

Environmental Science

**UNESCO-IHE
Institute for Water Education**

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Contents

Report on the MSc programme Environmental Science of the UNESCO-IHE Institute for Water Education Delft 5

Administrative data regarding the programme	5
Administrative data regarding the institution.....	5
Quantitative data regarding the programme	5
Composition of the assessment committee	6
Working method of the assessment committee	6
Summary judgement regarding the quality of the MSc programme Environmental Science	9
Description of the standards from the Assessment Framework for Limited Programme Assessments	14
Committee's judgement regarding the quality of the joint degree programmes.....	32
International Masters in Environmental Technology and Engineering IMETE	32
Limnology and Wetland Management LWM	36
Environmental Technologies for Sustainable Development ETSuD	39

Appendices 43

Appendix 1: Curricula vitae of the members of the assessment committee	45
Appendix 2: Site visit programme	47
Appendix 3: Domain-specific framework	51
Appendix 4: Intended learning outcomes	53
Appendix 5: Final qualifications according to Dublin descriptors	59
Appendix 6: Overview of the curriculum of the programme.....	61
Appendix 7: Quantitative data regarding the programme.....	63
Appendix 8: Documents studied by the committee during the visit.....	65
Appendix 9: Programme structure IMETE.....	67
Appendix 10: Programme structure LWM.....	69
Appendix 11: Programme structure ETSuD	71
Appendix 12: Declarations of independence	73
Appendix 13: List of abbreviations	77

This report was finalised on 11 December 2012

Report on the MSc Programme Environmental Science of the UNESCO-IHE Institute for Water Education, Delft

This report takes the NVAO's Assessment Framework for Limited Programme Assessments as a guiding document.

Administrative data regarding the programme

MSc programme Environmental Science

Name of the programme:	Environmental Science Environmental Science
CROHO number:	75007
Level of the programme:	master of science
Orientation of the programme:	academic
Number of credits:	106-125 EC
Specialisations or tracks:	The programme offers the following specialisations: <ul style="list-style-type: none">• Environmental Science and Technology, Delft (106 EC);• Environmental Planning and Management, Delft (106 EC);• Water Quality Management, Delft (106 EC);• Limnology and Wetland Ecosystems (joint degree application) (106 EC);• Environmental Technology and Engineering (joint degree application) (120 EC);• Environmental Technology for Sustainable Development (joint degree application) (125 EC).
Location(s):	Delft (in cooperation with other institutes as indicated per specialisation)
Mode(s) of study:	full-time
Expiration of accreditation:	31-12-2013

The visit of the assessment committee to the UNESCO-IHE Institute for Water Education took place on 17-19 September 2012.

Administrative data regarding the institution

Name of the institution:	UNESCO-IHE Institute for Water Education
Status of the institution:	(partly) publicly funded institution
Result institutional assessment:	pending

Quantitative data regarding the programme

The required quantitative data regarding the programme are included in Appendix 7.

Composition of the assessment committee

The committee that assessed the MSc programme Environmental Science consisted of:

- Prof. dr. André van der Beken (chair), emeritus professor, Free University Brussels (Vrije Universiteit Brussel);
- Prof. Ing. Janos Bogardi, professor in Water Resources at the Faculty of Agriculture of the University of Bonn, Germany;
- Academician Dipak Gyawali, professor at the Nepal Academy of Science and Technology (NAST);
- Prof. dr. Rivka Kfir, extraordinary professor Microbiology and Plant Pathology and senior advisor at the Water Institute, University of Pretoria, South Africa;
- Prof. dr. Grietje Zeeman, professor in New Sanitation at Wageningen University and Research Centre (WUR);
- Franca Kramer BSc, master student of Water Management at Delft University of Technology.

Appendix 1 contains the CV's of the members of the committee.

The committee was supported by Adrienne Wieldraaijer-Huijzer M.A., QANU staff member and project leader, and by Dr. Marianne van der Weiden who acted as the committee's secretary.

All members of the committee and the secretary signed a declaration of independence as required by the NVAO protocol to ensure that the committee members assess without bias, personal preference or personal interest, and the judgement is made without undue influence from the institute, the programme or other stakeholders (see Appendix 12).

Working method of the assessment committee

Preparations for the site visit

Upon receiving the critical reflection of the MSc programme Environmental Science on 29 June 2012, QANU checked the critical reflection to ensure that it could serve as the key document informing the assessment. Additional information was requested by QANU concerning the joint degrees and a revised version, received on 16 July 2012, was found to fulfill the criteria of relevance and completeness. Copies of the critical reflection were sent to the members of the assessment committee.

In addition to the critical reflection, the committee received ten recent student's theses from the Environmental Science programme. This was done based on a pre-selection of the ten from the list of theses in the critical reflection. The theses evaluated by the committee covered the full range of marks: included in the sample were theses with a low mark (6.0-6.9), with an intermediate mark (7.0-8.4) and with a high mark (8.5-10). The committee members used QANU's checklist for the assessment of theses to ensure that their assessments were comparable and covered the relevant aspects.

Prior to the site visit, the project leader met with representatives of the UNESCO-IHE Institute and agreed on the programme for the site visit and the associated practical

arrangements. The programme included consultations with staff members and students and both groups were informed about the opportunity to speak to the committee confidentially during the visit.

The site visit

The site visit took place on 17, 18 and 19 September 2012. The detailed programme of the site visit is presented in Appendix 2. It started with a preparatory meeting, in which the committee members discussed the critical reflections and the theses they had received prior to the site visit. The committee also discussed and agreed on the questions and issues to be discussed during the interviews with representatives of the programme, students and other stakeholders.

The committee conducted interviews with the management of the institute, students, lecturers, alumni, members of the Programme Committee (the equivalent of the Education Committee), the Examination Board, the student counsellor and the alumni officer. In addition, the members of the committee studied supplementary materials made available by the programme management. An overview of this documentation is given in Appendix 8.

The site visit was extended by half a day to allow for the assessment of the proposed joint degree programmes. The committee studied additional documents that were made available by the programme management, relating to the structure of the joint degree programmes and their management, the cooperation agreements, joint exam regulations and detailed module and course descriptions. Interviews with the partner institutes were arranged through Skype and telephone conferencing. In its deliberations the committee paid separate attention to the assessment of the joint degrees.

The committee conducted a concluding interview with the management, followed by an internal committee meeting. During this meeting the committee discussed its findings, formulated its conclusions and gave its assessment of the standards of the assessment framework. Finally, the chairman of the committee presented the committee's preliminary findings to staff and students of the institute.

After the site visit

Following the site visit, the committee secretary composed a draft report. Thereafter, the report was studied by all committee members who provided further comments and insights to the secretary. The secretary processed all corrections, remarks and suggestions for improvement provided by the committee members to finalise the preliminary report which was submitted to QANU. QANU's secretariat sent this version to the UNESCO-IHE Institute, inviting them to check it for factual errors, inaccuracies and inconsistencies. The secretary forwarded the comments and suggestions provided by the Institute to the chairman of the committee, and, where necessary, to the other committee members. The committee decided whether the comments and suggestions were to be incorporated in the report or ignored. On the basis of the committee's decisions, the secretary compiled the final version of the programme report.

Explanation of the definitions used for the assessment

In accordance with the NVAO's Assessment Framework for Limited Programme Assessments, the committee used the following definitions for the assessment of both the standards and the programme as a whole.

Generic quality

The quality that can reasonably be expected in an international perspective from a higher education bachelor's or master's programme.

Unsatisfactory

The programme does not meet the current generic quality standards and shows serious shortcomings in several areas.

Satisfactory

The programme meets the current generic quality standards and shows an acceptable level across its entire spectrum.

Good

The programme systematically surpasses the current generic quality standards across its entire spectrum.

Excellent

The programme systematically surpasses the current generic quality standards well across its entire spectrum and is regarded as an (inter) national example.

The default assessment is 'satisfactory', i.e. the programme complies adequately with the criteria.

Summary judgement regarding the quality of the MSc programme Environmental Science

The judgement of the assessment committee is based on information provided in the critical reflection, the sample of theses, additional documentation provided during the site visit and interviews conducted with staff, students and graduates of the programme. During its assessment, the committee noted positive aspects as well as ones which could be improved. Taking these aspects into consideration, the committee decided that the programme in Environmental Science **fulfills the requirements** set by the NVAO for accreditation.

Standard 1: Intended learning outcomes

UNESCO-IHE is a development oriented institute of higher education and the MSc Environmental Science is one of the four MSc programmes offered to mid-career professionals from around the world. Environmental Science offers six specialisations, four of them in cooperation with international partner institutes: Environmental Science and Technology (EST); Environmental Planning and Management (EPM); Water Quality Management (WQM); Limnology and Wetland Ecosystems (LWE); Environmental Technology and Engineering (IMETE); Environmental Technology for Sustainable Development (ETSuD).

The programme aims to deliver graduates who are able to use their knowledge of physical, chemical and biological processes in order to develop and implement solutions for environmental problems. For the latter the graduates also need knowledge of social, economic, legal and management processes, and skills that enable them to work in multidisciplinary teams. While the name of the master programme Environmental Science covers a broad area, it is clear to partner institutes and prospective students that at UNESCO-IHE, being an institute for water education, the focus is on water issues. In the double degree programmes, UNESCO-IHE uses the cooperation with partner institutes to cover the broader range of environmental science.

The programme's learning objectives specify the acquirement of scientific knowledge and understanding of natural processes of the environment and the socio-economic concepts underlying its exploitation, the application of this knowledge in interdisciplinary contexts, the ability to conduct research on the basis of a good research plan and appropriate methodologies, and the skills to communicate the results of research to colleagues and stakeholders orally and in written reports. The final qualifications show a good balance between applied and academic science. The character of the programme is considered most appropriate for a field such as Environmental Science. The committee therefore assesses the first standard as **satisfactory**.

Standard 2: Teaching-learning environment

The Delft-based curriculum consists of 106 ECTS and runs over 18 months. It has four distinct phases: a common foundation, specialisation, writing a research proposal and the MSc research project. The committee supports the initiative of the Programme Committee to pay extra attention to the development of academic skills in the curriculum. This is essential not only to prepare the students for their assignments and master thesis, but an assessment of these skills will also identify the students who need extra guidance and tutoring.

The programme has used the T-shape model in designing the curriculum. In this model the vertical bar of the letter T represents the in-depth knowledge of the main discipline and the horizontal bar reflects the basic knowledge of adjacent disciplines. The T-shape model

approach was welcomed by the students. They appreciate the design of the programme in first broadening their scope and then focusing again. They praised especially the combination of theory and application and found the balance between breadth and depth to be just right.

The double degree programmes are neatly combined with the specialisation modules of the Delft programme and add a specific regional focus and/or a thematic broadening. The committee concludes that these double degree programmes are a worthwhile addition and that the programme staff ensures that their contents and level are of the same quality as the single degree programme. The committee has looked separately at the three double degrees that are proposed to become joint degrees and will formulate its assessment at the end of the summary judgment of the MSc Environmental Science.

The didactical concept is well-considered. In the beginning of the programme, the emphasis is on lectures, assignments, laboratory sessions and self-study. During the specialisation phase fieldwork, group discussions, role-playing and presentations are added to broaden the students' perspective. The learning objectives are described in clear module sheets. Each module uses a variety of teaching and assessment methods, depending on the goal of the course. Lectures are given by UNESCO-IHE staff and by guest lecturers who provide additional theoretical expertise and examples from the professional field. The students appreciate the input of guest lecturers.

Students find the study load demanding. A large volume of material has to be covered over 18 months, and many students have been out of the classroom for many years. Furthermore, the work on the research project is difficult for many students because only few of them have a research background. The guidance and supervision during the research phase are intensive to provide the students with the necessary support. Two double degrees with partner institutes have a longer duration, ranging from 120 (IME/TE) to 125 (ETSuD) EC, indicating a possible need for a study period longer than 18 months.

The academic staff is well-qualified academically and professionally, and has good teaching skills. They are also highly committed. Their international background and experience fit the scope of the programme and the contexts of the students. For additional input guest lecturers are called upon. The Student Office offers non-academic support in a proactive manner and well-coordinated with the academic support by the Programme Coordinator and the Specialisation Coordinator. The committee recommends to establish for each incoming student a 'portfolio' with his/her initial motivation and career plan, which should be discussed and updated as needed, preferably with a personal mentor from the start.

The committee recognises the often intricate selection of the right candidates with the correct background. It recommends therefore to explore the possibilities for on-line preparation and self-learning opportunities through the e-Campus development. The committee acknowledges the effort to balance the appropriate level of the curriculum and its necessary flexibility within the constraints of the duration of the programme. The committee suggests to look into the possibility of offering a programme of 120 EC for all students and granting credits to incoming students with professional experience, comparable with an internship of 6 months.

The curriculum clearly reflects the T-shaped concept. The group work approach is a useful way to prepare future environmental scientists to face real-life interdisciplinary problems. This approach as well as most of the curriculum allow for good interaction among students. An international exposure is given in field trips and site visits. The institute has well-staffed

specific services and good facilities. The committee therefore assesses the second standard as **satisfactory**.

Standard 3: Assessment and achieved learning outcomes

The committee established that the assessment system of the UNESCO-IHE functions well. Good control mechanisms ensure that work is systematically and consistently graded. The committee further found the variety of assessment methods to be appropriate. The examination structure has clearly been tailored to the intended learning outcomes of the programme. The assessments are transparent, valid and reliable.

The committee studied a representative sample of the Environmental Science theses. In most cases the committee agreed with the mark given by the thesis committees, but in a number of cases the committee would have given a slightly lower mark. The committee suggests to include an examiner, fully external to the Institute, in all thesis committees. All theses met the minimum requirements for academic quality and some were at a higher level. On this basis the committee concludes that the MSc Environmental Science graduates have achieved the intended learning outcomes of an academic master. The positive effect of the master programme was confirmed by the alumni with whom the committee met. The committee therefore assesses the third standard as **satisfactory**.

The committee assesses the standards from the assessment framework for limited programme assessments in the following way:

Standard 1: Intended learning outcomes	satisfactory
Standard 2: Teaching-learning environment	satisfactory
Standard 3: Assessment and achieved learning outcomes	satisfactory
General conclusion	satisfactory

Assessment of the joint degree programmes

In addition to the assessment of the MSc Environmental Science the committee has assessed three specialisations for which UNESCO-IHE intends to request accreditation as a joint degree.

The International Masters in Environmental Technology and Engineering (IMETE) is a 24 months Erasmus Mundus programme, offered jointly with ICT Prague and the University of Ghent. Limnology and Wetland Management (LWM) is an 18-months programme, offered in partnership with BOKU (University of Natural Resources and Life Sciences, Vienna, Austria) and Egerton University (Njoro, Kenya). Environmental Technologies for Sustainable Development (ETSuD) is a 22-months joint programme with AIT, Bangkok, Thailand.

The learning objectives of all three programmes include those of the MSc Environmental Science. They have been extended with a limited number of learning objectives to address the specific focus of the joint programme. The programmes are complementary to the water focus of UNESCO-IHE: the partner institutes of IMETE and ETSuD expand the curriculum to include other elements, such as air, soil and hazardous waste. The level of the intended learning outcomes, the attention to academic skills and the incorporation of an independent research project, making up 25% (IMETE, ETSuD) to 33% (LWM) of the programme, assured the committee that standard 1 can be assessed as **satisfactory**.

The joint programmes are well-structured and make intelligent use of the modules that are already available at the institutes. The Joint Management Committees for each programme have developed a combination of modules that guide the students in a logical way to the level that is required to prepare a research proposal in a certain specialisation. The students conduct the research under supervision of a professor of one of the partner institutes. There are clear module sheets for all components of the joint programmes. The cooperation between the partner institutes is often based on long-standing relationships and good understanding of each partner's educational programmes and research activities. The arrangements have been laid down in detailed cooperation agreements with equal responsibilities for each partner. This, however, makes the organisational structure rather heavy, and may lead to a loss of flexibility in adapting the programme to new needs. The committee noted that all staff members involved are aware of this risk and that they expect this to be mainly an issue at the start which will be 'ironed out' through learning by doing. IMETE and ETSuD had some teething problems in their first year. These were reflected in IMETE having issues related to balancing the workload over the semesters and for ETSuD in attracting a sufficient number of students. The programmes make use of the same staff and facilities as the MSc Environmental Science. In conclusion, the committee assesses standard 2 as **satisfactory**.

