

Critical Reflection

Master of Science Programme in Water Management and Governance





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CHAPTER 1: INTRODUCTION

Introducing IHE Delft

This report is the result of the critical reflection of the Programme Committee¹ responsible for the Master of Science programme in Water Management and Governance (hereinafter ‘WMG Master programme’) at IHE Delft Institute for Water Education (hereinafter ‘the Institute’). As the Institute holds a positive NVAO ITK decision (dated 12th May 2015), this reflection, and therefore also the structure of this report, are based on the limited assessment framework (Assessment framework for the higher education accreditation system of the Netherlands, September 2016).

IHE Delft operates under the auspices of UNESCO (as a so called category 2 institute) and carries out research, education and institutional strengthening activities in the field of water, and with a focus on the Global South². The Institute continues the work that began in 1957 when it first offered a postgraduate diploma course in Hydraulic Engineering to practising professionals from developing countries. The Institute envisions a world in which people manage their water resources sustainably and in which all sectors of society, particularly the poor, can enjoy the benefits of basic water services. Its mission expresses a commitment to generating and sharing knowledge, training water leaders and building capacity all over the world. Whilst the Institute is prominently involved in its own research and education on its Delft premises, it is also instrumental in strengthening the efforts of other universities and research centres in the Global South, and active in joint MSc education with a variety of partners. The administrative data regarding the WMG Master programme and the Institute are provided in Tables 1.1 and 1.2.

Table 1.1. Administrative data regarding the programme

Nomenclature of the programme in CROHO ³ :	Water Management and Governance
Orientation of the programme:	Academic orientation
Level of the programme:	Master of Science
Programme type:	Post-initial
Number of credits:	106 ECTS
Specialisations:	- Water Cooperation and Diplomacy (Joint specialization) - Tailor-made study trajectories based on student portfolios
Location:	Delft, the Netherlands
Mode of study:	Full time
CROHO registration number:	75008

Table 1.2. Administrative data regarding the institution

Name of the institution:	IHE Delft Institute of Water Education
Status of the institution:	Not publicly funded, higher education institution
Outcome of the institutional quality assurance assessment:	Positive – decision 12th May 2015

¹ The WMG Programme Committee exists of the main professors, the programme coordinator, the MSc research coordinator, coordinators of the thematic profiles, a representative of the Educational Bureau, and student representatives of each cohort. An overview of the current members is available on request.

² Global South is used here to encapsulate those countries that are most in need of capacity development (i.e. education, research and institutional strengthening) in the water sector.

³ CROHO is the Central Register of Higher Education Programmes in the Netherlands.

The WMG Master programme is one of four 18 months Masters programmes⁴ offered by the Institute, the other programmes being those in: *Urban Water and Sanitation*; *Environmental Science*; and *Water Science and Engineering*. These programmes consist of a 12 months modular taught part and a 6 months MSc thesis research phase. The total study load of the 18 months programme equals 106 ECTS⁵ credit points.

In recent years the number of specialisations within these programmes has grown, as a result of the Institute's participation in initiatives such as the Erasmus Mundus programme. As a result, some specialisations are now offered jointly with European and overseas partners in the South, in line with the Institute's overall policy of establishing educational partnerships. Generally, these joint specialisations have a somewhat different structure and duration than the 18 months fully Delft-based specialisations; a number of them lead to a joint degree. One such joint specialisation resides with the WMG Master programme, i.e. the MSc in Water Cooperation and Diplomacy, which is offered jointly with the University for Peace (Costa Rica) and Oregon State University (USA). For this joint specialization students are expected to obtain 35 ECTS credits (equivalent to seven modules) at IHE Delft. Upon graduation students receive degrees from each hosting organization.

Programme evolution since the last accreditation

Inspired by the previous visitation panel and in response to developments in the field of study, the WMG Programme Committee has implemented a number of modifications during the last five years. Something worthy of mention is that since 2015 we collaborate with the University of Peace and the Oregon State University to jointly offer a specialization on Water Cooperation and Diplomacy. We are also proud of our progress in making our education more student-centred, through the design and careful testing of the implementation of tailor-made study trajectories based on student portfolios. After positive evaluations of the trial phase by students and staff⁶, the WMG programme committee has decided that all WMG students will follow this personalized study profile from the academic year 2018-2020 onwards (with the exception of the students enrolled in the joint Water Cooperation and Diplomacy specialization). The implication of this decision is that the four specializations that the WMG programme used to offer cease to exist (for more details, see Chapter 3). Another important theme in our continuous attempts to improve the contents of the educational programme is interdisciplinarity. Over the last couple of years, we have made interdisciplinarity a more explicit concern of what we teach, both through the purposive dedication of space and time for discussing (ways of dealing with) the challenges of combining insights, concepts, theories and methods from multiple disciplines, as well as through paying attention in the study programme to different ways of doing interdisciplinarity (process, modelling and theories).

Since the last accreditation, the name of the programme has been changed from *Water Management* to *Water Management and Governance*. This name change reflects and marks an increased recognition of the importance of governance – and of social sciences more broadly - within the academic domain. Moreover, we have updated and improved the content of several modules, developed some new modules and are more explicitly giving attention to the coherent and incremental development of academic and professional skills. These and other developments have led to revisions in the final qualifications of the programme to ensure that the intended learning outcomes continue being well aligned with the content of the programme.

In response to the suggestions raised by the previous visitation committee, a rubric for assessment of master's theses has been developed at institute level (see Annex 13). This rubric is actively used within the WMG Master programme in preparation of and during MSc theses examinations. In addition to this rubric and following a specific recommendation from the last visitation committee, we have agreed to better recognize the value of multi- and interdisciplinary research approaches in the assessment of MSc theses. We have also followed the recommendation of the visitation panel to include an examiner fully external to the Institute in all the MSc thesis examination committees. Many of the more specific suggestions given by the previous visitation panel have also been taken up. We explain this in more detail in the next chapters.

⁴ A fifth, 68 ECTS (1 year) MSc programme in Sanitation has been added in 2018.

⁵ European Credit Transfer and Accumulation System.

⁶ Student evaluations and reflection reports on the tailor-made study trajectories are available on request.

Self-reflection approach

This report is the result of a six months process of critical reflection by the Programme Committee responsible for the WMG Master programme. This reflection took place during the first half of 2018 with a particular focus on (i) the alignment of the programme's intended learning outcomes, curriculum and assessment, and (ii) academic skills development trajectories within the taught part of the programme. Module coordinators were involved in the process through various meetings and discussion sessions. The process took place in parallel to, and in coordination with, the self-reflections done by the Programme Committees responsible for the other three Master Programmes. The Education Bureau has provided overall guidance and coordination.

In addition to the self-reflection by the Programme Committees, a group of ten students representing the four IHE Delft Master programmes were invited to reflect on the educational programmes, including the content and delivery of the curriculum, the study environment and the assessment methods and procedures. They worked independently and have been encouraged to be critical, ambitious and constructive in their feedback. This resulted in a separate report which will be shared with the visitation panel. It should be noted that this in-depth appraisal of this selected group of students is in addition to the regular anonymous student evaluations that are carried out through online surveys by the Education Bureau.

The next chapters describe in detail the current status for each of the four *accreditation standards* as defined by NVAO, present the findings of the self-reflection by the Programme Committee, as well as the associated ongoing developments and plans for the future.

CHAPTER 2: INTENDED LEARNING OUTCOMES

Introduction

The previous visitation panel assessed the intended learning outcomes (Standard 1) of the WMG Master programme as *good* (QANU, 2012). It praised the interdisciplinary and development oriented nature of the programme. The accreditation report commended the emphasis of the intended learning outcomes on the ability to successfully navigate between applied and academic science, and praised the hybrid character of the programme as distinctive and appropriate for the field of study.

Since the last critical reflection, the Programme Committee has built on these strengths, while also engaging in continuous efforts to further improve the programme. Notably, we have more clearly delineated the academic domain of the field of study. This has led, amongst others, to a change in the name of the programme from *Water Management* to *Water Management and Governance* and to more explicit attention to interdisciplinarity. We revised the mission and the intended learning outcomes of the programme in accordance with these developments, and also reviewed the final qualifications that specify the knowledge and skills that successful graduates of the WMG Master programme should have acquired. Moreover, at Institute level final qualifications have been formulated for IHE Delft Master programmes which had to be combined with the programme specific qualifications. In addition to this, specific learning objectives have been defined for the new joint specialization on Water Cooperation and Diplomacy. These developments are discussed in more detail in this chapter.

This chapter elaborates the mission of the programme as well as the domain-specific requirements based on the current delineation of the academic field. It also provides an overview of the intended learning outcomes as well as the level and orientation of the WMG Master programme.

Mission

Water management and governance are central to the new 2030 Agenda for Sustainable Development of the United Nations. Water does not just matter for achieving the specific sustainable development goal on access to clean water and sanitation, but also plays a major role in helping achieve several other goals, such as reducing poverty and hunger; achieving gender equality and redressing inequities; sustaining natural resources and aquatic ecosystems; maintaining peace and fostering cooperation; building resilient infrastructure; and responding to climate change. The importance of water in achieving this wide range of development outcomes underscores the need for comprehensive educational programmes on water management and governance. Because the different societal objectives associated with water are not always or necessarily compatible, and may sometimes even conflict, the ability to clearly articulate, measure, and disentangle different (ways of achieving) water objectives becomes a key competency that students need to acquire, as does their ability to understand and spell out how these different objectives relate to each other. In the same vein, the ability to analyse and effectively deal with the possible contestations and contradictions in framing water-related problems and proposed solutions becomes ever more important. Understanding and helping design organizations and institutions in support of effective arrangements and processes for accessing, sharing and protecting water is never fully straightforward as values, means and goals are constantly reinterpreted, rearranged and renegotiated. In terms of education, this means that students need to become equipped with a sound scientific knowledge base to understand and assess (trends in) water availabilities and qualities, while also learning to engage with controversies and reflect critically on how different understandings and assessment methods and outcomes may themselves be informed by, or entangled with, interests and power relations.

In line with the above and the Institute's vision on education (Annex 1), the WMG programme's overall mission is to strengthen the capacity of the water sector by training reflexive water professionals and experts who have the knowledge and capacity to develop, plan, implement and critically evaluate water management and governance policies and strategies in support of the ecologically wise and socially equitable use of water. It does so by adopting interdisciplinary approaches and reflexive methodologies in its teaching and by explicitly discussing the prospects and tensions associated both with combining insights and languages from multiple disciplines, as with the often contested nature of water.

The programme primarily targets mid-career professionals from the Global South who already work in the water sector, either with governments, non-governmental organizations or the private sector. While these traditionally are professionals who have an engineering or natural science educational background, increasingly also professionals from other disciplinary (e.g. geographers, economists, social scientists, lawyers) and professional

backgrounds (e.g. journalists, entrepreneurs, activists) enroll or display interest in the WMG programme. We welcome this new group. Moreover, the programme increasingly attracts students from other countries of origin or with less professional experience who have an interest in specializing in water and the ambition to contribute to inclusive development. Because in many countries the water sector is highly male dominated, resulting in a masculine professional culture (Zwarteveen, 2008), we make special efforts to encourage women to enroll in the WMG programme. Most notably, when we are consulted in the process of awarding fellowships (e.g. Nuffic, Rotary), we give priority to female candidates.

In line with its development-oriented focus and its mission to strengthen the water sector particularly in the Global South, the programme's specific aim is to help advance the career of graduates in their home countries, thus also avoiding brain drain. We do this by our educational and thematic focus and through our collaboration with partners in the Global South.

Domain-specific reference framework

The academic domain of this programme is still relatively young and evolving, continuously extending the disciplinary fields and approaches from which it takes inspiration. In this section we describe four (partially interlinked) developments in the academic fields of water management and governance that have been instrumental in advancing the WMG programme in recent years.

First, at IHE as elsewhere, (educational) attention to water management and governance largely originated from the ambition to train engineers about the 'soft' side of managing water, teaching them how water is not just about natural science and engineering, but also about understanding and ways of influencing people's behaviours in relation to water. Prevailing scientific languages and methods used to think about and intervene in water continue to be those of the environmental sciences and engineering. Yet, there is a growing number of scholars from other disciplines active within both the academic and professional domain. These often embrace less positivist epistemological understandings of water, those that more explicitly acknowledge how understanding and planning or regulating water is always simultaneously scientific and political (or normative). In line with this development, in our programme we have started more explicitly thematising the co-existence of different ways of knowing, linked to a recognition that all knowledges are situated. Together with our students, we disentangle the constitutive relationship between power and knowledge to shed light on why certain knowledges gain more authority and travel more easily than others (Foucault, 1980; Mills, 2003). Moreover, we teach our students that objectivity in science does not just consist of repeating data sets or being 'impartial', but also entails making standpoints, assumptions and methodological choices explicit and plausible. This requires from staff and students the capacity to critically reflect on their own world views and choices, the ability to contrast and compare different methods, theories and ways of making abstractions, as well as the ability to deal with plurality and uncertainty.

Second, whereas the focus within the academic domain used to be on integrating multiple disciplines, there is a growing recognition that water management and governance questions require interdisciplinary or transdisciplinary forms of analysis (Lélé and Norgaard, 2005; Di Baldassarre et al., 2014). In the programme, we pay attention to approaches (i.e. multi-stakeholder processes, co-evolution, co-production or co-creation), theoretical concepts (socio-nature, socio-technology and socio-hydrology) and models that make interdisciplinary research and interventions possible. These concepts, approaches and models have in common that they transcend the disciplinary boundaries between the social, the natural and the technical, thereby allowing to understand watery realities as systems or processes in which the social, the natural and the technical co-constitute each other. An important focus in the WMG programme are real-world challenges and problems in the management and governance of water as they are experienced and articulated by various actors. This is why we treat the everyday practices of those actors – i.e. the people who study, regulate, negotiate, distribute, treat, abstract, use, discharge, monitor or assess water – as an important empirical anchor of our research and educational efforts. By appreciating and understanding how these actors relate to, engage with, plan and intervene in water, and in turn how the capricious nature of water co-shapes their decisions and actions, our students obtain practical and contextualized insights in the complex and dynamic relations between society, technology and nature.

Third, the increased popularity of term water governance within scholarly and policy circles stems from widespread appreciation of the fact that most water decisions are no longer taken by clearly identifiable public actors who have relatively bounded mandates. Instead, such decisions 'happen' in globalizing coalitions and networks of private and public parties who enter into negotiations with each other and with civil society organisations around specific issues or themes. As such, the term water governance also draws attention to the broader processes that determine how societal rule and order is established through and in water in highly heterogeneous societies (Bridge and Perreault, 2009). Including water governance in the name of the programme thus also implies a choice to pay more attention in the content of the programme to the relationships between the

management of water (e.g. in towns, irrigation systems, river basins) on the one hand, and the wider organization of authority and order in society on the other. By doing this, we also more explicitly introduce the possibility to critically reflect on the linkages between water and different development trajectories.

And lastly, the theme of how to balance objectives of economic development (productivity) with those of ecological integrity and social justice becomes ever more prominent in societal and scientific water debates. Foregrounding this question means explicitly linking the analysis of water management and governance processes and interventions to the evaluation of their outcomes in terms of actual distributions of water (Zwarteveen et al., 2017). To allow doing this, we have chosen to make attention to how particular arrangements and approaches co-shape the direction and nature of water flows (and what this means for whom) a very explicit theme of the WMG programme. Adopting a pragmatic approach, we do not promote or teach particular policy models (such as Integrated Water Resources Management or adaptive governance) but instead invite students to scrutinize and discover what different approaches and models help doing and for whom (Savenije and Van der Zaag, 2002; Rusca and Schwartz, 2017). Student's ability to do this is what will allow them to develop the reflexivity needed to help design, inform and advance efforts to redress water-related inequities and unsustainabilities, and hopefully support efforts to achieve more (environmental) justice in water.

To allow them to successfully and effectively engage in the above developments and debates, students need combined competencies to understand how water and society interact and co-shape each other. First, they need a sound understanding of water availability in terms of quality and quantity, and hence of key biophysical and hydrological processes. They also need to be able to quantify the uses, needs and requirements of water of humans and the environment (Loucks and Van Beek, 2005), which includes becoming acquainted with and learning to critically appreciate the value of advanced tools to produce assessments and predictions of quantities and qualities (e.g. remote sensing, modelling). Second, they need to acquire a critical understanding of the social and political processes that shape access, allocation, treatment, use and discharge of water, often through legal, institutional and economic arrangements designed for the purpose. In Chapter 3 we specify how these diverse competences receive attention throughout the WMG curriculum. Table 2.1 shows how we have currently sub-divided the field of study into four broad themes, which resemble the specializations that were previously offered.

Table 2.1. WMG thematic profiles and focus areas.

Thematic profile	Focus
Water quality	Studies the impacts of human activities on aquatic ecosystems, as well as alternative remedial actions, under different levels of environmental stress and in different socio-economic contexts.
Water resources	Studies the ways in which water availability and use are matched, and develops alternative land use and water allocation policies and models and critically reflects on legal and institutional arrangements from the local watersheds to the basin scale and beyond.
Water services	Studies the provision of water and sanitation services and the management of related infrastructure, and scrutinizes and designs institutional and financial instruments and business models for different socio-economic contexts.
Water conflict and cooperation ⁷	Studies processes of conflict and cooperation over water taking account of the interplay between the main biophysical processes and social dynamics with a view of anticipating, preventing and managing conflicts and develops skills to design and facilitate inclusive consultation and conflict management processes between actors at different levels.

Intended learning outcomes

Given its academic domain, the overall aim of the WMG Master programme is to impart students with the knowledge, insights and skills that are required to research, develop, implement and critically evaluate water management approaches and governance processes in order to foster equitable and sustainable uses and distributions of water. In line with these intended learning outcomes, final qualifications have been formulated at programme level that specify the knowledge and skills that successful graduates of the WMG Master programme should have acquired (Annex 2). These final qualifications include the newly defined final qualifications at Institute level that are applicable for all four 18-month Master programmes offered by IHE.

Based on these final qualifications, additional end qualifications have been formulated for the joint specialisation on Water Cooperation and Diplomacy (Annex 3). In addition, more general descriptions and learning objectives have been formulated to delineate the thematic profiles that students may opt for as part of their tailor-made track (Annex 4; for more details, see Chapter 3).

⁷ This includes the joint specialization on Water Cooperation and Diplomacy.

Level and orientation

The academic standard achieved by the WMG Master programme corresponds to the master's level. The intended learning outcomes, as formulated in the final qualifications, are described according to the Dublin descriptors, see Annex 2.

The WMG Master programme has a university master's orientation with professional problem solving at an academic level and academic research as the corner stones of the programme. In the WMG programme, the students are continuously confronted with different – sometimes conflicting– scientific views on water management and governance issues. In problem oriented modules, students are requested to unravel different views and courses of actions taken by actors for coping with specific problems to then form and defend their own positions on the basis of scientific argumentation and ethical considerations. In this way, the graduate students are being prepared, stimulated and challenged to think across disciplines, to carefully study problems, to formulate appropriate questions, to design research approaches, to evaluate alternatives, to analyse results critically, to propose professional solutions and interventions, and to reflect on their own competencies, standpoints and practices.

The ability to conduct independent academic research is explicitly covered by the final qualifications of the programme (final qualifications 4, 5, 9, and 10), including the ability to critically reflect on own research approaches and outcomes and the responsibility to conduct research in an ethical manner. The general academic standards are explicitly covered by the final qualifications of the programme (final qualifications 12 to 16), including the ability to debate on different insights and to effectively communicate across disciplines and cultures to enhance collaboration in teams. The final qualifications also explicitly stipulate the need for students to be able to reflect on own educational and professional background to identify a personal learning trajectory to realize career objectives and their professional development goals.

