taking part in re-assessments is required if:

- one of the assessments scores is lower than 5.0 or marked as a ‘fail’;

- the module mark is a fail (lower than 6.0). In this case one or more assessments for which a mark lower than 6.0 has been obtained can be re-taken.

Taking part in re-assessments is not allowed if:

- the module mark is a pass (6.0 or higher) and all assessments are scored 5.0. or higher

7.2 The first written and oral re-assessments take place in the examination period immediately following the examination period of the first attempt, except for the re-examinations of modules 10 and 11 for which a separate day will be announced in the academic calendar.
Also for the second written and oral re-assessments for modules 10 and 11 a separate day will be announced in the academic calendar.

7.3 Students of short courses or online courses (including GPDP) are eligible to sit for one (1) re-assessment within 3 months after the end date of the course they are registered for (NB: This applies to participants who paid for doing assessments).

7.4 Re-submission of failed assignments has to take place before the end of the examination period immediately following the examination period of the first attempt.

7.5 Students are not allowed to sit for further assessments during the programme period they are registered for, if they failed 14 or more credits (after the first re-assessments) of the taught part of the programme (this does not include the MSc proposal defence).

7.6 The format of a re- assessment may deviate from that of the first assessments for the same module.

Article 8 The organisation of the assessments

8.1 Assessments are carried out according to the Examination Procedures as described in annex B of these regulations.

8.2 In the case of oral or written assessments for an online course, the student has to provide proof of identity (e.g. passport) to the examiner.

8.3 Students are expected to be in the examination room 10 minutes before the scheduled start of the exam. They will not be allowed to enter the examination room after the scheduled start of the examination.

8.4 Misreading the date, time or room allocation are not accepted as legitimate reasons for absence from an examination or for arriving too late.

8.5 Students who suffer from a physical or sensory impairment are offered the opportunity to take examinations such that, as much as possible, account is taken of their disability. For more details reference is made to annex H

Article 9 Oral assessments

9.1 Oral assessments are taken individually (only one student at a time). During oral assessments, a second staff member is present as an observer. In case of absence of

a second staff member, the oral assessment is recorded for reference purposes and kept on file for 12 weeks.

9.2 During oral assessments for online courses a second staff member as observer is not required. The oral assessment has to be digitally recorded and kept on file for 12 weeks.

9.3 Oral assessments are non-public, unless stated otherwise in the module plan or current regulations.

Article 10 MSc proposal defence

10.1 The MSc thesis proposal examination is an oral examination during the examination period indicated in the academic calendar. The examination consists of a presentation of the proposal, and a discussion with the examining committee. The examining committee consists of the supervisor and the mentor of the student. The examination is open to public attendance and discussion.

10.2 To be allowed to sit for the MSc proposal defence, students must have successfully completed all modules, with a maximum of 1 failed module.

10.3 The MSc thesis proposal defence is assessed as a pass or a fail. In the case of a fail, the student may defend his/her thesis proposal one more time within one month after the first attempt before the same examining committee as stipulated in article 10.1. In the case of an unsuccessful second attempt the student is not allowed to embark on the MSc thesis work.

Article 11 Replacement of modules and transfer of credit points

11.1 Replacement of a module by a course followed elsewhere and transfer of credit points is generally not granted. In exceptional cases, the Examination Board may evaluate a request and conclude to grant a transfer of credit points, after receiving a favourable recommendation from the programme committee.

11.2 For joint specializations credits obtained at the partner institute are accepted on the basis of the credit transfer agreements made in the cooperation documents.

Article 12 Absence from examinations and late submission of assignments

12.1 Absence from an examination or late submission of an assignment must be reported by the student to the programme coordinator as early as possible. Absence is only allowed if the student missed a substantial part of the education relevant for the examination due to:

a. medical reasons, to be confirmed by student counsellor or a statement by a doctor;
b. serious personal circumstances beyond control of the student which should be supported by written evidence as far as possible.

12.2 For cases in which the programme coordinator, in agreement with the module coordinator, decides that the absence from an examination or the late submission of the assignment is justified, the student shall sit the examination or submit the assignments as soon as is reasonably possible.

12.3 For cases in which the programme coordinator, in agreement with the module coordinator, decides that the absence from an examination or the late submission of the assignment is not justified, a mark of 1.0 will be recorded.

Article 13 Fraud

13.1 Any assessment must be taken by the student him or herself. Never by someone else.

13.2 If a student is caught in an attempt to take unfair advantage during an examination, the invigilators or examiners inform the Academic Registrar who submits a written report to the Examination Board after investigation of the incident, and after having had a discussion with the student.

13.3 Plagiarism is an act of fraud.

13.4 An examiner who observes or suspects fraud during the marking of examination work is required to submit a substantiating report to the Examination Board via the module coordinator.

13.5 If the Examination Board, after investigation of the incident as described in articles 13.1-13.3, concludes that there has been a case of fraud, the offender will be given a mark of 1.0 for the examination work.

13.6 If a student commits severe or repeated fraud, the Examination Board may decide to withdraw the student the right to sit for one or more examinations for a determined period with a maximum period of one year.

13.7 In case of severe or repeated fraud the rectorate, upon advice of the Examination Board, may also decide to permanently terminate the registration of the student concerned.

Chapter 5. Results of Assessments

Article 14 Assessment and notice of assessment results

14.1 Assessment results (including the thesis examination) are represented on a scale of 1.0 to 10.0, with one decimal of accuracy, unless the assessment is a pass or non-pass. Marks 6.0 and higher indicate a pass.
The following grading scale is used:

9.0 - 10.0	Excellent
8.0 - 8.9	Very good
7.0 - 7.9	Good
6.0 - 6.9	Sufficient
5.9 and below	Fail

14.2 Assessment results (including the thesis examination) obtained at partner institutes are represented according to the descriptions in annex C of these regulations.

14.3 The mark for a module is determined by the weighted average of the results of the various assessments. The weights for each assessment are stated in the module plan. The minimum mark that should be obtained for each assessment is 5.0.
Marks between 5.0 and 5.9 can be compensated by higher marks of other assessments in the same module.

14.4 After a successful re-sit of an assessment, the mark for the module is recalculated according to the weighted average of the assessment results. The highest mark obtained (first assessment or re-sit) for an assessment will be used. However, the maximum module mark which can be awarded when there has been a re-assessment is 7.0.

14.5 Students will be informed on the outcome of their module mark and assessments as soon as possible, at least three weeks before the planned re-assessments.

14.6 Students will be informed on the outcome of their module mark and re-assessments as soon as possible, but maximum three weeks after the re-assessments.

14.7 The examination committee for the thesis examination shall communicate the result immediately after the defence. The mark and distinction recommendation remain conditional until confirmed by the Examination Board.

Article 15 Period of validity

15.1 The result of a module, if successful, is valid for an unlimited period of time.

15.2 Notwithstanding paragraph 1 of this article, the period of validity for which the Examination Board takes module results into account for the programme evaluation is four years after the end of the academic year in which the results were obtained

Article 16 Right to inspection of assessments

16.1 Students may, upon their own request, peruse their assessment work within ten working days after they were notified of the result.

16.2 Where a practical is part of a module, the work for that part may be returned to the students when all assessments of the module are fully completed.

Article 17 Study progress and study advice

17.1 All study results that are required for evaluating the performance of the students, are recorded by the Education Bureau on behalf of the Examination Board.

17.2 Students can view their individual study progress in the electronic study information system.

Chapter 6. Thesis Examination

Article 18 The organisation of the thesis examination

18.1 Students can sit the thesis examination only if all other modules required to obtain the degree have been successfully completed.

18.2 All students have to submit the examination version of the thesis report on or before the date announced by the Examination Board, and defend their thesis in the designated period.

18.3 The thesis will be assessed by a thesis examination committee consisting of three members: an IHE professor as the chairperson, the IHE mentor and one independent examiner.
Associate professors with UTQ can also be supervisors and chair the MSc examination Committees.

In special circumstances the committee may consist of more than three members (but not more than four):

a) If the IHE Delft mentor is a PhD fellow, an additional staff member has to be appointed in the committee.

b) If the research work is carried out outside IHE Delft a co-mentor from that institute may be appointed.

c) If the research work is co-mentored by a staff member from another chair group at IHE Delft;

d) In the case of a double degree or joint degree programme, where the MSc research work is carried out under co-supervision of staff members of the partnering institutes.

Independent examiners:

a) are not involved in the preparation of the thesis work
b) must be capable of reaching an independent judgement of the quality of the MSc thesis and the student without having any personal interest in this judgement and that of the other members of the examination committee.
c) are from outside the institute or are in exceptional cases from another chairgroup within the institute, and are not involved in the supervision of the research work.
d) have to possess at least a Master degree.

18.4 After submission, the thesis will be assessed by the members of the examination committee, including a check on plagiarism. If the examination committee concludes that the thesis is unfit to be successfully defended, they may propose to the student to accept a fail without the thesis defence. The student is given the opportunity to re-sit as per Article 18.5. The student can also decline the offer and ask for the thesis defence to be organised anyhow.

18.5 If the outcome of the thesis examination, including the defence, is a fail, the examination can be repeated once. The examination committee will detail the reasons

for the failure in writing and clarify what is required to pass the exam. The student is not entitled to receive further supervision.
The thesis shall be re-submitted and the defence shall be done within three months after the date of the first defence session and will, in principle, be done in front of the same MSc Examination Committee as for the first attempt. The examination can take place via videoconference.

18.6 The maximum recorded mark for a re-sit of the thesis examination is 7.0.

18.7 The MSc thesis work shall be assessed according to the MSc thesis assessment criteria as outlined in appendix E.

18.8 The mark for the thesis examination is based on the following components: written MSc thesis report, oral presentation, and examination. The latter includes the ability of the student to satisfactorily answer questions from the examination committee. The oral presentation of the thesis research has a maximum duration of 30 minutes and is followed by a maximum 30 minutes examination discussion with the examining committee.
The oral presentation is open to public attendance and discussion.

18.9 The decision on a final mark for the thesis examination in principle will be based on a consensus of the examining committee. In the case of insurmountable disagreements the chair of the examining committee takes a decision.

18.10 The maximum duration of the MSc research phase is six months for full-time study. In the case of a *force majeure,* as supported by substantiating documents, extension of this period may be granted by the Examination Board on request by the student through his/her mentor.

Chapter 7. Criteria, degrees and certificates

Article 19 Evaluation of the programme

19.1 The student has fulfilled the requirements for the programme evaluation if s/he has met the following criteria:

1. Urban Water and Sanitation programme:

Specialisation	Offered by	Type of degree	Criteria for diploma awarding			
1. Water Supply Engineering	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
2. Sanitary Engineering	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
	• IHE Delft • Universidad de Valle, Cali, Colombia	Double degree	Successfully completed all modules at IHE Delft and Cali	Obtained a minimum of 113.36 ECTS.	GPA of 3.5 or higher for the course work done at Univalle	Achieved a mark '6' or higher for the thesis examination
3. Urban Water Engineering and Management	• IHE Delft • Asian Institute of Technology, Thailand	Joint degree	Successfully completed all modules at IHE Delft and AIT	Obtained a minimum of 120 ECTS	minimum CGPA of 2,75 for courses at AIT	Has obtained a grade 'fair' or higher for the Master thesis at AIT

2. Environmental Science programme:

Specialisation	Offered by	Type of degree	Criteria for diploma awarding			
1. Environmental Science and Technology	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
2. Environmental Planning and Management	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
3. Applied Aquatic Ecology for Sustainability	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
4. Limnology and Wetland Management	• IHE Delft • BOKU - University of Natural Resources and Life Sciences, Vienna, Austria • Egerton University, Egerton, Kenya	Joint degree	Successfully completed all modules at IHE Delft, BOKU, and Egerton	Obtained a minimum of 120 ECTS		
5. Environmental Technology and Engineering Programme (IMETE)	• IHE Delft • Ghent University • University of Chemistry and Technology (UCT), Czech Republic.	Joint degree	Successfully completed all modules at IHE Delft, Ghent and Prague	Obtained a minimum of 120 ECTS		

3. Water Management and Governance programme:

Specialisation	Offered by	Type of degree	Criteria for diploma awarding			
1. Water Management and Governance	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
2. Water Cooperation and Diplomacy	IHE Delft Oregon State University U-Peace	Triple degree	Successfully completed all modules at IHE Delft, Oregon and U-Peace			

4. Water Science and Engineering programme:

Specialisation	Offered by	Type of degree	Criteria for diploma awarding			
1. Hydrology and Water Resources	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
2. Hydraulic Engineering - River Basin Development	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
3. Coastal Engineering and Port Development	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
4. Land and Water development for Food Security	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
5. Hydroinformatics- Modelling and information systems for water management	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		
	• IHE Delft • Escuela Colombiana de Ingeneria Julio Garavito, Bogota, Colombia	Double degree	Successfully completed all modules at IHE Delft and at Bogotá	Obtained a minimum of 106 ECTS		

6. Flood Risk Management (Erasmus Mundus programme).	• IHE Delft • Technische Universität Dresden, Germany • Universitat Politècnica de Catalunya, Spain • University of Ljubljana, Slovenia	Multiple degree	Successfully completed all modules of the programme, according to the grading rules of TU-Dresden, University of Ljublijana, TU-Catalonia and IHE Delft	Obtained a minimum of 120 ECTS		
7. Groundwater and Global Change - Impacts and Adaptation (Erasmus Mundus programme).	• IHE Delft • TU Dresden, Germany • University of Lisbon, Portugal	Multiple degree	Successfully completed all modules of the programme, according to the grading rules of the University of Lisbon, Technical University Dresden, and IHE Delft	Obtained a minimum of 120 ECTS		
8. Sustainable Urban Water Management	IHE Delft	IHE Delft degree	Successfully completed all modules at IHE Delft	Obtained a minimum of 106 ECTS		

5. **Graduate professional diploma programmes**:

Name	Offered by		Criteria for diploma awarding			
Sanitary Engineering	• IHE Delft	Diploma	Successfully completed all modules at IHE Delft	Obtained a minimum of 20 ECTS for the programme		
Sanitation	• IHE Delft	Diploma	Successfully completed all modules at IHE Delft	Obtained a minimum of 20 ECTS for the programme		

Water Supply Engineering	• IHE Delft	Diploma	Successfully completed all modules at IHE Delft	Obtained a minimum of 20 ECTS for the programme		
Water and Wastewater Treatment Technology	• IHE Delft	Diploma	Successfully completed all modules at IHE Delft	Obtained a minimum of 20 ECTS for the programme		
Urban Water Networks and Floods	• IHE Delft	Diploma	Successfully completed all modules at IHE Delft	Obtained a minimum of 20 ECTS for the programme		
Cleaner Production and Residuals Management	• IHE Delft	Diploma	Successfully completed all modules at IHE Delft	Obtained a minimum of 20 ECTS for the programme		

19.2 The student has fulfilled the requirements for the short or online course if s/he successfully completed all assessments of the course.

19.3 The student has successfully completed the programme evaluation or short / online course evaluation if the Examination Board takes a decision to that effect.

Article 20 Awarding of degrees and certificates

20.1 Master of Science degree.
Students who have successfully completed the programme evaluation requirements will be awarded the Master of Science degree. The diploma is signed by the Chair of the Examination Board, the Rector of the Institute and the Academic Registrar. In addition to the diploma, the graduate receives a diploma supplement stating the results achieved and credit points obtained for each component of the programme.

20.2 Certificate of Graduate Study.
Students who fail to meet the master programme evaluation requirements and have accumulated a minimum of 45 credits will be awarded a certificate of graduate study in the programme for which they are registered. Registration as student will be terminated.