The committee studied the assessment system and the way the checks and balances have been worked out in the cooperation agreements. Not all three agreements describe the same in-depth regulations but the committee found them to be appropriate and trusts that they will be adapted for a smooth running of these joint degree programmes. The committee considers the quality (transparency, validity, reliability) of the assessments for the joint programmes at UNESCO-IHE to be in order, as these are the same or comparable to those assessed for the MSc Environmental Science. The partner institutes have quality control systems of their own, but the committee has not looked into them in detail. The committee is satisfied with the explicit regulations set for the marking of the thesis and for the award of the degree by all partner institutes who have to mutually agree to the decision. A sample of LWI theses were found to be of the required level and were marked appropriately. For IMETE and ETSuD no theses were as yet available. On the basis of the explicit IMETE and ETSuD exam regulations and the positive assessment of the assessment system of Environmental Science the committee expects that the final qualifications will be achieved. The committee assesses this standard as **satisfactory**.

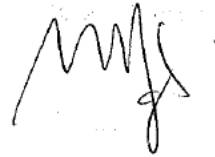
In conclusion, the committee assesses the three proposed joint degree programmes as **satisfactory**.

The chair and the secretary of the committee hereby declare that all members of the committee have studied this report and that they agree with the judgements laid down in the report. They confirm that the assessment has been conducted in accordance with the demands relating to independence.

Date: 11 December 2012



Prof. dr. André van der Beken



Dr. Marianne van der Weiden

Description of the standards from the Assessment Framework for Limited Programme Assessments

Structure and mission of the institute

The UNESCO-IHE Institute for Water Education was established jointly by UNESCO and the Government of the Netherlands in 2003 as a UNESCO ‘category I’ institute. The Institute carries out research, education and capacity building activities in the fields of water, environment and infrastructure. UNESCO-IHE continues the work that began in 1957 when IHE first offered a postgraduate diploma course in Hydraulic Engineering to practising professionals from developing countries.

UNESCO-IHE 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 UNESCO-IHE is involved in its own research and education on the Delft premises, it is also instrumental in strengthening the efforts of other universities and research centres throughout the world, which increase the knowledge and skills of professionals working in their respective water sectors.

UNESCO-IHE offers four MSc programmes, partly with international partner institutes:

- MSc Water Management
- MSc Municipal Water and Infrastructure
 - Including double degree programmes with KNUST, Ghana; UniValle, Colombia; AIT, Thailand*
- MSc Water Science and Engineering
 - Including double degree programmes with UniValle, Colombia; Ain Shams University, Egypt; Haramaya University, Ethiopia; AIT, Thailand; Sriwijaja University, Indonesia; Technical University Dresden, Germany, Barcelona Tech, Spain and University of Ljubljana, Slovenia (Erasmus Mundus); University of Algarve, Portugal, University of Lodz, Poland and University of Kiel, Germany (Erasmus Mundus)
 - Including specialisations together with Hohai University, China
- MSc Environmental Science
 - Including double degree programmes with AIT, Thailand*; UniValle, Colombia; ICT Prague and University of Ghent, Belgium (Erasmus Mundus)*; BOKU, Austria and Egerton, Kenya*

* UNESCO-IHE intends to change four double degrees into joint degrees.

Characteristic for the institute is its combination of applied research and advisory work, its multidisciplinary and international staff and its teaching programmes for an international student body.

Standard 1: Intended learning outcomes

The intended learning outcomes of the programme have been concretised with regard to content, level and orientation; they meet international requirements.

Explanation:

As for level and orientation (bachelor's or master's; professional or academic), the intended learning outcomes fit into the Dutch qualifications framework. In addition, they tie in with the international perspective of the requirements currently set by the professional field and the discipline with regard to the contents of the programme.

1.1. Findings

This section deals with the mission of the programme (§1.1.1.), the domain-specific framework of the field of environmental science (§1.1.2.), the educational objectives (§1.1.3.), the level (§1.1.4.) and benchmarking of the programme (§1.1.5.).

1.1.1 Mission of the programme

The critical reflection states that the need for sustainable development is now widely acknowledged. The programme in Environmental Science aims to contribute to this need by providing graduates with the knowledge and skills to contribute, directly or indirectly, to the conservation and wise-use of natural resources for the benefit of society. Successful participants will have scientific and technical skills to analyse and assess environmental systems and problems, to propose sustainable solutions and to contribute to relevant policies and strategies. The knowledge acquired by the graduates will provide them with competence and tools to conduct critical evaluations and develop appropriate solutions to critical environmental challenges. The programme targets mid-career professionals, who have at least three years of working experience as university lecturers, employees of (local) governments, staff of non-governmental organisations and private sector employees.

1.1.2 Domain-specific framework

The academic field of Environmental Science is described in the critical reflection as the science of the interactions between the physical, chemical, and biological components of the environment. Environmental Science is thus characterised by its use of knowledge from a diverse range of scientific disciplines. It is inherently interdisciplinary linking strongly with social and political structures. An understanding of the Environmental Science field enables the development of solutions for environmental problems, an appreciation of the feasibility and uncertainty of natural resource management. It also provides for the understanding of the social, economic and political context which may put pressure on the environment. See Appendix 3 for an overview, taken from the critical reflection.

1.1.3 Educational objectives of the programme

The aim of the programme is to educate the students and provide them with the knowledge, insight and skills that are required to practice independently as professionals within the field of environmental science and to be appropriate candidates for further study towards a research career.

After successful completion of programme, graduates will be able:

Knowledge and theory

1. to demonstrate knowledge and understanding of the physical, chemical and biological processes of the environment, of the socio-economic concepts underlying the functioning

- and exploitation of environmental systems, and of the complex inter-relationship between the protection and wise use of environmental resources;
2. to describe the rationale for an integrated and interdisciplinary approach for the sustainable management of water and environmental resources;

Methods, techniques and tools

3. to design, optimise and interpret environmental monitoring and assessment schemes (including statistics and modelling) in order to gain an understanding of problems, trends, causes and effects;

Analysis, synthesis and integration

4. to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of environmental problems, under different socio-economic, cultural and legal contexts, and under often data-poor conditions;

Research/General academic skills

5. to conduct research, independently or in a multidisciplinary team, including the formulation of research questions and hypotheses, the selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations;
6. to communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences;
7. to demonstrate academic attitude and learning skills (including thinking in multidisciplinary dimensions and distinguishing main issues from minor ones), to enhance and keep up-to-date the acquired knowledge and application skills in a largely independent manner.

In an annex to the critical reflection these general learning objectives have been specified for the six specialisations in detailed and concrete learning outcomes. See appendix 4 for an overview.

1.1.4 Level

The critical reflection states that the programme is designed to meet the Level 7 descriptors of the European Qualification Framework (Dublin descriptors). This provides for highly specialised knowledge as the basis for original thinking and/or research, critical awareness of knowledge issues in a field and at the interface between different fields; specialised problem-solving skills in order to develop new knowledge and procedures and to integrate knowledge from different fields; and competencies to apply knowledge to address unpredictable problems, and for taking responsibility for contributing to professional knowledge. In Appendix 5 the final qualifications have been related to the Dublin descriptors. The committee finds this a helpful overview that indicates not only the general qualifications but also those that are specific for certain specialisations.

The MSc programme in Environmental Science comprises a range of linked modules, culminating in a period of independent academic research. Students are trained in solving problems at an academic level and are provided with the competence required to conduct independent academic research. The above forms an essential element of the programme; this is also reflected in the final qualifications of the programme and the intended learning outcomes. The six-month MSc research phase is preceded by a course in research methodology and MSc research proposal development, and finished with an MSc thesis that

is defended in public in front of a committee which includes at least one external examiner who is generally an expert in the specific topic from a university or a professional organisation. In most cases the MSc research is related to on-going research projects that include PhD or post-doctoral studies or other projects at top-level research institutes or engineering consultancies.

1.1.5 Benchmarking

The current programme is based on the benchmark study carried out by a group of experts from academia and professional practice. The programme's learning outcomes are comparable to those of other MSc programmes in Environmental Science. These include the Vrije Universiteit Amsterdam, Open University, Wageningen University, University of Edinburgh and University of London Queen Mary's College. On the other hand, the focus on water issues and on developing countries makes the Environmental Science at UNESCO-IHE different from most comparable Environmental Science programmes. In addition, the UNESCO-IHE programme has a specific mandate to train mid-career water professionals from all over the world, including from emerging and least developed countries. UNESCO-IHE therefore takes into account and assesses the work experience of applicants in the admission procedure.

The committee inquired during discussions with students and with members of the Programme Committee why the focus on water aspects is not reflected in the title of the programme. The current title suggests a much broader content, while air, soil or climate change do not explicitly form part of the programme. The students are well-informed regarding the scope of the programme and that it covers a broad spectrum of issues, but mostly focused on water. They experience it as an integrated programme, including the broader environmental aspects that relate to water, i.e. interactions between water and other components of the environment. The staff indicated that it is clear to all involved that in an 18-months programme a selection of topics is necessary and that Environmental Science cannot cover the whole field. They are certain that to prospective students the context of UNESCO-IHE and its mission in water education are clear from all materials issued by UNESCO-IHE and that they, therefore, know what to expect. Air and soil are given attention in the programme in an introductory way and are also discussed in the modules on environmental planning and policy making. Next year a new elective module will be offered on climate change and its relationships and implications regarding water. The critical reflection states that in response to the comments of the previous assessment committee the educational offering of the programme has been broadened by new cooperation arrangements. Such arrangements include the cooperation with AIT, Thailand, where UNESCO-IHE focuses on water and AIT on air and soil. The second one is the cooperation in the IMETE programme where, in addition to water pollution, the contamination and remediation of solid waste and polluted soils, sediments and gases are addressed.

1.2 Considerations

The committee fully agrees with the mission of the programme. The programme is an interdisciplinary programme that combines the natural (physics, biology, chemistry) and social sciences. It specifically addresses the required political structures for the development and implementation of sustainable environmental solutions.

In the national and international context the niche of the Environmental Science programme at UNESCO-IHE is evident. The emphasis on water aspects of environmental issues is a given because the programme is taught at UNESCO-IHE, and this is clear to (prospective)

students. The programme's focus on developing countries and mid-career professionals and the cooperation with partners in the global South distinguishes it from other programmes on environmental science. Based on the above, the committee concludes that both aspects can be seen as strengths of the Environmental Science programme.

The committee praises the programme management with the balance it has found between high academic standards and the applicability of the theoretical knowledge. The committee finds the final qualifications and learning objectives to be well-formulated. Both staff and students are well-informed regarding learning expectations for the programme in general and for its specialisations. The learning objectives reflect the appropriate master level and are recognisably formulated in terms of the Dublin descriptors. They show the necessary focus on analytical and research skills for an academic master's programme.

1.3 Conclusion

MSc programme Environmental Science: the committee assesses Standard 1 as **satisfactory**.

Standard 2: Teaching-learning environment

The curriculum, staff and programme-specific services and facilities enable the incoming students to achieve the intended learning outcomes.

Explanation:

The contents and structure of the curriculum enable the students to achieve the intended learning outcomes. The quality of the staff and of the programme-specific services and facilities is essential to that end. Curriculum, staff, services and facilities constitute a coherent teaching-learning environment for the students.

2.1 Findings

This section firstly covers the coherence and structure of the curriculum (§2.1.1.). Subsequent paragraphs discuss the didactical concept (§2.1.2.), study load (§2.1.3.) and the system of student guidance (§2.1.4.). Finally, the composition of the academic staff (§2.1.5.), the student body (§2.1.6.) and the facilities (§2.1.7.) are dealt with.

2.1.1 The curriculum

The curriculum is designed systematically: starting with knowledge and theory, then addressing methodology, techniques and tools, and through analysis, synthesis and integration finally reaching the research and general academic skills. The degree of difficulty and complexity increases with time, and the emphasis shifts from memorising to applying, integrating and, ultimately, synthesising new knowledge. This is visually illustrated in the tables as provided in the critical reflection which indicate the relationship between the learning objectives and the programme components: the shift to the more complex learning objectives is evident.

The programme offers six specialisations:

- Environmental Science and Technology (EST)
- Environmental Planning and Management (EPM)
- Water Quality Management (WQM)
- Limnology and Wetland Ecosystems (LWE)
- Environmental Technology and Engineering (IMETE)
- Environmental Technology for Sustainable Development (ETSuD)

Although all specialisations lead to the final qualifications as described in section 1 and, therefore, to the master degree Environmental Science, there are significant differences between them. EST students can follow the whole programme in Delft, but there is also a possibility to start at Universidad del Valle in Colombia and join the programme in Delft after the first three modules. In that case the students receive a double degree upon graduation. The modules offered abroad are the same as the ones offered at UNESCO-IHE, using largely the same course materials. EPM is a single degree, offered at UNESCO-IHE. WQM is a multidisciplinary specialisation offered together with the MSc programme Water Management. It leads to a UNESCO-IHE degree.

LWE, IMETE and ETSuD are double degrees, offered in collaboration with a number of international partners. LWE currently consists of five modules at UNESCO-IHE, four modules at Egerton University, Kenya, three modules plus the group work at BOKU University, Austria, and the final research project at one of the three participating institutions. It will be featured as a joint degree in slightly modified format under the name of LWM (Limnology and Wetland Management), see appendix 10. IMETE is an Erasmus Mundus programme with a duration of 24 months and a study load of 120 EC. It starts in Delft (four modules) and continues the taught part at ICT Prague, from February until September, and at

Ghent University, Belgium, in the third semester. The MSc thesis research can be done at each of these three institutes. ETSuD, finally, is given in cooperation with AIT, Thailand. It is a 20-months programme (120 EC) where students start at AIT in Bangkok with the foundation modules and join the Delft programme after the fourth module for the specialisation programme. For the work on their research proposal and research project students return to AIT.

UNESCO-IHE wishes to change the double degree status into that of a joint degree for the LWE, IMETE and ETSuD specialisations. The application for the accreditation of the joint degrees will be submitted to the NVAO with the re-accreditation request for the MSc Environmental Science. UNESCO-IHE has, therefore, requested the committee to assess these specialisations against the standards set for joint degrees. The committee's views regarding the above are presented under a separate section (pp. 31-42).

The programme in Delft follows a modular structure; the duration of each module is three weeks, with a study load of 5 EC. The learning objectives, content and didactical approach are described in the module sheets for each module for all the specialisations, including the modules offered abroad. The committee found these very helpful for the students. They also provide staff with a basis for assessing and improving coherence between the modules and for fine-tuning the curricula. The assessment committee found the learning materials and assignments well-designed and the literature provided up-to-date and of an appropriate level. This was based on an assessment of a selection of the Environmental Science modules carried out during the site visit. An overview of the curriculum structure is given in Appendix 6.

The programme has four distinct phases:

- common part of four modules for all specialisations
- specialisation part of eight modules specific for each specialisation
- preparation of the MSc proposal, followed by a defence
- research project and public defence

The critical reflection states that the common part is intended to facilitate a baseline of learning and knowledge across the incoming students who have very different backgrounds, i.e. different first degree, professional experience and geographical origin. In the first module students are introduced to general questions about the relationship between natural resources, human impact and the environment. The second and third module focus on understanding natural processes in the environment, the drivers of growth of populations and economies, exploitation and sustainability of natural resources, pollution and its risks for human health. In module 4 students are introduced to tools and procedures, such as data collection and analysis and modelling of human-environmental systems. These four modules are compulsory for all students except for those who start in Thailand or Colombia. Those students join the programme in Delft after the third module and start with the methods module. They follow the first foundation courses in the partner institute. The modules offered abroad are the same as the ones offered at UNESCO-IHE, using largely the same course materials.