Reflection

The relation between the domain specific requirements and intended learning outcomes is coherent and has been further strengthened since the last self-evaluation process. More emphasis in the intended learning outcomes is given to the interdisciplinary nature of the academic domain, and theories and tools to critically reflect on policies, interventions and academic discourses have also become more prominent in the programme. At the same time, the intended learning outcomes that focused on disciplinary knowledges and skills needed for this field of study have been revised to ensure they are concise and concrete. We also decided to reduce the total number of final qualifications in order keep the programme focused and coherent. The level and orientation of the programme is academic and the intended learning outcomes comply with the Dublin descriptors.

One of the main challenges for this programme is that it has become more strongly rooted in and inspired by post-positivist epistemological approaches. These differ from the positivist scientific paradigm that is still implicitly the norm within much of the water domain. Many of the incoming students have been formed within undergraduate programmes and professional environments that nurture (forms of) positivism. Teaching them to question the relationship between scientific facts and realities, and showing that there are different ways of knowing water, is new to many of them. A related and perhaps more joyful challenge is that interdisciplinary theories, models and methodologies are still being developed. Many have their own limitation and obstacles, and therefore need to be used with critical caution. We actively engage students in debates about the prospects and fallacies of combining or transcending disciplinary approaches or methods through several educational activities within the programme. While many enjoy this, for some students it is not easy to appreciate that there is not one universally best or truest answer or solution. A continued quest for balancing the teaching of applied and pragmatic interdisciplinary approaches to *do* water management and governance with theories and methods to evaluate, analyse and question water management and governance models and approaches is therefore essential. Because the WMG programme draws on a variety of disciplines, there may be a risk that certain subjects are not treated with sufficient depth. We try avoiding this by carefully designing the curriculum in interaction with partners in the field, and by constantly monitoring the students' performance on the different disciplines (see also Chapter 3 and 4). The current sub-division of the domain in specific themes still follows the structure of the former specializations, because they are recognizable for students, staff and fellowship funding agencies. Yet, because relatively few students opt for a thematic profile as part of their tailor-made track, these themes become less prominent in organizing the programme. We consider this a positive development, as it facilitates cross-disciplinary, student-centred and practice-based learning in support of new and creative ways of understanding and dealing with water.

CHAPTER 3: TEACHING-LEARNING ENVIRONMENT

Introduction

The previous visitation panel assessed the teaching-learning environment (Standard 2) of the WMG Master programme as *good* (QANU, 2012). It praised the didactical concept of the programme as student-centred, and also commended the efforts made to stimulate the independent and active learning attitude of students as part of their intellectual growth. The accreditation report was also positive about how each module uses a variety of teaching and assessment methods, which are well aligned with the learning objectives set for the different modules. The previous visitation panel assessed the academic staff as well-qualified academically and professionally, with good teaching skills and relevant international experience that fits the scope of the programme and the contexts of the students. Moreover, it valued the contribution of guest lecturers who provide additional theoretical expertise and examples from the professional field.

Since the last critical reflection, the Programme Committee has given follow up to the encouragement by the previous visitation panel to move towards a programme without distinctive specialisations⁸, to offer a maximum flexibility to students based on their individual portfolios. We also enthusiastically took up the recommendation to give more emphasis to the incremental development of relevant academic and professional skills, including effective collaboration in multidisciplinary and intercultural teams. To ensure that the modules remain relevant, and to create space to lecture on interdisciplinary approaches, the contents of several modules have been revised and new modules have been developed. We have also started to more carefully monitor the performance of guest lecturers. We have drastically reduced the number of guest lecturers teaching in the programme. Moreover, in response to the previous accreditation process, we now offer on-line preparation modules to incoming students on various elementary topics relevant to the programme. The recent refurbishment of the Institute's buildings has modernized and improved the teaching facilities.

This chapter provides detailed information on the current curriculum, the didactical concept applied and the quality assurance mechanisms in place. It also gives an overview of the students that are enrolled in the WMG programme as well as the staff deployed and the available facilities to deliver the programme.

Curriculum

As solutions to water problems always consist of a combination of engineering (infrastructure, technology), institutions (rules, laws, policies), and organisations, the WMG programme brings together insights about (ways of knowing and assessing) water quality and quantity with understandings of the infrastructural, political and institutional arrangements to regulate its access, allocation, treatment, use and discharge. The programme follows a modular structure, each module having a duration of three weeks and a study load of 5 ECTS credits. Modules on offer therefore range from those that are rather technical or natural science oriented (hydrology, ecology, engineering) via more skills-oriented modules aimed at acquiring the abilities to effectively 'do' water management and governance (law, conflict resolution, mediation, modelling, environmental assessment, finance and partnership) or measure and predict it (remote sensing, modelling) to more interpretive social science modules (institutional analysis, political ecology, gender analysis, development studies, economic geography). Annex 5 gives a detailed overview of the modules currently offered in the WMG programme. Throughout the programme, specific attention is paid to different ways of integrating these different disciplines and sources of knowledge. Annex 6 gives an overview of the Water Cooperation and Diplomacy specialization that resides under the WMG programme, including the courses offered at the partner universities.

Because of the problem-oriented and pragmatic focus of the programme, we use water problems as they are experienced by relevant actors (e.g. water users, operators, engineers, policymakers, politicians and researchers) in their everyday dealings with water as the empirical anchor. Here we take advantage from the fact that the majority of our students are mid-career professionals, who bring their own experiences to the classroom. We ever more consciously try to make use of these rich experiences, by nurturing a safe environment and adopting interactive teaching methods that allow students to share, compare and critically discuss them. In addition, we continuously expose our students to cases elsewhere and let them interact with diverse groups of actors (e.g. water users, operators, policy makers) so that they learn to identify and appreciate how they may differently define problems and solutions. Tracing possible contestations and untangling possible controversies between actors and their viewpoints, or between different ways of assessing and measuring water, as well as learning ways of fostering

⁸ With the exception of the joint specialization in Water Cooperation and Diplomacy.

cooperation, solving conflicts and creating synergies, forms a red thread throughout the programme. The use and discussion of different advanced tools to measure and predict water availabilities and demands forms an intrinsic part of this effort. Among others through the production of short documentaries⁹, role games, guest lecturers by practitioners, field trips, and applied MSc thesis research, students thus learn to appreciate, understand and deal with the truly wicked nature of many water problems.

Since the academic year 2014-2016 the WMG programme offers the possibility to students to follow a tailor-made study trajectory¹⁰ in addition to four programme specializations on water quality, water resources, water services, water conflict. From the academic year 2018-2020 onwards these specializations will be abandoned and all students will choose their own study trajectory. For this purpose, students will develop a portfolio during the foundation phase (see Annex 5), based on their own reflections of their educational and professional background on the one hand and their career ambitions and opportunities on the other. Based on the portfolio, they will identify personal learning needs and choose the subsequent educational modules and an initial MSc research topic. In this process, the students are guided by dedicated and trained coaches. If applicable, the employer of the students may also be consulted in the process. The tailor-made study trajectory can to a certain extent include modules offered by other MSc programmes at IHE Delft and/or at partner universities (exchange/joint/double degree). The study profiles need to be approved by the Programme Committee, who remain responsible to ensure the graduates have fulfilled the final qualifications of the WMG programme. In its deliberation on the student portfolios, the WMG Programme Committee in particular looks at the motivations of students to select specific modules, the coherence between selected modules, and the incremental build-up of knowledge and skills in preparation for the initially selected MSc thesis topic. To ensure the unique interdisciplinary characteristics of the WMG programme all students are obliged to follow the foundation phase (current module 1 to 5) and an integration phase (current modules 9 and 12).

Thematic study profiles have been defined to facilitate incremental learning on contemporary topic for those students who prefer a more guided study course. For each thematic study profile learning outcomes have been defined and a range of modules have been identified from which the students can choose (see Annex 4). Students who opt for a thematic study profile can have this explicitly mentioned on their MSc degree.

Based on the above, the current programme can be divided in four distinct phases, see Table 3.1.

Table 3.1. Phases within WMG Master programme.

Phase	Content and structure
Foundation phase	Common basis at the start of the programme, during which the students follow five common modules ¹¹ which provides a broad and balanced state-of-the art of biophysical and hydrological processes, water systems, law, economics, management and governance, as well as expose students to interdisciplinary and multidisciplinary approaches in the rapidly evolving field of water management and governance. In addition, the foundational modules aim at strengthening academic and professional skills (e.g. academic reading and writing, presentation techniques, team work, problem analysis).
Tailor-made phase	Students choose five modules that will allow them to achieve their personal learning objectives, aiming either to broaden their scope or deepen their knowledge and apply relevant skills depending on the needs and ambitions of the individual student ¹² . In addition, a variety of summer courses are offered to expose the students to the latest developments in the field.
Integration phase	Common part towards the end of the taught part of the programme to test the knowledge, insight and skills acquired in the preceding modules in a multi-disciplinary, problem-solving environment. This part consists of a two-week international field trip in which students are exposed to contemporary water management and governance issues in southern Europe as well as trained in collecting biophysical and socio-economic data through fieldwork in a river basin in Spain. This is followed by a three-week group work seeking management solutions for the same river basin from an integrated and development-oriented perspective.
Research phase	Final phase of the programme in which students develop a research proposal and follow an intensive course in research methodology and techniques. After approval of the proposal, students carry out a six months thesis research project. Research topics can be defined by students themselves (where applicable, in consultation with their employer) or they can choose from wide range of suggested topics presented during the Institute-wide MSc thesis research fair and published in the WMG MSc Topic database on the e-campus. The MSc thesis research usually is of an applied nature and deals with relevant domain-specific topics. Thesis research frequently addresses new scientific developments, and is often linked to on-going research programmes in which academic staff members are involved and/or on-going PhD research projects. We encourage students to carry out field work in their home country or make use of the opportunity to get experience in an unfamiliar country.

⁹ Amongst others, in the water governance modules students produce in small groups short documentaries on contemporary water governance topics which are publically screened at IHE Delft as well as at external documentary festivals and placed on social media. Examples of these documentaries can be viewed on: <https://flows.hypotheses.org/1112> and <https://flows.hypotheses.org/1138>.

¹⁰ So far, 25 students have opted for the tailor-made study trajectory. Student portfolios are available on request.

¹¹ For didactical as well as practical reasons modules 1 and 2 as well as modules 3 and 4 are delivered in parallel during six weeks periods.

¹² Students enrolled in the joint specialization on Water Cooperation and Diplomacy follow specific modules on water conflict analysis and water resources planning (see Annex 6).

The curriculum that is offered within the WMG programme is regularly reviewed and updated (see Table 3.2). Each year the Programme Committee approves the curriculum to be offered before the start of the new academic year. The offered curriculum is specified in the programme handbook of each particular academic year. The annual plan highlights the key educational initiatives for that particular year, including the required budget. The main drivers for curriculum revisions are the outcomes of the students' module evaluations¹³ as well as emerging new developments from the academic and professional field. Module coordinators write a critical reflection report at the end of the module in which they respond to student evaluations and suggest changes in the curriculum and assessments if needed. These reflections are discussed, together with the student evaluations, within the Programme Committee and feedback is given to the coordinators. Following up the previous accreditation process, the WMG Programme Committee also introduced external peer-reviews of modules. So far, three modules have been reviewed by external experts, which greatly improved the content and structure of these modules. The Education Bureau has now taken up the responsibility to coordinate the peer-review of modules at Institute level and they are currently planning extensive reviews of other WMG modules. At the end of each academic year, the programme coordinator prepares an annual report for the Rectorate which includes a critical reflection on the content and delivery of the programme, as well as the results obtained by students and a response to their evaluation of the programme¹⁴.

To facilitate communication between the various staff involved in the delivery of the WMG programme, regular meetings and events are organized where (aspects of) the WMG programme are discussed. These meetings include curriculum review workshops, thematic sessions, coordination meetings, trainings, and recess days for all staff lecturing in the WMG programme to review and discuss the entire programme. The sequence of the course modules, to ensure alignment between them and avoid gaps and overlaps within the programme is an important theme in these meetings. To ensure an efficient and coherent implementation of the Master programmes, regular meetings also take place with representatives of the supporting units, such as the Education Bureau, Student Affairs and IT, as well as with the coordinators and chairs of the other Master programmes at the Institute.

Table 3.2. New curricula within WMG Master programme since previous accreditation.

New curricula	Content	Main target group
WMG modules	Three-week modules on urban water governance; water resources assessment; environmental management water services; and strategic planning of river basins and deltas.	WMG students
Lecture series	Lecture series incorporated in existing modules on e.g. the role of (social) media in water diplomacy; data-driven modelling of relations between water, energy and food; integrated modelling for multiple uses of water resources; the politics of water infrastructure; intersection of gender and race in water; water accounting using remote sensing technologies; governance of invisible groundwater resources; global politics of climate change interventions.	WMG students
Introduction Week	One week induction course themed 'Pluralizing water sciences' to stimulate debate on disciplinary and geographical boundaries within scientific knowledge production on water.	All Master students
Summer courses	One week courses on water and gender; visual methods for water communication; water diplomacy; and leadership.	All Master students
Student fora	Seminars organized by WMG students to stimulate scholarly debate. Four sessions were organized by the 2016-2018 batch on integration and interdisciplinary theories, concepts and approaches. The 2017-2019 student batch focuses on the theme science, policy and practice in collaboration with ES students.	All Master students
Preparatory courses	Online self-study guides on elementary topics including chemistry; mathematics; microbiology; and social sciences (in preparation).	Prospective Master students

¹³ As part of the Institute's policy, the Education Bureau requests annually detailed feedback from students on one-third of the modules offered in the WMG Master programme, which entails that every WMG module is evaluated by students every three years. In addition, the WMG Programme Committee carries out a less extensive survey of the remaining modules in each academic year to monitor student satisfaction regarding the content and delivery of each module.

¹⁴ Annual reports of the WMG programme are available on request.

Didactic concept and policy

In line with the Institute's vision on education (Annex 1), all education at IHE Delft follows the concept of aligned teaching and active learning, which means that lecturers design and plan learning activities and assessment methods in such a way that they effectively contribute to achieving the set learning objectives (Biggs and Tang, 2011). Effective learning develops when the three key elements of the learning process are being aligned: learning objectives, learning activities and assessments¹⁵. Learning objectives define and describe about what, and at what level of demonstration, learning is to be mastered. Assessments test during or at the end of the learning process the process of mastering the learning content and need to be designed in such a way that they substantiate to what extent the student has achieved the learning objectives. Learning activities facilitate the active process of mastering and demonstration of newly acquired knowledge and skills, and as such help the students to achieve the learning objectives. The learning triangle depicts the alignment between the different educational elements (see Figure 3.1).

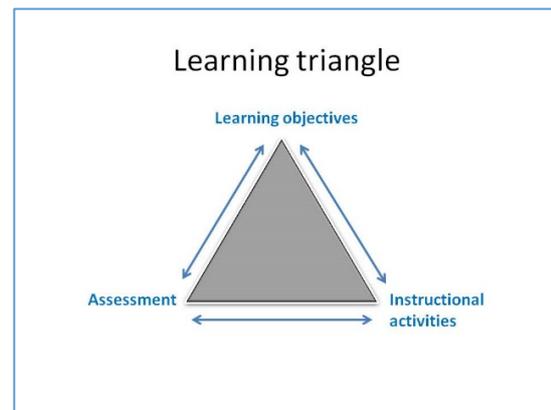


Figure 3.1. Aligned learning triangle

Education is a learning process that needs the active participation of the learner to optimize the learning curve. Lecturers therefore explicitly encourage the students to actively process the offered information. Students have to show responsibility and initiative, collect information on their own, bring in own experiences, and dynamically participate in discussions and group works. Various instructional methods are available to stimulate this and a policy note has been approved to guide lecturers in carefully choosing didactic approaches that fit with the intended learning outcomes (Annex 8).

To stimulate the concept of aligned teaching and active learning the rectorate decided in 2007 that all teaching staff have to follow the University Teaching Qualification (UTQ) programme and obtain an UTQ diploma. The Education Bureau of the Institute is responsible for the organization of the UTQ programme and the UTQ training courses are offered twice a year. The UTQ diploma is required for promotion to the status of senior lecturer and for an employment contract for indefinite period, and is also a prerequisite for becoming a coordinator of a module in the MSc programme. For staff members who have already obtained their UTQ certificate, regular courses on didactics are offered to refresh or strengthen competencies, for instance on the preparation of assessments, mentoring MSc students, and guiding of group work.

In line with this Institute-wide policy, the curriculum of the WMG programme is specifically designed to achieve the final qualifications. The structure and sequencing of the programme components are such that the different types of learning outcomes are being addressed at various instances throughout the programme. Annex 7 shows the contribution of each module towards achieving the final qualifications of the programme. For each module specific learning objectives have been set and aligned learning activities and methods of verification (examination, evaluation) have been developed (see Annex 5). The content and didactical approach of each module is explicitly defined in the module sheets incorporated in the on-line programme handbook. To avoid students experience a cognitive overload (Felder and Brent, 2016) conventional lectures are increasingly infused with reversed teaching moments in which the classroom is flipped and students are actively engaged in reviewing the content of the lecture.

Throughout the programme, students are increasingly being challenged to apply the knowledge and theory acquired during the earlier parts of the programme, and synthesise this knowledge to critically analyse concrete cases, presented, among others, during the field trip and the group work (see also Annex 7). In this way we strive to offer a coherent programme that allows for an incremental learning process and stimulates critical and interdisciplinary thinking. To achieve this, the programme employs a dedicational concept that defines five different learning trajectories (De Bie and Kleijn, 2004). These trajectories get attention throughout the programme within various modules and learning activities (see Table 3.3).

¹⁵ Learning objectives define and describe about what, and at what level of demonstration, learning is to be mastered. Assessments test during or at the end of the learning process the process of mastering the learning content. Learning activities facilitate the active process of mastering and demonstration.

Table 3.3. Learning trajectories within WMG programme

Learning trajectory	Focus	Educational activities
Conceptual trajectory	Understanding, applying and critically reflecting on how concepts within different disciplines are being defined and operationalised and how they are derived from, and shaping, theoretical approaches and everyday practices within different normative contexts.	Foundation modules, a selection of modules based on the specific needs and interests of students as identified in the student portfolio, MSc thesis research.
Skills trajectory	Incremental development of academic and professional skills, including scientific ethics, information literacy, critical reading, scientific writing, oral presentation, discussion and debating, quantitative and qualitative research methods for data collection and analysis, collaboration in multidisciplinary and intercultural teams, project management, leadership, advocacy, negotiation and diplomacy.	Foundation modules, a selection of modules and assignments based on the specific needs and interests of students as identified in the student portfolio, MSc thesis research.
Interdisciplinary trajectory	Understanding and applying of interdisciplinary approaches, including explicitly dealing with the challenges of combining insights, concepts, theories and methods from multiple disciplines.	Foundation modules, international field trip, group work.
Reflective trajectory	Reflect on their own assumptions, world views as well as their professional attitude and performance, and the implications thereof for research and collaboration.	Foundation modules, workshops on cooperation in teams, group work, MSc thesis research.
Career development trajectory	Identifying individual learning needs and future career ambitions based on a critically reflection of previous educational and professional experiences as well as personal drives and career opportunities.	Conversations with coach, drafting of student portfolio.

Teaching staff and guest faculty¹⁶

The development and delivery of modules within the WMG programme is carried out by 52 IHE Delft staff members with diverse academic and professional backgrounds. Together they cover the multidisciplinary domain of water management and governance. From this pool of staff members currently 22 staff members are intensively involved throughout the programme in lecturing, facilitation of group work, tutorials and role games, organizing fieldtrips, MSc research supervision and examination. The other staff members give focused inputs within their field of expertise. The faculty of the Institute is very dedicated and has strong affinity with inclusive development. In addition, a pool of approximately 50 guest lecturers is available on request to contribute to the programme delivery. Within various modules they give conventional lectures, participate in expert seminars and debates, and facilitate workshops and role plays. The guest lecturers have a variety of backgrounds such as academia, government, non-governmental organizations and consulting firms in the Netherlands and abroad, and provide direct linkages with the academic and professional practice.