20.3 Certificate of Attendance.
Students who fail to meet the master programme evaluation requirements, or who suspend or terminate their registration, will be issued a certificate stating the results achieved and credit points obtained for each successfully completed component of the programme, and the period of registration. The Certificate of Attendance is signed by the Course coordinator and the Academic Registrar.

20.4 If a student, who obtained a certificate as referred to in art. 20.2 or 20.3, re-registers to the same programme and meets (after assessment(s)) the requirements of the MSc degree within 4 years after termination, s/he is obliged to return the certificate as mentioned under art 20.2 and art 20.3.

20.5 With reference to art 20.4, if a student re-registers within 4 years with the aim to obtain an MSc degree, s/he has to re-take only in full the failed and missed modules or modules with equivalent ECTS as offered and allowed by the academic programmes in that particular year

20.6 Certificate for short or online course.
Students who have successfully completed a credited short or online course including all its assessments, will be awarded a certificate. The certificate is signed by the Course coordinator and the Academic Registrar. In addition to this certificate, the graduate receives an academic transcript stating the result achieved and credit points awarded.

20.7 Certificate of Attendance.
Students who have successfully completed the short or online course without assessments, and who have demonstrated an active participation in the course throughout the whole study period, verified by the course coordinator, will be awarded a Certificate of Attendance.
The Certificate of Attendance is signed by the Course coordinator and the Academic Registrar.

20.8 GPDP diploma
Students who have successfully collected a minimum of 20 ECTS for one of the GPDP programmes will be awarded a Graduate Professional Diploma.
The diploma is signed by the Chair of the Examination Board, the Rector of the Institute and the Academic Registrar. In addition to the diploma, the graduate receives a diploma supplement stating the results achieved and credit points obtained for each component of the programme.

20.9 Students who fail to meet the requirements for the awarding of the GPDP diploma will receive a Certificate (art 20.4) for those courses which were successfully completed.

Article 21 Criteria for MSc degree with distinction

21.1 An MSc degree with distinction can be awarded upon recommendation of the examination committee. The recommendation is made in recognition of the exceptional performance by the student and is submitted with motivation to the Examination Board for consideration. Recommendations are admissible if the following minimum criteria have been met:

For single degree programmes the candidate obtained:
- a mark of 8.5 or higher for the thesis examination, and
- an arithmetic average mark at IHE Delft of 8.0 or higher for all modules in the taught part of the programme that are assessed on a numerical scale, conform article 14.1.

For double / multiple degree programmes where student sits for the thesis examination at IHE Delft the candidate obtained:
- a mark of 8.5 or higher for the thesis examination, and
- an arithmetic average mark at IHE Delft of 8.0 or higher for all modules that are assessed on a numerical scale, conform article 14.1.

The recommendation should also be based on the results for the courses obtained at the partner institute(s).

21.2 No recommendation for distinction can be made for students who obtained their thesis credits at a partner institute in the framework of a double / multiple degree programme.

21.3 The student will be awarded an MSc degree with distinction if the Examination Board takes a decision to that effect.

Chapter 8. Appeals

Article 22 Grounds for appeal

22.1 Students have the right to appeal to the Examination Board against an assessment result, if

- there existed circumstances affecting the student's performance of which the examiner in question was not aware when a decision was taken, and which could not reasonably have been presented at the time;
- there was a procedural error/irregularity or other inadequacy on the part of the IHE of such a nature as to cause doubt as to whether the result would have been different had there not been such an irregularity;
- there exists evidence of prejudice or bias on the part of the examiners making the decision.

22.2 Students have the right to appeal to the Academic Appeals Board against a decision of the Examination Board or a decision of the Registrar, not being a decision about an appeal as referred to in Article 23.2.a.

Article 23 Procedure for appeal

23.1 A student shall first attempt to resolve the problem with the decision making body or person that has taken the disputed decision. If mediation is required, the role of mediator will be assigned to the programme coordinator.

23.2 a) If the appeal concerns a decision taken by an Examiner or an MSc Examination Committee, the appeal shall be submitted to the Examination Board within 3 weeks following the date on which the decision was made known. It should be submitted by the student in writing, stating the grounds for appeal and enclosing appropriate documentation, including an account of the attempt to resolve the case amicably.
b) The decision of the Examination Board is final and binding. It cannot be submitted for appeal to the Academic Appeals Board.

23.3 a) If the appeal concerns a decision taken by the Examination Board - not being an appeal as referred to in Article 23.2 - or a decision taken by the Academic Registrar, the appeal shall be submitted to the Academic Appeals Board within 3 weeks following the date on which the decision was made known. It should be submitted by the student in writing, stating the grounds for appeal and enclosing appropriate documentation, including an account of the attempt to resolve the case amicably.
b) The decision of the Academic Appeals Board is final and binding.

23.4 Pending the outcome of the appeal procedure, the initial (contested as per appeal) decision will remain in force and will be implemented

23.5 Reference is made to Appendix F for a detailed description of the appeal procedure.

Chapter 9. Final Articles

Article 24 Amendments

24.1 Amendments to these regulations are made by separate decision of the Rectorate.

24.2 No amendments shall be made in relation to the ongoing academic year, unless there is reasonable expectation that the amendment will not disadvantage the students.

Article 25 Unforeseen situations

25.1 Situations which are not foreseen by the present regulations will be decided on by the Examination Board, where necessary after consultation with the programme committee concerned.

Article 26 Publication

26.1 The Rectorate is responsible for the timely publication of these Examination Regulations, and any amendments thereof.

Article 27 Period of application

27.1 These regulations take effect for the cohort 2019 – 2021. Approved by the Rectorate of IHE Delft.

Appendix A Qualifications of Graduates

UWS - Water Supply Engineering

Knowledge and understanding	1. Place the specialized knowledge gained into a broader understanding of water issues, challenges, debates and developments. 2. Understand the required basic chemical, physical and (micro)biological principles commonly applied in the field of water supply and sanitation. 3. Understand the engineering- and socio-economic aspects of urban water systems 4. Understand different international practices and approaches in wider urban water systems. 5. Understand the configuration of drinking water supply systems, including treatment, water transport, and distribution. 6. Understand water quality criteria and their standards, and their relation to public health, environment and urban water cycle. 7. Explain physical, chemical and biological processes that take place within water supply systems. 8. Identify how water quality affects selection of water treatment process. 9. Explain hydraulic concepts and their relationship to water transport within treatment plants and distribution networks. 10. Recognize and understand the importance and methods for operation and maintenance of water supply systems. 11. Identify options for centralized and urban systems versus decentralized and rural systems.
Applying knowledge and understanding	1. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques. 2. Conduct research independently in a scientifically sound and ethically responsible manner. 3. Contribute to interdisciplinary and evidence-based knowledge development and problem solving. 4. Integrate disciplinary knowledge and skills in a broader urban water system problem solving context. 5. Collect, process and analyse field/lab data related to water supply and sanitation systems. 6. Design and rehabilitate raw water abstraction, transport, treatment and distribution processes and systems. 7. Select treatment processes depending on the nature of impurities to be removed and the intended use of the treated water. 8. Apply modelling tools for simulation, prediction of performance and operation of water supply system components.
Making judgements	1. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems. 2. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches. 3. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations. 4. Define, evaluate and select water supply technology alternatives on the basis of chosen selection criteria.
Communication	1. Communicate and present effectively, both in writing and orally, employing the appropriate information and communication technologies. 2. Debate and defend findings and insights, in a clear, systematic and convincing manner. 3. Communicate effectively across disciplines and cultures to enhance collaborations in teams.
Learning Skills	1. Develop competencies required to further develop and expand their knowledge and skills on their own initiative

UWS - Sanitary Engineering

Knowledge and understanding	1. Place the specialized knowledge gained into a broader understanding of water issues, challenges, debates and developments. 2. Understand the required basic chemical, physical and (micro) biological principles commonly applied in the field of water supply and sanitation. 3. Understand the engineering- and socio-economic aspects of urban water systems. 4. Understand different international practices and approaches in wider urban water systems. 5. Understand and explain the role of sanitation in urban water cycle and its relation to public health and environment. 6. Develop rational approaches towards sustainable waste (water) management via pollution prevention, appropriate treatment, resources recovery and re-use on both centralized and decentralized level. 7. Understand in-depth relevant physical, chemical and biological processes, and their mutual relationships within various sanitation components.
Applying knowledge and understanding	1. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques. 2. Conduct research independently in a scientifically sound and ethically responsible manner. 3. Contribute to interdisciplinary and evidence-based knowledge development and problem solving. 4. Integrate disciplinary knowledge and skills in a broader urban water system problem solving context. 5. Collect, process and analyze field/lab data related to water supply and sanitation systems. 6. Apply gained knowledge and skills in practice; 7. Prepare conceptual engineering and process design of sanitation components; 8. Apply modern tools for technology selection and carry out modelling of sanitation components. 9. Identify, develop and conduct independent research including formulation of hypotheses selection and application of research methodologies, and the formulation of conclusions and recommendations. 10. Carry out desk studies, field work, and laboratory based research. 11. Contribute to the development of innovative approaches to the provision of adequate and sustainable sanitation services in developing countries and countries in transition.
Making judgements	1. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems. 2. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches. 3. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations. 4. Define and critically analyze, assess and evaluate various urban drainage and sewerage schemes, and wastewater, sludge and solid waste treatment process technologies. 5. Analyze, synthesize, integrate, interpret, and discuss both scientific and practical information in the context of various research and engineering projects including preparation of Master plans, feasibility studies and preliminary designs.
Communication	1. Communicate and present effectively, both in writing and orally, employing the appropriate information and communication technologies. 2. Debate and defend findings and insights, in a clear, systematic and convincing manner. 3. Communicate effectively across disciplines and cultures to enhance collaborations in teams.
Learning Skills	1. Develop competencies required to further develop and expand their knowledge and skills on their own initiative.

UWS - Urban Water Engineering and Management

Knowledge and understanding	1. Place the specialized knowledge gained into a broader understanding of water issues, challenges, debates and developments. 2. Understand the required basic chemical, physical and (micro) biological principles commonly applied in the field of water supply and sanitation. 3. Understand the engineering- and socio-economic aspects of urban water systems. 4. Understand different international practices and approaches in wider urban water systems. 5. Understand the urban water cycle and its water system components, their characteristics and functioning within greater urban infrastructure systems. 6. Understand urban water management problems including ability to: identify water systems' demand; deal with climatic and hydrologic uncertainties and/or extremes (e.g., flooding); institutional limitations; and work within a data-constrained environment. 7. Understand water infrastructure/asset planning, financing and management, and utility management. 8. Familiarize with the concept of integrated water resources management (IWRM) and its application to a variety of water management problems at the urban catchment scale.
Applying knowledge and understanding	1. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques. 2. Conduct research independently in a scientifically sound and ethically responsible manner. 3. Contribute to interdisciplinary and evidence-based knowledge development and problem solving. 4. Integrate disciplinary knowledge and skills in a broader urban water system problem solving context. 5. Collect, process and analyze field/lab data related to water supply and sanitation systems. 6. Make appropriate and critical use of methods, techniques and tools necessary to monitor, analyze and design urban water systems including: water supply infrastructure; drinking water treatment and distribution; wastewater collection, treatment, transport and disposal systems; drainage and flood protection systems. 7. Identify, articulate, analyze and solve problems of the urban water cycle and systems, integrating theory and applications. 8. Collect, summarize, analyze and interpret technical data/materials in a structured form to gain knowledge on urban water system design and operation and maintenance. 9. Work with a range of information technology tools (e.g., GIS tools) available for solving urban water management problems and for effectively communicating with fellow water managers, researchers, scientists, planners, and policy-makers.
Making judgements	1. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems. 2. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches. 3. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations. 4. Critically analyze and assess the need for continued-education and research on planning, design, maintenance and management of urban water systems.
Communication	1. Communicate and present effectively, both in writing and orally, employing the appropriate information and communication technologies. 2. Debate and defend findings and insights, in a clear, systematic and convincing manner. 3. Communicate effectively across disciplines and cultures to enhance collaborations in teams.
Learning Skills	1. Develop competencies required to further develop and expand their knowledge and skills on their own initiative.

Water Management and Governance

Knowledge and understanding	1. Place the specialized knowledge gained into a broader understanding of water issues, challenges, debates and developments. 2. Analyse biophysical and social processes and appraise principles and approaches relevant to water management and governance. 3. Recognize and distinguish different ways of knowing and framing water questions and problems in order to analyse water management and governance processes from an interdisciplinary perspective.
Applying knowledge and understanding	1. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques. 2. Conduct research independently in a scientifically sound and ethically responsible manner. 3. Contribute to interdisciplinary and evidence-based knowledge development and problem solving. 4. Analyse and contextualize governance arrangements and (integrated) management approaches to address water issues in socially inclusive and ecologically sustainable ways.
Making judgements	1. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems. 2. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches. 3. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations. 4. Reflect critically on the implications of water management and governance interventions on society and nature and formulate and defend own standpoint.
Communication	1. Communicate and present effectively, both in writing and orally, making use of information and communication technologies suited for the audience and the purpose. 2. Debate and defend findings and insights, in a clear, systematic and convincing manner. 3. Communicate effectively across disciplines and cultures to enhance collaborations in teams.
Learning Skills	1. Develop competencies required to further expand their knowledge and skills on their own initiative. 2. Reflect on own professional and educational background in order to identify a personal learning trajectory to realize career objectives and professional development goals.

WMG - Water Conflict and Diplomacy

Knowledge and understanding	1. Place the specialized knowledge gained into a broader understanding of water issues, challenges, debates and developments. 2. Analyse biophysical and social processes and appraise principles and approaches relevant to water management and governance. 3. Recognize and distinguish different ways of knowing and framing water questions and problems in order to analyse water management and governance processes from an interdisciplinary perspective. 4. Discuss and compare theories and concepts that relate to water conflict, cooperation and diplomacy.
Applying knowledge and understanding	1. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques. 2. Conduct research independently in a scientifically sound and ethically responsible manner. 3. Contribute to interdisciplinary and evidence-based knowledge development and problem solving. 4. Analyse and contextualize governance arrangements and (integrated) management approaches to address water issues in socially inclusive and ecologically sustainable ways. 5. Critically analyze latent and actual water disputes including key elements of conflict analysis and key contextual elements. 6. Critically analyze different dispute resolution mechanisms and participatory processes. 7. Select and use conflict management tools to develop water cooperation and diplomacy processes and arrangements to mitigate and resolve water disputes in socially inclusive and ecologically sustainable ways.
Making judgements	1. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems. 2. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches. 3. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations. 4. Reflect critically on the implications of water management and governance interventions on society and nature and formulate and defend own standpoint. 5. Identify and reflect critically on issues, challenges and potential conflicts regarding competition and cooperation around water at different scales.
Communication	1. Communicate and present effectively, both in writing and orally, making use of information and communication technologies suited for the audience and the purpose. 2. Debate and defend findings and insights, in a clear, systematic and convincing manner. 3. Communicate effectively across disciplines and cultures to enhance collaborations in teams.
Learning Skills	1. Develop competencies required to further expand their knowledge and skills on their own initiative. 2. Reflect on own professional and educational background in order to identify a personal learning trajectory to realize career objectives and professional development goals.