The specialisation part consists of eight modules for students of EST, EPM, WQM and ETSuD. IMETE and LWE students leave for Prague and Kenya respectively at the start of the specialisation phase. Six of these modules are taught modules, some of which are obligatory while others are elective courses. Most specialisation modules are given as modules in more than one specialisation. The committee finds this is an efficient way for organising the curriculum. It also strengthens interactions between students from different

specialisations, thus contributing to the interdisciplinary nature of the programme. The seventh module is the international fieldtrip and fieldwork. The fieldwork is done in Limburg and studies the hydrology, chemistry, biology, soil composition and land use of and around the river Geul and its tributaries. This module is taken by students of all specialisations together, except for IMETE and LWE students who are, as mentioned above, abroad during this part of the programme to follow specialisation courses. An extensive fieldtrip and fieldwork are not part of their programmes. The eighth module is the group work module, where EST, EPM and WQM students work together to apply the learned knowledge, techniques and skills in a multidisciplinary approach to come up with an integrated solution for a series of environmental problems in the fictitious country Ecoland. ETSuD students have a group work module of their own. Each specialisation has its own study track with a fixed set of courses, but students are allowed to exchange modules after permission of the Programme Coordinator. This makes it possible to ensure a coherent programme with a maximum benefit for each individual student because students can avoid having to restudy topics they have already proven knowledge on.

The MSc proposal part is a six week period when students get practical information for their MSc research and will write, under the guidance of a mentor, a research proposal for their MSc thesis. This period is concluded with an oral presentation and defence of the MSc proposal.

During the final part of the curriculum students carry out their research on the basis of the approved proposal, write their thesis and defend it in public. After successful completion and defence students of EST, EPM, WQM and LWE are awarded the MSc degree in Environmental Science by UNESCO-IHE. Currently IMETE students are awarded two degrees: a joint degree from the University of Ghent and ICT Prague and the MSc degree in Environmental Science by UNESCO-IHE. Similarly, ETSuD students receive two degrees: one in Environmental Engineering and Management with specialisation in Environmental Technology and Management from AIT, and the MSc degree in Environmental Science from UNESCO-IHE. Under new regulations UNESCO-IHE intends to award joint degrees to LWE (to be renamed as LWM), IMETE and ETSuD graduates.

Discussion with students

The students with whom the committee met during the site visit were all very satisfied with their choice of Environmental Science. They praised especially the combination of theory and application and the way this works out in practice during the interdisciplinary fieldtrip and the group work. They also felt that the balance between breadth and depth is right. The choice of topics that are covered in the modules is appreciated. The lecturers are able to link the contents of the courses to the context in the developing countries, for example by including affordability and the natural circumstances of the tropics when discussing the best choice of water treatment. Sometimes the modules are very interesting and students would prefer them to go more in-depth, which is not possible in the time available. As an example they mentioned the module on Environmental Engineering. They, nevertheless, find such courses a good basis for further learning, for example by using it as a starting point during the thesis research work. The students appreciated the fact that modules are shared between specialisations and sometimes with other participants who follow the module as a short course. Especially the latter group usually consists of very experienced people from different countries who contribute a lot to the course. Sometimes the broad range of participants coming from different backgrounds is not easy for the lecturer to manage.

Improvement suggestions given by the students include the need for a stronger emphasis on Geo-information Systems (GIS) during the analytical module and the re-scheduling of the research methodology course prior to students commencing work on their research proposals. The students also reflected on the large variation in background among students. They observed that not all students have learned in their first degree programmes to write or quote correctly. Since this is a very important aspect especially in the research phase but also for assignments, they advise that this academic skill is addressed earlier in the curriculum. The IMETE programme was offered for the first time in 2011-2013 and initially experienced some teething problems. Last-minute changes were introduced. The integration of the curriculum parts in Delft, Prague and Ghent should be improved to remove overlaps and improve coordination. Students had to adjust to different methods and cultures and ways of teaching between the three partner institutions. This was felt to be both an advantage and a disadvantage. All in all, however, the IMETE programme and its joint degree were appreciated and the efforts of all institutes and people involved in the programme were recognised by the students.

Discussion with the Programme Committee

Some of the issues that were raised by the students were subsequently discussed with the Programme Committee, as this committee carries the overall responsibility for the academic quality, content and organisation of the Environmental Science programme. The Programme Committee consists of the Chair of the programme, the Programme Coordinator and a Deputy Programme Coordinator, Specialisation Professors and Coordinators, the MSc Coordinator, student representatives per cohort and a representative of the Education Bureau. The Programme Committee also has representatives of the other MSc programmes of UNESCO-IHE and the international partners. The Programme Committee confirmed that it is their explicit policy to use components of the programme in different specialisations and that they are satisfied with the resulting student numbers per module. Regarding the depth of the modules they justified the current contents on the basis of the limited time and the need to focus on water aspects. A more advanced module to deepen the knowledge of Environmental Engineering would not be on offer in the Environmental Science master programme, but could be chosen as an elective from the master programme Municipal Water and Infrastructure. The Programme Committee acknowledged that some changes in the IMETE programme are necessary, such as a better spread of the study load over the semesters and a more pronounced attention to the academic skills during the programme across the semesters in different institutions. They interpret the overlap, as mentioned in the meeting with the students, as useful rehearsal rather than mere overlap, and are not aware that this is at present problematic.

The Programme Committee has appointed a committee to advise on the position of academic skills in the curriculum and on the best way to clarify the learning lines in the curriculum to students. They have requested this advice with a view to the future developments, such as the joint degrees. The wish to move from double to joint degrees is part of the institute's internationalisation policy which aims to look for added value through collaboration with external partners and to increase the accessibility of the UNESCO-IHE programmes to students around the world. Added value is found in complementarity of contents, such as the focus on air and soil at AIT and on water at UNESCO-IHE. Increased accessibility is the result of regional intake and lower costs. Regional equity is an integral part of UNESCO-IHE's policy, although this does not necessarily lead to joint degrees. The assessment committee noted that other master programmes had made different choices. The Programme Committee of Environmental Science deliberately aims at joint degrees for LWI, IMETE and ETSuD because these specialisations are stand-alone programmes, based on long-

standing relationships with trusted partners. All partners involved (AIT, Egerton, BOKU, Prague and Ghent) have sufficient staff capacity and an adequate quality assurance system for education and research.

2.1.2 Didactical concept

The critical reflection states that the curriculum is designed to deliver graduates who have in-depth knowledge in their respective fields, combined with the ability and attitude to work across disciplines. This reflects on the use of the UNESCO-IHE's T-shape model in the designing of Environmental Science's curricula. The vertical bar of the letter T represents the in-depth knowledge of the main discipline and the horizontal bar reflects the basic knowledge of adjacent disciplines.

The didactic methods used in the programme are varied. The critical reflection describes that during the common phase of the programme, the emphasis is on lectures, assignments, laboratory sessions and self-study. During the specialisation phase fieldwork, group discussions, role-plays and presentations are added to broaden the students' perspective. The summer courses are not programme bound and open to students of all UNESCO-IHE programmes. Where possible and appropriate, students work in small groups of 2-5 students. This stimulates interaction, communication and teamwork, and thus contributes to the horizontal bar of the T. The work in the research phase is done independently on an individual basis, guided by a mentor and supervised by a professor.

The work on the MSc thesis is the 'masterpiece' of the curriculum: it starts with the formulation of a good research question. The thesis study is, wherever possible, related to research interests of the supervising staff member and/or related to on-going PhD studies or projects. The majority of students select a topic from a list of master topics and some adjust this to their own interest. It is also possible for students to define their own topic. The thesis work includes developing an appropriate and feasible methodology, collection and analysis of data, and formulating conclusions and recommendations. Students are also expected to place the results into a context of current knowledge and to write a thesis that meets a professional standard. This requires the integration of knowledge of environmental science with general academic skills.

2.1.3 Study load

The critical reflection indicates that the curriculum has a study load of 106 EC and has to be completed within 18 months. The specialisations given in collaboration with other partners that lead to double degrees have a study load of 120 EC. Most students succeed in completing the programme within this time period although almost all of them told the committee that it is a very full and intensive programme. They would prefer a 24 months programme with more time for the technical subjects.

The alumni were of the opinion that the programme should not be made longer but that time should be utilised better. The foundation modules are useful but in their view these modules are too long. Since the different foundation modules are difficult or easy for different students, depending on their background, the alumni suggest that they should not be scheduled in blocks but parallel to each other, so that the workload is spread more evenly over the semester.

The Programme Committee realises that the programme is heavy, but states that 18 months or 106 EC should be enough for a postgraduate programme. Participating students have work experience and have had professional exposure. In most master programmes for students

without working experience these elements are added, for example through an internship. This also explains the difference with IMETE and ETSuD that have a study load of 120 EC and 125 EC respectively: these have different target groups and a different focus. The Programme Committee agrees that a longer programme with more content would be nicer and better, but that in practice this is not feasible. Main reasons are financial, such as the fellowship requirements, and the reluctance of employers to grant longer study leaves. The committee agrees with the Programme Committee that in the circumstances they have found the best balance. The committee suggests to look into the possibility of offering a programme of 120 EC for all students and granting credits to incoming students with good working experience, comparable with an internship of 6 months.

Although time pressure remains a concern, the committee established that students do not generally perceive the study load as impossible. The curriculum may be demanding and leave little room for reflection, but it does not lead to students dropping out of the programme. According to the lecturers, students are able to cope with the demands because they are highly motivated and strongly interested in the issues dealt with in the courses.

2.1.4 Tutoring and guidance

Because students at UNESCO-IHE come from different countries and cultures and mostly have no home base in the Netherlands, much attention is paid to the tutoring and guidance of the students.

In advance of their arrival they receive a Preparation Guide with practical information on travelling to and living in the Netherlands. Upon arrival they are given a Practical Guide about the services provided by UNESCO-IHE, about formal issues such as housing, immigration and health care, and about everyday life in the Netherlands. Information about the programme, its contents, rules and regulations and study-related facilities is provided in a handbook that students receive at the start of the programme.

Non-academic support is given by the Student Affairs office. A student counsellor tries to help students in case of emotional problems such as homesickness or the effects of previous traumas. Students with study problems are in principle referred back to their Programme Coordinator or the Specialisation Coordinator, although in some cases the study counsellor is also involved. For academic support, all lecturers can be approached with questions. For the thesis research a staff member supervises the work of the student. In addition, during the thesis writing, each student has a mentor, a member of the academic staff of the chosen specialisation. The students are, generally speaking, satisfied with the role of the mentor. They note that the students are expected to take the initiative to contact the mentor if they need help. The committee concludes that the arrangements and facilities to support the students during their stay in the Netherlands are extensive and work properly. The committee recommends to establish for each incoming student a 'portfolio' with his/her initial motivation and career plan, which should be discussed and updated as needed, preferably with a personal mentor from the start.

2.1.5 Academic staff

The MSc programme in Environmental Science is developed and delivered by a team of 37 UNESCO-IHE staff members and 35 guest lecturers. For UNESCO-IHE staff members the staff/student ratio is 1:9.7 for the taught part and 1:22.5 for the MSc supervision. The core of the programme is taught by UNESCO-IHE staff. For those topics that cannot be covered adequately by in-house staff, the Programme Committee engages guest lecturers from universities, public or private institutions. The students with whom the committee met during

the site visit the students expressed their appreciation for the input of guest lecturers and the additional expertise and knowledge that they bring in. The students told the committee that some of the guest lecturers were very good and experienced, and that they could be contacted to answer questions after the lectures, just as the core staff. Some of them, however, as one student put it bluntly, “do not have the gift of teaching”.

The UNESCO-IHE staff is well qualified academically: all full professors have appointments at universities in the Netherlands, which testifies to their academic standing. The great majority of associate professors and lecturers hold PhD degrees. The publication record has increased substantially over the last years. Research and education are well-connected. Results of research are used directly in the modules. In addition, all staff members and the guest lecturers have extensive and relevant professional experience in developing countries and in countries in transition. This experience ensures that the educational programme is tailored to the professional and institutional context of the countries of origin of the students. Finally, the teaching qualities of the staff members are evaluated positively by the students in the regular module evaluations. In their meeting with the committee during the site visit students described their relationship with staff members as open and that they appreciate the interaction with staff members throughout the programme.

The committee considers the broad team of educational staff a strong point of the MSc programme. The input of guest lecturers provides additional input in a very efficient and effective manner.

2.1.6 Student body

The Environmental Science programme attracts 40 to 50 students per year. The enrolment in the various specialisations fluctuates over the years and is influenced by the availability of fellowships. The programme targets mid-career professionals with at least three years of working experience. This is reflected in the average age of the students: the largest group is 25-30 years old. The largest group comes from sub-Saharan Africa and has a science background.

The students are very motivated and committed to work hard. Their enthusiasm was clear in their meeting with the committee. For most of them a full time study requires quite an adjustment from the life they were used to. Their employer has allowed them a study leave and they are expected back with a degree after 18 months. The dropout rate is very low (0-5 students over the last five years) and the success rate is on average 90-95%.

In the meeting with the Programme Committee the committee discussed how students can best be prepared for the master study and during the programme be prepared for the research phase. To bring all students to a more or less equal level of knowledge at the beginning of the programme the first modules are essential. The time for these must, however, be as short as possible to allow enough time to provide depth as well as width. Sending preparatory materials in advance is an option, but it is difficult to check if a student has made use of it. This cannot be enforced unless an entrance exam is introduced. Providing remedial materials during the programme is another option, but adds to the study load for students who are weaker and are, therefore, already struggling. When discussing with the committee the possibilities to identify the weaker students and to take a go/no go decision (binding study advice) after the foundation phase the lecturers indicated that this measure would be too strong. Experience shows that students can still adapt and grow later in the programme. The committee stresses the importance of the selection procedure of applicants and recommends the development of on-line preparation of selected candidates. The committee agrees that the

role of academic skills training is essential not only to prepare the students for their assignments and master thesis, but an assessment of these skills will also identify the students who need extra guidance and tutoring.

2.1.7 Facilities

The facilities of the UNESCO-IHE institute are geared to the multidisciplinary nature of the programmes. Well-equipped and well-staffed laboratories are used during the modules that focus on chemical analysis in the foundation modules, in the Environmental Science and Technology specialisation and in the Water Quality Management specialisation. For group work and role-plays the necessary classrooms and places where students can work in small groups are available. The classrooms and work spaces have recently been renovated. The videoconferencing room is an indispensable facility to allow for direct communication with partners overseas.

IT-facilities and the necessary software packages are available. Students receive a laptop at the start of the academic year and can purchase it for a reasonable price at the end of the programme. Wireless internet is available throughout the building. The library is used intensively by students throughout the programme and possesses a large amount of books and journals. The number of electronic journals has increased during the last years. In 2011 the e-campus project was launched, using the Moodle-software (Modular Object-Oriented Dynamic Learning Environment or Course Management System). Students and staff are supported by a Moodle-coordinator.

The committee is of the opinion that the UNESCO-IHE building offers very good facilities for the academic education of the students in an atmosphere that makes their stay in the Netherlands fruitful and enjoyable.

2.2 Considerations

After studying the various aspects of the programme's teaching and learning environment, the committee established that the contents and structure of the curriculum enable students to achieve the intended learning outcomes. The programme provides a good basis in the natural sciences and the socio-economic concepts that are required to understand the complex issues in the field of environmental science and to play a role at an academic level in analysing and solving environmental problems in a sustainable way. The specialisations provide the necessary depth. The elective modules, the fieldtrip and fieldwork, and the group work introduce interaction among students from the different specialisations and thus contribute to the horizontal bar of the T-shape model of the curriculum. The double degrees based on complementary academic strengths and long-standing cooperation with international partners have an added value both for students and for UNESCO-IHE. The double degrees, including the Erasmus Mundus programme, provide education on relevant new topics, tailored to the needs of developing countries. They also increase the accessibility for new participants because part of the programme can be followed in their own region and, for Erasmus Mundus, because an additional number of fellowships is available. In addition, the double degrees increase the visibility and impact of UNESCO-IHE. By the use of existing modules and an intelligent combination of these with the input of partner institutes, such as in Erasmus Mundus, the risk of fragmentation is as much as possible avoided.

The division of the curriculum into four distinct phases of foundation, specialisation, research proposal and research work is logical. The combination of courses and the interaction among students during the field work and group work allow proper attention to both bars of the T-shape model of education: the vertical bar of deepening and the horizontal bar of broadening.