The 22 main lecturers of the WMG programme are enthusiastic and highly committed. They are women¹⁷ and men of different ages and stages in their professional careers, originating from different countries in the world, including various European countries as well as (among others) India, Sudan, Pakistan, Colombia, Philippines, Canada and China. They have diverse educational backgrounds ranging from hydrology, ecology, civil engineering, public administration and law, to human geography, anthropology, and the political sciences. They also bring in a range of professional experiences obtained in various sectors, including government, private sector organizations, non-governmental organizations and academia. Annex 9 and Annex 10 give a detailed overview of the staff members and guest lecturers respectively involved in the delivery of the WMG programme during the academic year 2016-2018. Recently two senior lecturers were recruited with specific expertise on water conflict analysis and diplomacy to further strengthen the human resources available to teach on this subject.

The IHE Delft staff members are actively involved in academic research, mostly as part of research programmes that are funded by competitive grants of reputable national and international academic bodies. All professors and several others colleagues involved in delivering the WMG programme are members of the editorial boards of relevant international journals and/or scientific steering committees. Most academic staff members are involved in PhD supervision, and regularly publish in scientific journals and present papers at international conferences. Figure 3.2 provides insight in the number of ISI-rated publications by the 22 staff members closely involved in the WMG programme, while the publications by all academic staff members are listed in the annual reports of IHE Delft. The staff members' active involvement in research exposes students to a rich academic research environment. They also incorporate new research findings and emerging themes into the educational curricula. Most staff members are regularly invited to teach at other universities in the Netherlands and abroad and/or to

¹⁶ The data provided in this section is based on the modules that fall under the responsibility of the WMG Programme Committee and as such do not include modules offered and coordinated by other programmes in which WMG students enrol.

¹⁷ About half of the WMG staff members are female, including two female professors.

serve as external members in examination committees. The full professors all have so-called zero appointments at universities in The Netherlands, including the Delft University of Technology, University of Amsterdam and Wageningen University. All Associate Professors¹⁸ and senior lecturers that regularly teach in the WMG Programme hold PhD degrees, and the lecturers either hold PhD degrees or are in (advanced) stage of obtaining their PhD degree. The majority of staff members have extensive and relevant professional experience in developing countries and in countries in transition. This experience ensures that the WMG programme is tailored to the professional and institutional context of the countries where the students originate from.

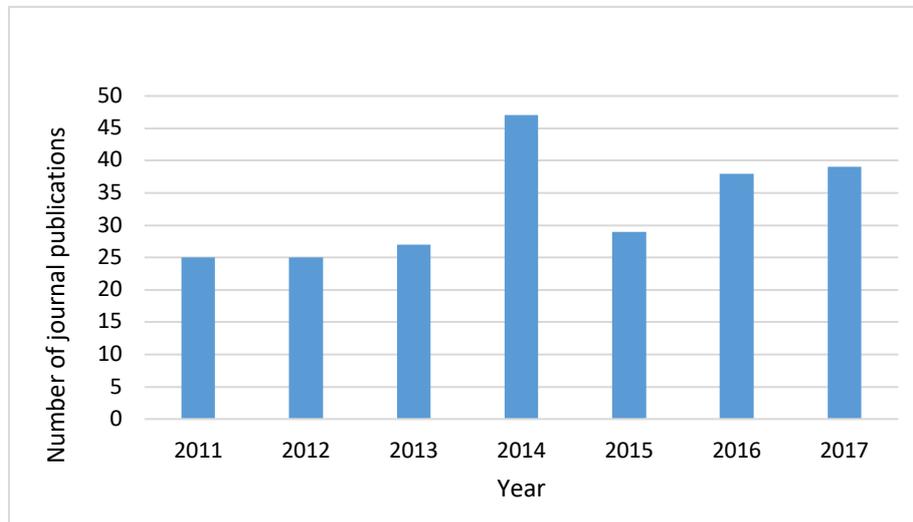


Figure 3.2. Published articles in ISI-rated peer-reviewed scientific journals by academic staff closely involved in the WMG Master programme (Annex 9) (Source: Scopus, June 2018)

More than half of the staff members who are intensively involved in the delivery of the WMG programme have fulfilled the requirements of the UTQ programme, while the others, mainly recently joined colleagues, are in the process of obtaining their UTQ diplomas. In addition, during the last academic year WMG staff members participated actively in additional didactical training sessions, e.g. on preparation of assessments, mentoring MSc students, and guiding of group work. Specifically for the WMG programme, seven staff members have followed two days training on student counselling and career-coaching. A follow-up training is planned for autumn 2018. These staff members are the ones who guide the WMG students during the identification and implementation of their tailor-made study trajectory.

The staff time¹⁹ dedicated to education within the WMG Master programme for the 2016-2018 cohort cumulates to a total of 4.2 FTE. This time is used for teaching, preparation, development, coordination of the taught part of the programme. Of this faculty input 3.7 FTE was used for the taught part of the programme by staff members of IHE Delft. In addition, 25 guest lecturers²⁰ corresponding to about 820 hours (equivalent to 0.5 FTE) gave input in the taught part of the programme. For the MSc thesis phase approximately 80 hours per student in total are dedicated to mentoring and supervising students on their individual research assignments. Table 3.4 provides an overview of the time input of the faculty. This faculty input results in a student-staff ratio of 7.8 during the taught part of the programme and a student-staff ratio of 21 during the MSc thesis research phase²¹. A substantial part of the remaining staff time is used on activities that indirectly contribute to education such as research projects, capacity development projects at partner institutions and consultancy projects for governments and international funding agencies (e.g. World Bank, UN agencies, USAID, DGIS).

¹⁸ With the exception of one Associate Professor who does not hold PhD degrees due to human resources policies of the past.

¹⁹ Based on the actual time writing records from October 2016 to April 2018.

²⁰ This number does not include the guest lectures who teach in modules on water quality during the tailor-made phase as those modules are offered and coordinated by the ES Master programme.

²¹ The ratio is calculated based on full-time student equivalent and includes students enrolled in the joint specialization on Water Cooperation and Diplomacy. For the academic year 2016-2018 33 students followed the taught part of the programme and 29 students the MSc research phase. The actual student-staff ratio deviates slightly as also short course participants enroll in some WMG modules (approximately 35 student-modules per year) and WMG students follow modules offered in other IHE Delft Master programmes and vice-versa as part of their electives.

At programme level a programme coordinator (approximately 0.3 FTE) is appointed to guide the overall execution of the programme including providing support to module coordinators, monitoring of student performance and facilitation quality control. The MSc thesis research is overseen by the MSc research coordinator who takes responsibility for the publication of the online MSc Topic database, coordinates the assignment of mentors and supervisors to students, monitors student progress, plans the defences, and addresses any matters that might arise during the thesis research.

Table 3.4. Actual staff input in WMG Master programme

Academic year	Programme part	Hours	FTE input
2016/2018	Taught part IHE Delft staff	6,300	3.7
2016/2018	Taught part guest lecturers	820	0.5
2016/2018	MSc supervision	2,320	1.4
Total		9,440	5.6

On average a student has 614 contact hours²² with the lecturers during the taught part of the WMG programme, which translates to approximately 21 contact hours on average per week. These contact hours are used for lectures, tutorials, workshops, coaching sessions, fieldtrips in the Netherlands, and role plays. Of these contact hours on average some 19% is provided by guest faculty. The remaining study load hours are reserved for self-study, (group) assignments and examinations. In addition, students collaborate closely with lecturers during the two week international fieldtrip in Spain and Portugal (module 9), where they jointly carry out field work in small groups. The final module of the taught part of the programme (module 12) is reserved for group work in which students analyse and interpret the data collected during the fieldwork in Spain. This module is organized in such a way that students work relatively autonomously in small teams with regular input and feedback from staff members.

During the MSc thesis research phase the students spend on average 50 contact hours with staff members. For the preparation of the MSc thesis proposal, students meet regularly with their mentors and participate in peer-learning groups in which they review each other's work under guidance of a staff member. During the data collection phase, often abroad, students have regular contact with their mentors via email, Skype or other social media. When students are in Delft they have weekly meetings with their mentors to discuss the students' progress and agree on the course of the research. Supervisors attend these meetings approximately every month or more regular upon request of the mentors and/or students. In addition, thematic MSc Cluster meetings are organized on a regular basis during which students present the research progress to their peers and their mentors as well as to other interested academic staff members.

The performance of all staff and guest lecturers is routinely monitored through student evaluations after the conclusion of each module. The results are reviewed by the Programme Committee which proposes remedial measures if needed. The evaluation contains questions concerning the didactics, educational materials, the possibility for discussion and questions of each lecturer, and the relevance of the lecturer's subject. In general students are highly satisfied with the quality of the IHE Delft staff as well as the guest lecturers: an average score of respectively 4.4 and 4.3 are given on a scale of 1 (poor) to 5 (excellent) in the end-of-year evaluation of 2016-2018.

Students

The WMG programme attracts 34 students on average per year²³. In line with its mission and target group, the student population enrolled in the WMG Master programme is highly diverse in terms of age, gender, geographic location and academic background (see Figure 3.3). Because the programme targets mid-career professionals, the relative age of the students is higher compared to that of students enrolled in MSc degree programmes at Dutch universities²⁴. Most students have work experience in the public sector and to a lesser extent in the private sector. Each cohort also has a few students who are active in non-governmental or civil society organizations. The representation of the different geographical locations shows the international orientation of the programme, with

²² Based on the teaching schedules for modules 1-8, 10 and 11 (29 weeks in total), which includes the taught modules except the international fieldtrip and the group work.

²³ Average of last three cohorts, including students enrolled in the joint specialization.

²⁴ According to the Dutch Statistic Bureau, 70% of the students at Dutch Universities obtain their MSc degree before their 26th birthday (CBS, 2018).

students from the Global South representing 88% of the total²⁵. The programme succeeded to enrol considerable numbers of female students, thereby actively contributing to the gender equity agenda of the United Nations. Within the WMG programme, students with different undergraduate diplomas can enrol: ranging from those with BSc degrees in engineering or natural sciences (such as environmental sciences, geology and chemistry) from those with BA degrees in social sciences (such as public administration, law, anthropology and economy). Over the years, we have seen a more balanced representation of the different disciplines in the class room due to an increase of the number of students with a social science background. We very much welcome this development as the academic diversity contributes to the exchange and cross-fertilization of knowledge between the various disciplines and facilitates the interdisciplinary orientation of the WMG Master programme. In addition, most modules have an inflow of short course participants and students from other Master programmes which further diversifies the student population.

The Dutch Government is the main source of fellowships, through the Nuffic-NFP programme and other capacity development oriented programmes, followed by the Rotary, World Bank and StuNed. In recent years the number of students who fund their own studies has increased and currently they represent approximately 20% of the WMG student population.

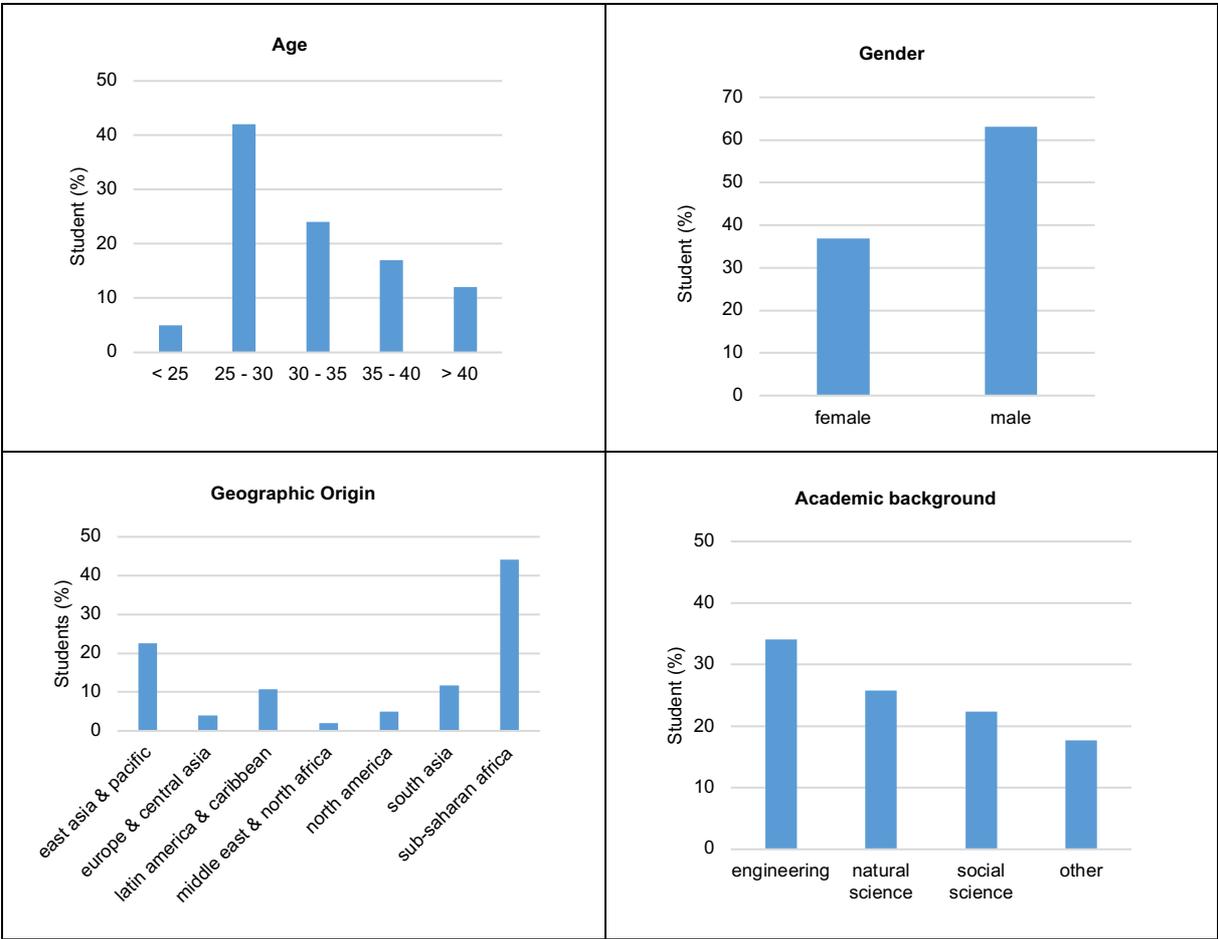


Figure 3.3 Student composition in terms of age, gender, geographic origin and educational background²⁶ based on the average of the cohorts 2014-2016, 2015-2017 and 2016-2018.

²⁵ Developing country status based on OECD DAC list of ODA recipients valid March 2018.

²⁶ The category 'other background studies' includes multi- and interdisciplinary oriented studies such as agriculture and water resources management.

Programme-specific facilities

As the WMG Master programme combines skills, methods and theoretical approaches from a range of disciplines, it requires a range of facilities to support the delivery of its programme. The IHE Delft laboratories are used during the modules that focus on chemical analysis in the foundation part of the programme, the thematic profile on Water Quality, and when needed in the MSc thesis research phase. During the international fieldwork and MSc research phase portable equipment is used for field measurements and on-site analysis. IT facilities and specialized software packages are widely used within the programme ranging from software packages used within natural science (e.g. HBV, Mike-11, SWAT, WAFLEX, and Gams) and software packages within social science (e.g. SPSS, Atlas-TI, NetDraw) to software packages that integrated the various disciplines (e.g. QGIS, LIBRA, WEAP, Altaguax DSS). We strive to use open source software packages as much as possible to ensure students can utilize the obtained skills after graduation. The IHE Delft library is used intensively throughout the programme for literature studies and essay writing. The library contains a vast collection of academic literature in the form of scientific journals, books and PhD and MSc theses. Especially the number of electronically available journals has increased during the last years as well as the availability of relevant academic literature on social sciences.

In various modules group work and role plays form part of the didactical approach. Well-equipped and spacious class rooms and places where students can work in small groups are essential during those modules. The refurbishment of the premises, including the installation of so-called smart boards and the creation of student work places, has greatly improved the facilities. The WMG students also make use of the video conferencing studio and its multimedia facilities and equipment to produce short documentaries on water related topics.

A Moodle supported e-campus is available for sharing of lecture materials, uploading of assignments and facilitating staff-student interaction during the delivery of the modules. The use of the e-campus with its many interactive and innovative tools is now fully embedded in the daily practices of students and staff members. Students receive a fully equipped laptop upon arrival in Delft and wireless internet is available throughout the premises and student hostels to ensure students have access to lecture materials and other online sources.

Reflection

The current curriculum is well aligned with the final qualifications of the WMG Master programme. Curriculum review is a continuous activity and staff involved has extensive professional international experience, which ensures that the programme remains in tune with the latest developments in both the academic domain and the water sector. The outcomes of student evaluations are actively used in reviewing the curriculum and regularly lead to revisions in the content and structure of modules. Each module offered in the programme uses a variety of teaching and assessment methods, which are well aligned with the learning objectives set for the different modules. Given the emphasis on working in (small) groups in some modules, we have started to pay more explicit attention to group dynamics in multidisciplinary and intercultural contexts. In the end-of-year evaluation of the 2016-2018 batch, the students scored the link and coherence among the various modules in the programme with a 4.0 on a scale of 1 (poor) to 5 (excellent).

The didactical concept of the programme is student-centred, aimed at stimulating the independent and active learning attitude of students. The career-oriented tailor-made study trajectories further encourage the intellectual growth of the students. These encourage students to take responsibility for their own learning and progress, thereby also optimizing their learning experience. The intensive interactions between students and their coaches in this process is highly valued by both, and contributes to an inspiring learning and working environment. For the immediate future, we aspire to better delineate and structure the five learning trajectories in the content of the programme. Most notable, we are engaging in plans to further improve the inclusion of the skills trajectory and the interdisciplinary trajectory as incremental and consistent pathways through the programme. Also in drafting the student portfolios, we are looking for ways to engage students more explicitly in the different learning trajectories to identify their educational needs and ambitions.

In terms of study load, there is a reasonable balance between the scheduled contact hours and time for other educational activities. The contact hours per module vary depending on the learning objectives. The modules that focus on skills development (both research and professional skills) tend to have a higher number of contact hours than more theoretically oriented modules. Nevertheless, we think that some individual modules are still too congested in terms of content, while some also continue to rely too much on conventional didactic methods with little space for more activating reversed teaching methods. This is especially true in the foundation phase. Also the structure and sequence of the programme can be further improved, to increase the choice of available modules per time slot and create more space for students to engage in topics and themes of their own choice (for instance in the form of *capita selecta* and/or internships). One module that we intend to structurally revise is the group work

module. For several consecutive years, both students and staff have expressed dissatisfaction with this module, in terms of content as well didactic approach. We are currently experimenting with a different design of this module, making it a more explicit part of the preparations for the MSc research phase. The proposed improvements and changes to the WMG Master programme will be taken up within the regular curriculum review.

The intensive interaction between students and supervisory teams during the MSc thesis phase is well appreciated, producing a steepening of the learning curve of the students. Especially the newly introduced peer-review process during the proposal phase and the regular thematic cluster meetings during the thesis research have proven to be useful ways of cross-fertilizing research efforts and encouraging students to reflect on, and engage with, the broader academic debates in which their research is embedded. Moreover, these activities help students to develop research and professional skills, including giving and receiving constructive feedback.