ES - Environmental Science and Technology

Knowledge and Understanding	1	be able to place the knowledge gained through their own specialization into a broader understanding of contemporary global water issues, challenges, debates and developments.
	2	understand the required basic chemical, physical, (micro)biological and ecological principles commonly applied in the field of environmental science.
	3	understand the socio-economic dimensions of environmental systems.
	4	understand different common practices and approaches in river basin and environmental management.
	5	identify the way to prevent environmental pollution through resource management and application of re-use technologies.
	6	identify the way polluted water, waste, gas, soils and sediments can be treated to reduce environmental risk.
Applying Knowledge and Theory	1	formulate research questions and hypotheses, select and apply research methods, theories and techniques, and prepare a research plan.
	2	conduct independent research.
	3	contribute to multidisciplinary and creative problem solving.
	4	contribute to the development of knowledge and integrate it with knowledge from other field.
	5	integrate disciplinary knowledge and skills in an environmental science context.
	6	collect, process and analyse field data.
	7	develop, design and apply technologies for the prevention and remediation of environmental pollution by searching scientific information, conducting scientific research in the field of environmental technology and engineering, and reporting their findings by means of scientific reports and papers.
Making Judgements	1	identify relevant research, ideas and approaches from literature and other sources in view of their potential for helping understand or solve particular water-related problems.
	2	critically discuss, as well as comparatively evaluate and judge existing knowledge, ideas and approaches against each other, well as against own research approaches and outcomes.
	3	recognize and address ethical and sustainability dimensions in professional practice
	4	use research outcomes to inform well-founded, original conclusions, solutions or recommendations.
	5	critically analyse and evaluate a range of options for the prevention or remediation of environmental problems under prevailing socio-economic conditions.
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies.
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams.
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative.

ES - Environmental Policy Making

Knowledge and Understanding	1	be able to place the knowledge gained through their own specialization into a broader understanding of contemporary global water issues, challenges, debates and developments.
	2	understand the required basic chemical, physical, (micro)biological and ecological principles commonly applied in the field of environmental science.
	3	understand the socio-economic dimensions of environmental systems
	4	understand different common practices and approaches in river basin and environmental management.
	5	understand how the legal, cultural, technical, ethical, socio-economic, and/or political context influences environmental planning and management, and sustainable outcomes, from local to global levels.
	6	analyse policy and planning instruments to improve management of water and natural resources.
	7	analyse concepts, methods and tools for strategic decision-making such as policy analysis, planning and environmental and social impact assessment.
Applying Knowledge and Theory	1	formulate research questions and hypotheses, select and apply research methods, theories and techniques, and prepare a research plan.
	2	conduct independent research.
	3	contribute to multidisciplinary and creative problem solving.
	4	contribute to the development of knowledge and integrate it with knowledge from other field.
	5	integrate disciplinary knowledge and skills in an environmental science context.
	6	collect, process and analyse field data.
	7	apply and reflect upon concepts, methods and tools for strategic decision-making.
	8	design and implement water and environmental plans for various levels of decision-making.
Making Judgements	1	identify relevant research, ideas and approaches from literature and other sources in view of their potential for helping understand or solve particular water-related problems
	2	critically discuss, as well as comparatively evaluate and judge existing knowledge, ideas and approaches against each other, well as against own research approaches and outcomes.
	3	recognize and address ethical and sustainability dimensions in professional practice.
	4	use research outcomes to inform well-founded, original conclusions, solutions or recommendations.
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies.
	2	debate and defend findings and insights, in a clear, systematic and convincing manner.
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams.
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative.

ES - Applied Aquatic Ecology for Sustainability

Knowledge and Understanding	1	be able to place the knowledge gained through their own specialization into a broader understanding of contemporary global water issues, challenges, debates and developments.
	2	understand the required basic chemical, physical, (micro)biological and ecological principles commonly applied in the field of environmental science.
	3	understand the socio-economic dimensions of environmental systems.
	4	understand different common practices and approaches in river basin and environmental management.
	5	understand and evaluate the physical, biogeochemical, and ecological processes related to the functioning of natural and degraded aquatic ecosystems.
Applying Knowledge and Theory	1	formulate research questions and hypotheses, select and apply research methods, theories and techniques, and prepare a research plan.
	2	conduct independent research.
	3	contribute to multidisciplinary and creative problem solving.
	4	contribute to the development of knowledge and integrate it with knowledge from other field.
	5	integrate disciplinary knowledge and skills in an environmental science context.
	6	collect, process and analyse field data.
	7	integrate stakeholder objectives and scientific knowledge to create management objectives for the sustainable management, restoration, and conservation of aquatic ecosystems.
Making Judgements	1	identify relevant research, ideas and approaches from literature and other sources in view of their potential for helping understand or solve particular water-related problems.
	2	critically discuss, as well as comparatively evaluate and judge existing knowledge, ideas and approaches against each other, well as against own research approaches and outcomes.
	3	recognize and address ethical and sustainability dimensions in professional practice.
	4	use research outcomes to inform well-founded, original conclusions, solutions or recommendations.
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies.
	2	debate and defend findings and insights, in a clear, systematic and convincing manner.
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams.
	4	effectively communicate the responses of lakes, rivers, and wetlands to anthropogenic pressures to stakeholders and peers.
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative.

ES - Limnology and Wetland Management

Knowledge and Understanding	1	to demonstrate understanding of natural environmental processes, the socio-economic concepts underlying functioning and exploitation of environmental systems, and of the complex interrelationship between protection and wise use of environmental resources;
	2	to describe the rationale for an integrated and interdisciplinary approach for the sustainable management of water and environmental resources
	3	to identify the impacts of human activities on freshwater ecosystems in different socio-economic contexts;
	4	to demonstrate knowledge and understanding of the international water quality guidelines;
	5	to name and explain concepts, instruments and technologies for protection and remedial actions of freshwater ecosystems.
Applying Knowledge and Theory	1	to design, optimise and interpret environmental monitoring and assessment schemes (including statistics and modelling) in order to gain an understanding of problems, trends, causes and effects;
	2	to design, optimise and interpret environmental monitoring and assessment schemes for freshwater ecosystems;
	3	to apply general scientific methods (including statistics and environmental modelling) for the development and application of scientific and technological approaches, concepts and interventions to address problems of freshwater ecosystems;
	4	to conduct research, independently/in multidisciplinary teams, incl. formulation of research questions and hypotheses, selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations.
Making Judgements	1	to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of environmental problems, under different socio-economic, cultural and legal contexts, and under often data-poor conditions;
	2	to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of problems related with freshwater ecosystems, under different socio-economic and legal contexts, and under often data-poor conditions;
	3	to contribute in interdisciplinary teams in developing solutions for prevention/remediation of aquatic ecosystem problems by linking scientific knowledge to engineering interventions and management decisions in different cultural/socio-economic contexts.
Communication	1	to communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences.
Learning Skills	1	to demonstrate academic attitude and learning skills (incl. thinking in multidisciplinary dimensions and distinguishing main issues from minor ones), to enhance and keep up-to-date the acquired knowledge and application skills in an independent manner.

ES - Environmental Technology and Engineering

Knowledge and Understanding	1	be able to place the knowledge gained through their own specialization into a broader understanding of contemporary global water issues, challenges, debates and developments
	2	understand the required basic chemical, physical, (micro)biological and ecological principles commonly applied in the field of environmental science
	3	understand the socio-economic dimensions of environmental systems
	4	understand different common practices and approaches in river basin and environmental management
	5	identify the way to prevent environmental pollution through resource management and application of re-use technologies
	6	identify the way polluted water, waste, gas, soils and sediments can be treated to reduce environmental risk
Applying Knowledge and Theory	1	formulate research questions and hypotheses, select and apply research methods, theories and techniques, and prepare a research plan
	2	conduct independent research
	3	contribute to multidisciplinary and creative problem solving
	4	contribute to the development of knowledge and integrate it with knowledge from other field
	5	integrate disciplinary knowledge and skills in an environmental science context
	6	collect, process and analyse field data
	7	develop, design and apply technologies for the prevention and remediation of environmental pollution by searching scientific information, conducting scientific research in the field of environmental technology and engineering, and reporting their findings by means of scientific reports and papers
Making Judgements	1	identify relevant research, ideas and approaches from literature and other sources in view of their potential for helping understand or solve particular water-related problems
	2	critically discuss, as well as comparatively evaluate and judge existing knowledge, ideas and approaches against each other, well as against own research approaches and outcomes
	3	recognize and address ethical and sustainability dimensions in professional practice
	4	use research outcomes to inform well-founded, original conclusions, solutions or recommendations
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
	4	effectively communicate the responses of lakes, rivers, and wetlands to anthropogenic pressures to stakeholders and peers
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

WSE - Coastal Engineering and Port Development

Knowledge and Understanding	1	have knowledge of contemporary water issues, challenges, debates and developments
	2	demonstrate knowledge and understanding of hydrological, hydraulic and environmental processes and phenomena, and their inter-relationships, in natural and built environments
	3	have an understanding of the application of modern analysis and design techniques to coastal problems and the expertise necessary to make decisions on effective engineering interventions in the coastal environment
	4	have advanced level of knowledge and understanding of coastal processes, and nautical and logistic aspects and their interrelationship with the nearshore and offshore structures
Applying Knowledge and Theory	1	the ability to draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques
	2	the ability to conduct research independently in a scientifically sound and ethically responsible manner
	3	the ability to contribute to interdisciplinary and evidence-based knowledge development and problem solving
	4	apply appropriate modelling and data management tools related to hydrological, hydraulic, morphological and environmental processes, to support management and engineering interventions
	5	integrate monitoring, modelling and information to support safe and reliable decision making
	6	develop strategies to cope effectively with problems related to natural hazards (e.g. coastal floods) and shoreline erosion problems and understand the conflict between coastal developments and natural coastal processes
	7	apply sophisticated design techniques using theoretical concepts of coastal hydraulics and various principles and approaches of coastal engineering design to advance the needs of society for shelter, infrastructure and a safe environment
	8	evaluate and implement coastal engineering solutions in a multidisciplinary and interdisciplinary environment
	9	apply hydraulic and nautical, logistic and economic theories in the planning and design of coastal and ports layout and port logistics
Making Judgements	1	the ability to identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems
	2	the ability to critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches
	3	the ability to interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations
	4	apply engineering creativity and design skills, both independently and in multidisciplinary teams
	5	have a sense of professionalism and an appreciation for the obligations of a professional and be aware of the professional and ethical issues encountered in scientific and engineering practice
	6	place a coastal engineering and/or port project in its environment (social, ecological and physical environment), quantify and understand the interactions between the project and the environment
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

WSE - River Basin Development

Knowledge and Understanding	1	have knowledge of contemporary water issues, challenges, debates and developments
	2	demonstrate knowledge and understanding of hydrological, hydraulic and environmental processes and phenomena, and their inter-relationships, in natural and built environments
	3	have knowledge and understanding of the latest concepts and theories that are required for independent professionals within the field of hydraulic engineering and river basin development
	4	have knowledge and understanding of the cross-sectoral linkages determinant for the design and planning of sustainable water infrastructures prepared for global change
	5	have an analytical understanding of physical mechanisms and processes in the natural and built environment that are determinant for the design and planning of sustainable water infrastructures prepared for global change
Applying Knowledge and Theory	1	the ability to draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques
	2	the ability to conduct research independently in a scientifically sound and ethically responsible manner
	3	the ability to contribute to interdisciplinary and evidence-based knowledge development and problem solving
	4	apply appropriate modelling and data management tools related to hydrological, hydraulic, morphological and environmental processes, to support management and engineering interventions
	5	integrate monitoring, modelling and information to support safe and reliable decision making
	6	apply and master tools like analytical solutions and numerical models for hydraulic and hydrological processes, remote sensing and GIS-based models for the design of water infrastructure at the project scale and for river basin scale planning
	7	estimate, predict and prepare the occurrence of hydrological extremes within and across river basins
	8	model and quantify fluvial processes involving the transport of water and sediments, which are determinant for the morphodynamics of rivers, safety of citizens, and for physical, chemical, and biological mechanisms in the river basin
	9	plan and design water infrastructures essential for food and energy production, domestic and industrial water supply, and protection against floods and geomorphological hazards
	10	initiate research and development activities, innovative solutions for the adequate management of water resources and for the sustainable development of water infrastructures within the river basin
Making Judgements	1	the ability to identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems
	2	the ability to critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches
	3	the ability to interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations
	4	apply engineering creativity and design skills, both independently and in multidisciplinary teams
	5	have a sense of professionalism and an appreciation for the obligations of a professional and be aware of the professional and ethical issues encountered in scientific and engineering practice
	6	to identify opportunities for innovative development of tools and strategies for water management at the river basin scale, and to identify research avenues regarding physical processes essential in the design of water infrastructures
	7	to assess the sustainability of water infrastructures and of tools and strategies for river basin water management, by critical assessment of their technical, socio-economic and environmental components
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

WSE - Hydroinformatics

Knowledge and Understanding	1	have knowledge of contemporary water issues, challenges, debates and developments
	2	demonstrate knowledge and understanding of hydrological, hydraulic and environmental processes and phenomena, and their inter-relationships, in natural and built environments
	3	have understanding of the information cycle and systems approach in relation to the management of water based systems, and have a thorough awareness of the flow of information following the sequence “data - modelling - forecasting - optimization – decision support - management”, aimed at sustainable development and stakeholder involvement
	4	have a good understanding of numerical methods for solving equations of water flow, and knowledge of their ranges of applicability in various contexts
	5	have an understanding of advanced and appropriate information and communication technologies, advances in computer science, computer programming, data science and applied mathematics, and their use in building technologies supporting water management in a wide sense
Applying Knowledge and Theory	1	the ability to draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques
	2	the ability to conduct research independently in a scientifically sound and ethically responsible manner
	3	apply appropriate modelling and data management tools related to hydrological, hydraulic, morphological and environmental processes, to support management and engineering interventions
	4	integrate monitoring, modelling and information to support safe and reliable decision making
	5	master the theory and practice of different modelling paradigms and systems analysis, and, in particular, physically based and data driven modelling, computational intelligence and multi-disciplinary optimization, and integrate these in hydroinformatics systems
	6	apply the knowledge of numerical methods for solving equations of water flow, computational intelligence and data analysis, be able to implement them in research computer codes and apply to various problems of water modelling and forecasting
	7	to select and apply available software and internet-based tools, integrate them, and critically assess their advantages and disadvantages in application to water resources management, hazard risk assessment and forecasting, environmental planning and asset management
Making Judgements	1	the ability to identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems
	2	the ability to critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches
	3	the ability to interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations
	4	apply engineering creativity and design skills, both independently and in multidisciplinary teams
	5	have a sense of professionalism and an appreciation for the obligations of a professional and be aware of the professional and ethical issues encountered in scientific and engineering practice
	6	make critical use of advanced theories, concepts and tools in hydroinformatics to search innovative solutions for new problems and situations, either independently or within a team
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