The timely selection of a research topic, the module in research methodology and the development of the research proposal prepares students for conducting their individual thesis research. The learning objectives per specialisation and the module descriptions are clear and provide insight into the contributions of curriculum components to the achievement of the intended learning outcomes of the MSc programme. Overall, the committee is satisfied with the content of the curriculum. The courses are academic in orientation but at the same time never lose sight of the intrinsically applied nature of environmental science. Whenever possible, the results of the research activities and other projects of staff members are integrated in the courses. Furthermore, the literature that is used is appropriate and up-to-date.

The main challenge of the curriculum is its density and the high level of intensity that follows from it. The programme sets out to present a comprehensive 18-months training programme to a very heterogeneous body of students. The committee maintains that, within the limitations of this set-up, the programme management is doing well. In order to address the widely different levels of knowledge and skills with which the students enter the programme, the management has developed a set of foundation modules. The committee advises the staff to investigate alternative or additional possibilities, for example by expecting self-learning from the students before they commence their studies in Delft and testing the students' basic knowledge on arrival. The e-Campus development can be a useful tool for this purpose. Time should also be set aside for debate on general issues with staff and students from all specialisations, for example in seminars or evening lectures. Supporting students' adjustment is addressed by an extensive system of student monitoring, in which both the Programme Coordinator and the Specialisation Coordinator and the student counsellor play a role. This mechanism assures that potential problems are identified at an early stage. The programme staff intends to intensify the training of academic skills throughout the programme. This is expected to contribute even more to the timely identification of weaker students who can then be tutored more intensively.

The core staff is highly motivated and involved, well qualified academically and seems to possess excellent teaching qualities. These staff members are strongly connected to the professional field in the Netherlands and abroad and bring extensive experience with applied research into the classrooms. This is clearly appreciated by the students. Guest lecturers are called in for additional specific expertise and as a link with the professional field. Students generally praise the additional input they provide.

Traditionally, the student population of UNESCO-IHE is very diverse, in both academic qualifications and geographical background. As mid-career professionals on study leave they have, on the one hand, some difficulties at the start of the programme to adjust to being back in class but, on the other hand, they are highly committed and motivated to succeed. The committee appreciates the efforts of the programme staff to help students before and during the programme to achieve the required level to follow the programme fruitfully.

2.3 Conclusion

MSc programme Environmental Science: the committee assesses Standard 2 as **satisfactory**.

Standard 3: Assessment and achieved learning outcomes

The programme has an adequate assessment system in place and demonstrates that the intended learning outcomes are achieved.

Explanation:

The level achieved is demonstrated by interim and final tests, final projects and the performance of graduates in actual practice or in post-graduate programmes. The tests and assessments are valid, reliable and transparent to the students.

3.1 Findings

This section firstly deals with the assessment system and quality monitoring of the thesis (§3.1.1.) and with the achieved learning outcomes on the basis of the quality of the theses and the position of alumni on the labour market (§3.1.2.).

3.1.1 Assessment system

The Education and Examination Regulations provide a detailed overview of the nature, frequency and marking of assessments as well as the possibilities for re-examination and appeal procedures. They are safeguarded by the Examination Board. All students are informed about the rules in the Handbook they receive at the start of the programme.

The assessments of the modules include written exams, oral exams, assignments, oral presentations and written reports. Some assessments are carried out by small groups to facilitate team working skills. Most modules include two or more methods of assessment to reflect the multiple intended learning outcomes of the modules.

Students are informed about the assessment methods and their relative weight for each module in various ways. They are listed in the module sheets and are explained in more detail by the module coordinator at the beginning of a module, including the evaluation criteria that will be used for marking the various assessments. Written hand-outs with instructions are provided for assignments. Example exam questions are usually available for students of the module and tutorials are organised to practice the application of the knowledge in preparation for the exams.

Written exams are compiled by the module coordinator and peer-reviewed by the programme coordinator. Marking is done anonymously based on student registration numbers. Oral exams are always conducted by at least two staff members to ensure impartiality. After each assessment students are given feedback on their performance and are given the chance to inspect their exams. Students are asked to evaluate the quality of the assessments in the module evaluations. Re-examinations normally take place during the next examination period indicated in the academic calendar. Students will not be allowed to sit for further re-examinations or –assignments if they failed more than three re-examinations for the first thirteen modules of the programme. An appeal procedure is in place and fraud or cheating is taken very seriously.

The assessment of the final thesis follows a procedure of four steps. First, the final version of the thesis is checked with modern software to minimise the chances of plagiarism. Second, for each thesis assessment an exam committee is established, consisting of the supervisor (professor), the mentor and an external member from another department within UNESCO-IHE or from outside the institute. The members of the exam committee are appointed by the Examination Board. Third, the student presents and defends his/her thesis in an oral public defence. Fourth, the exam committee uses a list of evaluation criteria to grade the

performance of the student, including the content, academic attitude and editorial aspects of the presented work. These criteria are listed in the Handbook and therefore known to the students. They are not yet cross-linked with the learning objectives of the programme. The Examination Board intends to do this next year. The committee considers this to be an important step. There is no rule for the relative weight of the different criteria in the final mark of the thesis. This has been discussed among the staff but was viewed as a mechanistic approach that may be risky. Also, it was felt that this would not give sufficient freedom for the different roles in the exam committee, such as the mentor being focused on the process and the external examiner on the product. Although the committee agrees with this line of reasoning, additional mechanisms could add great value to the assessment of thesis. The committee recommends a rubric for assessment of MSc theses. The thesis evaluation form should include a relative weight for the different criteria for assessing the final mark, which will enable a more objective assessment of the MSc theses. Relative weights for thesis assessment is used in many universities in the Netherlands as well as other universities in Europe and other parts of the world.

The Examination Board safeguards the compliance with the rules set for the thesis assessments. The deadline for submission of the thesis in early April is clear to students and upheld quite strictly. Requests for extensions are handled by the Examination Board. The staff is responsible for the marks but the Examination Board supervises the outcomes on the basis of statistics and extreme grades. Decisions on distinctions are taken by the Examination Board and are based on the module marks and the thesis mark. Module marks and thesis marks differ quite often, and reflect that different skills are expected. Usually module marks are higher than the thesis marks. The use of an external examiner provides another reference point for addressing potential inflation of thesis marks and the granting of distinctions. The Examination Board also regulates assessment marks by comparing the outcomes of the different MSc programmes and by benchmarking the average thesis marks with the Delft University of Technology, Wageningen University and the VU University of Amsterdam. To date, the grades allocated by the programme were at the same level.

The committee has studied the information on the assessment system and discussed the assessment system with the Examination Board. The committee also noted that the students generally expressed their satisfaction with the feedback they are given on their assignments. Some lecturers organise a review session when the marks are available. Overall, the procedures as set and safeguarded by the Examination Board apparently ascertain a fair and transparent system. The various checks and balances oversee the process of assessments and validate its reliability and fairness. The committee considers this to be a strong point. The link between the learning objectives of the programme and the marking of the thesis, to be made explicit in the near future, will further improve the assessment procedures.

The committee investigated the diploma and diploma supplement that are issued after graduation. The diploma supplement contains the relevant information about the degree and the degree level, and includes the learning objectives of the chosen specialisation, the names of the modules and the marks that were earned, and the title and mark of the final thesis. The committee concludes that this is a valuable and clear document that will help students in their future careers. Students who fail to meet the programme examination requirements will be issued a certificate stating the result achieved including the EC for each successfully completed component of the programme as well as the period of registration. Students who fail to meet the programme examination requirements and have accumulated a minimum of 45 EC will be awarded a 'certificate of post-graduate study'.

3.1.2. Achieved learning outcomes

The committee studied a representative sample of the Environmental Science theses. In most cases the committee agreed with the mark given by the programme staff, but in a number of cases the committee would have marked slightly lower. Especially most of the lower marked theses (6-7) showed deficiencies in one or more aspects, such as the quality of the discussion and the coherence of the thesis, the use of sometimes fairly simple methods and techniques and the lack of a justification of the selected methodology. In general, however, the theses had clear objectives and problem formulation, an adequate selection and application of research methods, showed proper operationalisation and logical reasoning and followed the criteria for academic reporting. All of them were at least sufficient in these respects and some were at a higher level. On this basis the committee concludes that the MSc Environmental Science graduates have achieved the intended learning outcomes of an academic master. The committee advises that in the future staff should pay attention to guiding the students regarding the distinction between conclusions and discussion.

The critical reflection describes that in 2010-2011 a tracer survey was held among 6,500 UNESCO-IHE alumni, to which 1,149 alumni responded. The respondents included 77 Environmental Science alumni who graduated between 2005 and 2010. The survey shows that nearly all students return to their former jobs, which is not surprising, because it is often a prerequisite of donors for admission to UNESCO-IHE MSc programmes. About 15% of the alumni find a PhD position. In their employment almost all alumni contribute to the development of their country or region and all of them agree that their working environment was conducive for using the knowledge and skills they had acquired during their study at UNESCO-IHE. The alumni officer informed the committee that each year a number of refresher courses is organised for the alumni.

These positive outcomes were confirmed by the feedback the committee received from a limited number of alumni. Their main asset after completing their UNESCO-IHE degree was that they felt prepared to work around the world with very different people and on different topics. They found the interdisciplinary approach useful and were able to apply their knowledge across various sectors. UNESCO-IHE taught them to be critical and took them to a higher level, which helped them make further career moves. The programme builds up team work among the students and combines a practical approach with theoretical knowledge. The alumni described this as “the beauty of the institute”. They admit that there may be engineering or scientific programmes with a stronger disciplinary reputation, but that the combination offered by UNESCO-IHE is unique and a better combination for developing countries. When asked for suggestions for improvement the alumni mentioned that the programmes should embrace new issues, such as interdisciplinary modelling. They also suggested that there should be more synchronisation among the MSc programmes regarding the grading criteria for the theses. The committee agrees that UNESCO-IHE should always be alert to new developments to be addressed in its programmes, but regards the new initiatives with various partners as an indication that this awareness is present. The committee advises the Examination Board to keep monitoring the grading criteria and grades for the master theses and to design a standardised evaluation form for the thesis assessment.

3.2. Considerations

The committee established that the assessment system of the UNESCO-IHE functions very well. Good control mechanisms are ensuring that work is systematically and consistently graded. The committee further found the range of assessment methods to be sufficiently large. The examination structure has clearly been tailored to the intended learning outcomes of the programme. The committee especially appreciates the system of blind marking and the

involvement of external assessors. The assessment system has strong checks and balances and the assessments are transparent, valid and reliable.

After studying examination results as well as a sample of recent theses, the committee established that graduates of the Environmental Science programme meet the end qualifications as specified under Standard 1. From the committee's conversations with alumni, it became sufficiently clear that graduates of the programme are truly able to function as capable environmental scientists and scientifically trained practitioners and managers.

3.3. Conclusion

MSc programme Environmental Science: the committee assesses Standard 3 as **satisfactory**.

General conclusion

The committee has assessed all three standards as satisfactory. The committee judges the programme to be a stimulating academic master's programme. The profile of the programme, its position within the field, the clearly formulated intended learning outcomes, the coherent structure and interdisciplinary contents of the curriculum, the well-kept facilities, and the overall enthusiasm displayed by both staff members and students all contribute to a fitting teaching-learning environment. The assessment of the learning outcomes in tests, assignments and, above all, the master thesis meets the required quality standards. Both the quality of the theses and the experiences of the alumni show that the intended learning outcomes are achieved.

The committee assesses the *MSc programme Environmental Science* as **satisfactory**.

Committee's judgement regarding the quality of the joint degree programmes

UNESCO-IHE intends to submit three specialisations of the MSc programme Environmental Science for additional accreditation as joint degrees. To substantiate this request UNESCO-IHE has asked the assessment committee to pay separate attention to the quality of these three specialisations as joint degree programmes. Specific information on these degree programmes was made available in the critical reflection and during the site visit. The committee has also conducted additional interviews with the Joint Management Committees of the international partners involved. On that basis the committee is able to assess these programmes on the same standards as the MSc programme Environmental Science.

Joint degree programme International Masters in Environmental Technology and Engineering IMETE

Standard 1: Intended learning outcomes

The aim of the IMETE programme is to address the need for training in the field of environmental technologies and engineering by educating a new generation of environmental scientist and engineers that can provide adequate and state-of-the-art environmental technology and engineering solutions to tackle complex, multidisciplinary environmental issues, such as today's global environmental pollution problems.

As stated in the Examination regulations, IMETE is an English taught postgraduate MSc programme on Environmental Technology and Engineering for students with a university level bachelor's degree in an appropriate field for the programme, which has been awarded by a university of recognised standing. Furthermore, a good command of the English language is required. In this respect it differs from the target group of the Environmental Science programme: the prospective students are younger and have no professional experience. To compensate for the lack of professional experience as compared with the Environmental Science students, the duration of the programme has a study load of 120 EC and a duration of 24 months. The stated mission is broader than for the Environmental Science programme, in the sense that the focus is not on the developing countries but that it aims to give students experience globally. The Joint Management Committee of the programme told the committee, however, that IMETE also wants to help in exporting European technologies to developing countries. The committee can, therefore, understand why the participation of UNESCO-IHE in this Erasmus Mundus programme is a real asset and why one of the members of the Joint Management Committee said that "to have IHE as a partner is a luxury".

The intended learning outcomes for the IMETE programme combine the final qualifications of the MSc programme Environmental Science with two additional learning objectives in Knowledge and Theory and two in Methods, Techniques and Tools. The intended learning outcomes have been related to the final qualifications according to the Dublin descriptors. This shows that they are of the required master level. See Appendices 4 and 5.

Students are trained to solving problems at an academic level and the ability to conduct independent academic research is an essential element of the programme. The fourth semester of IMETE is focussed on the MSc thesis research project.

The committee fully subscribes to the aims of the programme. The programme is an interdisciplinary programme that combines the natural (physics, biology, chemistry) and social sciences, and trains the social and interpersonal skills to work in interdisciplinary teams. This combination of knowledge and skills is needed to develop and implement sustainable solutions to environmental problems. The committee judges the final qualifications and learning objectives to be well-formulated. They clarify to staff and students what is expected from IMETE graduates. The learning objectives reflect the appropriate master level and are recognisably formulated in terms of the Dublin descriptors. They show the necessary focus on analytical and research skills for an academic master's programme. The committee therefore assesses the first standard as **satisfactory**.

Standard 2: Teaching-learning environment

The IMETE programme is offered jointly by UNESCO-IHE, the Institute of Chemical Technology (ICT) Prague and by the University of Ghent. The co-operation between partner institutes from at least three EU countries is a requirement for funding and scholarships from the Erasmus Mundus scheme. In the programme, UNESCO-IHE focuses on water, Ghent and Prague on soil, sediment and air. The programme starts in October at Delft where the students follow introductory courses. In February of the following year the students travel to ICT Prague for more in-depth courses. There they stay until June. Throughout the first year, a course focusing on scientific skills (6 EC) is taught by UNESCO-IHE, ICT Prague and the University of Ghent together. In the second semester the students will start to elaborate a research plan and start up the literature review for a specific research project. Over summer, students can do an internship at one of the companies that is an associated partner. In September of the second year, the students go to the University of Ghent for a specialisation semester. In the fourth semester, IMETE students do their MSc thesis research under the supervision of professors of one of the three IMETE partners. The thesis work can also be done at one of the associated partner institutions under the supervision of a staff member from the sending partner institution. In principle, students can choose in which institute they want to do their MSc thesis research. The staff told the committee, however, that it may be necessary to assign students to the supervisor and institute of their second choice if it turns out that the workload of staff is too uneven. For an overview of the curriculum see appendix 9.

To ensure a good coherence and to avoid overlap, the programme has been composed by a Joint Programme Committee. UNESCO-IHE is responsible for the first semester and has the task to bring all students to the same level of Environmental Science knowledge. For this purpose the four common modules of the Environmental Science master programme are very suitable. For the second semester at ICT Prague new courses have been specifically developed to achieve an optimal fit for the joint programme. The structure and coherence of the programme, as described in the Consortium Agreement, are well-considered. The first run of the IMETE programme started in October 2011. The committee heard in its meeting with Environmental Science students that not all details have yet worked out perfectly and that the communication about some last minute changes sometimes fell short. The overall impression was, however, positive and the committee is convinced that the combination of courses and other educational activities will help the students to achieve the intended learning outcomes.