Over the last years, the number of lecturers who are intensively involved in teaching in the WMG programme has reduced. Most notable, we have halved the number of guest lecturers since the last accreditation. The amount of time invested in the taught part of the programme by staff has nevertheless remained the same, while the time input by guest lecturers has increased by approximately 20%. As result of quality control measures, fewer, well evaluated, guest lecturers are now asked to give more elaborate input in the programme. The number of IHE staff members providing input in the programme is slightly reduced since the last accreditation, possibly due to an increase of temporary staff appointments (PostDocs and project-based appointments) in recent years, which only allows for limited and short-term involvement in education. This means that the education load of the permanent staff members has increased. Even though staff appraisal methods do not always value educational achievements as highly as research and acquisition achievements, these staff members are highly committed to deliver the programme and show continuous dedication and enthusiasm to improve the content and delivery of the programme. The time invested in mentoring and supervising students during their MSc thesis research has slightly increased as result of more joint activities during this phase, such as the peer-learning during the proposal development and the MSc cluster meetings. This is highly appreciated by students and the quality of the MSc proposals and final theses has improved as a consequence. As result of the changes in staff input, the student-staff ratios have decreased compared with the last accreditation.

The WMG Master programme is well coordinated. Minutes of the regular meetings, as well as concept notes and policy documents are available to all involved staff on the e-campus and/or intranet. There is nevertheless scope to further smoothen and improve the flows of information on educational matters, better ensuring that information is shared in a timely manner and that all are involved in ongoing discussions on the educational directions of the programme. Even though the IT facilities are modern and of good quality, there is also scope to further improve the coordination of IT support, making sure that adequate back-up support is available to guarantee the smooth delivery of especially those educational activities that employ innovative didactic approaches based on multi-media or activities that take place in the larger auditoria.

Despite the reduced fellowships available from the Dutch Government (Nuffic-NFP programme), the programme has succeeded to maintain a relatively steady number of students per cohort by diversifying the funding sources for fellowships and securing an ever larger number of self-paying students. We have nevertheless noticed that self-paying students may have different expectations and needs than other students. The tailor-made study trajectories makes it possible and easier to cater to these expectations, but there remains scope to further adjust the content and modality of the programme to this changing student composition. Unfortunately, the average number of female students has reduced as compared with the last evaluation moment, and efforts to improve the gender balance of the student population are desirable. We are also keen to attract more students employed by non-governmental and civil society organizations, as these play an ever more important role in helping safeguard the sustainability and justice of water management and governance decisions and processes.

Throughout the programme, the student-staff ratio is relatively low and can be increased from a cost-efficiency perspective, either by increasing the number of students or by reducing the investment of staff time. One possible option here is to engage in more intensive collaborations with other Master programmes inside or outside of IHE Delft, or to consider alternative modalities for delivering the programme. Another challenge is that internal funds to support fieldwork during the MSc research phase are drying up, which means that it becomes imperative to look for alternative sources of financial support for MSc fieldwork. In case these sources come from external sponsors, it needs to be ensured that the thesis research can be carried out without compromising the academic freedom of students.

Development plan

In line with the reflection above, the WMG Programme Committee is working on several revisions to further improve the programme. Currently we are reviewing the content and structure of the foundation phase, in three ways. First, we have made the decision to reduce the length of this phase²⁷. Second, we want to give more explicit attention to interdisciplinarity and epistemology. And third, we want to employ more innovative didactic methods. With these revisions, we aspire to make the foundation phase into an even more solid basis for the rest of the programme, using it to expose students to the broad range of questions, actors and disciplines covered by the domain. This will both anchor them in the field, and help them make an informed choice for the modules they want to follow in the rest of their study period. In addition, the WMG Programme Committee would like to use the foundation phase to firmly initiate coherent and incremental academic and professional skills trajectories that will run throughout the programme. Within the student portfolios, and under guidance of coaches, these skills trajectories can be personalized. The WMG Programme Committee is considering possibilities to award specific ECTS to skill-oriented projects that may run in parallel to the content modules.

In line with this, we are revising the process and format for the development of the student portfolios with the purpose of enticing and motivating students to more actively engage with the different learning trajectories as defined in the didactic approach. Here, we also want to pay more specific attention to the final qualifications of the programme in the justification of the modules they select. As drafting a coherent and targeted portfolio requires time and efforts from the students, we realized that we need to develop ways to facilitate the process. Options here include online portfolios, the automatic integration of basic information, and interactions with students on this matter prior to their arrival in Delft. Moreover, we have planned for: the coaches who guide students in selecting tailor-made study trajectories to receive further training; the further specification of the rules and procedures for the tailor-made phase; and the design of new tools that allow the WMG Programme Committee to improve the quality control of this part of the programme. In particular, the alignment between the selected modules and the final MSc thesis topic choice will get more attention in this process.

The revision of the foundation phase will have consequences for the content and structure of the remaining part of the taught programme. The aim is to ensure that in each time slot students can choose from a diverse range of modules, and that space is created in the programme for *capita selecta* in the form of student projects, minor theses and/or internships. Currently the international fieldtrip and the group work modules are being reoriented from an integrative and solution-oriented focus towards a focus on interdisciplinarity and dealing with wicked problems. We do this by teaching students to trace and map controversies (Venturini, 2010) around water, in the process exposing and teaching them to deal with the challenges of combining insights, concepts, theories and methods from multiple disciplines and multiple sources. As for the group work module, we are changing this to focus more on analysis and less on the development of collaborative skills. This is also because skills to effectively work in small teams are already taught in earlier parts of the programme (and hence eventually the name of the group work module will change accordingly).

In terms of coordination, efforts will be made to improve the communication between the various staff members involved in the WMG programme. Decisions taken by the WMG Programme Committee will be communicated to the concerned parties in a more active and timely manner. Quarterly meetings will be organized by the programme coordinator to inform all module coordinators and the main lecturers (and not just the members of the Programme Committee) on the latest developments and directions of the programme. The WMG Programme Committee also aims to become more active in advertising the programme and acquiring fellowships to attract more students, especially targeting prospective female students and students working for non-governmental and civil society organizations. As part of this process, and in line with the ambition to offer flexible and tailor-made study trajectories, different modalities to deliver the programme will be explored, including part-time and online formats.

²⁷ The plan is to reduce the foundation phase to 20 ECTS (compared to 25 ECTS currently) consisting of one interdisciplinary introduction module of 10 ECTS (running 8 weeks in total) followed by two disciplinary oriented modules of 5 ECTS each (running 8 weeks in total in parallel) on natural science (e.g. hydrology, hydraulics, ecology) and social science (e.g. governance, law, economics).

CHAPTER 4: STUDENT ASSESSMENT

Introduction

In the previous accreditation process the student assessment (Standard 3) and the achieved learning outcomes (Standard 4) were combined in one standard. At that time the visitation panel assessed this standard for the WMG master programme as *satisfactory* (QANU, 2012). It established that the assessment system of the Institute functions well and that good control mechanisms are in place that ensure that student assessments are systematically and consistently graded. It praised the assessment system with its strong checks and balances that allow for transparent, valid and reliable assessment of students.

As mentioned in the didactic concept, all education at IHE Delft follows the concept of aligned teaching. A key element of this didactical approach is that type and content of the assessments is well aligned with the learning objectives set for each module to ensure module coordinators can actually verify to what extent a student has achieved each of the learning objectives. This chapter elaborates the assessment policy at the Institute, with particular focus on the alignment of assessments. Moreover, it provides an overview of the progress made in the recent years to further improve the quality control of the assessments.

Assessment policy and regulations

Mid 2017 the Rectorate approved a comprehensive policy framework for the assessment of the educational offerings of IHE, including the MSc programmes, the online courses, the short courses and other diploma programmes (Annex 11). In this broad policy framework unwritten policies and existing practices have been formalized and the organization of assessments, including the roles of lecturing staff, management and support staff, has been made more explicit. The policy also includes new aspects, amongst others on the design of assessments and feedback to students on their performance in assessments. The policy document outlines four key areas of importance for developing and implementing good quality assessments:

1. The content of assessments, including the formats, levels of valuation and evaluation criteria.
2. The organization of assessments.
3. Strengthening competence for assessment among staff.
4. Quality assurance for assessment.

Currently this assessment policy is implemented via the programme coordinators and further fine-tuned where needed to ensure assessments are carried out in a coherent and appropriate manner throughout the Institute.

Backbone of the quality assurance of assessments at the Institute are the Education and Examination regulations (Annex 12). It provides a detailed overview of the nature, frequency and marking of assessments as well as the possibilities for re-examination and appeal procedures for both the taught as well as the thesis part of the programme. Proper implementation of these regulations and planning of MSc examinations, including the assessment of graduation results, is monitored by the Examination Board. These regulations are part of the study guide, which is available for the students at the start of the programme.

The study guide also contains module plans of all modules offered in the programmes. Each module plan contains a description on how the module is assessed, as well as the weight of each assessment for calculating the final mark of the module. Most modules include two or more methods of assessment to ensure alignment with the multiple intended learning outcomes of the modules. In case a module coordinator intends to deviate from the indicated assessment procedure, prior approval of WMG Programme Committee and the Examination Board is required.

Quality control of assessment practices

Implementation of assessment requires input from different parts of the organization. Programme Committees bear the overall responsibility for the content of assessment and the alignment with the final qualifications of each programme. They approve module plans prior to the start of the academic year. Module Coordinators are appointed 'examiners' and as such responsible for the content and quality of all assessments pertaining to the module. They gather and organise the inputs from individual lecturers to design consistent assessments that are aligned with the

learning objectives of the module. On request, they also provide individual feedback to students on their performance. The Programme Coordinator works closely with module coordinators to safeguard the alignment between modules and programme level and screens written examinations before the exams are given to students. Module coordinators are responsible for handing in summative assessments to the Education Bureau in time to be administered according to the rules stipulated in the Examination Regulations.

The Education Bureau is responsible for the implementation of the summative assessments, including organizing the exam sessions, arranging invigilators for written exams, communicating with academic staff about the marking and informing students about the results and archiving of examination work. All non-formal assessments can be implemented within the Master programmes without involving the Education Bureau. The Education Bureau also carries out programme and module evaluations. The latter also comprises a reflection on the assessment. The Examination Board appoints examiners and ensures that quality assurance mechanisms are in place to monitor the appropriateness and quality of assessments. The Board also decides about exemptions, extensions, and handles appeals against decisions made by examiners. The Academic Appeals Board handles appeals about decisions taken by the Examination Board and the Academic Registrar.

Reflection

The UTQ programme and other didactical trainings organised in-house have contributed to improving the skills of lecturers to design and align assessments. At Institute level the challenge remains to have all teaching staff participate in these trainings.

The quality assurance system that was conceived five years ago offers a good framework in which all involved parties have clear roles and responsibilities. Additional elements are progressively built in. Examples are the systematic handing in of assignments via e-campus, using a standardised template for written exams, demanding signed examination forms for oral exams, requesting model answer sheets prior to examination, and applying plagiarism checks throughout the programme by running all written assignments (e.g. literature studies, essays, MSc theses) through software to detect similarities with other sources. Despite these measures being useful in the quality assurance context, they also are perceived as bureaucratic and limiting the flexibility of lecturers. A good balance needs to be kept to motivate lecturers to employ these instruments in useful and effective ways.

Given recent experiences, the WMG Programme Committee is of the opinion that the Education and Examination regulations need to be revised to ensure that students are not allowed to start MSc thesis research until they successfully completed the taught part of the programme. This will avoid situations in which students at the last moment are not allowed to defend their thesis, while they (and their mentors and supervisors) have invested considerable efforts in conducting the MSc thesis research. Moreover, given the challenge to master the multiple disciplines on which the WMG Master programme is based, it would be desirable if students are allowed to have one insufficient module mark ($\geq 5,0$) on their transcript as long as their average mark for the taught part remains sufficient ($\geq 6,0$).

CHAPTER 5: ACHIEVED LEARNING OUTCOMES

Introduction

During the previous accreditation process, the visitation panel assessed the achieved learning outcomes (Standard 4) of the WMG master programme as *satisfactory* (QANU, 2012). According to the accreditation report, the examination structure was clearly tailored to the intended learning outcomes of the programme. It emphasized that the variety of assessment methods and the execution of assessments were appropriate, yet recommended more oral exams instead of written exams. Based on a representative sample of the WMG MSc theses, the visitation panel also concluded that the graduates achieved the intended learning outcomes of an academic master; all theses met the minimum requirements for academic quality and some were at a much higher level. The visitation panel recommended to show more appreciation for MSc theses that engage with interdisciplinary approaches as it felt that these theses received in most cases a lower mark than theses that draw on single disciplines.

This chapter describes the current assessment practices for the taught part of the WMG Master programme as well as the MSc thesis research. Moreover, it provides an overview of the progress made in the recent years to further improve the assessment of students.

Assessment practices in the programme

Within the WMG Master programme the assessment methods vary per module depending on the intended learning outcomes (see also Annex 5). The assessments include written exams, oral exams, individual assignments such as essays and modelling exercises, and group assignments. Most modules include two or more methods of assessment to ensure alignment with the multiple learning objectives of the modules that often require different ways of evaluating student's performance. To ensure a balance between individual and group efforts, group assignments do not count for more than 50% of the final mark of any module, except for the group work module. To adequately reflect individual performance, student-peer assessments have been introduced within the more extensive group assignments. In the past year several WMG lecturers have been trained on how to prepare, mentor and assess group work and in early 2018 a manual has been developed that includes detailed suggestions on assessment methods.

All assessments within the programme are carefully designed to meet the required quality standards. At the start of each module, the module coordinator explains to the students the assessment procedure of the module including the evaluation criteria that will be used for marking the various assessments. For assignments, written hand-outs with instructions are distributed through e-campus and extensive guidance is given during the assignment. Where possible, example exam questions are shared with the students during the module and tutorials are organized to practice the application of the knowledge in preparation for the exams. Written exams are compiled by the module coordinator based on input from key lecturers, and peer-reviewed by the programme coordinator on clarity, consistency and feasibility. The programme coordinator also cross-checks if exam questions sufficiently deviate from previous exams. In principle the marking of the written exams is done anonymously based on student numbers. Oral exams are always conducted by at least two academic staff members to safeguard impartiality and after each exam assessment forms are signed by both examiners. All written assignments given in the WMG Master programme are standardly checked by module coordinators on plagiarism using software (*Turnitin*). After each assessment students are given feedback on their performance and are given the chance to inspect their exams in group sessions and/or individually. Questions related to the assessment methods are also part of the students' evaluations and are discussed by the WMG Programme Committee. In case of any irregularity, remedial actions are taken immediately in line with the Education and Examination regulations.

The WMG Master programme culminates in the MSc thesis research project, which is the decisive moment to assess if the students achieved the final qualifications of the programme. Not only does the MSc thesis research project test the ability of students to apply domain-specific knowledge, it also assesses their ability to integrate this knowledge and to conduct scientific research independently by applying the obtained academic skills. In this way, the programme aims to ensure that the prospective graduates are well prepared to contribute to theoretical, methodological and applied developments in the field of water management and governance.

Thesis topics are carefully selected and approved by the WMG Programme Committee. Within a six week period the students develop detailed research proposals including a literature review that needs to be defended before the actual research can start. Since 2014-2016, indicative marks are given for the thesis proposal defence to give students insight where they stand and what they could expect. If an insufficient mark is given, students

need to improve and re-do the research proposal defence within one month. Students also need to sign a declaration of responsibility on research ethics as part of their thesis proposal.

During the thesis research students are supervised intensively and have regular meetings with the mentors and peers. To ensure roles and responsibilities are explicitly discussed and agreed upon, a thesis supervision agreement has to be signed by the student, mentor(s) and supervisor. Usually after six months the students are ready to defend their final thesis. Only in exceptional cases and/or unfortunate personal circumstances extension of the research phase is granted by the IHE Delft Examination Board. The assessment of the final theses is carefully structured and follows a clear four-step procedure for quality assurance, namely:

- 1) The final version of the theses are officially checked with software (*Turnitin*) to minimize the chances of plagiarism. All similarity reports are public and checked by the mentor and where needed discussed with the supervisors. In case, the similarity index is 20% or higher, supervisors need to submit an assessment of the similarity report to the Examination Board who will decide if the thesis is accepted or if the student will be charged with academic fraud.
- 2) For each thesis assessment an appropriate examination committee is established that has the specific knowledge to evaluate the content of the research project. The exam committee consists of the supervisor (professor), the mentor(s)²⁸, as well as an external member. This external member is a professional or academic in the field of water management and governance from outside the Institute²⁹. The Examination Board approves the composition of the examination committee of each thesis.
- 3) The final assessment of the thesis includes the evaluation of the written thesis as well as an oral public defence in which the student presents in summary form his/her work and responds to questions posed by the examination committee and the audience.
- 4) The examination committee actively uses a rubric for the assessment of the MSc thesis research (Annex 13), which has been developed at institute level in response to the suggestions raised by the previous visitation panel. The external examiner is requested to draft prior to the thesis defence a detailed assessment based on two criteria of the rubric, namely the criteria on knowledge and understanding of the research subject, and on originality, analysis and interpretation. During the deliberation of the examination committee, as well as in the feedback to the students, the rubric is used to determine the final mark for the MSc thesis. The assessment rubric is available to students and is explicitly discussed with them by the MSc research Coordinator at the start of the MSc thesis research phase.

In addition to the above procedures, examination committees of WMG students are asked to carefully assess and explicitly value multi- and interdisciplinary approaches within MSc theses research in response to the observation of the previous visitation panel that these theses tend to receive lower marks. In cases where students adopt such approaches, and the examination committees are satisfied with the results, this will be reflected in the final mark.

Assessment results and graduation rates

Table 5.1 summarizes the average marks given for the taught part of the programme as well as for the MSc theses produced by the 2016-2018 cohort. Within the WMG Master programme the majority of the students receive marks within the medium category (7.0 to 8.4). The marks given in the taught part of the programme are steady over the years, ranging from a 7.2 to a 7.3 on average during the last five cohorts. As a result of the multidisciplinary foundation of the programme, students often excel in a few modules, while getting lower marks in other modules, which affects the overall average mark of students during the taught part of the programme. The marks given for MSc thesis research fluctuate a bit more, ranging from 6.9 to 7.5 on average during the last five cohorts as in some academic years there are more students who excel than in other years.

²⁸ In case multiple mentors are involved in the MSc thesis research, their views are taken into account in the deliberations of the examination committee but the scores they give weigh as one to keep balance in the overall assessment. In all cases, the main mentors are academic staff members of IHE Delft. PhD students can only be involved in MSc thesis research as a co-mentor.

²⁹ In the academic year 2016-2018, two external examiners were unable to attend the MSc thesis defence at the last moment. To avoid delays in finalizing the studies, these examiners were replaced by colleagues from other academic departments within IHE Delft who have not been involved in teaching in the WMG programme and were not involved in the MSc thesis research of the respective students.

Table 5.1. Marks given for taught part and MSc theses for the 2016-2018 cohort.

Phase of programme	Low <6.9	Medium 7.0<>8.4	High >8.5	Average mark
Taught part (average of modules)	34%	59%	15%	7.3
MSc theses	22%	63%	15%	7.4

The WMG Programme Committee closely monitors marks at module level to ensure module assessments are reasonable and within the expected standards. For most WMG modules the majority of the students obtain marks in the medium category (7.0 to 8.4) and only few students achieve marks in the high category (8.5 and above). Some modules, in particular the first two modules of the foundation phase and the quantitative-oriented modules in the tailor-made phase, are perceived as difficult by the students and many students score low marks (50% and above score in the lowest category for the academic year 2016-2018). This is partly related to the diverse backgrounds and entry levels of the students as well as the broad orientation of the modules that aim to prepare the students for the rest of the programme. One module, the international fieldtrip shows unusually high marks: the majority of the students score marks in the medium category and a few in the highest category which results in an average mark of 8.1 for the module³⁰. These observations have been noted by the Programme Committee and the assessment methods of these modules will be revised if necessary for the future.