WSE – Hydrology and Water Resources

Knowledge and Understanding	1	have knowledge of contemporary water issues, challenges, debates and developments
	2	demonstrate knowledge and understanding of hydrological, hydraulic and environmental processes and phenomena, and their inter-relationships, in natural and built environments
	3	be aware of the importance of hydrology to society and the relationship of hydrology with related disciplines
	4	have in-depth understanding of the current theories and concepts in both surface and subsurface hydrology, the relevant physical, chemical and biological process interactions between the hydrosphere, the lithosphere, the biosphere and the atmosphere
	5	master the major hydrological methodologies and applications with regard to both water quantity and water quality, including techniques for data collection, processing and analysis, and the application modelling techniques
Applying Knowledge and Theory	1	the ability to draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques
	2	the ability to conduct research independently in a scientifically sound and ethically responsible manner
	3	the ability to contribute to interdisciplinary and evidence-based knowledge development and problem solving
	4	apply appropriate modelling and data management tools related to hydrological, hydraulic, morphological and environmental processes, to support management and engineering interventions
	5	integrate monitoring, modelling and information to support safe and reliable decision making
	6	apply and integrate the relevant physical, chemical, applied mathematical, computational and earth-scientific principles and concepts, and to use information and communication technology relevant to hydrology
	7	design and conduct hydrological assessments and experiments for both application and scientific purposes, either independently or within a team-based framework
Making Judgements	1	the ability to identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems
	2	the ability to critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches
	3	the ability to interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations
	4	apply engineering creativity and design skills, both independently and in multidisciplinary teams
	5	have a sense of professionalism and an appreciation for the obligations of a professional and be aware of the professional and ethical issues encountered in scientific and engineering practice
	6	evaluate and analyse hydrological systems and processes at a wide range of scales in both space and time for the purpose of water resources assessment, natural hazards assessment and mitigation, and environmental planning and management
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

WSE - Land and Water Development for Food Security

Knowledge and Understanding	1	have knowledge of contemporary water issues, challenges, debates and developments
	2	demonstrate knowledge and understanding of hydrological, hydraulic and environmental processes and phenomena, and their inter-relationships, in natural and built environments
	3	have knowledge and understanding of the latest concepts and theories of irrigation and drainage design, modernization and management, and land reclamation for sustainable development and food security
	4	have knowledge and understanding of the cross-sectoral linkages related to land and water development comprehending wider aspects of society, economy, human health and environment and its contributions to food security
Applying Knowledge and Theory	1	the ability to draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques
	2	the ability to conduct research independently in a scientifically sound and ethically responsible manner
	3	the ability to contribute to interdisciplinary and evidence-based knowledge development and problem solving
	4	apply appropriate modelling and data management tools related to hydrological, hydraulic, morphological and environmental processes, to support management and engineering interventions
	5	integrate monitoring, modelling and information to support safe and reliable decision making
	6	apply the latest hydraulic engineering and hydrological methods in planning, design and implementation of irrigation and drainage schemes, independently or in a multidisciplinary team
	7	apply innovative tools like Remote Sensing and GIS in planning and performance management of land and water development schemes for enhanced food security
	8	contribute to the development of innovative approaches for adequate and sustainable land and water development for food security
Making Judgements	1	the ability to identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems
	2	the ability to critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches
	3	the ability to interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations
	4	apply engineering creativity and design skills, both independently and in multidisciplinary teams
	5	have a sense of professionalism and an appreciation for the obligations of a professional and be aware of the professional and ethical issues encountered in scientific and engineering practice
	6	identify options for participatory land and water development, and critically assess their technical, socio-economic and environmental performance
	7	evaluate aspects of planning, design, modernization, operation & maintenance and financing of irrigation and drainage schemes
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

WSE – Flood Risk Management

Knowledge and Understanding	1	have knowledge of contemporary water issues, challenges, debates and developments
	2	demonstrate knowledge and understanding of hydrological, hydraulic and environmental processes and phenomena, and their inter-relationships, in natural and built environments
	3	have a comprehensive knowledge base and understanding of the current theory and practice relating to flooding and flood management
	4	have an understanding of advanced and appropriate information and communication technologies and data science, and their use in building technologies supporting flood risk management
		have a broad scientific knowledge about conservation, restoration and management measures to overcome challenges imposed on water by humans and by climate change
Applying Knowledge and Theory	1	the ability to draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques
	2	the ability to conduct research independently in a scientifically sound and ethically responsible manner
	3	the ability to contribute to interdisciplinary and evidence-based knowledge development and problem solving
	4	apply appropriate modelling and data management tools related to hydrological, hydraulic, morphological and environmental processes, to support management and engineering interventions
	5	integrate monitoring, modelling and information to support safe and reliable decision making
	6	apply specific practical skills, such as identifying the major physical processes in a given river basin or coastal zone and their interaction with the associated assets and receptors
	7	apply sophisticated hydroinformatics and modelling tools, best practices and information and communication technology to address the problems of flood risk management
Making Judgements	1	the ability to identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems
	2	the ability to critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches
	3	the ability to interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations
	4	apply engineering creativity and design skills, both independently and in multidisciplinary teams
	5	have a sense of professionalism and an appreciation for the obligations of a professional and be aware of the professional and ethical issues encountered in scientific and engineering practice
	6	identify the links between all issues related to flooding in order to apply an integrated approach using the best tools to support decision making for the sustainable management of floods (
	7	advise on a basin-wide approach to flood risk management
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

WSE - Groundwater and Global Change - Impacts and Adaptation

Knowledge and Understanding	1	have knowledge of contemporary water issues, challenges, debates and developments
	2	demonstrate knowledge and understanding of hydrological, hydraulic and environmental processes and phenomena, and their inter-relationships, in natural and built environments
	3	have in-depth understanding of the current theories and concepts in both surface and subsurface hydrology, the relevant physical, chemical and biological process interactions between the hydrosphere, the lithosphere, the biosphere and the atmosphere
	4	be able to explain in depth how groundwater systems respond to climate variability and human activities in both an urban and rural context, and how this is dealt with in water resources management in adaptation to climate and global change
Applying Knowledge and Theory	1	the ability to draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques
	2	the ability to conduct research independently in a scientifically sound and ethically responsible manner
	3	the ability to contribute to interdisciplinary and evidence-based knowledge development and problem solving
	4	apply appropriate modelling and data management tools related to hydrological, hydraulic, morphological and environmental processes, to support management and engineering interventions
	5	integrate monitoring, modelling and information to support safe and reliable decision making
	6	apply and integrate the relevant physical, chemical, applied mathematical, computational and earth-scientific principles and concepts, and to use information and communication technology relevant to hydrology
	7	design and conduct hydrological assessments and experiments for both application and scientific purposes, either independently or within a team-based framework
	8	use field assessment and process understanding techniques in combination with modelling tools to study and simulate groundwater and climate processes and their interactions with each other, with the environment and with human activities, within identified and quantified levels of uncertainty, for the purpose of integrated water resources management
Making Judgements	1	the ability to identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems
	2	the ability to critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches
	3	the ability to interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations
	4	apply engineering creativity and design skills, both independently and in multidisciplinary teams
	5	have a sense of professionalism and an appreciation for the obligations of a professional and be aware of the professional and ethical issues encountered in scientific and engineering practice
	6	evaluate and analyse hydrological systems and processes at a wide range of scales in both space and time for the purpose of water resources assessment, natural hazards assessment and mitigation, and environmental planning and management
	7	identify and select the appropriate groundwater-related solutions to water scarcity under climate and global change in terms of technical, socio-economic and environmental
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

WSE - Advanced Water Management for Food Production

Knowledge and Understanding	1	have knowledge of contemporary water issues, challenges, debates and developments
	2	demonstrate knowledge and understanding of hydrological, hydraulic and environmental processes and phenomena, and their inter-relationships, in natural and built environments
	3	Have knowledge and understanding of the latest concepts and theories of irrigation and drainage design, modernization and management, and land reclamation for sustainable development and food security
	4	Have knowledge and understanding of the cross-sectoral linkages related to land and water development comprehending wider aspects of society, economy, human health and environment and its contributions to food security
Applying Knowledge and Theory	1	the ability to draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques
	2	the ability to conduct research independently in a scientifically sound and ethically responsible manner
	3	the ability to contribute to interdisciplinary and evidence-based knowledge development and problem solving
	4	Contribute to the development of knowledge and integrate it with knowledge from other field
	5	apply appropriate modelling and data management tools related to hydrological, hydraulic, morphological and environmental processes, to support management and engineering interventions
	6	integrate monitoring, modelling and information to support safe and reliable decision making
	7	apply the latest hydraulic engineering and hydrological methods in planning, design and implementation of irrigation and drainage schemes, independently or in a multidisciplinary team
	8	apply innovative tools like Remote Sensing and GIS in planning and performance management of land and water development schemes for enhanced food security
	9	contribute to the development of innovative approaches for adequate and sustainable land and water development for food security
Making Judgements	1	the ability to identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems
	2	the ability to critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches
	3	recognize and address ethical and sustainability dimensions in professional practice
	4	have the ability to interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations
	5	apply engineering creativity and design skills, both independently and in multidisciplinary teams
	6	have a sense of professionalism and an appreciation for the obligations of a professional and be aware of the professional and ethical issues encountered in scientific and engineering practice
	7	iIdentify options for participatory land and water development, and critically assess their technical, socio-economic and environmental performance
	8	evaluate aspects of planning, design, modernization, operation & maintenance and financing of irrigation and drainage schemes
Communication	1	communicate and present effectively , both in writing and orally, employing the appropriate information and communication technologies
	2	debate and defend findings and insights, in a clear, systematic and convincing manner
	3	cooperate effectively in multi-/interdisciplinary and intercultural teams
Learning Skills	1	have the competencies to further develop and expand their knowledge and skills on their own initiative

Appendix B Examination Procedures

GENERAL RULES

Students taking part in an examination are expected to have taken notice of these procedures and are expected to understand the implied meaning of these procedures.

WRITTEN EXAMINATIONS

PROCESS:

1. the students brings his / her student card and displays it on the table;
2. the invigilator verifies the card and confirms attendance by the student by ticking the box of the student on the attendance list;
3. students hand in their exam papers at the end of the session; this is their own responsibility;
4. invigilators bring the exam papers to the Education Office (immediately after the exam);
5. Education Officers verify which exam papers have been received and record this on a list;
6. the list produced by the Education Officers serves as the evidence that the exam papers have been handed in;
    a. if exam papers get lost and they have been recorded on the list of Education Office, IHE Delft has the responsibility to propose an adequate alternative assessment to the student.
    b. if a student claims that an exam paper got lost and the exam paper is not recorded on the list of Education Office, then the Institute considers the exam paper not to have been handed in by the student. There will be no alternative assessment proposed.

Invigilators: The invigilators (examination supervisors) ensure proper conduct of the examination and maintain order in the examination room. They will announce the beginning and the duration of the examination, and will warn the students 10 minutes before the ending of the examination.

Communication: During the examination, students are not allowed to exchange materials or to communicate with other students. If something is unclear, students have to inform the invigilator, who will contact the programme coordinator, the examiner or education officer if necessary.

Attendance list: Students are considered to have taken part in an examination from the moment they receive the examination papers from the invigilators, whether or not they submit any answers.

Bags: Bags and carrying cases, including penholders, are to be placed along the side of the

room before the start of the examination.

Exam paper: Answer and scratch paper will be provided to the students
Students provide the answers in clearly readable English, with proper indication of the question label. All answer papers must carry the student number and locker number of the student. Unreadable answers or unidentified answer papers may be discarded for assessment by the examiner.

Pen: Students are required to bring the necessary writing and drawing tools. The answer papers to be submitted must be written with a pen, a pencil is not allowed.

Dictionary: The use of a printed language dictionary without any additional written annotations is allowed (all languages are allowed). Invigilators are allowed to check the dictionaries for hand-written annotations during the exam (spot checks while they are walking around).
Electronic dictionaries are not allowed.

Calculators: Only self-contained calculators with a single-line display or dual-line display are allowed, provided that these devices are battery operated, that any audio functions are switched off, and that these devices are exclusively built for calculation purposes only and do not have internet access.

Cell phones: Use of cell phones is not allowed and must be switched off

Other materials: The use of materials other than listed above, including blank paper, texts, laptops, computing and communication devices, personal audio and video devices, of any kind, is not allowed.
Examiners may nevertheless allow students to use specified text matter or other effects in a so-called 'open book' examination. These materials shall not include previous or example examinations and solutions.

Toilet visit: Only one student at a time will be allowed by the invigilator to leave the examination room for a short visit to the lavatory, except during the first 15 and the last 15 minutes of the examination. Examination materials and requirements may not be taken outside the examination room. Before leaving the examination room, students have to hand over their cell phone to the invigilator.

Submission of exam papers: Students who finish the examination at least 15 minutes after the start and at least 15 minutes before the ending of the examination are allowed to submit their work to the invigilator and quietly leave the examination room.
Students have to ensure that all required papers are submitted to the invigilator. Papers cannot be submitted after the student has left the examination room.

ASSIGNMENT REPORTS AND INDIVIDUAL DISCUSSIONS

For designated subjects students have to submit an assignment report, which will be assessed as part of the subject examination. The examiner may discuss the assignment report with the student as part of the assessment.

The examiner will set a deadline for submitting assignment reports. The deadline cannot be set at a date after the examination period for the subject, as indicated in the academic calendar. Students submit assignments to either the lecturer or the responsible coordinator.

Appendix C GRADING SYSTEMS used by partner institutes

1. Asian Institute of Technology

Grade	Grade Points	Description
A	4	Excellent
B+	3.5	
B	3	Good
C+	2.5	
C	2	Fair
D	1	Deficient
F	0	Fail
I		Incomplete

2. Universidad del Valle

Grade	Description
0.0	Given when absent from the exam without valid reason, when blank exam is submitted, or when caught cheating.
1.0 – 2.9	Non-pass, resit needed
3.0	Acceptable
4.0	Good
5.0	Excellent

Degree is awarded when

- GPA for the taught part is 3.5 or higher, and
- a pass is obtained for the thesis. (pass / non-pass)

3. Egerton University

Grade	Grade Points	Description
A	70% and above	Excellent
B	60-69%	Good
C	50-59%	Average
F	0-49%	Fail

Grading systems approved by the University Senate, with 50% as the pass mark.

4. BOKU

Austrian grade	ECTS Grade	Description
1	A/B	excellent/very good
2	C	good
3	D	satisfactory
4	E	pass

5. TU Dresden:

Grade	Grade Points	Description
A	1	very good
B	2	good
C	3	satisfactory
D	4	sufficient
E	5	insufficient

All courses have to be lower than 4 for a degree.

6. University of Ljubljana

Grade	Description
10	excellent: outstanding results with negligible mistakes
9	very good: high pass with minor mistakes
8	very good: sound knowledge
7	good: sound knowledge with major mistakes
6	satisfactory: adequate knowledge suiting minimum criteria
5 - 1	insufficient: failure, poor knowledge below minimum criteria

Candidates with grades satisfactory (6) or more, have passed the examinations successfully.
The student has two grades per subject: separately theory and lab exercise (seminar work). For thesis there are also two grade: written report and presentation, both should be more than 6. Finally we have one grade for thesis and common final grade of study (special formula).

7. TU-Catalonia

Grade	Description
9.0 - 10.0	excellent
7.0 - 8.9	very good
5.0 - 6.9	satisfactory
4.0 - 4.9	marginal fail
0.0 - 3.9	fail
NP	not examined
R	recognition

MH Honors (is given on exceptional cases)

8. University of Lisbon

Grade	Grade Points	Description
A	20-18	excellent
B	17-16	very good, with few errors
C	15-14	good, with some errors
D	13-12	satisfactory, with many errors
E	11-10	sufficient

9. Oregon State University

Grade	Grade Points	Description
A	4	
A-	3.7	
B+	3.3	
B	3.0	
B-	2.7	
C+	2.3	
C	2.0	
C-	1.7	
D+	1.3	
D	1.0	
D-	0.7	
F	0.0	

Grade Requirement
A grade-point average of 3.00 (a B average) is required: 1) for all courses taken as a degree-seeking graduate student, and 2) for courses included in the graduate degree or graduate certificate program of study. Grades below C (2.00) cannot be used on a graduate program of study. A grade-point average of 3.00 is required before the final oral or written exam may be undertaken.