All modules are evaluated on the basis of the quality control system of the participating institute that is responsible. Based on the accreditation systems that are in place in all EU-countries, the committee expects that they also meet the criteria as formulated in the Netherlands. In addition, each semester is evaluated with the students. Lecturers from the various collaborating institutes are working together with the aim to reduce overlaps and

enhance course compliability and synergy. All partners will be involved in supervising the research projects. The evaluation criteria have been defined in advance and are clear to staff and students. Grading equivalence is achieved by instituting joint juries as examination committees for each graduation project. Conversion tables have been drawn up to compare the grades and grading systems of the partner institutes.

Since each institute uses its own didactical approach, students have to adjust to different teaching methods and cultures, which they considered to be an advantage as well as a disadvantage. They applied explicitly for this joint degree programme and are satisfied with the experience. The committee does not consider the different teaching cultures a problem.

The study load is expected to be less intensive for the IMETE students than for their colleagues who have registered for the 18-months Environmental Science programme. The spread of the study load is not yet in balance. The first semester at UNESCO-IHE starts in October and ends in the first half of February, and is therefore shorter than the second semester in Prague (February-July). The Joint Management Committee intends to solve this in the next academic year.

The technical secretariat, located at the University of Ghent, functions as the first point of contact for all students. At each of the partner institutions the International Office and/or programme secretariat are the central point of reference for the students. According to the Consortium Agreement this is the place where students are provided with all the necessary information and material on the structure of the institution, its academic programmes and extra-curricular offerings. This office will also offer welcoming events and orientation. At UNESCO-IHE the Student Affairs department offers all the services and information that participants need in order to familiarise themselves with their new surroundings. IMETE students participate in the introductory Week One together with the other starting MSc students at the Institute. Additionally, since their arrival students are academically supported by the Programme Coordinator and by the Specialisation Coordinator. Furthermore, each student is assigned a mentor during the research period. Throughout this phase IMETE students also have a supervisor, who is a professor at one of the three partner institutions.

The lecturers involved in the IMETE programme belong to the core staff of the partner institutes. Based on the judgement on the Environmental Science programme the committee concludes that for UNESCO-IHE this means that they are well-qualified academics with a good teaching record. The committee also views the staff members of ICT Prague and the University of Ghent of good academic standing, based on the committee's knowledge of the accreditation procedures of the Czech Republic and Flanders as well as the approval of the IMETE proposal by the Erasmus Mundus programme.

Ghent coordinates the intake of the students on the basis of a procedure and criteria that are agreed upon by all three partners. Admission decisions are taken jointly, communication takes place by email. The IMETE consortium and the student sign a student agreement in which the obligations of the coordinating organisation and the student are put down in writing. In its first academic year (2011-2013) IMETE started out with 21 students. Applications are welcomed from all countries, scholarships are available for students from developing countries and countries in transition. The student body is, therefore, quite diverse and this diversity is part of the learning environment. This fits well with the mission of the traditional UNESCO-IHE programmes.

The facilities for the IMETE programme are the same as for the other programmes of the participating institutes. The committee follows the same line of reasoning as for the quality of the academic staff and is convinced that these are in order.

After evaluating the curriculum, consortium arrangements, quality control mechanisms, study load, staff, student body and facilities, the committee established that the teaching-learning environment of the IMETE programme enables students to achieve the intended learning outcomes. The committee therefore assesses this standard as **satisfactory**.

Standard 3: Assessment and achieved learning outcomes

The Consortium Agreement describes the regulations concerning exams. Examination tools include written exams, oral exams, project work and seminars. All exams are governed by the Assessment Regulations in place at the partner institution where the course is organised. In addition, the Management Board will define and issue a common framework for examinations, related to the specified learning outcomes for the IMETE programme as well. The committee expects that the common framework will guarantee the quality and comparability of the assessments throughout the programme.

The master thesis has to be defended at the institution of the supervising professor, in agreement with local institutional regulations. The Programme Committee of Environmental Science told the committee that joint juries are instituted as examination committees for each graduation project. The Consortium Agreement further states that the examination committee of IMETE ratifies the scores at the end of each academic year and decides on the final degree, including the award.

It is too early to assess the achieved learning outcomes of the IMETE programme. The first theses will be written in the first half of 2013. The committee can only conclude that each institution individually and the consortium as a whole have quality control mechanisms in place. On that basis the committee expects that the level of degrees to be awarded will be guaranteed but at present this cannot be proven on the basis of actual theses.

Because of the explicit IMETE exam regulations and the positive assessment of the assessment system of Environmental Science the committee assesses this standard as 'satisfactory' even in the absence of final theses.

The overall conclusion of the committee on the quality of the IMETE programme is **satisfactory**.

Joint degree programme Limnology and Wetland Management LWM

Standard 1: Intended learning outcomes

LWM is the continuation of the current LWE (Limnology and Wetland Ecosystems) specialisation of the Environmental Science programme and will administratively continue to be considered as a specialisation of the Environmental Science programme. With the joint degree LWM, UNESCO-IHE, BOKU (University of Natural Resources and Life Sciences, Vienna, Austria) and Egerton University (Njoro, Kenya) wish to take their long-standing cooperation a step further and show the complementarity of their input clearly on the degree certificate. The aim of the programme is to convey to the students the knowledge, insight and skills that are required to function as independent professionals within the field of Limnology and Wetland Management and to be appropriate candidates for further study towards a research career.

The target group consists of young academically strong professionals. Applicants must be honours graduates in their first degree in biology or the environmental sciences, and must have been the top of their class. Additionally, they must have a few years of work experience in the water sector. LWM is an open programme and welcomes applications from all over the world, with an emphasis on students from developing countries for whom a number of fellowships are available. One of the aims is to increase the number of international foreign students at Egerton University.

The intended learning outcomes for the LWM programme combine the final qualifications of the MSc programme Environmental Science with additional learning objectives in Knowledge and Theory; Methods, Techniques and Tools; and Analysis, Synthesis and Integration, to express the focus on wetlands. The intended learning outcomes have been related to the final qualifications according to the Dublin descriptors. This shows that they are of the required master level. See Appendices 4 and 5.

In all course components, students are trained to solve problems at an academic level. The ability to conduct independent academic research is an essential element of the programme. The third semester of LWM is spent on the MSc thesis research project.

The committee fully subscribes to the aims of the programme. The programme is the continuation of a well-established specialisation at UNESCO-IHE with the additional input of complementary partner institutes. The committee judges the final qualifications and learning objectives to be well-formulated. They clarify to staff and students what is expected from LWM graduates. The learning objectives reflect the appropriate master level and are recognisably formulated in terms of the Dublin descriptors. They show the necessary focus on analytical and research skills for an academic master's programme. The committee therefore assesses the first standard as **satisfactory**.

Standard 2: Teaching-learning environment

The LWM programme is offered jointly by UNESCO-IHE, BOKU (University of Natural Resources and Life Sciences, Vienna, Austria) and Egerton University (Njoro, Kenya). The programme starts in October at Vienna where the students follow five basic courses. In February of the following year the students travel to Kenya for four more in-depth courses. There they stay until the beginning of June. They then move to UNESCO-IHE for three modules, the group work, a course on research methods and the summer school. In this period they also start to work on their MSc proposal. In the third semester, LWM students do

their MSc thesis research under the supervision of professors of one of the three LWM partners. See appendix 10 for an overview of the programme.

To ensure a good coherence and to avoid overlap, the programme has been composed by a Joint Programme Committee. The modules have been developed in collaboration with alumni and the partners, with a view to minimise overlap and to emphasise the separate focus of each partner institute. The committee is convinced that the combination of courses and other educational activities will assist the students in achieving the intended learning outcomes.

Each of the modules is evaluated on the basis of a quality control system utilised by the participating institute responsible for it. Based on the accreditation systems that are in place in the relevant countries, the committee expects that they also meet the criteria as formulated in the Netherlands. Student evaluations are an on-going component of this quality control. Course content compatibility and synergy with other courses is achieved by close collaboration between lecturers. All partners will be involved in supervising and assessing the research projects. The evaluation criteria have been defined in advance and are clear to staff and students. Grading equivalence is achieved by instituting joint juries as examination committees for each graduation project. Conversion tables have been drawn up to compare the grades and grading systems of the partner institutes. All three partners expressed to the committee during the site visit that a good balance has been achieved between clear guidelines on the one hand and flexibility on the other hand. They all feel that they have a good understanding of problems that may arise in the future, but they are very positive about the development of this joint programme.

Each institute uses its own didactical approach. The committee does not consider the different teaching cultures a problem. The teaching methods are explained in detail in the module sheets. The committee has checked the module sheets and concludes that they provide clear information on all aspects of each course: the learning objectives, topics to be addressed in the syllabus, didactics, assessment method, lecturing materials and lecturing staff.

The LWM study load is expected to be of the same intensity as the Delft-based Environmental Science programme, because it is an 18-months programme, too. It may be even heavier because of the transitions to different institutions during the programme.

Regarding tutoring and guidance, at UNESCO-IHE students are academically supported by the Programme Coordinator and by the Specialisation Coordinator. Furthermore, each student is assigned a mentor during the research period. Throughout this phase students also have a supervisor, who is a professor at one of the three partner institutions.

The lecturers involved in the LWM programme belong to the core staff of the partner institutes. Based on the judgement on the Environmental Science programme the committee concludes that for UNESCO-IHE this means that they are well-qualified academics with a good teaching record. As for BOKU, Austria and the University of Egerton, Kenya, the committee understood from the Joint Management Committee and the documented evidence provided during the site visit that all partners bring in experienced staff members to the programme. Since LWM is the continuation of the LWE specialisation, where the two partner institutes were also involved, the committee is convinced that the input of qualified staff is well taken care of.

BOKU coordinates the intake of the students on the basis of a procedure and criteria that are agreed upon by all three partners. Admission decisions are taken jointly, communication takes

place by email. Applications are welcomed from all countries, with a focus on developing countries. Scholarships are available from the Austrian government for students from East Africa. The University of Egerton aims to attract students from all over Africa and internationalise its student body. The committee, therefore, expects that there will be an overrepresentation of African students but, apart from that, the student body will be quite diverse and this diversity is part of the learning environment. This fits well with the mission of the traditional UNESCO-IHE programmes.

The facilities for the LWM programme are the same as for the other programmes of the participating institutes. The committee follows the same line of reasoning as for the quality of the academic staff and is convinced that these are in order.

After evaluating the curriculum, consortium arrangements, quality control mechanisms, study load, staff, student body and facilities, the committee established that the teaching-learning environment of the LWM programme enables students to achieve the intended learning outcomes. The committee therefore assesses this standard as **satisfactory**.

Standard 3: Assessment and achieved learning outcomes

The Cooperation Agreement describes the regulations concerning exams. The module sheets describe the assessment methods, which include written exams, oral exams, exercises, written reports, oral presentations, practical activities and project work. All exams are governed by the Assessment Regulations in place at the partner institution where the course is organised.

The master thesis has to be defended at the institution of the supervising professor, in agreement with local institutional regulations. The Cooperation Agreement states that the MSc examination committee consists of members according to the regulations of each institute, and includes a member of each partner institute. The latter two members do not have to attend physically the MSc examination, but will comment on the thesis and take part in the deliberations of the committee. A student has successfully completed the programme examination when the local examination board takes a decision to that effect and a 'no objection' has been received from the examination boards of the other parties. Since LWM will also continue as a specialisation within the Environmental Science programme and, therefore, its results and level of grading will be scrutinised by the Examination Board of UNESCO-IHE, the committee is confident that there are good mechanisms in place to guarantee the level of the assessment of courses and theses.

The committee read two theses of the LWE specialisation of the MSc programme Environmental Sciences. The committee agreed with the marks given by staff and would even have marked them slightly higher. Considering the fact that the same partners were involved in LWE as in LWM and that the same quality control mechanisms will apply, the committee expects that the achieved learning outcomes will be at the required academic master level. The committee assesses this standard as **satisfactory**.

The overall conclusion of the committee on the quality of the LWM programme is **satisfactory**.

Joint degree programme Environmental Technologies for Sustainable Development ETSuD

Standard 1: Intended learning outcomes

ETSuD is currently offered as double degree, based on a specialisation of the Environmental Science programme and will administratively continue to be considered as a specialisation of the Environmental Science programme. With the joint degree ETSuD, UNESCO-IHE and AIT (Asian Institute of Technology, Bangkok, Thailand) wish to take their long-standing cooperation a step further and show the complementarity of their input clearly on the degree certificate. UNESCO-IHE has strong expertise in water, AIT in air, soil and hazardous waste. The joint degree is meant to combine forces in order to respond to the fast developments related to environmental issues, such as population growth, industrialisation, problems of waste and pollution. It is a bottom-up initiative, based on project contacts of the Dutch Directorate of International Cooperation.

The aim of the programme is to convey to the students the knowledge, insight and skills that are required to function as independent professionals within the field of Environmental Technology for Sustainable Development and to be appropriate candidates for further study towards a research career. The target group consists of young professionals. Applicants must have a first degree in a relevant engineering or science area and some years of relevant working experience. ETSuD is an open programme and welcomes applications from all over the world. Due to AIT's regional position it is expected that more applications will come from Asian students.

The intended learning outcomes for the ETSuD programme combine the final qualifications of the MSc programme Environmental Science with two additional learning objectives in Knowledge and Theory, and two in Methods, Techniques and Tools. The intended learning outcomes have been related to the final qualifications according to the Dublin descriptors. This shows that they are of the required master level. See appendices 4 and 5.

Students are trained to solving problems at an academic level and the ability to conduct independent academic research is an essential element of the programme. The third semester of ETSuD is spent on the MSc thesis research project.

The committee fully subscribes to the aims of the programme. The committee judges the final qualifications and learning objectives to be well-formulated. They clarify to staff and students what is expected from ETSuD graduates. The learning objectives reflect the appropriate master level and are recognisably formulated in terms of the Dublin descriptors. They show the necessary focus on analytical and research skills for an academic master's programme. The committee therefore assesses the first standard as **satisfactory**.

Standard 2: Teaching-learning environment

The ETSuD programme is a sandwich programme offered jointly by UNESCO-IHE and AIT, Thailand. The 22-month fulltime programme starts in August at Bangkok where the students follow five basic courses. In January of the following year the students travel to Delft for the foundation course Analytical tools in environmental sciences and six specialisation courses. At UNESCO-IHE the students start to prepare their MSc thesis proposal. In addition to lectures, exercises, laboratory work, fieldwork and fieldtrips, these modules include a two week European fieldtrip. In August of the second year they return to

AIT to do their MSc thesis research, co-mentored by UNESCO-IHE staff, and continue with advanced courses. See appendix 11 for an overview of the programme.

To ensure a good coherence and to avoid overlap, the programme has been composed by a Joint Programme Committee. The modules at UNESCO-IHE are also part of the EST and EPM specialisations, which is a very efficient use of available staff time and also allows for interaction between the groups of students. The programme is designed with a view to minimise overlap and to emphasise the separate focus of each partner institute. The committee is convinced that the combination of courses and other educational activities reflects the complementary strengths of the two institutes, make an intelligent use of the courses that are already available at each of the two partners, and will help the students to achieve the intended learning outcomes.

All modules are evaluated on the basis of the quality control system of the participating institute that is responsible. Student evaluations are a permanent component of this quality control. Lecturers are in touch with each other to gear the contents of their courses to each other. In supervising and assessing the research projects, both partners will be involved. The evaluation criteria have been defined in advance and are clear to staff and students. Grading equivalence is achieved by instituting joint juries as examination committees for each graduation project. On a technical level, conversion tables have been drawn up to compare the grades and grading systems of the partner institutes. Both partners are very positive about the development of this joint programme.

Each institute uses its own didactical approach. The committee does not consider the different teaching cultures a problem. The teaching methods are explained in detail in the module sheets. The committee has checked the module sheets and concludes that they provide clear information on all aspects of each course: the learning objectives, topics to be addressed in the syllabus, didactics, assessment method, lecturing materials and lecturing staff.

The study load is expected to be less intensive for the ETSuD students than for their colleagues who have registered for the 18-months Environmental Science programme. The spread of the study load is not yet in balance. The advanced course in the final semester at AIT is probably not feasible.