Table 5.2 gives an overview of the student performance during the last three academic years. The table shows that on average 83% of the students graduate with an MSc degree, mostly within 18 months after the start of the programme. Some student leave the programme prematurely, some for personal reasons, while other students fail to obtain an MSc degree either because they do not pass taught modules or failed the MSc proposal or final thesis defence³¹. If they qualify³², they will return home with a Certificate of Post-graduate Studies for the taught part of the programme. From the 2016-2018 cohort, three students graduated with distinction, while two students failed the thesis defence and at the time of writing were preparing for re-examination. For one student the thesis defence was delayed with one month due to personal circumstances, while 5 students left the programme prematurely as result of non-passed modules in the taught part of the programme or failing the MSc thesis proposal defence. Annex 14 provides a detailed overview of the theses produced by the students during the academic year 2016-2018.

Table 5.2. Student enrolment and completion ratios of the WMG Master programme

	2013-2015	2014-2016	2015-2017	2016-2018
Students enrolled	33	37	30	33
Completion ratio after 18 months	76%	84%	80%	76%
Completion ratio up to date	85%	84%	83%	79% ³³

Reflection

As demonstrated in this chapter, the testing and assessment system of the WMG Master programme is rigorous and sound, and has been further strengthened over the years. This particularly applies to the final assessment of the intended learning outcomes during the MSc thesis defence. As the great majority of the students graduate within 18 months, it can be concluded that the programme is successful in achieving its intended learning outcomes. The adequacy of the final assessment is confirmed by that fact that many of the MSc theses with high marks resulted in publications in renowned scientific journals (see Annex 15) and/or presentations at international conferences. The quality of the programme perhaps also shows in how graduates from the WMG programme

³⁰ It should be noted that until recent students would receive a pass or a fail for this International Fieldtrip module. The WMG Programme Committee decided that this module should be graded in the same way as other modules and considerable efforts have been made to develop a consistent and relevant assessment rubric in order to do so. The assessment for this module will be further improved for the coming year.

³¹ Students have the right to re-sit the thesis defense once within a period of three months after the first attempt.

³² Certificate is awarded to students who obtained a minimum of 45 (previously 54) ECTS credit points.

³³ Completion ratio up to May 2018. Two MSc thesis re-defenses are scheduled for June/July 2018. If successful, the completion ratio would cumulate to 85%.

successfully enrol into PhD programmes at respected universities, or in the career success of many of our alumni who are working at senior positions in the water sector³⁴, primarily in their home countries.

The completion ratios have slightly reduced since the last accreditation process, mainly as a result of more strict conditions for resitting exams multiple times which means more students need to leave the programme prematurely. Despite the tragedy this entails for the individual students, we encourage this development as it creates clarity to students and lecturers and ensures sufficient attention can be paid to well performing students.

Within the taught part of the WMG programme, there is scope for improving the structuring of feedback to students on assessments, so that assessments are not only used to evaluate students, but also to facilitate their incremental learning process. Assessment now takes place at module level in different forms, without taking into account the feedback that students were given in previous modules. Especially on skills-oriented assignments such as essays or presentations, students will need to receive timely, detailed and constructive feedback in order to further improve their performance. Within group work assignments a more consistent approach is needed to assess individual contributions of students as part of the reflexive learning trajectory.

The assessment rubric for MSc thesis research has been a useful tool to structure the evaluation of, and feedback on, MSc theses and to improve the consistency in the marks given to thesis. The assessment of multi- and interdisciplinary MSc theses remains a challenge as it also requires external examiners who appreciate and are capable to evaluate these kinds of theses. In a few cases interdisciplinary MSc research efforts have led to diverging opinions on the quality of theses among examination committee members, resulting in intensive deliberations on the final mark and dissatisfaction for all parties involved.

The average thesis mark has slightly increased during the last two cohorts. The future needs to prove whether this is a coincidence as a result of stronger cohorts, the result of improved guidance and assessment of MSc thesis research or a general tendency among examiners to make more a sharper distinction between strong and weaker theses. The increased attention to interdisciplinarity in our teaching, and the explicit request to MSc thesis examination committees to appraise multi- or interdisciplinary approaches for their merits rather than comparing to monodisciplinary oriented theses, has paid off because some of these theses have received high marks (8.0 and above) in the academic year 2016-2018.

Development plan

In line with the reflection above, the WMG Programme Committee has several plans to further improve the testing and assessment system of the programme. First of all, the Programme Committee would like to further develop the different learning trajectories as defined in the didactic concept and design specific formative assessments for each trajectory, in addition to existing summative assessments in the programme. This, in combination with timely and detailed feedback on assignments and exams, will contribute to optimize the incremental learning process of students throughout the programme.

To improve the assessment of assignments carried out in small groups, and to allow for more detailed individual appraisal and feedback, the recommendations of the group work manual will be implemented. The WMG Programme Committee aims to develop a standard practice for evaluating group work and lecturers will be encouraged to follow further training on this matter. Also the assessment methods of the modules that have relatively lower and higher average marks and/or low standard deviations will be further scrutinized to further improve the assessments.

The new student administration system does not adequately facilitate blind marking of written exams as marks need to be registered by name rather than by student number. The WMG programme therefore aims to develop formats at programme level to ensure students continue to be assessed anonymously. Moreover, the new administration system has many useful functions for integration of information and real-time monitoring of student's performance. However, these functionalities are not fully known yet by the programme and module coordinators. The WMG programme committee therefore will request for training of relevant staff, so that the system can be fully utilized.

To further improve the process of assessing MSc theses, the WMG Programme Committee will draft a memo to the Education Bureau based on the comments received from WMG lecturers on the assessment criteria, including concrete suggestions for improvement of the rubric. Moreover, the Programme Committee aims to tailor the MSc thesis assessment rubric to the specific orientation of the WMG Master programme, in particular appraising multi- and interdisciplinary research. This does not mean that all MSc thesis research within the WMG

³⁴ Through alumni tracer surveys, an interactive alumni database and an IHE Delft LinkedIn profile, the Institute is informed on the career developments of alumni.

programme need to follow a multi- or interdisciplinary approach, but rather that the efforts of students who take up this challenge will be explicitly examined and acknowledged. For theses that adopt a multi- or interdisciplinary approach the WMG Programme Committee will pay extra attention to the selection of the members of the examination committees and where needed add additional (external) examiners to the committees to ensure they are well placed to assess these theses. A long term plan to involve external examiners in the assessment of MSc research proposals will also be revived and further explored as external feedback can improve the focus of the research and the consistency in research methodology at an early stage.

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Annexes

1. IHE Delft vision on quality of education.
2. Final qualifications WMG Programme.
3. Final qualifications Water Cooperation and Diplomacy Specialization.
4. Description and learning objectives of WMG thematic profiles.
5. Overview of WMG curriculum and assessment methods.
6. Overview of Water Cooperation and Diplomacy Specialization curriculum.
7. Link between WMG final qualifications and modules.
8. IHE Delft policy on instructional methods and didactic approaches.
9. Staff involved in teaching in WMG programme 2016-2018.
10. Guest lecturers teaching in WMG programme 2016-2018.
11. IHE Delft assessment policy.
12. IHE Delft education and examination regulations 2016-2018³⁵.
13. Rubric MSc thesis examination.
14. Overview of WMG MSc theses 2016-2018.
15. Journal papers co-authored by WMG Students based on MSc thesis research.

³⁵ The annexes of the Examination Regulations are available on request.

Annex 1: IHE Delft vision quality of education

Vision on education and the quality of education

IHE Delft envisages a world in which people manage their water and environmental resources in a sustainable manner, and in which all sectors of society, particularly the poor, can enjoy the benefits of basic services. The education at IHE best prepares students to contribute to building this world.

Global challenges related to globalization, environmental and societal change will expose future graduates to water problems of unprecedented complexity and magnitude. They therefore require a range of knowledge, skills and attitudes to be optimally prepared for these new challenges and to contribute effectively to the development of integrated solutions. This implies that due attention is paid not only to the academic fields of engineering, natural sciences and social sciences, but also to the development of trans-disciplinary skills that facilitate the work at the interfaces of traditional disciplines and make the connection to the real world. The aim of IHE is to implement multidisciplinary programmes with a strong emphasis on the interrelation of academic fields and interdisciplinary approaches. Students are prepared for trans-disciplinary (involving non-academic stakeholders) challenges associated with the complex water issues in the real world.

IHE envisages water professionals who have the desire, the ability and the responsibility to be lifelong learners. They are therefore prepared for future challenges in their professional careers in an ever-changing world. They continue to be supported and stay internationally connected as part of the IHE alumni community.

The vision of the quality of education is linked to all education-related activities of IHE. It provides the basis to develop and implement related policies and practices, and to ensure an enabling environment to effectively carry out related activities. The vision is characterized by the following:

- The postgraduate education of IHE is science-based and aims to be highly relevant particularly in a development context. It addresses the needs of present and future generations in the field of water and environment.
- IHE endeavors to ensure that its graduates become critically and independently thinking effective professionals who engage with a broad range of disciplines related to water, including natural sciences, social sciences and engineering in environmental and societal complex contexts (T-shape competency profile).
- IHE believes in strengthening the academic and professional skills of students through learner-centered didactic methodologies that promote active learning.
- IHE aims to maximize the potential of every student who enrolls in its programmes, by enhancing students' learning experiences and optimizing the academic success rate.
- IHE creates a life-changing experience for its students by exposing them to an intercultural environment characterized by plurality and diversity of ideas, experiences and disciplines. The students develop intellectually, professionally and personally while participating in the programme and are prepared to continuously develop professionally ('lifelong learning').
- The implementation of the programmes is characterized by a high degree of transparency, openness, flexibility and inclusiveness. The staff members are highly skilled and motivated.
- The quality of education is continuously reviewed through cycles of internal and external assessments, accreditation, student evaluations and critical self-reflections.
- IHE provides all students and staff involved an enabling environment that includes staff qualifications training, appropriate quality of facilities for education and research, IT support, knowledge management and performance management.

Annex 2: Final Qualifications WMG Programme

Graduates in the MSc programme in Water Management and Governance have the ability to:

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

4. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques.
5. Conduct research independently in a scientifically sound and ethically responsible manner.
6. Contribute to interdisciplinary and evidence-based knowledge development and problem solving.
7. Analyse and contextualize governance arrangements and (integrated) management approaches to address water issues in socially inclusive and ecologically sustainable ways.

Making judgements

8. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems.
9. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches.
10. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations.
11. Reflect critically on the implications of water management and governance interventions on society and nature and formulate and defend own standpoint.

Communication

12. Communicate and present effectively, both in writing and orally, making use of information and communication technologies suited for the audience and the purpose.
13. Debate and defend findings and insights, in a clear, systematic and convincing manner.
14. Communicate effectively across disciplines and cultures to enhance collaborations in teams.

Lifelong learning skills

15. Develop competencies required to further expand their knowledge and skills on their own initiative.
16. Reflect on own professional and educational background in order to identify a personal learning trajectory to realize career objectives and professional development goals.

Annex 3: Final Qualifications WCD Specialization

Graduates in the joint specialization on Water Conflict and Diplomacy of the MSc programme in Water Management and Governance have the ability to:

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

5. Draft a research plan, including the formulation of research questions and hypotheses and the selection of research methods, theories and techniques.
6. Conduct research independently in a scientifically sound and ethically responsible manner.
7. Contribute to interdisciplinary and evidence-based knowledge development and problem solving.
8. Analyse and contextualize governance arrangements and (integrated) management approaches to address water issues in socially inclusive and ecologically sustainable ways.
9. Critically analyze latent and actual water disputes including key elements of conflict analysis and key contextual elements.
10. Critically analyze different dispute resolution mechanisms and participatory processes.
11. 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

12. Identify and appraise relevant research, concepts and approaches in view of their potential for helping understand or solve water-related problems.
13. Critically discuss and evaluate own research approaches and outcomes within the context of existing knowledge and approaches.
14. Interpret research findings critically in order to formulate evidence-based conclusions, solutions and/or recommendations.
15. Reflect critically on the implications of water management and governance interventions on society and nature and formulate and defend own standpoint.
16. Identify and reflect critically on issues, challenges and potential conflicts regarding competition and cooperation around water at different scales.

Communication

17. Communicate and present effectively, both in writing and orally, making use of information and communication technologies suited for the purpose and the audience.

18. Debate and defend findings and insights, in a clear, systematic and convincing manner.
19. Communicate effectively across disciplines and cultures to enhance collaborations in teams.

Lifelong learning skills

20. Have the competencies to further develop and expand their knowledge and skills on their own initiative.
21. Be able to reflect on own professional and educational background in order to identify a personal learning trajectory to realize career objectives and professional development goals.

Annex 4: Description and learning objectives of thematic profiles in Water Management and Governance Master programme

Thematic Profile on Water Quality

Water Quality studies the water quality impacts of human activities on aquatic ecosystems, as well as alternative remedial actions, under different levels of environmental stress and in different socio-economic contexts, and develops skills to develop alternative policies and strategies for environmental sustainability.

The learning objectives of the thematic profile on Water Quality are:

1. Describe and predict for a given water resources system the main hydrological, hydraulic, chemical and biological processes and how these processes are dynamically linked with aquatic ecosystems as well as with human activities such as land and water use and pollution.
2. Describe and explain the main concepts and instruments for analysing and influencing formal and informal arrangements for water quality management, including policies, laws and institutions, and by adopting a historical perspective.
3. Interpret, design and optimize water quality assessment and monitoring programmes by applying experimental, statistical and modelling tools.
4. Define a given water resources system, and describe the water and pollution flows across time and space, including the various water uses, and describe the interdependencies these create between the various water users.

Students who opt for the thematic profile on Water Quality are expected to carry out MSc thesis research on a related topic and enrol at least in four of the following modules: Water and environmental law; Water quality assessment; Wetlands for wastewater treatment; Environmental management and water services; Environmental planning and implementation; Environmental assessment for water-related policies and developments; Aquatic ecosystem processes and applications.

Other recommended modules for this profile are: Water economics; Water and environmental policy analysis; Wetlands for livelihoods and conservation; Strategic planning of river basins and deltas.

Thematic Profile on Water Resources

Water Resources studies the ways in which water availability and use are matched as well as the implications of land use and water allocation policies and interventions at different scales, and develops skills to critically reflect on legal and institutional arrangements from the local watersheds to the basin scale and beyond.

The learning objectives of the thematic profile on Water Resources are:

1. Define a given water resources system, and describe the water flows across time and space, including the various water uses, and describe the interdependencies these create between the various water users.
2. Describe and predict for a given water resources system the main hydrological, hydraulic, chemical and ecological processes and how these processes are dynamically linked with human activities, including land and water use.

3. Model processes of the water system (rainfall-runoff, flooding, water allocation, water accounting), validate models, critically interpret model outcomes in order to derive insight in trends, causes and effects, and define and explain model limitations.
4. Describe different concepts to determine the value of water for various uses and users in (amongst others) economic and social terms and explain how these concepts can be used in water resources planning at various spatial and temporal scales.

Students who opt for the thematic profile on Water Resources are expected to carry out MSc thesis research on a related topic and enrol at least in four of the following modules: Water and environmental law; Water economics, Water resources assessment; Water system modelling; Water resources planning; Institutional analysis; Strategic planning of river basins and deltas; IWRM as tool for adaptation to climate change.

Other recommended modules for this profile are: Drought management and reservoir operations; Flood risk management; Applied groundwater modelling; Innovative systems for agriculture; Hydroinformatics for decision support.

Thematic Profile on Water Services

Water Services studies policies and business models for the provision of water and sanitation services through the analysis of organizational, infrastructural and financial arrangements in different socio-economic contexts, and develops skills to design and reflect on arrangements for water service provision.

The learning objectives of the thematic profile on Water Services are:

1. Describe for a given water resources system the interplay between the main biophysical processes and social dynamics, in analysing service delivery modalities.
2. Relate debates concerning water supply and sanitation provisioning to the management and governance of water organizations using theories from different academic disciplines (e.g. economics, public administration, sociology, political science, law).
3. Analyse various approaches and tools water service providers can employ in order to improve the sustainability and resilience of their practices
4. Design and defend water and sanitation service arrangements in different socio-economic, political and administrative contexts.

Students who opt for the thematic profile on Water Service are expected to carry out MSc thesis research on a related topic and enrol at least in three of the following modules: Managing water organizations; Environmental management and water services; Finance in the water sector; Partnerships in the water sector; Institutional analysis.

Other recommended modules for this profile are: Urban water governance; Decentralized water supply and sanitation; Water sensitive cities.

Thematic Profile on Water Cooperation and Conflict Management

Water Conflict and Cooperation¹ studies processes of conflict and cooperation over water taking account of the interplay between the main biophysical processes and social dynamics with a view of

¹ This includes the joint master programme on Water Cooperation and Diplomacy.

anticipating, preventing and managing conflicts, and develops skills to design and facilitate inclusive consultation and conflict management processes between actors at different levels.

The learning objectives of the thematic profile on Water Cooperation and Conflict Management are:

1. Describe for a given water resources system the interplay between the main biophysical processes and social dynamics, in analysing, anticipating, preventing and managing conflicts.
2. Define a given water resources system, assess the different functions of the water resources system and the often competing interests of water using sectors and actors, describe the interdependencies between these, and finally assess the possibilities and limitations of cooperation.
3. Describe and explain the main concepts and instruments for analysing and influencing formal and informal arrangements over water for cooperation, including policies, laws and institutions, and by adopting a historical perspective.
4. Design and facilitate conflict prevention and management processes, such as consensus building, public participation, negotiation or mediation between actors at different levels.

Students who opt for the thematic profile on Water Conflict and Cooperation are expected to carry out MSc thesis research on a related topic and enrol in at least three of the following modules: Water and environmental law; Water conflict management I; Water conflict management II; Institutional analysis.

Other recommended modules for this profile are: Water resources planning; Water and environmental policy analysis; Urban water governance; Strategic planning of river basins and deltas; IWRM as tool for adaptation to climate change.