10. UPEACE
The University for Peace grades on a zero (0) to ten (10) scale
The minimum passing grade is 7.0
Some courses may be evaluated with pass/fail.
The general average on the final transcript is a weighted average

Grade	Grade Points	Description
A	9.5 -10	excellent
A-	9.0 – 9.4	excellent
B+	8.5 – 8.9	good
B	8.0 – 8.4	good
C+	7.5 – 7.9	satisfactory
C	7.0 – 7.4	satisfactory
F	Below 7.0	fail

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Appendix D MSc modules: names, credits & assessment methods

The tables on the next pages give an overview of the module in each specialisation, including the ways these modules are assessed.

1. Urban Water and Sanitation programme

Water Supply Engineering

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3346	Introduction to UWS 1	S.G. Salinas Rodríguez, PhD	4.5	126	50		10				40	
Compulsory	201920T02	M3527	Introduction to UWS 2	S.G. Salinas Rodríguez, PhD	4.5	124	65						35	
Compulsory	201920T03	M3538	Introduction to UWS 3	N.P. van der Steen, PhD	5	140	80		20					
Compulsory	201920T04	M3338	Unit Operations in Water Treatment (Coagulation, Sedimentation, Flotation and Filtration)	N. Dhakal, MSc	5	144	60		20				20	
Compulsory	201920T05	M3557	Disinfection, Adsorption and Natural Processes for Water Treatment	G. Ferrero, PhD	5	146	70		20				10	
Compulsory	201920T06	M3528	Groundwater Resources and Treatment	B. Petrusevski, PhD	5	143	60		15				25	
Compulsory	201920T07	M3635	Water Transport and Distribution	N. Trifunovic, PhD	5	141	20					40	40	
Compulsory	201920T08	M3591	Desalination and Membrane Technology	S.G. Salinas Rodríguez, PhD	5	140	65		10				25	
Compulsory	201920T09	M3342	International Fieldtrip and Fieldwork UWS	D. Ferras, PhD	5	150							100	
	1 module to be chosen from this list:													
Elective	201920T10	M3610	Urban Water Systems	Dr. Z. Vojinovic, PhD	5	142	40						60	
Elective	201920T10	M3551	Water Treatment Processes and Plants Design	S.K. Sharma, PhD	5	141		20		40			40	
Elective	201920T10	M3648	Industrial Effluents Treatment and Residuals Management	H.A. Garcia Hernandez, PhD	5	139						60	40	
	1 module to be chosen from this list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environment	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras, PhD	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3114	Groupwork Sint Maarten	B. Petrusevski, PhD	5	140		40					60	
Compulsory	201920T14	M3627	Thesis Research Proposal Development for UWS	D. Ferras, PhD	9	40							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong	36	1008		100						
				Total number of credits:	106									

Sanitary Engineering

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3346	Introduction to UWS 1	S.G. Salinas Rodríguez, PhD	4.5	126	50		10				40	
Compulsory	201920T02	M3527	Introduction to UWS 2	S.G. Salinas Rodríguez, PhD	4.5	124	65						35	
Compulsory	201920T03	M3538	Introduction to UWS 3	N.P. van der Steen, PhD	5	140	80		20					
Compulsory	201920T04	M3531	Urban Drainage and Sewerage	A. Sanchez Torres, PhD	5	142	50						50	
Compulsory	201920T05	M1802	Conventional Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140	80						20	
Compulsory	201920T06	M3529	Resource Oriented Wastewater Treatment and Sanitation	F.J. Rubio Rincón, PhD	5	145	60		10				30	
Compulsory	201920T07	M3612	Wastewater Treatment Plants Design and Engineering	C.M. Lopez Vazquez, PhD	5	140	50			25			25	
Compulsory	201920T08	M3054	Modelling of Wastewater Treatment Processes and Plants	C.M. Hooijmans, PhD	5	132	100							
Compulsory	201920T09	M3342	International Fieldtrip and Fieldwork UWS	D. Ferras, PhD	5	150							100	
	1 module to be chosen from the following list:													
Elective	201920T10	M3610	Urban Water Systems	Dr. Z. Vojinovic, PhD	5	142	40						60	
Elective	201920T10	M3551	Water Treatment Processes and Plants Design	S.K. Sharma, PhD	5	141		20		40			40	
Elective	201920T10	M3648	Industrial Effluents Treatment and Residuals Management	H.A. Garcia Hernandez, PhD	5	139						60	40	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environment	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras, PhD	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3114	Groupwork Sint Maarten	B. Petrusevski, PhD	5	140		40					60	
Compulsory	201920T14	M3627	Thesis Research Proposal Development for UWS	D. Ferras, PhD	9	40							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong	36	1008		100						
				Total number of credits:	106									

Sanitary Engineering – Universidad de Valle, Cali

Institute	Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment
Cali	Compulsory	201920		Chemistry of Environmental Pollution (C1)		3 (5.13)								
	Compulsory	201920		Environmental Pollution Microbiology (C2)		3 (5.13)								
	Compulsory	201920		Fundamentals of Environmental Processes (C3)		3 (5.13)								
	Compulsory	201920		Environmental and Development (C4)		3 (5.13)								
	Compulsory	201920		Engineering Research Introduction (C5)		2 (3.42)								
IHE	Compulsory	201920T04	M3531	Urban Drainage and Sewerage	A. Sanchez Torres, PhD	5	142	50						50
	Compulsory	201920T05	M1802	Conventional Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140	80						20
	Compulsory	201920T06	M3529	Resource Oriented Wastewater Treatment and Sanitation	F.J. Rubio Rincón, PhD	5	145	60		10				30
	Compulsory	201920T07	M3612	Wastewater Treatment Plants Design and Engineering	C.M. Lopez Vazquez, PhD	5	140	50			25			25
	Compulsory	201920T08	M3054	Modelling of Wastewater Treatment Processes and Plants	C.M. Hooijmans, PhD	5	132	100						
	Compulsory	201920T09	M3342	International Fieldtrip and Fieldwork UWS	D. Ferras	5	150							100
	1 elective from the following list has to be chosen:													
	Elective	201920T10	M3610	Urban Water Systems	Dr. Z. Vojinovic, PhD	5	142	40						60
	Elective	201920T10	M3551	Water Treatment Processes and Plants Design	S.K. Sharma, PhD	5	141		20		40			40
	Elective	201920T10	M3648	Industrial Effluents Treatment and Residuals Management	H.A. Garcia Hernandez, PhD	5	139						60	40
	Compulsory	201920T11	M3616	Thesis Research Proposal Development for AIT and Univalle	A. Sanchez Torres, PhD	5	140				100			
	Compulsory	201920T13	M3114	Groupwork Sint Maarten	B. Petrusevski, PhD	5	140		40					60
Cali	Compulsory	201920		Engineering Research I (C9)		4 (6.84)								
	Compulsory	201920		Engineering Research II (C10)		8 (13.68)								
All	Compulsory	201920T15		MSc research, thesis and defence		14 (23.94)	1008		100					
					Total number of credits:	113.4								

Urban Water Engineering and Management

Location	Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment
AIT	Compulsory	201920	ED78.36	Drinking Water Treatment		7.5								
AIT	Compulsory	201920	CE74.54	Integrated Water Resources Management		7.5								
AIT	Compulsory	201920		Wastewater Treatment		7.5								
AIT	Compulsory	201920	CE74.11	Watershed Hydrology		7.5								
IHE	Compulsory	201920T04	M3531	Urban Drainage and Sewerage	A. Sanchez Torres, PhD	5	142	50						50
IHE	Compulsory	201920T05	M3530	Asset Management	P.D.A. Pathirana, PhD	5	141				50			50
IHE	Compulsory	201920T07	M3635	Water Transport and Distribution	N. Trifunovic, PhD	5	141	20					40	40
IHE	Compulsory	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60
IHE	Compulsory	201920T09	M3342	International Fieldtrip and Fieldwork UWS	D. Ferras	5	150							100
	1 elective module has to be chosen from the following list:													
IHE	Elective	201920T10	M3610	Urban Water Systems	Dr. Z. Vojinovic, PhD	5	142	40						60
IHE	Elective	201920T10	M3551	Water Treatment Processes and Plants Design	S.K. Sharma, PhD	5	141		20		40			40
IHE	Elective	201920T10	M3648	Industrial Effluents Treatment and Residuals Management	H.A. Garcia Hernandez, PhD	5	139						60	40
IHE	Compulsory	201920T11	M3616	Thesis Research Proposal Development for AIT and Univalle	A. Sanchez Torres, PhD	5	140				100			
AIT/IHE	Compulsory			MSc research, thesis and defence		55								
					Total number of credits:	120								

2. Environmental Science programme

Environmental Science and Technology

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3371	Introduction to Environmental Science 1	E.D. de Ruijter van Steveninck, PhD	9	260	50						50	
Compulsory	201920T03	M3370	Introduction to Environmental Science 2	J.G. Evers, PhD	5	140	60						40	
Compulsory	201920T04	M3031	Integrated Project Environmental Science	N.P. van der Steen, PhD	5	140		30					70	
Compulsory	201920T05	M3517	Environmental Process Technology	N.P. van der Steen, PhD	5	142	65		35					
Compulsory	201920T06	M3399	Environmental Systems Analysis	Prof. K.A. Irvine, PhD	5	140	40	10					50	
Compulsory	201920T07	M3625	Water Quality Assessment and Monitoring	E.D. de Ruijter van Steveninck, PhD	5	140			15				85	
Compulsory	201920T08	M3413	Industrial Resource Management and Cleaner Production	E.R. Raj, PhD	5	140						60	40	
Compulsory	201920T09	M3516	International Fieldtrip and Fieldwork ES	Dr. J.P.E.H.B. Simaika, PhD	5	140							100	
	1 module to be chosen from the following list:													
Elective	201920T10	M3605	Ecotechnologies	J.L.C.M. van de Vossenberg, PhD	5	140	50		20				30	
Elective	201920T10	M3608	Aquatic Ecosystems Processes and Applications	G.M. Gettel, PhD	5	140		10					90	
Elective	201920T10	M3515	Environmental Assessment for Water-related Policies and Development	Dr. A. Mendoza - Sammet, PhD	5	140	40						60	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environment	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras, PhD	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3588	Applied Environmental Management	Dr. A. Mendoza - Sammet, PhD	5	140							100	
Compulsory	201920T14	M3634	Thesis Research Proposal Development for ES	Dr. A. Mendoza - Sammet, PhD	9	233							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong	36	1008		100						
				Total number of credits:	106									

Environmental Planning and Management

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3371	Introduction to Environmental Science 1	E.D. de Ruijter van Steveninck, PhD	9	260	50						50	
Compulsory	201920T03	M3370	Introduction to Environmental Science 2	J.G. Evers, PhD	5	140	60						40	
Compulsory	201920T04	M3031	Integrated Project Environmental Science	N.P. van der Steen, PhD	5	140		30					70	
Compulsory	201920T05	M3577	Water and Environmental Law	F.G.W. Jaspers, MA	5	138	70						30	
Compulsory	201920T06	M3399	Environmental Systems Analysis	Prof. K.A. Irvine, PhD	5	140	40	10					50	
Compulsory	201920T07	M3519	Water and Environmental Policy Analysis	Dr. A. Mendoza - Sammet, PhD	5	140	50						50	
Compulsory	201920T08	M3421	Environmental Planning and Implementation	J.G. Evers, PhD	5	140	40						60	
Compulsory	201920T09	M3516	International Fieldtrip and Fieldwork ES	Dr. J.P.E.H.B. Simaika, PhD	5	140							100	
	1 module to be chosen from the following list:													
Elective	201920T10	M3605	Ecotechnologies	J.L.C.M. van de Vossenberg, PhD	5	140	50		20				30	
Elective	201920T10	M3608	Aquatic Ecosystems Processes and Applications	G.M. Gettel, PhD	5	140		10					90	
Elective	201920T10	M3515	Environmental Assessment for Water-related Policies and Development	Dr. A. Mendoza - Sammet, PhD	5	140	40						60	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environment	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras, PhD	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3588	Applied Environmental Management	Dr. A. Mendoza - Sammet, PhD	5	140							100	
Compulsory	201920T14	M3634	Thesis Research Proposal Development for ES	Dr. A. Mendoza - Sammet, PhD	9	233							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong	36	1008		100						
				Total number of credits:	106									

Applied Aquatic Ecology for Sustainability

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3371	Introduction to Environmental Science 1	E.D. de Ruijter van Steveninck, PhD	9	260	50						50	
Compulsory	201920T03	M3370	Introduction to Environmental Science 2	J.G. Evers, PhD	5	140	60		0				40	
Compulsory	201920T04	M3031	Integrated Project Environmental Science	N.P. van der Steen, PhD	5	140		30					70	
Compulsory	201920T05	M3520	Applied Ecology and Bioassessment	Dr. J.P.E.H.B. Simaika, PhD	5	140	30						70	
Compulsory	201920T06	M3399	Environmental Systems Analysis	Prof. K.A. Irvine, PhD	5	140	40	10					50	
Compulsory	201920T07	M3625	Water Quality Assessment and Monitoring	E.D. de Ruijter van Steveninck, PhD	5	140			15				85	
Compulsory	201920T08	M3403	River and Floodplain Rehabilitation	Dr. J.P.E.H.B. Simaika, PhD	5	140		20					80	
Compulsory	201920T09	M3516	International Fieldtrip and Fieldwork ES	Dr. J.P.E.H.B. Simaika, PhD	5	140							100	
	1 module to be chosen from the following list:													
Elective	201920T10	M3605	Ecotechnologies	J.L.C.M. van de Vossenberg, PhD	5	140	50		20				30	
Elective	201920T10	M3608	Aquatic Ecosystems Processes and Applications	G.M. Gettel, PhD	5	140		10					90	
Elective	201920T10	M3515	Environmental Assessment for Water-related Policies and Development	Dr. A. Mendoza - Sammet, PhD	5	140	40						60	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environment	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3588	Applied Environmental Management	Dr. A. Mendoza - Sammet, PhD	5	140							100	
Compulsory	201920T14	M3634	Thesis Research Proposal Development for ES	Dr. A. Mendoza - Sammet, PhD	9	233							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong	36	1008		100						
				Total number of credits:	106									

Limnology and Wetland Management

Institute	Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Boku	Compulsory	201920	LWM 1	Basics in Limnology (LWM1)		9									
	Compulsory	201920	LWM 2	Ecology of Aquatic Organisms (LWM2)		6									
	Compulsory	201920	LWM 3	Basics in Applied Limnology (LWM3)		6									
	Compulsory	201920	LWM 4	Aquatic Ecosystem Management (LWM4)		3									
	Compulsory	201920	LWM 5	Scientific Methods (LWM5)		3									
Egerton	Compulsory	201920	LWM 6	Lake Ecology (LWM6)		6									
	Compulsory	201920	LWM 7	Ecology of Streams and Rivers (LWM7)		6									
	Compulsory	201920	LWM 8	Wetlands for Water Quality (LWM8)		6									
	Compulsory	201920	LWM 9	Fisheries & Aquaculture (LWM9)		6									
	Compulsory	201920	LWM 10	Fieldtrip on Sustainable Management and Utilisation of Coastal Ecosystems (LWM10)		2									
IHE	Compulsory	201920T09	LWM 11 (M3273)	Data Analysis and Modelling for Aquatic Ecosystems for LWM	A.A. van Dam, PhD	5.6	140	40	20					40	
	Compulsory	201920T10	LWM 12 (M3431)	Aquatic Ecosystems Processes and Applications for LWM	G.M. Gettel, PhD	5.6	140		10					90	
	Compulsory	201920T11	LWM 13 (M3318)	Wetlands for Livelihoods and Conservation for LWM	E.M.A. Hes, MSc	5.6	140		10					80	10
	Compulsory	201920T12	LWM 14 (M3498)	Summer School for LWM	E.M.A. Hes, MSc	1.6	44								100
	Compulsory	201920T13	LWM 15 (M3626)	Applied Environmental Management for LWM	Dr. A. Mendoza - Sammet, PhD	5.6	140							100	
All	Compulsory	201920	LWM 16	Electives for MSc research project (to be approved by JMC)		13									
	Compulsory	201920T15	LWM 17 (M3499)	MSc Research and Thesis Writing for LWM	Drs. E.A. de Jong	30	840		100						
					Total number of credits:	120									