Regarding tutoring and guidance, at UNESCO-IHE students are academically supported by the Programme Coordinator and by the Specialisation Coordinator. Furthermore, each student is assigned a mentor from AIT and a co-mentor from UNESCO-IHE during the research period.

The lecturers involved in the ETSuD programme belong to the core staff of the partner institutes. Based on the judgement on the Environmental Science programme the committee concludes that for UNESCO-IHE this means that they are well-qualified academics with a good teaching record. As for AIT, the committee understood from the Joint Management Committee and the documented evidence provided during the site visit that all partners bring in experienced staff members to the programme. UNESCO-IHE and AIT have had a long-standing research cooperation and know and trust each other well. The committee expects, therefore, that the input of qualified staff is well taken care of.

The selection of students is done on the basis of a procedure and criteria that are agreed upon by both partners. Admission decisions are taken jointly, communication takes place by email. Applications are welcomed from all countries, with a focus on Asian countries. In its first year

(2011-2013) ETSuD started with one student, in the following year (2012-2014) this has increased to four students. UNESCO-IHE and AIT will put increased efforts in marketing and a continued search for fellowships. The ETSuD student body will be comparable to that of the other UNESCO-IHE programmes, with a higher percentage of Asian students. The diversity is part of the learning environment. This fits well with the mission of the traditional UNESCO-IHE programmes.

The facilities for the ETSuD programme are the same as for the other programmes of the participating institutes. The committee follows the same line of reasoning as for the quality of the academic staff and is convinced that these are in order.

After evaluating the curriculum, cooperation arrangements, quality control mechanisms, study load, staff, student body and facilities, the committee established that the teaching-learning environment of the ETSuD programme enables students to achieve the intended learning outcomes. The committee therefore assesses this standard as **satisfactory**.

Standard 3: Assessment and achieved learning outcomes

The Cooperation Agreement describes the regulations concerning exams. The module sheets describe the assessment methods, which include written exams, exercises, assignments and practical activities. All exams are governed by the Assessment Regulations in place at the partner institution where the course is organised.

The master thesis has to be defended at AIT. The Cooperation Agreement states that the MSc examination committee consists of members according to the regulations of AIT, including a member of UNESCO-IHE. Participation of the latter member at the MSc thesis examination is preferable but not mandatory. Though not necessarily physically present, the committee member from UNESCO-IHE will comment on the thesis and take part in the deliberations of the committee. A student has successfully completed the programme examination when the AIT examination board takes a decision to that effect and a 'no objection' has been received from the examination boards of UNESCO-IHE. Since ETSuD will also continue as a specialisation within the Environmental Science programme and, therefore, its results and level of grading will be scrutinised by the Examination Board of UNESCO-IHE, the committee is confident that there are good mechanisms in place to guarantee the level of the assessment of courses and theses.

It is too early to assess the achieved learning outcomes of the ETSuD programme. The first theses will be written in the first half of 2013. The committee can only conclude that each institution individually and the consortium as a whole have good quality control mechanisms in place. On that basis the committee expects that the level of degrees to be awarded will be guaranteed but at present this cannot be proven on the basis of actual theses.

Because of the explicit ETSuD exam regulations and the positive assessment of the assessment system of Environmental Science the committee assesses this standard as **satisfactory** even in the absence of final theses.

The overall conclusion of the committee on the quality of the ETSuD programme is **satisfactory**.

APPENDICES

Appendix 1: Curricula vitae of the members of the assessment committee

Prof. dr. André van der Beken (chair) has been an emeritus professor at the Free University Brussels (Vrije Universiteit Brussel) since 2003 after having been a full professor since 1979. In 1969 he obtained his PhD in Agricultural Sciences from the University of Ghent. He has been a visiting professor at the Technical University Delft, Dept. of Hydrology (1981-1982), the University of Dar es Salaam, Dept. of Civil Engineering, Tanzania (1983, 1986), the Institut National d'Agronomie de Tunisie, Tunis (1984-1987), the Faculty of Sciences and Technology, Universidad Major San Simon, Cochabamba, Bolivia (1986), WARREDOC, University for Foreigners, Perugia, Italy (1988), the MSc programme in Eremology, University Ghent (1990-1996) and the Centre for Environmental Sanitation, University Ghent (1992 -2004). He has been the Director of the Interuniversity Post-graduate programme in Hydrology and a member of the Steering Committee of the Interuniversity Programme in Water Resources Engineering. André van der Beken was a member of the Peer Review Evaluation of the programmes of the Fonds National de la Recherche Luxembourg (2008-2010) and participated in the assessment of the education and training needs of the water resources management services of the Republic of South Africa (1998).

Prof. Ing. Janos Bogardi has been a co-opted professor in Water Resources at the Faculty of Agriculture of the University of Bonn, Germany since 2004. He obtained his PhD (Dr. Ing.) in Water Resources Management from the University of Karlsruhe in 1979. He has been the Executive Officer of the Global Water System Project of ESSP since 2009 and Senior Fellow since 2010, both at the Center of Development Research of the University of Bonn. Previously he was Director of the Institute for Environment and Human Security of the United Nations University (UNU-EHS) (2003-2009), including the vice-rectorship of the UNU in Europe from 2007 until 2009, worked as a Senior Programme Specialist and Chief of Section at UNESCO, Paris (1995-2003), as a professor at the Agricultural University of Wageningen, the Netherlands (1989-1995) and as an Associate Professor at the Asian Institute of Technology (AIT) in Bangkok, Thailand (1985 – 1988).

He is a member of the Deutsches Komitee für Katastrophenvorsorge (member of the board 2009-2011), of the International Association of Hydrologic Engineering and Research (IAHR) and of the International Association of Scientific Hydrology (IASH).

Dipak Gyawali is *Pragya* (Academician) of the Nepal Academy of Science and Technology (NAST) since 1992 and chairman of *Interdisciplinary Analysts*, a research and consulting firm. He chairs the newly founded liberal arts college, the Nepâ School of Social Sciences and Humanities. He also directs research at the non-profit Nepal Water Conservation Foundation. By profession, he is a hydroelectric power engineer (Moskovsky Energeticheskyy Institute, USSR, 1979) as well as a political economist studying resource use (Energy and Resources Group, University of California, Berkeley, 1986). He has served as Nepal's Minister of Water Resources (responsible for power, irrigation and flood control) between November 2002 and May 2003 and was a UNESCO/UNU-IAS Visiting Professor of Water and Cultural Diversity at the United Nations University in Yokohama, Japan in 2010. He was a member of the panel of experts of the Mekong River Commission and he currently serves on the Steering Committee of the Mekong Program on Water Environment and Resilience (MPower). Previously he has been chair or member of numerous national and international committees and programmes on water research and water management. Dipak Gyawali was a member of the assessment committee UNESCO-IHE in 2007.

Prof. dr. Rivka Kfir has been an Extraordinary Professor and advisor at the Water Institute, University of Pretoria, South Africa since 2011. She obtained her doctorate in medical

microbiology in 1981. She also holds a degree in Management, obtained from the Faculty of Economics and Political Science, University of London (1996). From 2001 until 2011 she was Chief Executive Officer of the Water Research Commission (WRC), Pretoria, South Africa. Before that she was Executive Director: Knowledge Management and Strategy, National Research Foundation, (NRF), Pretoria, South Africa (2000-2001) and Technology Manager, Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa (1996-2000). Rivka Kfir's professional activities include being a member of the Academy of Science of South Africa, ASSAf, the Water Institute of Southern Africa. She was a Founding Board member of the Global Water Research Coalition and a Governing Council member of the International Water Association (IWA). She has published numerous papers and articles.

Prof. dr. Grietje Zeeman is professor in New Sanitation at the Sub-department of Environmental Technology (ETE) at Wageningen University and Research Centre (WUR). She obtained her PhD in Agricultural and Environmental Sciences from Wageningen Agricultural University, The Netherlands in 1991. She has acquired funding for various research projects, such as The London School of Hygiene & Tropical Medicine (2011-2013), STW PhD and Post-doc research on Enhanced Enzymatic Anaerobic Fermentation of Organic Residues (EnzyFOR) (2011-2015). Grietje Zeeman has been on the scientific board for international conferences organised by the International Water Association (IWA) and on the organisation board of other international conferences. Her professional activities include chairing the Technical Committee Anaerobic Digestion (TCA) of the Dutch National Association for Water Quality Management (NVA) and her membership of ONS, an advisory body on New Sanitation.

Franca Kramer BSc obtained her bachelor's degree in Life Science and Technology from Delft University of Technology/University Leiden in 2009 and is currently enrolled as a master's student in Water Management, a specialisation programme in Civil Engineering at Delft University of Technology. Part of her master's programme was a research project at the Technical University Bandung, Indonesia. She participated in a study visit to Israel and Palestina on water management and attended the Young Water Professionals Conference in Leuven 2011. She has been a student member of the educational committee Civil Engineering.

Appendix 2: Programme of the site visit

Time	Subject	Panel
Monday 17 September		
08.45	<i>Welcome day 1</i>	Prof. Andras Szollosi-Nagy, rector Jan Herman Koster, Education Bureau
09:00 – 10:30	Preparatory meeting of the committee: discussing the NVAO framework for limited assessments and joint degrees	
10:30 - 11:30	Inventory and reading of information on programmes and joint degrees, supplied by UNESCO-IHE	
11:30 - 12:15	Discussing the critical reflections and theses of all four programmes	
12:15 – 13:00	<i>Lunch</i>	
13:00 – 14:00	Introductory meeting with the management	Prof. Andras Szollosi-Nagy, rector Prof. Stefan Uhlenbrook, vice-rector Academic Affairs Prof. Maria Kennedy, Chair programme committee MWI Prof. Dano Roelvink, Chair programme committee WSE Prof. Pieter van der Zaag, Chair programme committee WM Greet Vink, Business Director Jan Herman Koster, Education Bureau
14:00 – 14:45	Meeting with students of the master Water Management (students of all different tracks)	Claudia Zamora, WQM, Peru Bunthida Plengsaeng, WCM, Thailand Tobias Angula, WRM, Namibia Joseph Nartey, WRM, Ghana Risch Tratschin, WSM, Switzerland Kurniati Widyastuti, WSM, Indonesia
14:45 – 15:30	Meeting with the programme committee (teachers + student member 'educational committee') of the master Water Management	Prof. Pieter van der Zaag, Chair Jeltsje Kemerink, Programme Coordinator Schalk-Jan van Andel Prof. Meine Pieter van Dijk Safa Fanaian Student member Peter Kelderman Marloes Mul Maria Rusca Klaas Schwartz Jan Herman Koster, Education Bureau
15:30 – 16:00	<i>Break</i>	
16:00 – 16:20	Alumni officer	Maria Laura Sorrentino
16:20 – 17:05	Meeting with students of the master Water Science and Engineering (students of all different tracks)	Fátima Mussá, HWR, Mozambique Alex José Kaune Schmidt, LWD, Germany Eunice Rodrigues da Silva, HECEPD, Portugal Hesam Sanaee, HECEPD, Iran Ricardo González Flores, HERBD, Bolivia Alifita Ariestwi, HI, Indonesia Zhao Yi, HI, China

17:05 – 17:50	Meeting with the programme committee (teachers + student member 'educational committee') of the master Water Science and Engineering	Prof. Dano Roelvink, Chair Erik de Ruyter, Programme Coordinator Schalk Jan van Andel Karen Anguizola, Student member Luigia Brandimarte Prof. Charlotte de Fraiture Shreedhar Maskey Prof. Michael McClain Prof. Arthur Mynett Prof. Dimitri Solomatine Suryadi Prof. Stefan Uhlenbrook Mick van der Wegen Jan Herman Koster, Education Bureau
17:50 – 18:30	Rounding up	
18:30 – 19:00	<i>Travelling time</i>	
19:00 – 21:00	<i>Dinner</i>	
Tuesday 18 September		
08.45	<i>Welcome day 2</i>	
09:00 – 09:45	Meeting with students of the master Environmental Science	Ndayisaba Cyprie, EST, Rwanda Freweyni Tammene, EST, Eritrea Brenda Chimombe, EPM, Zimbabwe Mark Ayertey, WQM, Ghana Perdana Nugroheni, IMETE, Indonesia
09:45 – 10:30	Meeting with the programme committee (teachers + student member 'educational committee') of the master Environmental Science	Prof. Piet Lens, Chair Henk Lubberding, Programme Coordinator Hans van Bruggen Bipin Dangol, Student member Edwin Hes Tineke Hooijmans Prof. Ken Irvine Peter Kelderman Jeltsje Kemerink Prof. Jan Leentvaar Jan Herman Koster, Education Bureau
10:30 – 10:45	<i>Break</i>	
10:45-11:15	Skype conversation with the management committee including representative from AIT Bangkok about the ES Joint Degree programme Environmental Technology for Sustainable Development (ETSuD)	Prof. Piet Lens, UNESCO-IHE Peter van der Steen, UNESCO-IHE Prof. Ajit Annachhatre, AIT Dr. Thammarat, AIT Jan Herman Koster, Education Bureau
11:15 – 11:30	<i>Break</i>	
11:30 – 12:00	Skype conversation with the management committee including representatives from the BOKU university in Austria and the Egerton University in Kenya about the ES Joint Degree programme Limnology and Wetland Management	Edwin Hes, UNESCO-IHE Prof. Ken Irvine, UNESCO-IHE Dr. Kitaka, Egerton University Prof. Owido, Egerton University Dr. Stefan Schmutz, BOKU University Dr. Gerald Winkler, BOKU University Jan Herman Koster, Education Bureau
12:00-12:15	<i>Break</i>	

12:15 – 12:45	Skype conversation with management committee and representatives from the Ghent University and the Institute of Chemical Technology Prague about the ES Joint Degree programme Environmental Technology and Engineering	Prof. Piet Lens, UNESCO-IHE Peter van der Steen, UNESCO-IHE Jan Bartacek, ICT Prague Prof. Gijs du Laing, Ghent University Prof. Filip Tack, Ghent University Jan Herman Koster, Education Bureau
12:45 – 13:30	<i>Lunch</i>	
13:30 – 14:15	Guided tour / Consultation hour (if there are applications for the consultation hour the committee will split on the basis of expertise)	
14:15 – 15:00	Examination Board	Prof. Arthur Mynett, Chair Erick de Jong, Secretary Peter Kelderman Jan Nonner Prof. Dimitri Solomatine Nemanja Trifunovic
15:00 – 15:15	<i>Break</i>	
15:15 – 16:00	Real-life and skype meeting with alumni of all programmes from different countries	Aline Okello, Mozambique, PhD student Nirajan Dhakal, Nepal, PhD student Ali Dastgheib, Iran, UNESCO-IHE staff member Raquel dos Santos, Brazil, UNESCO-IHE staff member Benly Ramirez, Mexico, researcher Maria Pascual, Spain, Evides International Lukas Kwezi, Tanzania (through Skype), National Coordinator Global Water Initiative Julius Kipkemboi, Kenya (through Skype), Egerton University
16:00 – 16:20	Student counsellor <i>NB. For study advise and problems students go to the mentor of the programme committee. With other problems they go to the student counsellor. Because of the international character of UNESCO-IHE there is a short meeting with the student counsellor</i>	Sylvia van Opdorp-Stijlen
16:20 – 18:00	Looking at Joint Degree information and discussion	
18:00 – 18:30	<i>Rounding up</i>	
18:30 – 19:00	<i>Travelling time</i>	
19:00 – 21:00	<i>Dinner</i>	
Wednesday 19 September		
08.45	<i>Welcome day 3</i>	
09:00 – 09:45	Meeting with the students of the master Municipal Water and Infrastructure (students of all different tracks)	Leonard Msenyele, WSE, Tanzania Mira Yuliawati, WSE, Indonesia Angela Salinas, SE, Bolivia Zeeshan Bilal, SE, Pakistan Mohanad Abunada, UWEM, Palestine Sergio Muñoz Vazquez, UWEM, Mexico

09:45 – 10:30	Meeting with the programme committee (teachers + student member ‘educational committee’) of the master master Municipal Water and Infrastructure	Prof. Maria Kennedy, Chair Tineke Hooijmans, Programme Coordinator Prof. Damir Brdjanovic Jan Herman Koster, Education Bureau Maria Rusca Francesco Rubio, Student member Zoran Vojinovic
10:30 – 10:45	<i>Break</i>	
10:45 – 11:15	Skype conversation with the management committee including representative from AIT Bangkok about the MWI Joint Degree programme Urban Water Engineering and Management [NB. Local time in Bangkok: 15:45 – 16:45]	Prof. Damir Brdjanovic, UNESCO-IHE Zoran Vojinovic, UNESCO-IHE Prof. Maria Kennedy, UNESCO-IHE Tineke Hooijmans, UNESCO-IHE Prof. Visvanathan, AIT Dr. Babel, AIT Jan Herman Koster, Education Bureau
11:15 – 12:00	Internal committee meeting: preparation for concluding meeting with management	
12:00 – 12:30	<i>Lunch</i>	
12:30-13:15	Concluding meeting with management	Prof. Stefan Uhlenbrook, vice-rector Academic Affairs Prof. Maria Kennedy, Chair programme committee MWI Prof. Piet Lens, Chair programme committee ES Prof. Dano Roelvink, Chair programme committee WSE Prof. Pieter van der Zaag, Chair programme committee WM Jan Herman Koster, Education Bureau
13:15 – 14:45	Internal committee meeting preparing draft of preliminary results	
14:45-15:15	Preparing public presentation of the chairman	
15:15-15:30	Public presentation of preliminary results by the chairman	
15:30-16:00	Reception	

Appendix 3: Domain-specific framework

Academic field

Unsustainable management of natural resources hampers human development, contributing to unequal distribution of wealth, and impacting ecosystems and the services they provide. Pollution, depletion of resources and disintegration of ecological functions are of global, regional and local concern. These issues will become even more urgent in the future. Wise management of water and other resources, and the link with poverty and sustainable development are major global concerns.