Annex 5: Curriculum of the WMG Master Programme 2016-2018

Year 1	Foundation	5 ECTS	Principles of Integrated Water Resources Management Lectures / Workshop / Computer exercise/ Case study Written examination / Assignment			
		5 ECTS	The Water Resources System Lectures / Workshops / Lab work / Computer exercise Written examination / Assignment			
		5 ECTS	Water Governance Lectures / Workshops / Tutorial / Debates / Group work Oral examination / Assignment			
		5 ECTS	Water Economics Lectures / Workshops / Role play / Field trip / Group work Written examination / Assignment			
		5 ECTS	Water & Environmental Law Lectures / Workshops / Case study / Role play Written examination / Assignment			
Year 1	Tailor Made Trajectories		Water Quality	Water Resources	Water Conflict	Water Services
		5 ECTS	Water Quality Assessment Lectures / Lab work / Exercise Written examination / Assignment	Water Resources Assessment Lectures / Workshops / Computer exercises Written examination / Assignment	Water Conflict Management I Lectures / Workshops/ Role plays Written examination / Assignment	Managing Water Organizations Lectures / Workshops / Field trip / Role Play Oral examination / Assignment
		5 ECTS	Wetlands for Water Quality or Environmental Engineering Lectures / Lab work / Exercise Written examination / Assignment	Water Systems Modelling Lectures / Workshops / Tutorials Written examination / Assignment	Water Conflict Management II Lectures / Workshops/ Role plays Written examination / Assignment	Environmental Management and Water Services Lectures / Role Play / Exercise Oral examination / Assignment
		5 ECTS	Environmental Planning and Implementation Lectures / Exercise / Field trip Written examination / Assignment	Water Resources Planning Lectures / Workshops / Exercise Written examination / Assignment	Water Resources Planning Lectures / Workshops Written examination / Assignment	Finance in the Water Sector Lectures / Workshops / Field trip / Game Written examination / Assignment
		Integration	5 ECTS			
			International Fieldwork Excursions / Field measurements / Interviews / Team work Field work presentation / Reflection report			
		Tailor Made Trajectories	5 ECTS			
			Aquatic Ecosystems Lectures / Field work/ Lab work / Exercise; Writing assignment with oral examination			
			Institutional Analysis Lectures / Debates / Exercise/ Group work; Assignment			
			Partnerships for Water Supply and Sanitation Lectures / Case Study / Workshops / Field trip; Oral examination / Assignment			
		5 ECTS				
		IWRM as a Tool for Adaptation to Climate Change Lectures / Case study / Field trip / Exercise; Written examination / Assignment				
		Strategic Planning for River Basins and Deltas Lectures / Case study / Tutorial / Role play / Field trip; Written examination, Assignment				
		Urban Water Governance Lectures / Case study / Tutorial / Field trip / Exercise/ Group work; Assignment				
	Integration	5 ECTS				
		Group Work Workshops / Study in small groups Group assignment with oral examination; Reflection report				
		1 ECTS				
		Summer Course Lectures / Workshops / Exercises Pass or fail based on attendance				
Year 2	Research	9 ECTS	MSc Preparatory Course and Thesis Proposal Proposal writing / Tutorials / Lectures / Peer reviews / Lab and/or field work Thesis report / Defense presentation			
		36 ECTS	MSc Research Self-study Report / Defence presentation			

Annex 6: Overview of Water Cooperation and Diplomacy Specialization curriculum

UPEACE	15 ECTS	UPEACE Foundation Course <i>Lectures / Group discussions / Group work / Written assignments</i>
		General Course on the UN System <i>Lectures / Group discussions / Group work / Written assignments</i>
		Environment, Conflicts and Sustainability <i>Lectures / Group discussions / Group work and presentation / Written assignments</i>
		Water Security and Peace (concept, theories, and field course) <i>Lectures / Group discussions / Group work and presentation / Written assignments</i>
		Sustainable Agriculture <i>Lectures / Group discussions / Group work and presentation / Written assignments</i>
IHE Delft	35 ECTS	Water Governance <i>Lectures / Workshops / Tutorial / Debates / Group work Oral examination / Assignment</i>
		Water Economics <i>Lectures / Workshops / Role play / Field trip / Group work Written examination / Assignment</i>
		Water & Environmental Law <i>Lectures / Workshops / Case study / Role play Written examination / Assignment</i>
		Water Conflict Management I <i>Lectures / Workshops/ Role plays Written examination / Assignment</i>
		Water Conflict Management II <i>Lectures / Workshops/ Role plays Written examination / Assignment</i>
		Elective Module <i>Lectures / Workshops Examination / Assignment</i>
		Research Methodology + Thesis Proposal Work <i>Lectures / Workshops / Assignments</i>
OSU	26 ECTS	Natural Resources Leadership Academy
		Fundamentals of hydrology
		Applied Field Problems/ Writing in Water Resources
		Conducting Collaborative Projects/Fall Sociotechnical Aspects of Water Resources
		Fall Field Geography of Oregon/ Seminar/Journal club
Thesis	30 ECTS	Thesis <i>UPEACE / IHE Delft / OSU</i>

Annex 8: IHE Delft policy on instructional methods and didactic approaches

Introduction

IHE Delft is an institute for higher education, attracting students from all over the world with many different educational backgrounds. The vast majority has several years of relevant working experience. They come here with the ambition to deepen and broaden their knowledge, to become 'lifelong learners' who are able to contribute to solve water problems in their home countries and to build a network of peers.

Instructional methods and didactic approaches

Instructional methods and didactic approaches are means to stimulate students to develop knowledge and skills.

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.

Learning is an active process, where students construct their knowledge and are responsible for their own learning. By using an activating didactic approach, which could also include peer learning, students become a more independent and effective learner.

Aligned teaching and active learning

Teaching at IHE Delft is aligned, meaning that lecturers design and plan learning activities and formative and summative assessment methods such that they effectively contribute to achieving the learning objectives. Lecturers explicitly encourage the students to actively process the offered information. Students have to show responsibility and initiative, collect information on their own, bring in own experiences, and dynamically participate in discussions and group works.

Apart from acquiring cognitive competencies students also have to acquire several functional and personal competencies, so-called academic skills. These include, but are not necessarily limited to scientific ethics, information literacy, critical reading, scientific writing, oral presentation, discussion and debating, and research skills, covering the method(s) applied in the individual student's thesis research.

Policy directive

For each topic in the module plans in Educator, the module coordinators have to indicate which (combination of) instructional methods are used.

Relation between instructional methods and learning objectives.

In table 1 below an overview is given of the various instructional methods and didactic approaches used at IHE Delft and their relationship with the different learning objective levels according to Bloom's taxonomy.

Table 1: Overview of instructional methods, didactic approaches and critical competencies

Instructional method	Didactic approaches by the lecturer	Description	Relation to learning objectives (Bloom)	Critical competencies achieved by the students
<p>Interactive lecture</p> <p>Or:</p> <p>Activating lecture</p>	<p>Presenting a topic and involving students through questions and exercises</p>	<p>An explanation of a topic delivered before the class, alternated by interactions between lecturer and students, and among students. Interactive /Activating lectures serve one or more of the following functions:</p> <ul style="list-style-type: none"> • 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. 	<p>Knowledge, comprehension, application</p>	<p>Memorizing, recalling facts</p> <p>If students are activated:</p> <p>Explaining and discussing concepts with the lecturer and each other, solving problems, carrying out small assignments or exercises.</p>
<p>Case study</p>	<p>Presenting a case, demonstrating, guiding the decoding/bridging of theoretical knowledge into practical approaches, demystify basic knowledge and show applicability of this. Developing an assignment, including instructions and criteria for feedback and/or grading</p> <p>Giving feedback and if relevant guide the group work process.</p>	<p>Students work (individually or in groups) on a real life scenario in or outside a classroom setting and receive a specific assignment, for example to come up with an action plan or possible solution(s).</p>	<p>Application and integration</p>	<p>Applying knowledge in a new situation; capability of transforming basic knowledge into an instrument to reach a practical solution</p> <p>This could also include planning skills, designing skills, group work skills (depending on how the assignment is carried out), reading skills, writing or presentation skills (depending on how the assignment has to be delivered)</p>

<p>Role play</p>	<p>Developing a case for a role play. Developing instructions and criteria for feedback. Explaining relevance of the roleplay and giving instructions for players and observers. Guiding the roleplay. Guiding the feedback afterwards by players and observers. Wrapping up: lessons learned by students (could be done on the spot or with a reflection assignment)</p>	<p>In a role play students play a certain role to experience the responsibilities and tasks related to this, and to view and experience a situation from different perspectives.</p>	<p>Application and integration</p>	<p>Applying knowledge in a real life setting. Development of communication skills (speaking, expressing ideas, arguing, listening), skills to act and interact individually and in groups in a given setting. As students practice in a learning environment and are all invited to participate this could have a positive effect on their self-confidence.</p>
<p>Laboratory work</p>	<p>Presenting and explaining a topic in an interactive way. Giving a demonstration and involving the students to comment. Developing an experiment / assignment to be carried out by the students, including instructions and criteria for feedback and/or grading. Guiding the students while they carry out the assignment.</p>	<p>Students carry out experiments in a laboratory which illustrate and show them the physical evidence of the phenomena theorized in class; they practice practical aspects of science and technology, and learn to prepare and/or process data; they learn how to report experiments.</p>	<p>Comprehension, application and integration</p>	<p>Hands on approach: learning to carry out experiments, understanding the phenomena physically, learning the basics on instrumentation and equipment used in practice, learning to prepare, process and interpret data, writing reports.</p>

Fieldtrip Fieldwork	Developing an assignment to be carried out by the students during the fieldtrip or the fieldwork, including instructions and criteria for feedback and/or grading. Guiding the students while they carry out the assignment.	Excursion to existing systems or projects under construction, in order to learn from experiences and have physical contact with the results of the planning and designing activities in real life. Preferably students carry out an assignment during the field trip to activate them and to guide their learning. Investigation carried out in the field (learning by doing in the real world with real data)	Application and integration	Listening, interpreting, observing, and carrying out assignments in the field, comparing theory and practice, evaluating real life projects.
Assignment	Developing an assignment to be carried out by the students, including instructions and criteria for feedback and/or grading. Explaining the assignment and all procedural aspects (carrying out the task, deadlines, feedback and /or grading procedure).	Task on a subject that has already been delivered in a lecture to be performed outside of class, either in a group or individually. Assignments are carried out independently by the students and consist of activities to: <ul style="list-style-type: none"> • study or practice lecture material; • prepare a report or presentation; • work out the results of an exercise; • conduct an experiment or test; and /or • conduct a research or other study. 	Application and integration	Investigating, analyzing, elaborating, finding solutions, logical reasoning, and independent decoding of the knowledge acquired in the class. This could also include planning skills, designing skills, group work skills (depending on how the assignment is carried out), reading skills, writing or presentation skills (depending on how the assignment has to be delivered)
Exercise / workshop	Developing an exercise to be carried out by the students, including instructions and criteria for feedback and/or grading. Explaining the exercise and all procedural aspects (carrying out the	An exercise takes one of the following forms: <ul style="list-style-type: none"> • a design or practical exercise; • a computer exercise / experiment An exercise could be performed in class or outside of the classroom, individually or in a group.	Application and integration depending on the nature of the exercise	Decoding of the knowledge acquired in the class, finding solutions, logical reasoning, and application of knowledge to simple or more complex situations.

	<p>task, deadlines, feedback and /or grading procedure).</p>			
<p>MSc thesis</p>	<p>Supervision: discussing content, process (collaboration and mutual expectations) and procedure (learning goals, assessment criteria and milestones), giving feedback related to assessment criteria, being part of assessment committee; monitoring student work, motivating students, guiding them to working independently.</p>	<p>Perform independent research which includes literature review and solidification of past knowledge; identification of needs in terms of scientific and technologic assessment (formulation of hypothesis or research questions); establishment of clear objectives; prepare a research plan (methods); perform the research, possibly including lab work and/or running computational experiments; write a report and present it.</p>	<p>Integration</p>	<p>Research skills: formulating research question and/or hypothesis, doing a literature study, using certain methodology to answer the research question, analyzing and interpreting data, writing a thesis, presenting and defending results.</p> <p>Ability to work independently and to plan a project.</p> <p>Related academic skills: scientific ethics, information literacy, critical thinking, scientific writing, oral presenting, discussing and debating.</p>

Annex 9: Academic Staff involved in teaching in WMG programme (cohort 2016-2018)

Staff members closely involved in the WMG programme				
#	Name	Degree	Position	Expertise
1	Zwarteveen, M.	PhD	Professor	Water Governance
2	Van der Zaag, P.	PhD	Professor	Water Management
3	Gupta, J.	PhD	Professor	Water and Environmental Law
4	Irvine, K.A.	PhD	Professor	Aquatic Ecosystems
5	Jaspers, F.G.W.	MA	Associate Professor	Water and Environmental Law
6	Mohamed, Y.	PhD	Associate Professor	Hydrology and Water Accounting
7	Schwartz, K.	PhD	Associate Professor	Water Services Management
8	Kooy, M.	PhD	Associate Professor	Urban Water Governance
9	Kemerink, J.S.	PhD	Senior Lecturer	River Basin Governance
10	Torio, P.	PhD	Senior Lecturer	Water Services Management
11	Graas, S. (<i>vacant</i>)	MSc	Senior Lecturer	Water Resources Management
12	Van Cauwenbergh, N.	PhD	Senior Lecturer	Water Resources Planning
13	Masih, I.	PhD	Senior Lecturer	Water Resources Planning
14	Susnik, J.	PhD	Senior Lecturer	Water Resources Modelling
15	Jiang, Y.	PhD	Senior Lecturer	Water Economics
16	Evers, J.	PhD	Senior Lecturer	Environmental Policy and Planning
17	Guerrero, T.A.	PhD	Lecturer	Sanitation and Wastewater Governance
18	Fantini, E.	PhD	Lecturer	Water Governance
19	Smit, H.	MSc	Lecturer	River Basin Governance
20	Tutusaus, M.	MSc	Lecturer	Water Services Management
21	Shubber, Z.	MA, MSc	Lecturer	Law and Water Diplomacy
22	Flamini, A.C.	MSc	Lecturer	Water Services Management

Other staff members involved in the WMG programme				
#	Name	Degree	Position	Expertise
1	Bastiaanssen, W.G.M.	PhD	Professor	Water Accounting
2	Zevenbergen, C.	PhD	Professor	Flood Resilience of Urban Systems
3	Alaerts, G.	PhD	Professor	Capacity Building and knowledge management
4	Wehn, U.	PhD	Associate Professor	Water Innovation Studies
5	Popescu, I.	PhD	Associate Professor	Hydroinformatics
6	Douven, W.J.A.M.	PhD	Associate Professor	Integrated River Basin Management
7	Van der Steen, P.	PhD	Associate Professor	Environmental Technology
8	Gettel, G.	PhD	Senior Lecturer	Aquatic Biogeochemistry
9	Stigter, T.	PhD	Senior Lecturer	Hydrogeology and Groundwater Resources
10	Raj, E.	PhD	Senior Lecturer	Resource Recovery Technology
11	De Ruyter, E.	PhD	Senior Lecturer	Aquatic and Marine Ecology
12	Van Bruggen, J.J.A.	PhD	Senior Lecturer	Microbiology
13	Van Dam	PhD	Senior Lecturer	Ecological & Environmental Modelling
14	Van der Kwast, H.	PhD	Senior Lecturer	Ecohydrological Modelling
15	Wenninger, J.	PhD	Senior Lecturer	Hydrology
16	Ferrero, G.	PhD	Senior Lecturer	Water Supply Engineering
17	Cai, X.	PhD	Senior Lecturer	Water Productivity
18	Zuidgeest, A.	PhD	Lecturer	Wetlands and Aquatic Biogeochemistry
19	Mendoza-Sammet, A.M.	PhD	Lecturer	Environmental Planning and Management
20	Hes, E.M.A.	MSc	Lecturer	Environmental Systems Analysis

21	Ter Horst, R.	MA	Lecturer	Water Diplomacy
22	Darvis, L.P.	MA	Librarian	Plagiarism, literature search
23	Kruis, F.	BSc	Head Laboratory	Laboratory work
24	Wesselink, A.	PhD	Postdoc Researcher	Water Governance
25	Quesada, G.	PhD	Postdoc Researcher	Water Law and Groundwater Governance
26	Masia, S.	PhD	Postdoc Researcher	Water Systems Modelling
27	Van Opstal, J.	PhD	Junior Lecturer	Remote Sensing and Crop Productivity
28	Davalos, G.E.	PhD	Junior Lecturer	Water Accounting Analyst
29	Salvadore, E.	PhD	Junior Lecturer	Water Accounting Analyst
30	Michailovsky, C.	PhD	Junior Lecturer	Water Accounting Analyst

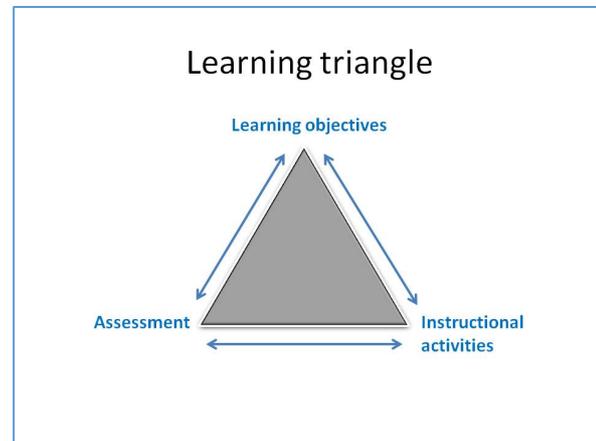
Annex 10: Guest Lecturers teaching in WMG programme (cohort 2016-2018)

#	Name	Degree	Expertise	Organization and country
1	Ahlers, R.	PhD	Water governance	Stichting Onderzoek Multinationale Ondernemingen (SOMO), The Netherlands
2	Bolding, E.	PhD	Irrigation management	Wageningen University, The Netherlands
3	Bring, A.	PhD	Climate change and hydrology	Stockholm University, Sweden
4	Budds, J.	PhD	Water governance, political ecology	University of East Anglia, United Kingdom
5	Dell'Angelo, J.	PhD	Water governance	IVM Institute for Environmental Studies, VU University, The Netherlands
6	Fenichel, E.	PhD	Bio-economics and ecosystem management	Yale University, New Haven, United States of America
7	Hofstra, M.	MSc	Water policy and governance	Independent Consultant. Formerly at IHE Delft, and Rijkswaterstaat, The Netherlands
8	Joosten, A.	MSc	Team work skills development	Docenten Academy, The Netherlands
9	Kamstra, C.	MBA	Water and sewerage utilities	Vitens Evides International, Cebu, Philippines
10	Kind, J.	MSc	Water economics	Deltares, The Netherlands
11	Kowarsky, J.	MSc	Transboundary water conflict management and negotiation	Tel Aviv, University, Tel Aviv, Israel
12	Langenberg, V.	PhD	Eco-technology and ecosystem, environmental impact assessment	Deltares, The Netherlands
13	Martinez Rodriguez, F.J.	MSc	Water supply	Diputación de Almería, Spain
14	Mastenbroek, A.	MSc	International relations	Netherlands Water Partnership, Netherlands
15	Mirumachi, N.	PhD	Human geography, water politics	King's College, London, United Kingdom
16	Perlot, W.	PhD	International negotiation	Clingedael Academy, The Hague, The Netherlands
17	Rap, E.	PhD	Irrigation management and water governance	International Water Management Institute, Cairo, Egypt
18	Rojas, E.	PhD	Archaeology and anthropology	University of Leiden, The Netherlands
19	Rusca, M.	PhD	Urbanism and water governance	King's College, London, United Kingdom
20	Schmeier, S.	PhD	Transboundary water governance	Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ), Germany
21	Smeets, P.	PhD	Microbial water quality	KWR Water, The Netherlands
22	Van Beek, E.	PhD	Water resources planning and management	Deltares, The Netherlands
23	Van de Groep, M.	MSc	Business economics, adaptive planning and management	Ministry of Planning and Investment, Vietnam
24	Vis, J.	MSc	Team work skills development	Docenten Academy, The Netherlands
25	Wolf, A.	PhD	Transboundary water conflict management and diplomacy	Oregon State University, USA

Annex 11: IHE Delft Assessment policy

Introduction

All educational offerings of the institute are based on the IHE educational concept: '**Aligned teaching and active learning**'. Education is a learning process that needs the active participation of the learner. Effective learning develops when the three key elements of the learning process are being aligned: learning objectives, learning activities and assessments.¹ This is depicted in the learning triangle.



Motive

The institute attracts a student population with a wide variety in cultural and education backgrounds. Students come here with different experiences about teaching, learning, learning materials and achieving milestones (through tests). Given this diverse international environment and driven by the quality ambitions of the institute it is a challenge that particular attention is given to the consistency, fairness and quality of assessments in the educational programmes.

Purpose

This document presents a policy framework for lecturing staff, management and support staff on the assessment of the educational offerings of IHE, including the MSc-programme specialisations, the individual modules, the online courses, other short courses and diploma programmes.

Definition

Assessment is a systematic way of collecting information about students' acquisition of knowledge, skills and attitudes when participating in an educational programme. In this context a programme should be read as a specialisation, a module, a short or online course or any other type of training. For IHE, assessments are an important input into making decisions about awarding students with a degree or diploma. To the students, assessments provide information about their progress in the learning process.