Environmental Technology and Engineering

Institute	Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
UCT Prague	Compulsory	201920		Environmental Microbiology		4									
	Compulsory	201920		Environmental Engineering		4									
	Compulsory	201920		Wastewater Treatment		5									
	Compulsory	201920		Waste Management and Treatment		4									
	Compulsory	201920		Atmospheric Pollution Control		3									
	Compulsory	201920		Sludge Management basics		2									
	Compulsory	201920		Environmental Engineering-Laboratory		3									
	Compulsory	201920		Elective project I		3									
	Compulsory	201920		Communication and writing skills for engineers I		2									
	Optional	201920		ELECTIVE Basics of Czech		2									
IHE	Compulsory	201920T05	M3517	Environmental Process Technology	N.P. van der Steen, PhD	5	142	65		35					
	Compulsory	201920T06	M3394	Elective project 2	Dr. C.D.M. Dupont	2	56		30					70	
	Compulsory	201920T06	M3518	Communication and Writing Skills for Engineers II	E.R. Raj, PhD	3	84		50					50	
	Compulsory	201920T09	M3503	International Fieldtrip IMETE	N.P. van der Steen, PhD	5	140							100	
		Track "Ecotechnologies":													
	Compulsory	201920T07	M3625	Water Quality Assessment and Monitoring	E.D. de Ruijter van Steveninck, Ph	5	140			15				85	
	Compulsory	201920T08	M3413	Industrial Resource Management and Cleaner Production	E.R. Raj, PhD	5	140						60	40	
	Compulsory	201920T10	M3605	Ecotechnologies	J.L.C.M. van de Vossenberg, PhD	5	140	50		20				30	
		Track " Wastewater treatment plant design and engineering":													
	Compulsory	201920T07	M3612	Wastewater Treatment Plants Design and Engineering	C.M. Lopez Vazquez, PhD	5	140	50			25			25	
	Compulsory	201920T08	M3054	Modelling of Wastewater Treatment Processes and Plants	C.M. Hooijmans, PhD	5	132	100							
	Compulsory	201920T10	M3648	Industrial Effluents Treatment and Residuals Management	H.A. Garcia Hernandez, PhD	5	139						60	40	
	Optional	201920T05	M3474	Basic Dutch for Foreigners	N.P. van der Steen, PhD	2	72								100
UGent	Compulsory	201920		Advances & Trends in Environmental Technology		3									
	Compulsory	201920		Basics of Process Engineering		3									
	Compulsory	201920		Basics of Control Engineering		3									
	Compulsory	201920		Bioresource Recovery Processes and Engineering		6									
	Track "Air":														
	Compulsory	201920		Urban and Indoor Air Pollution		5									
	Compulsory	201920		Advanced Waste Gas Treatment		3									
	Track " Soil":														
	Compulsory	201920		Pedology		3									
	Compulsory	201920		Soil Remediation		5									
	Elective	201920		Elective module(s)		7									
IHE	Elective	201920T11	M3607	Internship IMETE (7 ECTS)	N.P. van der Steen, PhD	7	196		20					80	
ALL	Compulsory	201920		Master Dissertation		30									
					Total number of credits:	120									

3. Water Science and Engineering programme

Coastal Engineering and Port Development

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3505	Introduction to Water Science and Engineering	Dr. L.G. Hayde, PhD	4	96	21					55	24	
Compulsory	201920T02	M3622	Hydrology and Hydraulics	Dr. S. Maskey, PhD	5	144	80						20	
Compulsory	201920T03	M3636	Introduction to Coastal Science and Engineering	Dr. A.A. Milho Semedo, PhD	5	132	75		25					
Compulsory	201920T04	M3583	Port Planning and Infrastructure Design	A. Dastgheib, PhD	5	146							100	
Compulsory	201920T05	M3630	Coastal Systems	Prof. dr. R.W.M.R.J.B. Ranasinghe	5	180						60	40	
Compulsory	201920T06	M3584	Design of Breakwaters and Dikes	A. Dastgheib, PhD	5	142				30			70	
Compulsory	201920T07	M3639	Process-based Coastal Modelling	J.A.H. Reyns, MSc	5	144							100	
	1 module to be chosen from the following list:													
Elective	201920T08	M3009	Dams and Hydropower	Dr. techn. M. Marence, PhD	5	161	45					45	10	
Elective	201920T08	M1309	Integrated Hydrological and River Modelling	Dr. S. Maskey, PhD	5	138		15					85	
Elective	201920T08	M3578	Food Security, Health and Environment	Ir. A.E.C. Duker, MSc	5	140		20					80	
Elective	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60	
Elective	201920T08	M3439	Climate Change Impacts and Adaptation in Deltas	Dr. A.A. Milho Semedo, PhD	5	140							100	
Elective	201920T08	M3644	River Flood Analysis and Modelling	Dr. I.I. Popescu, PhD	5	176	60						40	
Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							100	
	1 module to be chosen from the following list:													
Elective	201920T10	M3036	Drought Management and Reservoir Operations	M.G.F. Werner, PhD	5	138	60						40	
Elective	201920T10	M2214	Geotechnical Engineering and Dredging	M. van der Wegen, PhD	5	140				60			40	
Elective	201920T10	M3581	Innovative Water Solutions for Agriculture	P. Karimi, PhD	5	140	20						80	
Elective	201920T10	M3243	Flood Risk Management	Dr. B. Bhattacharya, PhD	5	132	30						70	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environ	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3367	Groupwork WSE	W. Veerbeek, PhD	5	140		100						
Compulsory	201920T14	M3284	Thesis Research Proposal Development for WSE	G.A. Corzo Perez, PhD	9	196							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong, MA	36	1008		100						
				Total number of credits:	106									

River Basin Development

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3505	Introduction to Water Science and Engineering	Dr. L.G. Hayde, PhD	4	96	21					55	24	
Compulsory	201920T02	M3622	Hydrology and Hydraulics	Dr. S. Maskey, PhD	5	144	80						20	
Compulsory	201920T03	M3389	River Basin Development and Environmental Impact Assessmen	Dr. I. Masih, PhD	5	142	50						50	
Compulsory	201920T04	M3090	Data Collection and Analysis and Design	M.G.F. Werner, PhD	5	138	70						30	
Compulsory	201920T05	M3412	Hydraulics and Remote Sensing for River Basin Development	Ir. A. Cattapan, MSc	5	138	20						80	
Compulsory	201920T06	M2730	River Morphodynamics	A. Crosato, PhD	5	140						80	20	
Compulsory	201920T07	M3631	Hydraulic Structures	D. Valero Huerta	5	140				40			60	
	1 module to be chosen from the following list:													
Elective	201920T08	M3009	Dams and Hydropower	Dr. techn. M. Marence, PhD	5	161	45					45	10	
Elective	201920T08	M1309	Integrated Hydrological and River Modelling	Dr. S. Maskey, PhD	5	138		15					85	
Elective	201920T08	M3578	Food Security, Health and Environment	Ir. A.E.C. Duker, MSc	5	140		20					80	
Elective	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60	
Elective	201920T08	M3439	Climate Change Impacts and Adaptation in Deltas	Dr. A.A. Milho Semedo, PhD	5	140							100	
Elective	201920T08	M3644	River Flood Analysis and Modelling	Dr. I.I. Popescu, PhD	5	176	60						40	
Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							100	
	1 module to be chosen from the following list:													
Elective	201920T10	M3036	Drought Management and Reservoir Operations	M.G.F. Werner, PhD	5	138	60						40	
Elective	201920T10	M2214	Geotechnical Engineering and Dredging	M. van der Wegen, PhD	5	140				60			40	
Elective	201920T10	M3581	Innovative Water Solutions for Agriculture	P. Karimi, PhD	5	140	20						80	
Elective	201920T10	M3243	Flood Risk Management	Dr. B. Bhattacharya, PhD	5	132	30						70	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environ	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3367	Groupwork WSE	W. Veerbeek, PhD	5	140		100						
Compulsory	201920T14	M3284	Thesis Research Proposal Development for WSE	G.A. Corzo Perez, PhD	9	196							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong, MA	36	1008		100						
				Total number of credits:	106									

Land and Water Development for Food Security

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3505	Introduction to Water Science and Engineering	Dr. L.G. Hayde, PhD	4	96	21					55	24	
Compulsory	201920T02	M3622	Hydrology and Hydraulics	Dr. S. Maskey, PhD	5	144	80						20	
Compulsory	201920T03	M3504	Irrigation and Drainage Essentials	F.X. Suryadi, PhD	5	142						30	70	
Compulsory	201920T04	M3506	Irrigation and Drainage Design Project I	F.X. Suryadi, PhD	5	140				43			57	
Compulsory	201920T05	M3554	Irrigation and Drainage Design Project II.	Dr. L.G. Hayde, PhD	5	142	23			24			53	
Compulsory	201920T06	M3534	Management of Irrigation and Drainage Systems	Ir. A.E.C. Duker, MSc	5	140						50	50	
Compulsory	201920T07	M3555	Optimization of Canal System Design and Operation	Dr. L.G. Hayde, PhD	5	140						27	73	
	1 module to be chosen from the following list:													
Elective	201920T08	M3009	Dams and Hydropower	Dr. techn. M. Marence, PhD	5	161	45					45	10	
Elective	201920T08	M1309	Integrated Hydrological and River Modelling	Dr. S. Maskey, PhD	5	138		15					85	
Elective	201920T08	M3578	Food Security, Health and Environment	Ir. A.E.C. Duker, MSc	5	140		20					80	
Elective	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60	
Elective	201920T08	M3439	Climate Change Impacts and Adaptation in Deltas	Dr. A.A. Milho Semedo, PhD	5	140							100	
Elective	201920T08	M3644	River Flood Analysis and Modelling	Dr. I.I. Popescu, PhD	5	176	60						40	
	1 module to be chosen from the following list:													
Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							100	
Elective	201920T10	M3036	Drought Management and Reservoir Operations	M.G.F. Werner, PhD	5	138	60						40	
Elective	201920T10	M2214	Geotechnical Engineering and Dredging	M. van der Wegen, PhD	5	140				60			40	
Elective	201920T10	M3581	Innovative Water Solutions for Agriculture	P. Karimi, PhD	5	140	20						80	
Elective	201920T10	M3243	Flood Risk Management	Dr. B. Bhattacharya, PhD	5	132	30						70	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environ	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3367	Groupwork WSE	W. Veerbeek, PhD	5	140		100						
Compulsory	201920T14	M3284	Thesis Research Proposal Development for WSE	G.A. Corzo Perez, PhD	9	196							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong, MA	36	1008		100						
				Total number of credits:	106									

Hydrology and Water Resources

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3505	Introduction to Water Science and Engineering	Dr. L.G. Hayde, PhD	4	96	21					55	24	
Compulsory	201920T02	M3622	Hydrology and Hydraulics	Dr. S. Maskey, PhD	5	144	80						20	
Compulsory	201920T03	M3532	Hydrogeology	Y. Zhou, PhD	5	140	70						30	
Compulsory	201920T04	M2367	Surface Hydrology	Dr. R.G.W. Venneker, PhD	5	126	70						30	
Compulsory	201920T05	M3533	Water Quality	Prof. M.E. McClain, PhD	5	146			20				80	
Compulsory	201920T06	M3537	Tracer Hydrology and Flow Systems Analysis	Dr. J.W. Wenninger, PhD	5	140	100							
	1 module to be chosen from the following list:													
Elective	201920T07	M1554	Hydrological Data Collection and Processing	Dr. R.G.W. Venneker, PhD	5	136	60		40					
Elective	201920T07	M3160	Groundwater Data Collection and Interpretation	T.Y. Stigter, PhD	5	140							100	
	1 module to be chosen from the following list:													
Elective	201920T08	M3009	Dams and Hydropower	Dr. techn. M. Marence, PhD	5	161	45					45	10	
Elective	201920T08	M1309	Integrated Hydrological and River Modelling	Dr. S. Maskey, PhD	5	138		15					85	
Elective	201920T08	M3096	Groundwater in Adaptation to Global Change Impacts	T.Y. Stigter, PhD	5	140							100	
Elective	201920T08	M3578	Food Security, Health and Environment	Ir. A.E.C. Duker, MSc	5	140		20					80	
Elective	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60	
Elective	201920T08	M3439	Climate Change Impacts and Adaptation in Deltas	Dr. A.A. Milho Semedo, PhD	5	140							100	
Elective	201920T08	M3644	River Flood Analysis and Modelling	Dr. I.I. Popescu, PhD	5	176	60						40	
Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							100	
	1 module to be chosen from the following list:													
Elective	201920T10	M3036	Drought Management and Reservoir Operations	M.G.F. Werner, PhD	5	138	60						40	
Elective	201920T10	M2214	Geotechnical Engineering and Dredging	M. van der Wegen, PhD	5	140				60			40	
Elective	201920T10	M3353	Applied Groundwater Modelling	Y. Zhou, PhD	5	142							100	
Elective	201920T10	M3581	Innovative Water Solutions for Agriculture	P. Karimi, PhD	5	140	20						80	
Elective	201920T10	M3243	Flood Risk Management	Dr. B. Bhattacharya, PhD	5	132	30						70	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environ	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3367	Groupwork WSE	W. Veerbeek, PhD	5	140		100						
Compulsory	201920T14	M3284	Thesis Research Proposal Development for WSE	G.A. Corzo Perez, PhD	9	196							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong, MA	36	1008		100						
				Total number of credits:	106									

Hydroinformatics: Modelling and Information Systems for Water Management

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3505	Introduction to Water Science and Engineering	Dr. L.G. Hayde, PhD	4	96	21					55	24	
Compulsory	201920T02	M3622	Hydrology and Hydraulics	Dr. S. Maskey, PhD	5	144	80						20	
Compulsory	201920T03	M3535	Information Technology and Software Engineering	Dr. J.L. Alfonso Segura, PhD	5	148	50						50	
Compulsory	201920T04	M3643	Modelling Theory and Computational Hydraulics	Dr. I.I. Popescu, PhD	5	136	55			25			20	
Compulsory	201920T05	M3536	Modelling and Information Systems Development	Dr. S.J. van Andel, PhD	5	136							100	
Compulsory	201920T06	M3429	Computational Intelligence and Operational Water Management	Prof. dr. D. Solomatine, PhD	5	136	55						45	
Compulsory	201920T07	M3232	River Basin Modelling	Dr. A. Jonoski, PhD	5	142	100							
	1 module to be chosen from the following list:													
Elective	201920T08	M3009	Dams and Hydropower	Dr. techn. M. Marence, PhD	5	161	45					45	10	
Elective	201920T08	M1309	Integrated Hydrological and River Modelling	Dr. S. Maskey, PhD	5	138		15					85	
Elective	201920T08	M3578	Food Security, Health and Environment	Ir. A.E.C. Duker, MSc	5	140		20					80	
Elective	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60	
Elective	201920T08	M3439	Climate Change Impacts and Adaptation in Deltas	Dr. A.A. Milho Semedo, PhD	5	140							100	
Elective	201920T08	M3644	River Flood Analysis and Modelling	Dr. I.I. Popescu, PhD	5	176	60						40	
Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							100	
	1 module to be chosen from the following list:													
Elective	201920T10	M3036	Drought Management and Reservoir Operations	M.G.F. Werner, PhD	5	138	60						40	
Elective	201920T10	M2214	Geotechnical Engineering and Dredging	M. van der Wegen, PhD	5	140				60			40	
Elective	201920T10	M3581	Innovative Water Solutions for Agriculture	P. Karimi, PhD	5	140	20						80	
Elective	201920T10	M3243	Flood Risk Management	Dr. B. Bhattacharya, PhD	5	132	30						70	
	1 module to be chosen from the following list:													
Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environ	Dr. R.G.W. Venneker, PhD	5	126	50	50						
Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras	5	140	60						40	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
Compulsory	201920T13	M3367	Groupwork WSE	W. Veerbeek, PhD	5	140		100						
Compulsory	201920T14	M3284	Thesis Research Proposal Development for WSE	G.A. Corzo Perez, PhD	9	196							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong, MA	36	1008		100						
				Total number of credits:	106									