Environmental science is the science of the interactions between the physical, chemical, and biological components of the environment. Environmental science is thus characterised by its use of knowledge from a diverse range of scientific disciplines. It is inherently interdisciplinary linking strongly with social and political structures. An understanding of the field of the environmental science enables the development of solutions to environmental problems, an appreciation of the feasibility and uncertainty of natural resource management, as well as the social, economic and political context with which pressures on the environment exist.

Benchmarking

The MSc programme in Environmental Science at UNESCO-IHE focuses on the aquatic environment. It comprises a range of linked modules, culminating in a period of independent academic research. The programme was revised in 2003, based on a benchmark by a group of experts representing academia and professional practice. This group was invited to critically evaluate the programme on academic content and standards. The review resulted in a number of comments and suggestions on sustainable development issues and the compliance with standards of practice. These have been incorporated into the curriculum.

The programme's learning outcomes are comparable to those of other MSc programmes in Environmental Science. These include the Vrije Universiteit Amsterdam, Open University, Wageningen University, University of Edinburgh and University of London Mary's Queen College. On the other hand, the focus on water issues and on developing countries makes the Environmental Science at UNESCO-IHE different from most comparable ES programmes.

Appendix 4: Intended learning outcomes

Intended learning outcomes per specialisation

Environmental Science and Technology (EST)

After successful completion of the specialisation graduates will be able:

Knowledge and theory

- to demonstrate knowledge and understanding of the physical, chemical and biological processes of the environment, of the socio-economic concepts underlying the functioning and exploitation of environmental systems, and of the complex inter-relationship between the protection and wise use of environmental resources;
- to describe the rationale for an integrated and interdisciplinary approach for the sustainable management of water and environmental resources;
- to identify the impacts of human activities on the environment, under different levels of environmental stress and in different socio-economic contexts;
- to name and explain concepts, instruments and technologies for pollution prevention and remedial actions in a national and international context;

Methods, techniques and tools

- to design, optimise and interpret environmental monitoring and assessment schemes (including statistics and modelling) in order to gain an understanding of problems, trends, causes and effects;
- to apply general methods (including statistics and modelling) in scientific and technological approaches, concepts and interventions;

Analysis, synthesis and integration

- to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of environmental problems, under different socio-economic, cultural and legal contexts, and under often data-poor conditions;
- to contribute as a flexible and creative member in interdisciplinary teams in developing solutions for prevention or remediation of environmental problems, by linking scientific knowledge to engineering interventions and to management decisions in different cultural and socio-economic contexts, and using different research skills;

Research/General academic skills

- to conduct research, independently or in a multidisciplinary team, including the formulation of research questions and hypotheses, the selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations;
- to communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences;
- to demonstrate academic attitude and learning skills (including thinking in multidisciplinary dimensions and distinguishing main issues from minor ones), to enhance and keep up-to-date the acquired knowledge and application skills in a largely independent manner.

Environmental Planning and Management (EPM)

After successful completion of the specialisation graduates will be able:

Knowledge and theory

- to demonstrate knowledge and understanding of the physical, chemical and biological processes of the environment, of the socio-economic concepts underlying the functioning and exploitation of environmental systems, and of the complex inter-relationship between the protection and wise use of environmental resources;
- to describe the rationale for an integrated and interdisciplinary approach for the sustainable management of water and environmental resources;
- to understand the environmental policy cycle and planning process and to analyse and prepare environmental policy strategies, taking into account the impact that society has on water and environmental resources;
- to name and explain principles, concepts and instruments of major national and international water and environmental legislation and common and desired institutional and management arrangements;

Methods, techniques and tools

- to design, optimise and interpret environmental monitoring and assessment schemes (including statistics and modelling) in order to gain an understanding of problems, trends, causes and effects;
- to apply general scientific methods (including statistics and environmental modelling) to processes of water and environmental resources allocation and use at different scales in order to gain an understanding of problems, trends, causes and effects;
- to apply environmental scientific methods (including environmental impact assessment, policy analysis, resource valuation, environmental economics) and models for institutional development with emphasis on policy development, functional decentralisation and good governance;
- to design and facilitate consultation- and decision-making processes between stakeholders, users and their representatives, water managers, politicians and other decision-makers;

Analysis, synthesis and integration

- to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of environmental problems, under different socio-economic, cultural and legal contexts, and under often data-poor conditions;
- to identify and critically assess the different ecological and socio-economic functions and values of the environmental system and the, often competing, interests of the various stakeholders;
- to design comprehensive environmental resources policies and strategies that aim to enhance the sustainable use of the environment especially focusing on water, and that include a suitable combination of technical, legal, administrative and financial measures;

Research/General academic skills

- to conduct research, independently or in a multidisciplinary team, including the formulation of research questions and hypotheses, the selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations;

- to communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences;
- to demonstrate academic attitude and learning skills (including thinking in multidisciplinary dimensions and distinguishing main issues from minor ones), to enhance and keep up-to-date the acquired knowledge and application skills in a largely independent manner

Water Quality Management (WQM)

After successful completion of the specialisation graduates will be able:

Knowledge and theory

- to demonstrate knowledge and understanding of the physical, chemical and biological processes of the environment, of the socio-economic concepts underlying the functioning and exploitation of environmental systems, and of the complex inter-relationship between the protection and wise use of environmental resources;
- to describe the rationale for an integrated and interdisciplinary approach for the sustainable management of water and environmental resources;
- to identify the impacts of human activities on aquatic ecosystems;
- to name and explain principles, concepts and instruments of main national and international water and environmental legislation and common and desired institutional and management arrangements;

Methods, techniques and tools

- to design, optimise and interpret environmental monitoring and assessment schemes (including statistics and modelling) in order to gain an understanding of problems, trends, causes and effects;
- to interpret, design and optimise water quality monitoring and assessment schemes in the watershed;
- to apply experimental, statistical and modelling tools for interpreting and designing water quality management programmes;

Analysis, synthesis and integration

- to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of environmental problems, under different socio-economic, cultural and legal contexts, and under often data-poor conditions;
- to contribute as a flexible and creative member in interdisciplinary teams in developing solutions for water quality management problems;
- to critically analyse and evaluate alternative water quality management programmes in the watershed under different socio-economic and legal contexts, often in data-poor conditions;

Research/General academic skills

- to conduct research, independently or in a multidisciplinary team, including the formulation of research questions and hypotheses, the selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations;
- to communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences;

- to demonstrate academic attitude and learning skills (including thinking in multidisciplinary dimensions and distinguishing main issues from minor ones), to enhance and keep up-to-date the acquired knowledge and application skills in a largely independent manner.

Limnology and Wetland Ecosystems (LWE)

After successful completion of the specialisation graduates will be able:

Knowledge and theory

- to demonstrate knowledge and understanding of the physical, chemical and biological processes of the environment, of the socio-economic concepts underlying the functioning and exploitation of environmental systems, and of the complex inter-relationship between the protection and wise use of environmental resources;
- to describe the rationale for an integrated and interdisciplinary approach for the sustainable management of water and environmental resources;
- to identify the impacts of human activities on freshwater ecosystems in different socio-economic contexts;
- to demonstrate knowledge and understanding of the international water quality guidelines;
- to name and explain concepts, instruments and technologies for protection and remedial actions of freshwater ecosystems;

Methods, techniques and tools

- to design, optimise and interpret environmental monitoring and assessment schemes (including statistics and modelling) in order to gain an understanding of problems, trends, causes and effects;
- to design, optimise and interpret environmental monitoring and assessment schemes for freshwater ecosystems;
- to apply general scientific methods (including statistics and environmental modelling) for the development and application of scientific and technological approaches, concepts and interventions to address problems of freshwater ecosystems;

Analysis, synthesis and integration

- to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of environmental problems, under different socio-economic, cultural and legal contexts, and under often data-poor conditions;
- to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of problems related with freshwater ecosystems, under different socio-economic and legal contexts, and under often data-poor conditions;
- to contribute as a flexible and creative member in interdisciplinary teams in developing solutions for prevention or remediation of freshwater ecosystems problems, by linking scientific knowledge to engineering interventions and to management decisions in different cultural and socioeconomic contexts, and using different levels of available knowledge and information;

Research/General academic skills

- to conduct research, independently or in a multidisciplinary team, including the formulation of research questions and hypotheses, the selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations;

- to communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences;
- to demonstrate academic attitude and learning skills (including thinking in multidisciplinary dimensions and distinguishing main issues from minor ones), to enhance and keep up-to-date the acquired knowledge and application skills in a largely independent manner.

International Masters in Environmental Technology and Engineering (IMETE)

After successful completion of the specialisation graduates will be able:

Knowledge and theory

- to demonstrate knowledge and understanding of the physical, chemical and biological processes of the environment, of the socio-economic concepts underlying the functioning and exploitation of environmental systems, and of the complex inter-relationship between the protection and wise use of environmental resources;
- to describe the rationale for an integrated and interdisciplinary approach for the sustainable management of water and environmental resources;
- to identify the impacts of human activities on the environment, under different levels of environmental stress and in different socio-economic contexts;
- to name and explain concepts, instruments and technologies for pollution prevention and remedial actions to treat polluted water, waste, gas, soils and sediments;

Methods, techniques and tools

- to design, optimise and interpret environmental monitoring and assessment schemes (including statistics and modelling) in order to gain an understanding of problems, trends, causes and effects;
- to apply general methods (including statistics and modelling) in scientific and technological approaches, concepts and interventions;
- to contribute as a flexible and creative member in interdisciplinary teams in developing solutions for prevention or remediation of environmental problems, by linking scientific knowledge to engineering interventions and to management decisions in different cultural and socio-economic contexts, and using different levels of available knowledge and information;

Analysis, synthesis and integration

- to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of environmental problems, under different socio-economic, cultural and legal contexts, and under often data-poor conditions;

Research/General academic skills

- to conduct research, independently or in a multidisciplinary team, including the formulation of research questions and hypotheses, the selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations;
- to communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences;
- to demonstrate academic attitude and learning skills (including thinking in multidisciplinary dimensions and distinguishing main issues from minor ones), to enhance and keep up-to-date the acquired knowledge and application skills in a largely independent manner.

Environmental Technology for Sustainable Development (ETSuD)

After successful completion of the ETSuD programme, graduates will be able:

Knowledge and theory

- to demonstrate knowledge and understanding of the physical, chemical and biological processes of the environment, of the socio-economic concepts underlying the functioning and exploitation of environmental systems, and of the complex inter-relationship between the protection and wise use of environmental resources;
- to describe the rationale for an integrated and interdisciplinary approach for the sustainable management of water and environmental resources;
- to identify the impacts of human activities on the environment, under different levels of environmental stress and in different socio-economic contexts;
- to name and explain concepts, instruments and technologies for pollution prevention and remedial actions in a national and international context;

Methods, techniques and tools

- to design, optimise and interpret environmental monitoring and assessment schemes (including statistics and modelling) in order to gain an understanding of problems, trends, causes and effects;
- to apply general methods (including statistics and modelling) in scientific and technological approaches, concepts and interventions;
- to contribute as a flexible and creative member in interdisciplinary teams in developing solutions for prevention or remediation of environmental problems, by linking scientific knowledge to engineering interventions and to management decisions in different cultural and socio-economic contexts, and using different levels of available knowledge and information;

Analysis, synthesis and integration

- to critically analyse and evaluate a range of options and alternatives for the prevention or remediation of environmental problems, under different socio-economic, cultural and legal contexts, and under often data-poor conditions;

Research/General academic skills

- to conduct research, independently or in a multidisciplinary team, including the formulation of research questions and hypotheses, the selection and application of research methodologies and techniques and the formulation of well-founded conclusions and recommendations;
- to communicate, debate and defend, clearly and systematically, findings and generated insights, and provide rational underpinning of these in oral and written presentations to a variety of audiences;
- to demonstrate academic attitude and learning skills (including thinking in multidisciplinary dimensions and distinguishing main issues from minor ones), to enhance and keep up-to-date the acquired knowledge and application skills in a largely independent manner.

Appendix 5: Final qualifications according to Dublin descriptors

Upon successful completion of the programme, students will have satisfied the final qualifications. These are listed according to the Dublin Descriptors.

Whenever required, specialisation-specific qualifications are added.

A. KNOWLEDGE AND UNDERSTANDING

1. Knowledge of current theory and contemporary developments in Environmental Science.
2. Knowledge of physical, chemical and biological processes of the environment.
3. Understanding of what is meant by “sustainability” and “wise use” of natural resources.
4. The ability to describe the rationale for an integrated and interdisciplinary approach for managing the environment.
5. Understanding the broader scientific, engineering and socio-economic context and the role of other disciplines required for Environmental Science.
6. EST: Knowledge of concepts, instruments and technologies for pollution prevention, treatment and remedial action.
7. EPM: Knowledge of economic, institutional and legal principles, approaches and instruments relating to the environment.
8. EPM: Knowledge of legislative, institutional and management principles and arrangements.
9. WQM: To list and explain legislative, institutional and management principles and arrangements.
10. LWE AND WQM: The ability to recognise the pollution impacts on water quality and identify remedial actions.

B. APPLYING KNOWLEDGE AND UNDERSTANDING

11. The ability to contribute to theoretical, methodological and applied developments in environmental science.
12. The ability to prepare and implement a sound plan for environmental research.
13. The ability to collect, analyse and organise relevant information and to draw sound conclusions on environmental issues.
14. EST: The ability to select and apply instruments and technologies for pollution prevention, treatment and remedial action.
15. EPM: The ability to design and apply models for managing of organisations, institutional development in water policy and decision-making processes incorporating stakeholder involvement.
16. EPM: The ability to formulate environmental policy strategies.
17. WQM: The ability to apply experimental, statistical and modelling tools for interpreting and designing water quality management programmes.
18. LWE: The ability to apply experimental and modelling tools for managing freshwater ecosystems.
19. LWE: The ability to apply knowledge of processes and functions of freshwater ecosystems for their management and protection.

C. MAKING JUDGEMENTS

20. The ability to decide between different environmental ideas and approaches independently, based on available information, and to assess the potential for their application, integration and further development.
21. The ability to select and apply a variety of techniques, tools and procedures in order to evaluate the environmental consequences of different development and intervention scenarios.

22. The ability to reflect critically on the impacts of different activities on the environment.
23. EST: To develop technological solutions for environmental problems based on scientific knowledge.
24. EPM: The ability to enumerate ecological and socio-economic functions and values of an environmental system and related, competing stakeholder interests.
25. EPM: The ability to design environmental policies that incorporate technical, administrative and financial aspects.
26. WQM: The ability to develop technical and managerial solutions for water quality problems on the basis of scientific knowledge.
27. LWE: The ability to develop technical and managerial solutions for problems in freshwater ecosystems on the basis of scientific knowledge.