Assessment principles

- An assessment should test the achievement of clearly defined learning objectives.
- An assessment evaluates a level of mastering a specific learning content.
- Efforts have to be made to make assessments as objective as possible.
- Lecturers are responsible for clearly communicating how assessments play a formal role in the grading

¹ Learning objectives define and describe about what and at what level of demonstration learning is to be mastered. Assessments test during or at the end of the learning process the process of mastering the learning content. Learning activities facilitate the active process of mastering and demonstration. Assessments should address the learning objectives and the learning activities should focus at the learning objectives as well. The type of assessment should fit with the learning activities.

Key areas

This document outlines four key areas of importance for developing and implementing good quality assessments:

- (1) the content of assessments;
 - a. formats
 - b. levels
 - at curriculum level
 - at module level
 - at topic level
 - c. criteria
- (2) the organization of assessments;
- (3) strengthening competence for assessment among staff;
- (4) quality assurance for assessment.

Each key area is described in detail below.

1. The Content of assessment

a. Formats

Assessments are used in two different formats: *Formative* and *Summative* assessment. Both types of assessments are an essential part of the educational offerings.

Formative assessment (e.g. homework, diagnostic self-tests) is used primarily to monitor the progress of students in their learning process. The results / feedback of formative assessments are used by lecturers to improve their teaching and by students to improve their learning. Formative assessment provides feedback to students and lecturers about the progress in achieving the learning objectives, as well as the better and less well understood elements of the learning. It provides opportunity for making adjustments in the learning process.

Summative assessment (e.g. written examinations), on the other hand, is used primarily to evaluate the learning achievement of students against the learning objectives of a module or programme. They are done during and at the end of a learning period (module). Summative assessments result in marking of the student's work. IHE uses an absolute grading system². This is in line with marking practices at other educational programmes that are accredited by the NVAO.

Both types of assessment can be taken in different formats (e.g. multiple choices test, writing a paper, delivering a presentation, interview, etc.) Summative assessments are the usual finalisation of a learning process, leading to a grading (mark) of the level of mastering the learning content.

b. Levels

Within our educational programmes, assessment is considered and organized at different levels (see details in annex A):

At the *programme specialisation level*, assessment consists of a variety of sub-assessments (exams, assignments, tests e.g. for individual modules or courses) that together constitute the assessment for the overall programme. At this level, the overall consistency of the assessment with the final

² In an absolute grading system students receive a grade (mark) irrespective of the grade of other students in the class. In a relative grading system the score is given to a student comparative to the scores of the other students.

qualifications³ is monitored to safeguard a balanced assessment with respect to the study load of the various programme components.

At the *module level*, consistency of the assessment type and weight with respect to the different topics and learning activities within the module is needed, as well as a proper balance between formative and summative assessments. This is described in the module plans.

At the *topic/learning activity level*, assessments should be balanced, providing sufficient representation of the topics and their study load in the course. In addition, the quality of the assessment items (open questions, closed questions, other forms of assessment) needs to be assured.

c. Five quality criteria for assessments

Assessments need to meet the following 5 quality criteria:

1. Validity: assessments should be aligned with the learning objectives of the activity
2. Reliability: test evaluation and results need to be repeatable
3. Transparency: it has to be clear to all students how they will be assessed
4. Practicability: assessments have to be manageable in terms of time and resources.
5. Effectiveness: assessments have to be designed in such a way that they stimulate the intended kind of learning

2. Responsibility and organization of assessment

Implementation of assessment requires input from different parts of the organization (see detailed description in annex B).

- a. Programme Committees and the programme / specialisation coordinators of the four MSc programmes bear the overall responsibility for the *content* of assessment and the alignment with the final qualifications of each programme specialisation.
- b. At module and course level, module coordinators and individual lecturers are responsible for the content of the assessments. Course coordinators are responsible for the assessment of short and online courses.
Programme- and specialisation coordinators work closely with module and course coordinators as well as individual lecturers to safeguard the alignment between modules and programme level.
- c. The Education Bureau is responsible for the *implementation of the summative assessments*, including organizing the exam sessions, communicating with academic staff about the marking and informing students about the results and archiving of examination work. Programme committees, programme and module coordinators, and lecturers are responsible for *handing in summative assessments to the Education Bureau in time* to be administered according to the rules stipulated in the Examination Regulations.

All non-formal assessments can be implemented within the educational programme without involving the Education Bureau.

³ Final qualifications are a description of the qualifications and competencies of graduates after graduation. Final qualifications are described according to the Dublin descriptors.

- d. The Examination Board is responsible for *monitoring the appropriateness and quality of assessments* and considers requests for extensions and appeals.

3. Strengthening competence for assessment within the organization

To achieve assessments that meet the five quality criteria, it is important that the quality and professionalism of the education staff (both teaching and support staff) regarding assessments is addressed. Regular training, support and quality control is needed. Therefore assessment is an integral part of the University Teaching Qualification programme. In addition, a specialized follow-up course on assessment is organised for all lecturers (details in annex C).

Academic staff members are responsible to maintain their competence in this area and participate in necessary training activities.

The Education Bureau is responsible for organizing activities in support of competency development for assessment.

4. Quality assurance for assessment (details in annex D)

The main objective of quality assurance for assessment is to maintain the overall quality of the education programmes and to ensure that the achievement of learning objectives is adequately tested.

The Examination Board, in close collaboration with the Education Bureau, is responsible for monitoring quality assurance of the assessments at the institute. The Education Bureau and academic staff members of the programme committees are responsible for safeguarding the quality of assessment content and organisation.

Annex 11.1: Assessment at IHE Delft: principles, methods and requirements

Assessment matrix

In Educator the module coordinators have to fill for every module a module plan. Part of the module plan is an assessment matrix.

An assessment matrix shows the relationship between the type of assessment and the learning objectives of the module.

Assessment answer sheets

For every assessment the examiner has to draft a sheet with either the correct answers to all questions, or the rough contours of possible model answers as for assessments not always one correct answer exists. It sometimes also is about reasoning, analysis and argumentation. The weight or marks to be earned for each question have to be given.

After the examination students have to be informed about the correct answers.

Assessment methods

<i>Assessment Method</i>	<i>Description</i>	<i>Academic Assessment Aspects</i>
Written Examination: Open and closed book	A number of questions to be answered with short written replies within the time frame of a preset number of hours.	<ul style="list-style-type: none"> • Acquisition of knowledge (facts,theories) • Application of knowledge • critical, independent judgment • effective communication
Oral Examination	A number of questions, asked orally by the examiner, to be answered orally by the student within the time frame of a preset number of hours.	<ul style="list-style-type: none"> • acquisition of knowledge • application of knowledge (facts, theories, methods, applications) • critical, independent judgment • effective communication
Individual Assignment: Paper / Report / Lab report / Exercise / Case Study	A task given to an individual student to complete before a preset deadline with a clear indication of what counts as a result to be submitted (e.g. paper, report, simulation, proposal, ...)	<ul style="list-style-type: none"> • acquisition of knowledge (facts, theories, methods, applications) • application of knowledge (facts, theories, methods, applications) and/or skills • critical, independent judgment • effective communication
Group Assignment Small group assignment / Groupwork (module13)	A task given to a group of students to complete, as a team, before a preset deadline with a clear indication of what counts as a result to be submitted (e.g. paper, report, simulation, proposal, ...)	<ul style="list-style-type: none"> • application of knowledge (facts, theories, methods, applications) • cooperation skills • critical judgment as a team
Presentation	An activity within a set time frame during which a student shows, describes, or explains something to a group of people	<ul style="list-style-type: none"> • Communication skills • organisation of knowledge and discerning attitude
Thesis Research Work Assessment	Thesis defense before the Examination Committee	<ul style="list-style-type: none"> • integral proof of having adequately mastered all Final MSc Qualifications

For each type of assessment examiners are required to check for the 5 assessment criteria:

Criterion	Main concerns	What to do
Validity	Is the assessment representative of the content/objectives of the module? Do the questions address the intended cognitive levels?	Make an assessment matrix. Compare the test to the matrix. Ask questions that <i>matter</i> .
Reliability	How many questions are there? Are the questions unambiguous and in clear language? Is the marking consistent? Is the lay-out of the exam clear?	Make clear scoring instructions. Get more than one person to do the marking. Ask a colleague to review the test. Apply the guidelines for question formulation. Perform test analysis afterwards and make improvements for next time.
Transparency	Do students know what to expect? (types of question, way of scoring etc)	Make a trial assessment available. Communicate the assessment with the students.
Practicality	Is it possible to create, take and mark the assessment in a reasonable amount of time?	Ask a colleague to review the assessment (should be 3-4x faster than student). Make use of estimates for time it takes to answer.
Effectiveness: Positive impact on learning/ educational impact	Does the assessment method in your module encourage the type of learning that you want? (e.g. understanding rather than remembering) Does the assessment method encourage students to start studying early?	Use formative testing. Incorporate opportunities for feedback. Ask questions that stimulate students to practice what you want them to practice.

Annex 11.2: Organisation of assessments

Implementation of the policy takes place at various levels in the organisation. The responsibility of each party with regard to assessments is given below.

The institute

It is the responsibility of the institute

1. to ensure, in collaboration with the programme committees, that all master programmes are externally validated (NVAO accreditation).
2. To establish the assessment policy, the examination regulations, and the organisational structures responsible for the implementation of the policy

The programme committee

It is the responsibility of the programme committee to ensure that:

1. every master programme has a coherent and balanced assessment programme and all modules contribute to achieving the final qualifications of a master programme (specialisation). This means that:
 - a. The programme committee determines the final qualifications and ensures that the learning objectives and content of the modules fit within these final qualifications.
 - b. All assessments are in line with the educational concept of the institute.
2. module assessments (set-up and results) are a standard item on the agenda of the programme committee meetings.
3. the content, the format, and criteria of all assessments are clear to all stakeholders. All (guest) staff and students are informed well in advance before the start of a module about content, format and criteria of all assessments in the Study guide.
4. external examiners are involved in the MSc thesis examinations.

The module coordinator

It is the responsibility of the module coordinator to ensure that the following requirements are met:

1. In constructing assessments the required learning objectives of a module are leading. This means that:
 - a) On the basis of the learning objectives of the module the examiners select an assessment format which fits best to test whether a student has understood the content.
 - b) To ensure, in collaboration with the examiners, that all assessments are valid and reliable.
2. Where feasible, during construction all assessments are peer reviewed.
3. Optimal use is made of ICT possibilities for the construction and implementation of assessments, and for giving feedback to the students.
4. For every module and for every written examination an assessment matrix is drafted by the module coordinator and the examiner respectively. At module level an assessment matrix shows the relationship between the type of assessment and the learning objectives of the module.

5. Assessments take place according to one or more of the 6 assessment methods as indicated in annex A.
6. Before the examination, examiners submit their examination questions, including an assessment matrix, and an answer sheet with correct answers to the module coordinator. For each question it is indicated how many points can be earned.
7. For short and online courses special / separate (oral or written) examinations are prepared by the examiners.
8. Compile the written examination if more than one examiner is involved. Module coordinators check the examination papers on:
 - Length and structure
 - Availability of an assessment matrix
 - Number points to be earned for each question
 - Clarity and English proficiency of the questions
 - Availability of model answers or correct answers
9. The module coordinator submits the examination papers to the education bureau, five (5) working days before the examination date.
10. After the examination the module coordinator / examiners collect the examination work in person at the education bureau.
11. The examiner assesses a written examination or assignment within a period of fourteen (14) days after the date of the examination, and submits the results to the module coordinator.
12. Assessments are graded conform the grading systems used by IHE Delft and its partner institutes.
13. The module coordinator collects all assessment results and uploads them in Educator.
14. Proper feedback is given to the students as feedback is one of the most important aspects of the learning process. Student therefore have the right to peruse their examination work within 10 working days after they were notified of the result. During perusal students are provided with the model or correct answers to the examination questions.
15. At the end of the perusal session the module coordinator submits the written examination papers to the education bureau.
16. The examiner shall determine the result of an oral examination directly after the examination has been conducted, and submits the results to the module coordinator.

Assessment dates

1. Written and oral examinations are organized in the designated weeks as indicated in the academic calendar.
Deviations from this rule need to be approved by the Examination Board.
2. Deadline for assignments, presentations and other means of assessing student's knowledge must take place during the implementation of the module and be finished before the start of the subsequent module.
3. So-called third and fourth attempts during the thesis research phase of the programme take place on a date jointly determined by the module and programme coordinator.

Responsibility of the education bureau

It is the responsibility of the education bureau to:

1. organize the assessments;
 - a. setting dates and times for all assessments;
 - b. receive and multiply written assessments;
 - c. invite invigilators;

- d. inform the students via the schedules about date, time and location of the assessment.
2. to collect the examination papers of the students after a written examination;
3. to send the examination papers to the examiners for marking;
4. inform each student individually about his / her assessment results via Educator within a period of twenty-one (21) days after submission of the (examination) work (in other words: three weeks before the re-examination).
5. Keep written examination work in archive for 7 years.

Responsibility of the examination board

The examination board of the institute is tasked / mandated to:

1. ensure the appropriateness of assessment methods through regular reviews by the Education Bureau and internal peers;
2. draft the examination regulations for all programmes and courses which lead to a degree / diploma, or certificate, based on a required number of ECTS points, and establish procedures and instructions within the framework of the Examination Regulations for assessing and determining the results of examinations;
3. establish criteria for the appointment of module coordinators as examiners;
4. annually approve the appointments of module coordinators (examiners) and approve the composition of MSc thesis examining committees;
5. approve proposed deviations from published assessment methods, as proposed by the module coordinator;
6. oversee the adherence to the examination regulations;
7. grant an exemption from taking one or more examinations;
8. grant admission to individual students to the thesis examination;
9. grant time extensions to individual students;
10. decide on appeals made by individual students;
11. verify that individual students have met the requirement for the MSc degree, the Certificate of Postgraduate Studies or the Professional Diploma;
12. award certificates and degrees.

Annex 11.3: Strengthening competences

All lecturing staff have to obtain, or have to be in the possession of a University Teaching Qualification (UTQ) diploma as described in the policy note 'Didactic professionalization of lecturing staff'.

In addition to the UTQ training programme, annually a special workshop on 'preparing examinations and assignments' is organized.

Annex 11.4: Quality assurance framework for assessments at IHE Delft

Quality assurance of assessment focusses the following aspects.

1. Regular monitoring of adherence to rules and regulations by the Education Bureau.
The Education Bureau monitors the correct implementation of the rules and regulations by lecturing staff via collecting information experiences during and with the organisation of all assessments. This information is standard point of discussion during the meetings of the Education Bureau and the programme coordinators.
2. Assessment is addressed in the module evaluation reports by the module coordinators.
3. Assessment methods and assessment results are discussed in the programme committee meetings.
4. In the annual qualitative and quantitative education reports assessment results have to be addressed.



UNESCO-IHE
Institute for Water Education

Education and Examination Regulations cohort 2016– 2018 (Annexes not included)

For:

- the Master Programmes in
 - a. Urban Water and Sanitation
 - b. Environmental Science
 - c. Water Management
 - d. Water Science and Engineering
- short and online courses which are part of these programmes (starting Sep 2016, and ending Sep 2017)
- Graduate professional diploma programmes

Approved by the Rectorate of UNESCO-IHE, [19-07-2016]

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1 Definition of terms

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

Act:	the Higher Education and Scientific Research Act (<i>Wet op Hoger Onderwijs en Wetenschappelijk Onderzoek</i>);
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;
Consent agreement:	a negotiated agreement of examining committee members to an examination which resolves the disputed issues;
Co-mentor:	a staff member from an external institute or different chair group within UNESCO-IHE 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 institute 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;
ECTS transfer:	the procedure of granting credits to a student for studies completed at another institute;
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 student's 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;
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 or ideas 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: <ul style="list-style-type: none"> • 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: <i>examen</i>);
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:	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;
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.

2 General Information

Article 1 Scope of the regulations

- 1.1 The present regulations apply to the education offerings and examinations within: the Master programmes in:
- Urban Water and Sanitation
 - Environmental Science
 - Water Management
 - Water Science and Engineering

Short and online courses which are part of these master programmes
Graduate Professional Diploma Programmes (GPDP)

referred to hereafter as ‘the programmes’.

The programmes are executed by the UNESCO-IHE 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 4 joint degree specialisations 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);
 - Environmental Technology for Sustainable Development (ETSuD).
- 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 The following Master of Science programmes and specialisations are offered:

1. Urban Water and Sanitation programme:

Specialisation	Offered by	Type of degree
1. Water Supply Engineering	UNESCO-IHE	UNESCO-IHE degree
	•UNESCO-IHE •Kwame Nkrumah University of Science and Technology, Ghana	Double degree
	•UNESCO-IHE •Universidad de Valle, Cali, Colombia	Double degree
2. Sanitary Engineering	UNESCO-IHE	UNESCO-IHE degree
	•UNESCO-IHE •Kwame Nkrumah University of Science and Technology, Ghana	Double degree
	•UNESCO-IHE •Universidad de Valle, Cali, Colombia	Double degree
3. Urban Water Engineering and Management	•UNESCO-IHE •Asian Institute of Technology, Thailand	Joint degree

2. Environmental Science programme:

Specialisation	Offered by	Type of degree
1. Environmental Science and Technology	UNESCO-IHE	UNESCO-IHE degree
	<ul style="list-style-type: none"> •UNESCO-IHE •Universidad de Valle, Cali, Colombia 	Double degree
2. Environmental Planning and Management	UNESCO-IHE	UNESCO-IHE degree
3. Water Quality Management	UNESCO-IHE	UNESCO-IHE degree
4. Limnology and Wetland Management	<ul style="list-style-type: none"> •UNESCO-IHE •BOKU - University of Natural Resources and Life Sciences, Vienna, Austria •Egerton University, Egerton, Kenya 	Joint degree
5. Environmental Technology for Sustainable Development	<ul style="list-style-type: none"> •UNESCO-IHE •Asian Institute of Technology, Thailand 	Joint degree
6. Environmental Technology and Engineering (Erasmus Mundus programme)	<ul style="list-style-type: none"> •UNESCO-IHE •Ghent University, Belgium, •ICTP, Prague, Czech Republic 	Joint degree

3. Water Management programme:

Specialisation	Offered by	Type of degree
1. Water Management	UNESCO-IHE	UNESCO-IHE degree
2. Water Resources Management	UNESCO-IHE	UNESCO-IHE degree
3. Water Services Management	UNESCO-IHE	UNESCO-IHE degree
4. Water Quality Management	UNESCO-IHE	UNESCO-IHE degree
5. Water Conflict Management	UNESCO-IHE	UNESCO-IHE degree

4. Water Science and Engineering programme:

Specialisation	Offered by	Type of degree
1. Hydrology and Water Resources	UNESCO-IHE	UNESCO-IHE degree
	<ul style="list-style-type: none"> •UNESCO-IHE •Hohai University, China P.R. 	UNESCO-IHE degree
2. Hydraulic Engineering - River Basin Development	UNESCO-IHE	UNESCO-IHE degree
	<ul style="list-style-type: none"> •UNESCO-IHE •University of Kuala Lumpur 	Double degree
3. Coastal Engineering and Port Development	UNESCO-IHE	UNESCO-IHE degree
	<ul style="list-style-type: none"> •UNESCO-IHE •Hohai University, China P.R. 	UNESCO-IHE degree
4. Land and Water development	UNESCO-IHE	UNESCO-IHE degree
	<ul style="list-style-type: none"> •UNESCO-IHE •Asian Institute of Technology Thailand 	Double degree
	<ul style="list-style-type: none"> •UNESCO-IHE •University of Nebraska -Lincoln, USA 	Double degree
5. Hydroinformatics- Modelling and information systems for water management	UNESCO-IHE	UNESCO-IHE degree
	<ul style="list-style-type: none"> •UNESCO-IHE •Hohai University, China P.R.; 	UNESCO-IHE degree
	<ul style="list-style-type: none"> •UNESCO-IHE •Universidad del Valle, Colombia 	UNESCO-IHE degree
6. Flood Risk Management (Erasmus Mundus programme).	<ul style="list-style-type: none"> •UNESCO-IHE •Technische Universität Dresden, Germany •Universitat Politècnica de Catalunya, Spain 	Multiple degree

	•University of Ljubljana, Slovenia	
7. Groundwater and Global Change - Impacts and Adaptation (Erasmus Mundus programme).	•UNESCO-IHE •TU Dresden, Germany •University of Lisbon, Portugal	Multiple degree

5. Graduate professional diploma programmes:

Name	Offered by	
Sanitation and Sanitary Engineering	•UNESCO-IHE	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 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 is executed on a part-time basis.