International Master programme in Hydroinformatics

Institute	Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment
Bogota	Compulsory	201920		Free surface Hydraulics		5								
	Compulsory	201920		Theory and basic Hydrological applications		5								
	Compulsory	201920		Hydraulics and Computational Hydrology		5								
	Compulsory	201920		Environmental Legislation and Sustainable Development		5								
	Compulsory	201920		Hydroinformatics and information systems development		5								
	Compulsory	201920		Science Technology and Society		n/a								
	Compulsory	201920		Project formulation (seminar)		n/a								
IHE	Compulsory	201920T06	M3429	Computational Intelligence and Operational Water Management	Prof. dr. D. Solomatine, PhD	5	136	55						45
	Compulsory	201920T07	M3232	River Basin Modelling	Dr. A. Jonoski, PhD	5	142	100						
		1 module to be chosen from the following list:												
	Elective	201920T08	M3578	Food Security, Health and Environment	Ir. A.E.C. Duker, MSc	5	140		20					80
	Elective	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60
	Elective	201920T08	M3439	Climate Change Impacts and Adaptation in Deltas	Dr. A.A. Milho Semedo, PhD	5	140							100
	Elective	201920T08	M3644	River Flood Analysis and Modelling	Dr. I.I. Popescu, PhD	5	176	60						40
	Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							100
		1 module to be chosen from the following list:												
	Elective	201920T10	M3036	Drought Management and Reservoir Operations	M.G.F. Werner, PhD	5	138	60						40
	Elective	201920T10	M3581	Innovative Water Solutions for Agriculture	P. Karimi, PhD	5	140	20						80
	Elective	201920T10	M3243	Flood Risk Management	Dr. B. Bhattacharya, PhD	5	132	30						70
		1 module to be chosen from the following list:												
	Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50
	Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras	5	140	60						40
	Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100
	Compulsory	201920T13	M3367	Groupwork WSE	W. Veerbeek, PhD	5	140		100					
	Compulsory	201920T15	M2927	MSc research, thesis and defence	Drs. E.A. de Jong, MA	36	1008		100					
					Total number of credits:	106								

Flood Risk Management

Institute	Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment
TU-Dresden	Compulsory	201920		Climatology and hydrology		5								
	Compulsory	201920		Flood Risk Management 1		5								
	Compulsory	201920		Flood Risk Management 2		5								
	Compulsory	201920		Geodesy		5								
	1 elective module to be chosen from the list:													
	Elective	201920		Ecology		5								
	Elective	201920		Hydraulic Engineering		5								
	1 elective module to be chosen from the list:													
	Elective	201920		Hydrochemistry		5								
	Elective	201920		Hydromechanics		5								
IHE	Compulsory	201920T06	M3429	Computational Intelligence and Operational Water Management	Prof. dr. D. Solomatine, PhD	5	136	55						45
	Compulsory	201920T07	M3232	River Basin Modelling	Dr. A. Jonoski, PhD	5	142	100						
	1 elective module to be chosen from the list:													
	Elective	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60
	Elective	201920T08	M3644	River Flood Analysis and Modelling	Dr. I.I. Popescu, PhD	5	176	60						40
	Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							100
	Compulsory	201920T10	M3243	Flood Risk Management	Dr. B. Bhattacharya, PhD	5	132	30						70
	Compulsory	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100
TU-Catalonia	Compulsory	201920		Global warming effects, Flood and Drought Management		3								
	Compulsory	201920		Coastal flooding: impacts, conflicts and risks		3								
	Compulsory	201920		Debris Flow and Flash Flood. Risk, Vulnerability, Hazard and Resilience concepts		5								
	Compulsory	201920		The Application of Radar-based Rainfall Observations and Forecast in Early Warning Systems and Flood Forecasting		4								
	Compulsory	201920		Fluvial morphodynamics		5								
UN-Ljubljana	Compulsory	201920		Spatial planning for flood protection		5								
	Compulsory	201920		Socioeconomical assessment of flood protection		5								
all	Compulsory	201920T15	M3231	MSc research, thesis and defence	Drs. E.A. de Jong	30	840		100					
					Total number of ECTS:	120								

Groundwater and Global Change - Impacts and Adaptation

Institute	Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
IST Lisbon	Compulsory			Hydrogeology (Hidr)		6									
	Compulsory			Hydrology, Environment and Water Resources (HARH)		6									
	Compulsory			Atmosphere Physics and Chemistry (FQA)		4.5									
	Compulsory			Integrated River Basin Management (GIBH)		4.5									
	Compulsory			Groundwater Pollution and Protection (PPAS)		6									
	Compulsory			Environmental Policies and Law (DPA)		4.5									
IHE	Compulsory	201920T06	M3537	Tracer Hydrology and Flow Systems Analysis	Dr. J.W. Wenninger, PhD	5	140	100							
	Compulsory	201920T07	M3160	Groundwater Data Collection and Interpretation	T.Y. Stigter, PhD	5	140							100	
	Compulsory	201920T08	M3096	Groundwater in Adaptation to Global Change Impacts	T.Y. Stigter, PhD	5	140							100	
	Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							100	
	Compulsory	201920T10	M3353	Applied Groundwater Modelling	Y. Zhou, PhD	5	142							100	
	1 module to be chosen from the following list:														
	Elective	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50	
	Elective	201920T11	M3609	Experimental Methods in Wastewater Treatment	C.M. Lopez Vazquez, PhD	5	140			40			60		
	Elective	201920T11	M3593	Decentralised Water Supply and Sanitation	S.K. Sharma, PhD	5	140	60	10					30	
	Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
	Elective	201920T11	M3637	Water Resources Planning under Changing Climate and Environ	Dr. R.G.W. Venneker, PhD	5	126	50	50						
	Elective	201920T11	M3214	Wetlands for Livelihoods and Conservation	E.M.A. Hes, MSc	5	140		10					80	10
	Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
	Elective	201920T11	M3417	Solid Waste Management	Dr. C.D.M. Dupont, PhD	5	140	50	15					35	
	Elective	201920T11	M3438	Advanced Water Transport and Distribution	D. Ferras	5	140	60						40	
	Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
	Elective	201920T11	M3647	Decision Support Systems in the Water Domain	Dr. A. Jonoski, PhD	5	128							100	
TU-Dresden	Compulsory			Climate Systems and Climate Modelling		5									
	Compulsory			Soil Water		5									
	Compulsory			Study Project IWRM (on Groundwater and Adaptation)		10									
	2 module to be chosen from the following list:														
	Elective			Ecology		5									
	Elective			Integrated land use management in the landscape		5									
	Elective			Water Quality and Water Treatment		5									
	Elective			Drinking Water Supply		5									
	Elective			Watershed Management II		5									
	Elective			Treatment Plant Design		5									
	Elective			Aquatic Ecology and Ecotoxicology		5									
	Elective			Communication and Conflict Management		5									
	Elective			Hydrochemistry		5									
	Elective			Flood Risk Management II		5									
	Elective			Geodesy		5									
	Elective			Soils		5									
	Elective			Statistics		5									
	Elective			Integrated Water Resources Management II (IWRM II)		5									
	Elective			Urban Water II		5									
	Thesis work to be carried out at one of the 3 instititutes:														
IHE	Compulsory	201920T15	M3231	MSc research, thesis and defence (IHE)		30	840		100						
	Compulsory			MSc research, thesis and defence (TU Dresden)		30									
	Compulsory			MSc research, thesis and defence (ULisboa)		30									
					Total number of credits (minimum)	120									

Sustainable Urban Water Management

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment
Compulsory	201920T01	M3505	Introduction to Water Science and Engineering	Dr. L.G. Hayde, PhD	4	96	21					55	24
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							1
Compulsory	201920T02	M3622	Hydrology and Hydraulics	Dr. S. Maskey, PhD	5	144	80						20
Elective	201920T02	M3327	Online course on Urban System Analysis, Planning and Management: Developing Skills	M. Radhakrishnan, PhD	5	100		40					60
Compulsory	201920T03	M3326	Urban System Analysis, Planning and Management: An Introduction	M. Radhakrishnan, PhD	5	140	50	25					25
Compulsory	201920T04	M3531	Urban Drainage and Sewerage	A. Sanchez Torres, PhD	5	142	50						50
Compulsory	201920T05	M3530	Asset Management	P.D.A. Pathirana, PhD	5	141				50			50
	1 module to be chosen from the following list:												
Elective	201920T06	M3529	Resource Oriented Wastewater Treatment and Sanitation	F.J. Rubio Rincón, PhD	5	145	60		10				30
Elective	201920T06	M3546	Water Resources Assessment and Modelling	Dr. I. Masih, PhD	5	146		35		25			40
Elective	201920T06	M3429	Computational Intelligence and Operational Water Management	Prof. dr. D. Solomatine, PhD	5	136	55						45
Elective	201920T06	M3399	Environmental Systems Analysis	Prof. K.A. Irvine, PhD	5	140	40	10					50
	1 module to be chosen from the following list:												
Elective	201920T07	M3635	Water Transport and Distribution	N. Trifunovic, PhD	5	141	20					40	40
Elective	201920T07	M3625	Water Quality Assessment and Monitoring	E.D. de Ruijter van Steveninck, PhD	5	140			15				85
Elective	201920T07	M3232	River Basin Modelling	Dr. A. Jonoski, PhD	5	142	1						
Elective	201920T07	M3519	Water and Environmental Policy Analysis	Dr. A. Mendoza - Sammet, PhD	5	140	50						50
	1 module to be chosen from the following list:												
Elective	201920T08	M1309	Integrated Hydrological and River Modelling	Dr. S. Maskey, PhD	5	138		15					85
Elective	201920T08	M3549	Water Resources Planning	Dr. N.J.M. van Cauwenbergh, PhD	5	143	60						40
Elective	201920T08	M3413	Industrial Resource Management and Cleaner Production	E.R. Raj, PhD	5	140						60	40
Elective	201920T08	M3404	Urban Flood Management and Disaster Risk Mitigation	Dr. Z. Vojinovic, PhD	5	140	40						60
Elective	201920T08	M3439	Climate Change Impacts and Adaptation in Deltas	Dr. A.A. Milho Semedo, PhD	5	140							1
Compulsory	201920T09	M3167	Fieldtrip and Fieldwork WSE	Dr. L.G. Hayde, PhD	5	140							1
Compulsory	201920T10	M3610	Urban Water Systems	Dr. Z. Vojinovic, PhD	5	142	40						60
Compulsory	201920T11	M3048	Water Sensitive Cities	P.D.A. Pathirana, PhD	5	160		25		25			50
Compulsory	201920T13	M3284	Thesis Research Proposal Development for WSE	G.A. Corzo Perez, PhD	9	196							100
Compulsory	201920T15	M3231	MSc research, thesis and defence	Drs. E.A. de Jong, MA	36			100					
				Total number of credits:	106								

Water Management programme

Water management and Governance

Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment	Attendance
Compulsory	201920T01	M3544	Introduction to Water and Development	Dr. J.S. Kemerink - Seyoum, PhD	1	44							100	
Compulsory	201920T01	M3547	What and who makes Water Management and Governance exp	Ir. H. Smit, MSc	9	248		20					80	
Compulsory	201920T03	M3623	Water Resources Management	S.D. Seyoum, PhD	5	141	60						40	
Compulsory	201920T04	M3548	Water Governance	Dr. J.S. Kemerink - Seyoum, PhD	5	141				40			60	
	1 module to be chosen from the following 3 modules:													
Elective	201920T05	M3596	Managing Water Organisations	K.H. Schwartz, PhD	5	144		15					85	
Elective	201920T05	M3577	Water and Environmental Law	F.G.W. Jaspers, MA	5	138	70						30	
			Any other choice (e.g. other IHE programmes)											
	1 module to be chosen from the following 3 modules:													
Elective	201920T06	M3545	Analyzing Water Use Practices - Institutional Analysis	Ir. H. Smit, MSc	5	140		20					80	
Elective	201920T06	M3546	Water Resources Assessment and Modelling	Dr. I. Masih, PhD	5	146		35		25			40	
			Any other choice (e.g. other IHE programmes)											
	1 module to be chosen from the following 3 modules:													
Elective	201920T07	M3552	Water Conflict Analysis	Dr. S. Schmeier, PhD	5	127	40						60	
Elective	201920T07	M3542	Water Economics and Finance	Dr. Y. Jiang, PhD	5	144	70						30	
			Any other choice (e.g. other IHE programmes)											
	1 module to be chosen from the following 4 modules:													
Elective	201920T08	M3597	Rethinking Urban Water Supply, Sanitation and Drainage	T. Acevedo Guerrero, PhD	5	166		30					60	10
Elective	201920T08	M3590	Water Conflict Negotiation and Mediation	Z.S. Shubber, LLM	5	133	50			10			40	
Elective	201920T08	M3549	Water Resources Planning	Dr. N.J.M. van Cauwenbergh, PhD	5	143	60						40	
			Any other choice (e.g. other IHE programmes)											
Compulsory	201920T09	M3642	International Fieldwork	T. Acevedo Guerrero, PhD	5	169		20					80	
	1 module to be chosen from the following 3 modules:													
Elective	201920T10	M3598	Remote Sensing for Water Resources Management	E. Salvadore, PhD	5	128						30	70	
Elective	201920T10	M3604	Partnerships, Networks and Stakeholder Analysis in the Water S	K.H. Schwartz, PhD	5	144							100	
			Any other choice (e.g. other IHE programmes)											
Elective	201920T11	M3580	Remote Sensing for Agricultural Water Management	P. Karimi, PhD	5	140						30	70	
Elective	201920T11	M3543	Sustainability and Resilience of Water Organisations	A.M.P. Bayona Valderrama	5	144		10					90	
Elective	201920T11	M3422	Strategic Planning for River Basins and Deltas	J.G. Evers, PhD	5	140							100	
			Any other choice (e.g. other IHE programmes)											
Compulsory	201920T13	M3629	Research Project	J. Susnik, PhD	5	153		100					100	
Compulsory	201920T14	M3594	Thesis Research Proposal Development for WMG	E. Fantini, PhD	9	272							100	
Compulsory	201920T15	M2927	MSc research, thesis and defence	E. Fantini, PhD	36	1008		100						
				Toal number of credits:	106									