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 UNESCO-IHE 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 of the study guides.

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.

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 Students cannot sit for a module assessment more than twice per academic year.
- 6.5 Students of a short and online course can sit for the assessment only once.
- 6.6 In case a student fails the examination of a GPDP module twice, the student can either redo the whole module again, or choose another module. In both cases agreement of the programme coordinator is needed.
- 6.7 The date and time of the written and oral examinations are announced in the programme schedules. Written and oral examinations take place during the examination periods indicated in the academic calendar.
- 6.8 Written and oral examinations for short and online course participants are held within two weeks after the end of the module.
- 6.9 The format for the assessment of a short course can deviate from the assessment format for the corresponding module.
- 6.10 Students of short courses or online courses are eligible to sit for the assessment of the course they are registered for provided that the fee to sit for these assessments has been paid.
- 6.11 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 examination work 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.
- 6.12 In the case of a combination of an oral and written examination of a module during the examination week, the maximum total duration of the combined examination shall not exceed three hours.

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.
- 7.2 Written and oral re-examinations take place during the following examination period as indicated in the academic calendar. Dates and times of written re-examinations are announced in the programme schedules. Not reading or misreading the schedules is not accepted as legitimate reason for failure to participate in a re-examination. All students will take the re-sit of a written examination at the same time.

- 7.3 The dates and times of written and oral (re-)examinations during the thesis period are set by the module coordinator in collaboration with the programme coordinator and the education bureau.
- 7.4 Students will only be allowed to re-sit an assessment for which a fail (i.e. mark lower than 6.0) has been obtained. The highest mark obtained (first assessment or re-sit) for the assessment will be used to compute the final module mark.
- 7.5 Students are not allowed to sit for further assessments during the programme period they are registered for, if they failed three separate modules (after re-assessments) during the taught part of the programme ('modules' does not include the MSc proposal defence).
- 7.6 The format of a re-examination may deviate from that of the first examination for the same module.
- 7.7 The latest moment to sit for a re-examination is one month before the submission date of the MSc thesis.

Article 8 The organisation of the examinations

- 8.1 Examinations are carried out according to the Examination Procedures as described in annex B of these regulations.
- 8.2 In the case of an oral or written examination 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. If required, an expert will be consulted for advice.

Article 9 Oral examinations

- 9.1 Oral examinations are taken individually (only one student at a time). During oral examinations, a second staff member is present as an observer.
- 9.2 During oral examinations for online courses a second staff member as observer is not required. The oral examination has to be digitally recorded and kept on file for 12 weeks.
- 9.3 Oral examinations 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 but maximum 2 modules.
- 10.3 The MSc thesis proposal defence is assessed as a pass or a fail. In the case of a fail, the student may present their defence 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 their MSc thesis work.

Article 11 Exemptions and transfer of credit points

- 11.1 Exemptions for assessments are 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 and/or the examination itself 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.
- 12.4 For all cases mentioned under art 12.2 and 12.3 the programme coordinator will inform the Examination Board and the planning office.

Article 13 Fraud

- 13.1 If a student is caught in an attempt to take unfair advantage during an examination, the invigilators or examiners will inform the Academic Registrar who will submit a written report to the Examination Board after investigation of the incident, and after having had a discussion with the student.
- 13.2 Plagiarism is an act of fraud.
- 13.3 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.

- 13.4 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.
- 13.5 If a student commits severe or repeated fraud, the Examination Board may decide to exclude the student concerned the right to sit for one or more examinations for a determined period with a maximum period of one year.
- 13.6 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.

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. 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 All written examination work of the students will, where feasible, be blind marked by the examiners involved.
- 14.5 Students will be informed on the outcome of their examination work as soon as possible, but at least three weeks before the planned re-examination.
- 14.6 The examination committee for the thesis examination shall determine the result immediately after the defence. The mark shall be formally communicated to the student before the diploma awarding by the Education Bureau.
- 14.7 After the assessment of a module has been completed, the student receives a written statement from the Education Bureau mentioning the overall module mark, the marks given for the different assessments, and if successful also the credit points granted for the module.
- 14.8 After a successful re-sit of an assessment, the mark for the module is recalculated according to the weighted average of the assessment results. However, the maximum module mark which can be awarded when there has been a re-assessment is 7.0.

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.

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.

16.3 Written examination work is archived for a minimum of 7 years.

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 Upon request, students will be provided with a written summary of the study results obtained in the programme to date.

6 Thesis Examination

Article 18 The organisation of the thesis examination

18.1 The thesis will be assessed by a thesis examination committee, normally consisting of three members: a professor as the chairperson, the mentor and maximum one external independent examiner.

In special circumstances the committee may consist of more than three members:

- a) If the UNESCO-IHE mentor is a PhD fellow, mentoring the MSc student in the context of his/her own research, is a member of the committee, an additional staff member is compulsory.
- b) If the research work is carried out outside UNESCO-IHE a second co-mentor from that external institute may be appointed.
- c) If the research work is co-mentored by a staff member from another chair group at UNESCO-IHE;
- 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.

External examiners:

- are not involved in the thesis work (independent)
- are from outside the institute or are in exceptional cases from a chair group within the institute, but not involved in the supervision of the research work.
- have to possess at least a Master degree.

18.2 The opportunity to sit the thesis examination is offered once every calendar month.

18.3 All students have to submit the examination version of the thesis report on the same date, and defend their thesis in the designated period, as annually announced by the Examination Board.

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

18.5 If the outcome of the thesis examination, including the defence, is negative, 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 has to finalize the work without further supervision nor financial support. The re-sit shall be taken within three months after the first attempt and will, in principle, be assessed by the same committee as for the first attempt. In special circumstances the examination can take place via videoconference.

18.6 The maximum recorded mark for a re-sit of the thesis examination is 6.0.

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 their mentor.

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:

SINGLE DEGREES:

- For the single UNESCO-IHE degree programmes:
 - Successfully completed all modules of the programme; and
 - Obtained a minimum of 106 ECTS.
- For the single UNESCO-IHE GPDP diploma:
 - Successfully obtained a minimum of 20 ECTS for the programme.

JOINT DEGREES:

- For the joint degree Limnology and Wetland Management programme (LWM):
 - Successfully completed all modules of the programme, according to the grading rules of BOKU, Egerton University and UNESCO-IHE; and
 - Obtained a minimum of 120 ECTS.
- For the joint degree International Master of Science in Environmental Technology and Engineering programme (IMETE) (Erasmus Mundus programme):
 - Successfully completed all modules of the programme, according to the grading rules of Ghent University, Institute of Chemical Technology in Prague and UNESCO-IHE; and
 - Obtained a minimum of 120 ECTS.
- For the joint degree Environmental Technology for Sustainable Development (ETSuD) conducted with the Asian Institute of Technology (AIT):
 - Obtained a minimum of 48 AIT credits / 125 ECTS credits, and
 - Obtained a minimum cumulative GPA of 2,75 for courses taken at AIT, and
 - Passed all modules taken at UNESCO-IHE, and
 - Has obtained a grade 'fair' or higher for their Master's thesis at AIT.
- For the joint degree Urban Water Engineering and Management (UWEM) conducted with the Asian Institute of Technology (AIT):
 - Obtained a minimum of 48 AIT credits / 120 ECTS credits, and
 - Obtained a minimum cumulative GPA of 2,75 for courses taken at AIT, and
 - Passed all modules taken at UNESCO-IHE, and
 - Has obtained a grade 'fair' or higher for their Master's thesis at AIT.

DOUBLE / MULTIPLE DEGREES:

- For the double degree programme Land and Water development conducted with the Asian Institute of Technology (AIT):
 - Obtained a minimum of 48 AIT credits / 120 ECTS credits, and
 - Obtained a minimum cumulative GPA of 2,75 for courses taken at AIT, and
 - Passed all modules taken at UNESCO-IHE, and
 - Has obtained a grade 'fair' or higher for their Master's thesis at AIT.
- For the double degree programmes in Water Supply Engineering, Sanitary Engineering, and Environmental Science and Technology conducted with Universidad del Valle:
 - Obtained a GPA of 3.5 or higher for the course work done at Univalle; and
 - Successfully completed all modules at UNESCO-IHE; and
 - Achieved a mark '6' or higher for the thesis examination; and
 - Obtained a minimum of 113,36 ECTS.

- For the double degree programmes in Water Supply Engineering, and Sanitary Engineering conducted with KNUST:
 - Obtained a CWA of 55% or higher for the course work done at KNUST; and
 - Successfully completed all modules at UNESCO-IHE; and
 - Achieved a pass for the thesis examination at KNUST; and
 - Obtained a minimum of 118 ECTS.

- For the double degree programme Land and Water development conducted with the University of Nebraska-Lincoln:
 - Successfully completed all modules of the programme; and
 - Obtained a minimum of 112 ECTS.

- For the double degree programme River basin development conducted with the University of Kuala Lumpur:
 - Successfully completed all modules of the programme; and
 - Obtained a minimum of 108.7 ECTS.

DOUBLE / MULTIPLE DEGREES (Erasmus Mundus programmes):

- For the multiple degree programme on Flood Risk Management:
 - Successfully completed all modules of the programme, according to the grading rules of TU-Dresden, University of Ljubljana, TU-Catalonia and UNESCO-IHE; and
 - Obtained a minimum of 120 ECTS.

 - For the double degree programme Water Co-operation and Peace conducted with the University of Peace and University of Oregon:
 - Successfully completed all modules of the programme, according to the grading rules of UPEACE, University of Oregon, and UNESCO-IHE; and
 - Obtained a minimum of 120 ECTS.

 - For the multiple degree programme in Groundwatch:
 - Successfully completed all modules of the programme, according to the grading rules of the University of Lisbon, Technical University Dresden, and UNESCO-IHE; and
 - Obtained a minimum of 120 ECTS.
- 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 at the next scheduled degree awarding ceremony. The degree is signed by the Chairman of the Examination Board, the Rector of the Institute and the Academic Registrar. In addition to the degree certificate, the graduate receives a degree supplement stating the results achieved and credit points 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 result achieved and credit points 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 re-registers within 4 years after termination and meets (after assessment(s)) the requirements of an MSc degree, 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 in full all failed and missed modules. Re-registration is only possible for a subsequent academic period.
- 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, 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 the programme will be awarded a Postgraduate Professional Diploma in Sanitation and Sanitary Engineering.
The diploma is signed by the Rector of the Institute, the Chair of the Examination Board and the Academic Registrar. In addition to this diploma the graduate receives a diploma supplement stating the learning objectives, the composition of the programme, the results achieved and the associated credit points.
- 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 The Master of Science degree can be awarded with distinction by the Examination Board if:

For single degree programmes:

- the candidate obtained a mark of 8.5 or higher for the thesis examination, and

- an arithmetic average mark at UNESCO-IHE of 8.0 or higher for all modules that are assessed on a numerical scale, conform article 14.1,
- there were no re-assessments during the taught part, and
 - a recommendation is made by the chair of the examination committee.

For double / multiple degree programmes where student sits for the thesis examination at UNESCO-IHE:

- the candidate obtained a mark of 8.5 or higher for the thesis examination, and
- an arithmetic average mark at UNESCO-IHE of 8.0 or higher for all modules that are assessed on a numerical scale, conform article 14.1.
- a recommendation is made by the chair of the examination committee.

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

For double / multiple degree programmes where student sits for the thesis examination at a partner institute:

- the candidate obtained an arithmetic average mark at UNESCO-IHE of 8.0 or higher for all modules that are assessed on a numerical scale, conform article 14.1.
- a recommendation is made by the professor responsible for the specialization concerned.

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

8 Appeals

Article 22 Grounds for appeal

- 22.1 Students have the right to appeal against an assessment result, if
- the performance of the student suffered through illness or other factors;
 - a material administrative error in the conduct of an assessment occurred;
 - the assessment or evaluation was not conducted in accordance with the regulations;
 - some other material irregularity occurred;
 - there is a serious unsolved conflict with the supervisor or the mentor.

Article 23 Procedure for appeal

- 23.1 A student shall first attempt to resolve the problem with the body or person that has taken the disputed decision.
- 23.2 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.
- 23.3 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.
- 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.

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 2016 – 2018. Approved by the Rectorate of UNESCO-IHE on 19-07-2016

Annex 13: MSc Rubric MSc thesis examination

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.	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.	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.	Generally lacks some coherence; may be poorly referenced, but includes at least some points relevant to the research. Aims and objectives no more than adequate.	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

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 maps, diagrams etc.	Appropriate actions and methods identified and detailed. Where appropriate, setting of research well described with relevant maps etc	Methodology generally sound but with some lapses in detail of methods, and/or proposed analysis. 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. Maps may be absent or poorly produced.	Methodology vague and poorly detailed. No obvious understanding of methodology relevant to research theme. Maps etc may be poorly produced or absent.
	Results	These are well analysed and presented with clarity, with clear and comprehensive relationship to 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 obvious flaws in analysis, but the general essence of the key findings conveyed.	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 be some repetition with the results section.	Largely a repetition of the results section, with minimal context to wider understanding and relevant literature.	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 and communication	Writing elegant and succinct. Uses precise language and correct terminology throughout. Figs and tables well laid out to a publishable quality with accurate and succinct legends.	A clear and well-written report that is technically proficient.	A generally well-written report that is understandable. Uses appropriate terminology. Occasional spelling or grammatical errors. Presentation generally neat	Language generally clear and uses correct terminology, but with some misunderstandings and lapses in grammar or spelling. Presentation and use of tables and figures may be sloppy.	Sentences and/or paragraphs poorly constructed. Language inexact or ambiguous. Contains numerous 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.

Annex 14: Overview WMG theses of the 2016-2018 cohort (up to May 2018)

#	Gender	Student name	Country	Thesis title
1	Mr	Biar Biar	South Sudan	Gender and Sustainable access to safe sanitation: How do gender power relations, labour, and shame influence participation of women in CLTS in Aweil, South Sudan?
2	Mr	Mosese Nariva	Fiji	Assessment on the impact of anthropogenic activity on water quality and ecosystem services: a case study of Laucala Bay.
3	Ms	Devina Bol	Belize	Effects of seasons on macroinvertebrates assemblage structure in streams of Belize: a case study of Maya Mountain arine Corridor
4	Mr	Muneeb Tariq	Pakistan	Evaluating reservoir operation strategy for securing water allocation in Indus Basin, Pakistan: Case Study of Tarbela Dam.
5	Mr	Luis Miguel Silva Novoa Sánchez	Peru	Understanding water infrastructure and its constitutive role in configuring social dynamics in small towns A case study in Moamba, Mozambique.
6	Mr	Ramkrishna Paul	India	Water governance in small towns at the rural-urban intersection: the case of Bushenyi-Ishaka, Uganda.
7	Mr	Julius Omuut	Uganda	The impact of infrastructure development on water supply services and viability of small towns: a case study of National Water and Sewerage Corporation (NWSC) Bushenyi and Kitgum operational Areas.
8	Ms	Lungile Senteni Sifundza	Swaziland	Evaluating the science-policy-practice interface to support drought management: A case of the Komati catchment in Southern Africa.
9	Mr	Isaac Barnes	Ghana	Serving the poor through pro-poor units: A case study in two Kenya Utilities.
10	Ms	Imelda Kavuu	Papua New Guinea	Donor influence of water utilities implementation of pro-poor strategies: case study of Nakuru and Kisumu, Kenya.
11	Mr	Abdi Muleta	Ethiopia	Pro-poor intervention programs and their influence on financial sustainability of pro-poor projects: study of two Kenyan water utilities.
12	Ms	Rachele Andreetta	Italy	Impact of climate change on groundwater recharge in the Great Maputo Aquifer, Mozambique
13	Mr	Cristo Perez Ceron	Colombia	Analysing groundwater resources management during droughts
14	Mr	Muhammed Abubakar	Ghana	Potential contribution of alternative water supply systems to urban water security: Case studies of New Achimota and Nima, Accra, Ghana.
15	Mr	Richmond Quansah	Ghana	Assessment of the potential contribution of alternative water supply systems to urban water security in Surabaya, Indonesia Case study: Sukomanunggal district.
16	Ms	Leslie Ford	USA	Zika in paradise: A crisis of water governance. An environmental history of San Andrés Island, Colombia.
17	Ms	Angela Bayona Valderrama	Colombia	Dengue, water and households: Habits and habitats for <i>Aedes aegypti</i> in Maputo City.

#	Gender	Student name	Country	Thesis title
18	Ms	Dina Failasufa	Indonesia	Analysis of irrigation water management for tail end farmers in large scale irrigation schemes in Indonesia. A case study of Citarum river basin West Java, Indonesia.
19	Mr	Bishal Dahal	Nepal	Mapping irrigation performance and contributing factors using remote sensing and field surveys: Case study of Tungabhadra irrigation project, Karnataka, India.
20	Mr	Landing Bojang	Gambia	Understanding water scarcity and vulnerability dynamics in the Sahel Region.
21	Mr	Ivan Siburian	Indonesia	Drought monitoring and assessment for agricultural area using remote sensing and hydrometeorological indices in West-Java, Indonesia: Case study of Citarum River Basin.
22	Mr	Mwangala Mwasaha	Kenya	Assessment of recent conflicts in a water scarce and socially fragile environment: The case study of Tana River Delta in Kenya.
23	Ms	Tanyaradzwa Mawoyo	Zimbabwe	A participatory design approach to irrigation systems for individual smallholder farmers using alluvial groundwater. A case of the semi-arid Mzingwane catchment, Zimbabwe
24	Ms	Juliet Nakanjako	Uganda	Water safety plans in Uganda: Enabling factors and barriers to scaling up in the Northern and Western regions.
25	Ms	Edna Tetteh	Ghana	Assessment of legal regulatory and enforcement instruments to combat small scale illegal mining to prevent pollution of rivers in Ashanti region, Ghana.
26	Mr	Hilmer Bosch	NL	Access to and ownership of water in Anglophone Africa: a case study of South Africa.
27	Mr	Armando Chitika Holguín	Mexico	Legal pluralism: Considering water ownership in Latin America, a case study of Chihuahua, Mexico.
28	Ms	Erin Dondru Patrice Jordan	Barbados	Effects of carbon dioxide concentration on ammonium oxidation and algal growth in an algal-bacterial bioreactor.

Annex 15 Journal papers co-authored by WMG Students based on MSc thesis

research Papers published in peer-review journals between 2011 and May 2018

Student name	Year of graduation	Reference
Alda-Vidal, C.	2014	Alda-Vidal, C. , Rusca, M., Zwarteveen, M., Schwartz, K., & Pouw, N. (2017). Occupational genders and gendered occupations: The case of water provisioning in Maputo, Mozambique. <i>Gender, Place and Culture</i> , 24(7), 974-990. https://doi.org/10.1080/0966369X.2017.1339019
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