Water Cooperation and Diplomacy

Institute	Type	Term	Code	Name	Coordinator	Credits	Studyload	Written examination closed book	Presentation	Lab report	Oral examination	Homework	Written examination open book	Assignment
Upeace	Compulsory	201920		Orientation		-								
Upeace	Compulsory	201920		Peace and Conflict Studies; The Foundation Course		3								
Upeace	Compulsory	201920		Environment, Conflicts and Sustainability		3								
Upeace	Compulsory	201920		United Nations System		2								
Upeace	Compulsory	201920		Water, Security and Peace		3								
Upeace	Compulsory	201920		Research Methodology 1		3								
IHE	Compulsory	201920T03	M3623	Water Resources Management	S.D. Seyoum, PhD	5	141	60						40
IHE	Compulsory	201920T04	M3548	Water Governance	Dr. J.S. Kemerink - Seyoum, PhD	5	141				40			60
	Elective module: 1 elective from following list:													
IHE	Elective	201920T05	M3596	Managing Water Organisations	K.H. Schwartz, PhD	5	144		15					85
IHE	Elective	201920T05	M3577	Water and Environmental Law	F.G.W. Jaspers, MA	5	138	70						30
	Elective module: 1 elective from following list:													
IHE	Elective	201920T06	M3545	Analyzing Water Use Practices - Institutional Analysis	Ir. H. Smit, MSc	5	140		20					80
IHE	Elective	201920T06	M3546	Water Resources Assessment and Modelling	Dr. I. Masih, PhD	5	146		35		25			40
IHE	Compulsory	201920T07	M3552	Water Conflict Analysis	Dr. S. Schmeier, PhD	5	127	40						60
IHE	Compulsory	201920T08	M3590	Water Conflict Negotiation and Mediation	Z.S. Shubber, LLM	5	133	50			10			40
IHE	Compulsory	201920T09	M3595	Research Methodology II and Thesis Proposal	Dr. M.J. Sehring, PhD	5	142		50					50
Oregon	Elective			Elective modules(Prcticum, NRLA list of courses, others)		3*								
Oregon	Compulsory	201920		Fundamentals of Hydrology		3								
Oregon	Compulsory	201920		Applied Field Problems		3								
Oregon	Compulsory	201920		Writing in Water Resources		4								
Oregon	Compulsory	201920		Conduct Collaborative Projects		3								
Oregon	Compulsory	201920		Sociotechnical aspects of Water		3								
Oregon	Compulsory	201920		Field Geography of Oregon 2		3								
Oregon	Compulsory	201920		SEM / Water Resources Issues		1								
Oregon	Compulsory	201920		R&C Fall Seminar Journal Club		1								
				Total credits for non-thesis part		73								
Oregon	Compulsory	201920		Thesis		36								
				Total credits for full programme		109								

Appendix E MSc thesis marking guidelines (latest update: August 2018)

Criterion 1	9.0 - 10.0	8.0 - 8.9	7.0 - 7.9	6.0 - 6.9	5.9 and below
	Excellent	**Very Good**	**Good**	**Sufficient**	**Fail**
Knowledge and understanding of the subject and answers to questions	An excellent and informative introduction, well-researched, with appropriate and key references. Evidence of critical thinking. Clear aims and objectives, within an overall context, which identifies knowledge gaps. Sets the scene for the research succinctly and elegantly. Gives answers that are internally consistent, with plausible explanations for observations. Clearly explains the logic steps in reasoning. Shows ability to distinguish major and minor points. Not only answers the question, but is able to discuss various aspects of possible answers.	Good project background, with reference to key literature. A logical framework that identifies the research objectives, but may lack some thoroughness, or comprise a limited series of research questions. It might be competent but a little mundane. Gives answers that are internally consistent, with plausible explanations for observations. Clearly explains the logic steps in reasoning. Shows ability to distinguish major and minor points.	Covers the main areas, but has minor flaws in logic or omissions of important detail, or minor flaws in structure. Aims and objectives comprehensible, but maybe slightly over or under ambitious, and/or lacking in clarity or precision. Objectives may be unrealistic. Gives answers that are internally consistent, with plausible explanations for observations. Clearly explains the logic steps in reasoning	Generally lacks some coherence; may be poorly referenced, but includes at least the major points relevant to the research. Aims and objectives no more than adequate. Gives answers that are internally consistent but do not give plausible explanations for observations. Reasoning shows logic.	Poorly structured, with significant omissions of key background literature. No logical progression. Fails to set the context of the project. Research question not developed into appropriate or testable hypotheses. Gives answers that are not internally consistent and gives wrong or doubtful explanations for observations made. Reasoning based on illogical assumptions, feelings, beliefs.

Criterion 2		9.0 - 10.0	8.0 - 8.9	7.0 - 7.9	6.0 - 6.9	5.9 and below
		Excellent	**Very Good**	**Good**	**Sufficient**	**Fail**
Originality, analysis and interpretation	Methods	Well-chosen and entirely appropriate and often novel methods identified clearly. Clear and easy to follow procedures and techniques. Where appropriate, good site description, with informative figures, maps, diagrams etc.	Appropriate actions and methods identified and detailed. Where appropriate, setting of research well described with relevant figures, maps, diagrams etc.	Methodology generally sound but with some lapses in detail of methods, and/or proposed analysis. Figures, maps or diagrams may be poorly produced, or not clear in the context of the research	Significant gaps in methods, or methods not always appropriate to the research questions, or very difficult to comprehend. Lapses in detail in parts of methodology. Figures, maps and diagrams may be absent or poorly produced.	Methodology vague and poorly detailed. No obvious understanding of methodology relevant to research theme. Figures, maps and diagrams may be poorly produced or absent.
	Results	These are well analysed and presented with clarity, with clear and comprehensive relationship to the the research questions.	Results reported well and with clarity. Some minor lapses in summary of findings. Shows ability to address methodological short-comings.	Results comprehensible, generally linking with the research questions. Figures and tables convey adequate meaning, providing a summary of at least some of the key findings.	Some flaws in analysis, but the general essence of the key findings conveyed.	Obvious flaws in analysis. Difficult to follow the results and, analysis. Presentation careless and poor summary of the key findings
	Discussion	Elegant and well structured, placing the results in the context of the international literature and demonstrating a clear understanding of their significance, and/or shortcomings. Show some new ideas and novel interpretation.	Identifies the key finding and relevance of these to some key literature. A well-ordered sequence to the chapter to produce a logical framework.	Recognises some interesting findings, but may be limited in placing these into a wider context. At least some use of key literature. There will likely to be some repetition with the results section.	Some repetition of the results section, with minimal context to wider understanding and relevant literature.	Largely a repetition of results. Fails to identify key findings and/or their wider significance. Little logical framework and lacking any individual ideas or interpretation.

Criterion 3	9.0 - 10.0	8.0 - 8.9	7.0 - 7.9	6.0 - 6.9	5.9 and below
	Excellent	**Very Good**	**Good**	**Sufficient**	**Fail**
Organisation, style, presentation	Writing elegant and succinct. Uses precise language and correct terminology throughout. Figs and Tables well laid out to	A clear and well-written report that is technically proficient.	A generally well-written report that is understandable. Uses appropriate terminology. Occasional spelling or	Language generally clear and uses correct terminology, but with some misunderstandings and lapses in grammar or	Sentences and/or paragraphs poorly constructed. Language inexact or ambiguous. Contains numerous

and communication	a publishable quality with accurate and succinct legends.		grammatical errors. Presentation generally neat	spelling. Presentation and use of tables and figures may be sloppy.	grammatical and spelling mistakes.

Criterion 4	**9.0 - 10.0**	**8.0 - 8.9**	**7.0 - 7.9**	**6.0 - 6.9**	**5.9 and below**
	Excellent	**Very Good**	**Good**	**Sufficient**	**Fail**
Creativity, independence, work planning and critical attitude	Student self-motivated and independent. Engages in intelligent discussion and responds well to suggestions.	Significant help may be given, but students show ability to learn from suggestions and develop ideas and research approaches accordingly.	Needs clear guidance and support, but gradually develops the required competencies.	A need to repeat instructions a number of times. Generally finds taking initiative difficult, and limited self-reliance.	Lacks motivation, or much ability to develop competencies. Shows little self-reliance or interest in the topic.

Appendix F Appeal procedure

(annex to the Examination Regulations)
28 April 2016

A student has the right to lodge an appeal against:

- decisions by examiners, the MSc Examination Committee, or the Examination Board;
- termination of registrations by the Academic Registrar.

NB: An appeal against the decision of an Examiner or an MSc Examination Committee is lodged with the Examination Board. The Examination Board's decision is final and binding, and can therefore not be appealed against with the Academic Appeals Board.

Before starting an appeal procedure, the student has the obligation to attempt to solve the case amicably with the body or person who took the disputed decision.

Appeal against the decision of an Examiner or an MSc Examination Committee:

1. The appeal shall be submitted in hard copy to the Examination Board (via its secretary) within 3 weeks following the date on which the decision was made known.
2. The appeal must be signed by the student (= appellant) and contain at least the following:
    a. name and address, degree programme and student number of the appellant;
    b. details of the Examiner or MSc Examination Committee concerned;
    c. a clear description of the decision against which the appeal has been lodged, on submission of a copy of the decision, if possible, or, if the appeal has been lodged against a refusal to decide, a clear description of the decision which should have been taken in the appellant's opinion;
    d. the grounds of the appeal;
    e. an account of the initiatives taken by the appellant to come to an amicable agreement with the decision maker.

3. The chair of the Board will inform the appellant of any omissions on the appellant's part and will invite him to rectify these within a period of time to be set by the chair. In the event that the appellant fails to rectify the omissions on his/her part, the appeal may be declared inadmissible.
4. The Examination Board may decide to hear the concerned parties.
5. The Examination Board will take a decision within three (3) weeks of receipt of the letter of appeal and inform the parties concerned accordingly in writing, stating whether the initial decision is to be upheld or a new decision taken.
6. The decision of the Examination Board is final and binding.

Appeal against the decision of the Examination Board or the Academic Registrar:

1. The appeal shall be submitted in hard copy to the Academic Appeals Board (via its secretary) within 3 weeks following the date on which the decision was made known.
2. The appeal must be signed by the student (= appellant) and contain at least the following:
    a. name and address, degree programme and student number of the appellant;
    b. details of the body or person who has taken the contested decision;
    c. a clear description of the decision against which the appeal has been lodged, on submission of a copy of the decision, if possible, or, if the appeal has been lodged against a refusal to decide, a clear description of the decision which should have been taken in the appellant's opinion;
    d. the grounds of the appeal;
    e. an account of the initiatives taken by the appellant to come to an amicable agreement with the decision maker.
3. The chair of the Board will inform the appellant of any omissions on the appellant's part and will invite him to rectify these within a period of time to be set by the chair. In the event that the appellant fails to rectify the omissions on his part, the appeal may be declared inadmissible.
4. The Academic Appeals Board may decide to hear the concerned parties.
5. The Academic Appeals Board will take a decision within four (4) weeks of receipt of the letter of appeal and inform the parties concerned accordingly in writing, stating whether the initial decision is to be upheld or a new decision taken.
6. The decision of the Academic Appeals Board is final and binding.

Appendix G Procedures when using eCampusXL for assessments

GENERAL RULES

Students taking part in an examination are expected to have taken notice of these procedures and are expected to understand the implied meaning of these procedures.

Electronic examinations take place in lecture rooms A4, A5 and B6
In the examination room

1. The student brings his/her own laptop to the examination room.
2. When the examination takes place in rooms A4 and A5, students for safety reasons have to connect their laptops with the available network cables in that room instead of using the less stable Wi-Fi.
3. The student brings his/her student card and displays it on the table.
4. A check of attendance is required to proof that the student has taken part in the examination. The invigilator (examination supervisors) verifies the student card and confirms attendance by the student by ticking the box of the student on the attendance list.
5. The invigilators ensure a proper conduct of the examination and maintain order in the examination room. They will announce the beginning and the duration of the examination, and will warn the students 10 minutes before the ending of the examination.
6. The invigilators will instruct the students to log in to the safe browser environment for the examination.
7. At the start of the examination the invigilator announces the password to the students to get access to the examination.
8. The programme will automatically save all answers during an examination every 5 minutes. However during the examination students are strongly advised to save his/her current answers as well various times before the final submission to prevent loss of work in case the server goes down. Students remain responsible for the final submission of their work.
9. For a situation where the time of an examination expires without the final submission, for example when the server is not available on that specific moment, a grace period has been set where attempts can be submitted even after the deadline, but questions cannot be answered/changed.
10. When the laptop of the student stops working correctly, the student can restart the computer and will arrive at the same place in the examination. (this will also work when restart/login is made on a different machine).
11. At the end of the examination the invigilators return the attendance list to the Planning Office.

Other issues:
Bags: Bags and carrying cases, including penholders, are to be placed along the side of the room before the start of the examination.

Dictionary: The use of a printed language dictionary without any additional written annotations is allowed (all languages are allowed). Invigilators are allowed to check the dictionaries for hand-written annotations during the exam (spot checks while they are walking around).
Electronic dictionaries are not allowed.

Calculators:. Use of calculators is not allowed and must be switched off. A scientific calculator inside the save browser environment is available.

Cell phones: Use of cell phones is not allowed and must be switched off

Communication: During the examination, students are not allowed to exchange materials or to communicate with other students. If something is unclear, students have to inform the invigilator, who will contact the

programme coordinator, the examiner or planning officer if necessary.

Other materials: The use of materials other than listed above, including blank paper, texts, of any kind, is not allowed.
Examiners may nevertheless allow students to use specified text matter or other effects in a so-called 'open book' examination. These materials shall not include previous or example examinations and solutions.

Toilet visit: Only one student at a time will be allowed by the invigilator to leave the examination room for a short visit to the lavatory, except during the first 15 and the last 15 minutes of the examination. Examination materials and requirements may not be taken outside the examination room. Before leaving the examination room, students have to hand over their cell phone to the invigilator.

Appendix H Studying with a disability

Adjustments to the benefit of students with disabilities or chronic illnesses

1. Upon a written and substantiated request to that effect, students with disabilities or chronic illnesses may be eligible for adjustments in teaching and examinations. These adjustments are coordinated to the situations of the students as much as possible, but they may not alter the quality or level of difficulty of a subject or the study programme. Facilities to be provided may include modifications to the form or duration of examinations and/or practical exercises to suit individual situations or the provision of practical aids.

2. Requests as mentioned in section 1 must be accompanied by a recent statement from a physician or psychologist or, in cases involving dyslexia, from a testing office registered with BIG, NIP or NVO. If possible, this statement should include an estimate of the extent to which the condition is impeding the student's academic progress.

3. Decisions concerning requests for adjustments relating to educational facilities are taken by the Chair of the Programme Committee. Decisions concerning adjustments relating to examinations are taken by the Examination Board.

4. Adjustments to examinations can involve the following or other matters:
   - form (e.g. replacing a written test with an oral test or vice versa, testing the required material in the form of interim examinations or granting exemptions to the attendance requirement);
   - timing (e.g. additional time for an examination, or a change to the distribution of examinations across the examination period, granting exemptions to admission requirements or extending the period within which a component must be completed);
   - aids permitted during testing (e.g. English-Dutch dictionaries for students with dyslexia);
   - location (taking the examination in a separate, low-stimulus space).

5. Adjustments in educational facilities could include:
   - providing modified furniture in teaching and examination spaces;
   - providing special equipment (e.g. magnification or Braille equipment for students with visual impairments and blindness or loop systems and individual equipment for students with hearing impairments and deafness);
   - providing more accessible course material;
   - providing special computer facilities (e.g. speech-recognition or speech-synthesising software);
   - providing a rest area.