D. COMMUNICATION

28. The ability to report and communicate environmental results clearly, and to explain and defend the reasoning and assumptions to a variety of audiences.
29. The ability to function effectively in a multi-disciplinary team.
30. EPM AND WQM: The capability to assess interests among different stakeholders and to facilitate decision-making processes.

E. LEARNING SKILLS

31. The ability to absorb, add to and use knowledge, insight and skills in a largely autonomous manner.

Appendix 6: Overview of the curriculum of the programme

	EST	EPM	WQM	LWE	IMETE [#]	ETSuD [#]
1*	Introduction to Environmental Science 1					Semester 1 Aug-Dec Thailand
2	Introduction to Environmental Science 2					* Env. Chemistry & Laboratory * Env. Quality Management * Hazardous Waste Techn. & Management * Selected electives
3	Introduction to Environmental Science 3					Semester 2 Jan-Aug Netherlands
4	Analytical Tools in Environmental Science					
5	Env. Systems Analysis	Env. Systems Analysis	Water Quality Assessment	Kenya	Czech Republic	Env. Systems Analysis
				Lake Ecology	Env. Microbiology Env. Engineering	
6	Env. Engineering	Env. Policy Making	Wetlands for Water Quality	Stream & River Ecology	Wastewater Treatment	Wetlands for Water Quality
					Sludge Management	
7	Env. Monitoring & Modelling	Env. Planning	Env. Planning	East African Wetlands for Water Quality	Atmosphere Prot. & Techn.	Env. Monitoring & Modelling
					Waste Man. & Treatment	
8	Cleaner Production	Water & Env Law	Water & Env Law	Fisheries & Aquaculture	Elective project	Cleaner Production
9	International Fieldtrip			Austria	Belgium	International Fieldtrip
				Microbial Communities & Ecosystem Functioning	Clean Technology Env. Fate & Man. of HM and Metalloids	
10	Aquatic Ecosystems	Managing Water Organisations	Aquatic Ecosystems	Conservation & Restoration Ecology	Microbial Re-use Techn.	Aquatic Ecosystems
					Env. Techn. & Engineering	
11	Solid Waste Management	Watershed & River Basin Management	Watershed & River Basin Management	Group work IWRM	Elective Courses	Watershed & River Basin Management
12	Group work			WQ Monitoring & Bio-indicators		Semester 3-4 Sep-May Thailand

13	MSc Preparation Course and Summer Course	MSc thesis at ÖAW, Egerton or UNESCO- IHE	MSc thesis at ICTP, Ghent University or UNESCO-IHE	Thesis work and Electives
14	MSc Proposal Writing			
15	MSc thesis at UNESCO-IHE			

* Module numbers are applicable to EST, EPM, WQM and LWE, programme duration; 18 months
ETSuD (20 months) and IMETE (24 months) follow a semester structure

Appendix 7: Quantitative data regarding the programme

Table 1. Student numbers in the Environmental Science programme per cohort over the last six years.

Cohort	Students	Failed/Stopped	MSc degree	Completion rate
2005-2007	44	0	44	100%
2006-2008	50	2	48	51%
2007-2009	39	1	38	97%
2008-2010	41	0	41	100%
2009-2011	57	5	52	91%
2010-2012	37	5	32	84%

Table 2. Staff input and teacher-student ratio achieved in MSc degree programme Environmental Science

Academic year	Programme part	FTE input	Student/FTE
2010-2012	Taught part UNESCO-IHE staff	3.1	9.7
2010-2012	Taught part guest lecturers	0.5	
2010-2012	MSc supervision	1.2	22.5

Table 3. Average contact hours within the MSc degree programme Environmental Science

Study phase	Contact hours
Taught part	560 hours
MSc thesis research	50 hours

Appendix 8: Documents studied by the committee during the visit

In addition to the information provided in the critical reflection and its annexes the committee investigated the following documents that were made available during the site visit:

- Overview of the curriculum, in relation to other MSc programmes at UNESCO-IHE;
- Outline description of two modules [stating learning outcomes, teaching method(s), attainment targets, assessment methods, literature (mandatory/recommended), teacher and credits;
- Minutes of the Programme Committee 2011 and 2012;
- Examination Board meeting minutes 2011 and 2012;
- Staff satisfaction survey 2012;
- Information about the joint degree programmes LWM, ETSuD and IMETE including cooperation agreement, management structure, joint education and examination regulations and the programme structure;
- Reports of audit visits to double and joint degree non-EU partners, including their accreditation status, CVs of academic staff teaching in the joint programme, facilities and quality assurance:
 - AIT, Bangkok;
 - Universidad del Valle, Colombia;
 - Egerton University, Kenya;
- Teaching and examination regulations;
- Programme Handbook 2011-2013;
- Preparation Guide and Practical Guide for students;
- Sample of Diploma and Diploma Supplement;
- Alumni Tracer Survey 2011.

The committee studied ten theses, which were selected at random by the project leader and the chair of the committee.

Environmental Planning and Management EPM	28035
	29797
	29894
Environmental Science and Technology EST	30303
	26984
	31949
Limnology and Wetland Ecosystems LWE	27425
	31035
Water Quality Management WQM	27615
	27022

Appendix 9: Programme structure IMETE

1. General courses (71 EC to be taken from the list below)

1.1 General competence and background courses, UNESCO-IHE Delft

Introduction to Environmental Science 1	semester 1	5 EC
Introduction to Environmental Science 2	semester 1	5 EC
Introduction to Environmental Science 3	semester 1	5 EC
Introduction to Environmental Science 4	semester 1	5 EC

1.2 Advanced and specialisation courses, ICT Prague

Environmental Microbiology	semester 2	5 EC
Environmental Engineering	semester 2	5 EC
Wastewater Treatment	semester 2	5 EC
Sludge Management	semester 2	2 EC
Atmosphere Protection Technology	semester 2	4 EC
Waste Management and Treatment	semester 2	4 EC
Elective Project	semester 2	5 EC

1.3 Transferable skills course, UNESCO-IHE, ICT Prague, University of Ghent

Scientific skills	semester 1+2	6 EC
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1.4 Specialisation courses, University of Ghent, Belgium

Clean Technology	semester 3	3 EC
Environm. Fate and Management of Heavy Metals and Metalloids	semester 3	5 EC
Microbial Re-use Technology	semester 3	3 EC
Summer school Environmental Technology and Engineering	before sem. 3	5 EC

2. Elective courses (19 EC to select from one to four modules from the list below)

2.1 Elective language courses (max. 4 EC to be taken from the list below)

Basic Dutch for foreigners, UNESCO-IHE	semester 1	2 EC
Basics of Czech, ICTP	semester 2	2 EC

2.2 Elective English-taught specialisation courses, University of Ghent (max. 19 EC to be taken from the list below)

Advanced Waste Gas Treatment	semester 3	3 EC
Applied Isotopes	semester 3	5 EC
Applied Statistics	semester 3	5 EC
Ecological Risk Assessment	semester 3	4 EC
Environmental Constructions	semester 3	5 EC
Environmental Ecology	semester 3	7 EC
Environmental Noise	semester 3	3 EC
Geostatistics	semester 3	5 EC
Life Cycle Assessment	semester 3	3 EC

Membrane Processes in Environmental Technology	semester 3	3 EC
Modeling and Control of Waste Water Treatment Plants	semester 3	3 EC
Quality of Groundwater Resources	semester 3	5 EC
Soil Degradation	semester 3	5 EC
Soil Water Management	semester 3	3 EC
Urban and Indoor Air Pollution	semester 3	5 EC
Internship	before sem. 3	5 EC

2.3 Elective Dutch-taught specialisation courses, University of Ghent (max. 19 EC to be taken from the Dutch-taught study programme Master of Bioscience Engineering: Environmental Technology in the third semester in Ghent)

2.4 Elective online course, UNESCO-IHE (max. 5 EC to be taken from the list below)

Cleaner Production and the Water Cycle	semester 3	5 EC
Constructed Wetlands for Wastewater Treatment	semester 3	5 EC
Ecological Sanitation	semester 4	5 EC
Sanitation-related Urban Groundwater Pollution	semester 4	5 EC

3. Master Dissertation	semester 4	30 EC
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Appendix 10: Programme structure LWM

1. Structure of the international Joint Master programme in Limnology and Wetland Management

1.1 Compulsory courses at BOKU	28.0 EC
1.2 Compulsory courses at Egerton University	22.4 EC
1.3 Compulsory courses at UNESCO-IHE	26.2 EC
1.4 Elective courses (to be selected at BOKU, EGU, UNESCO-IHE)	13.4 EC
1.5 Master's thesis	30.0 EC
Total	120 EC*

120 EC in Austria = 106 EC in the Netherlands

2. Module overview

BOKU study period

LWM1 Basics in Limnology	9 EC
LWM2 Ecology of Aquatic Organisms	6 EC
LWM3 Basics in Applied Limnology	6 EC
LWM4 Aquatic Ecosystem Management	4 EC
LWM5 Scientific Working	3 EC

Egerton study period

LWM6 Lake Ecology	5.6 EC
LWM7 Stream and River Ecology	5.6 EC
LWM8 Wetlands for Water Quality	5.6 EC
LWM9 Fisheries and Aquaculture	5.6 EC

UNESCO-IHE study period

LWM10 Wetlands for Livelihoods and Conservation	5.6 EC
LWM11 Aquatic Ecosystems: Processes and Applications	5.6 EC
LWM12 Data Analysis and Modeling for Aquatic Ecosystems	5.6 EC
LWM13 Group work	5.6 EC
LWM14 Research Methods and Summer School	3.8 EC

Electives/MSc proposal

LWM15 Research plan, logistics, site assessment, application and societal relevance	13.4 EC
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MSc Thesis

LWM16 MSc Research and Thesis Writing	30 EC
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Appendix 11: Programme structure ETSuD

Composition of the Joint Master programme in Environmental Technologies for Sustainable Development

AIT	
Environmental Chemistry and Laboratory	7.5 EC
Environmental Quality Management	7.5 EC
Any two courses out of:	15 EC
Air Pollution and Management	
Solid Waste Management	
Environmental Impact Assessment	
Industrial Waste Abatement and Management	
Elective	5 EC
UNESCO-IHE	
Analytical Tools in Environmental Science	5 EC
Environmental Systems Analysis	5 EC
Wetlands for Water Quality	5 EC
Advanced Water Treatment	5 EC
Cleaner Production and the Water Cycle	5 EC
International Fieldtrip and Fieldwork	5 EC
Elective	5 EC
Master's thesis proposal preparation	7 EC
AIT	
Master's thesis work	48 EC
Total	125 EC

Appendix 12: Declarations of independence



DECLARATION OF INDEPENDENCE AND CONFIDENTIALITY

TO BE SUBMITTED PRIOR TO THE ASSESSMENT OF THE PROGRAMME

THE UNDERSIGNED

A. VAN DER BEKEN
F. Laurentplein 45
9000 GENT

NAME:

HOME ADDRESS:

HAS BEEN ASKED TO ASSESS THE FOLLOWING PROGRAMME AS AN EXPERT / SECRETARY:

UNESCO - IHE

APPLICATION SUBMITTED BY THE FOLLOWING INSTITUTION:

HEREBY CERTIFIES TO NOT MAINTAINING ANY (FAMILY) CONNECTIONS OR TIES OF A PERSONAL NATURE OR AS A RESEARCHER / TEACHER, PROFESSIONAL OR CONSULTANT WITH THE ABOVE INSTITUTION, WHICH COULD AFFECT A FULLY INDEPENDENT JUDGEMENT REGARDING THE QUALITY OF THE PROGRAMME IN EITHER A POSITIVE OR A NEGATIVE SENSE;



HEREBY CERTIFIES TO NOT HAVING MAINTAINED SUCH CONNECTIONS OR TIES WITH THE INSTITUTION DURING THE PAST FIVE YEARS;

CERTIFIES TO OBSERVING STRICT CONFIDENTIALITY WITH REGARD TO ALL THAT HAS COME AND WILL COME TO HIS/HER NOTICE IN CONNECTION WITH THE ASSESSMENT, INSOFAR AS SUCH CONFIDENTIALITY CAN REASONABLY BE CLAIMED BY THE PROGRAMME, THE INSTITUTION OR NVAO;

HEREBY CERTIFIES TO BEING ACQUAINTED WITH THE NVAO CODE OF CONDUCT.

PLACE: GENT

DATE: 26 APRIL 2012

SIGNATURE:

A. VAN DER BEKEN
F. Laurentplein 45
9000 GENT



DECLARATION OF INDEPENDENCE AND CONFIDENTIALITY

TO BE SUBMITTED PRIOR TO THE ASSESSMENT OF THE PROGRAMME

THE UNDERSIGNED

NAME: Rihakfir

HOME ADDRESS: 97 Verbenia dr.
Lynnwood Lodge, Pretoria 0081
South Africa

HAS BEEN ASKED TO ASSESS THE FOLLOWING PROGRAMME AS AN EXPERT / SECRETARY:

Four Month degree programmes at UNESCO-IHE
Institute for Water Education

APPLICATION SUBMITTED BY THE FOLLOWING INSTITUTION:

QANU - Quality Assurance Netherlands University

HEREBY CERTIFIES TO NOT MAINTAINING ANY (FAMILY) CONNECTIONS OR TIES OF A PERSONAL NATURE OR AS A RESEARCHER / TEACHER, PROFESSIONAL OR CONSULTANT WITH THE ABOVE INSTITUTION, WHICH COULD AFFECT A FULLY INDEPENDENT JUDGEMENT REGARDING THE QUALITY OF THE PROGRAMME IN EITHER A POSITIVE OR A NEGATIVE SENSE;

1



HEREBY CERTIFIES TO NOT HAVING MAINTAINED SUCH CONNECTIONS OR TIES WITH THE INSTITUTION DURING THE PAST FIVE YEARS;

CERTIFIES TO OBSERVING STRICT CONFIDENTIALITY WITH REGARD TO ALL THAT HAS COME AND WILL COME TO HIS/HER NOTICE IN CONNECTION WITH THE ASSESSMENT, INSOFAR AS SUCH CONFIDENTIALITY CAN REASONABLY BE CLAIMED BY THE PROGRAMME, THE INSTITUTION OR NVAO;

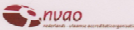
HEREBY CERTIFIES TO BEING ACQUAINTED WITH THE NVAO CODE OF CONDUCT.

PLACE: Pretoria, South Africa

DATE: 26-04-2012

SIGNATURE:

2


DECLARATION OF INDEPENDENCE AND CONFIDENTIALITY
 TO BE SUBMITTED PRIOR TO THE ASSESSMENT OF THE PROGRAMME

THE UNDERSIGNED

NAME: Prof. Dr. Janos BOGARDI

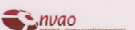
HOME ADDRESS: Bog Str. 14 53474 Bad Neuenahr
Amweiler, Germany

HAS BEEN ASKED TO ASSESS THE FOLLOWING PROGRAMME AS AN EXPERT / SECRETARY:
Degree Programmes of UNESCO-IHE Institute for Water Education, Delft, the Netherlands

APPLICATION SUBMITTED BY THE FOLLOWING INSTITUTION:
QANU

HEREBY CERTIFIES TO NOT MAINTAINING ANY (FAMILY) CONNECTIONS OR TIES OF A PERSONAL NATURE OR AS A RESEARCHER / TEACHER, PROFESSIONAL OR CONSULTANT WITH THE ABOVE INSTITUTION, WHICH COULD AFFECT A FULLY INDEPENDENT JUDGEMENT REGARDING THE QUALITY OF THE PROGRAMME IN EITHER A POSITIVE OR A NEGATIVE SENSE.

1


 HEREBY CERTIFIES TO NOT HAVING MAINTAINED SUCH CONNECTIONS OR TIES WITH THE INSTITUTION DURING THE PAST FIVE YEARS.

CERTIFIES TO OBSERVING STRICT CONFIDENTIALITY WITH REGARD TO ALL THAT HAS COME AND WILL COME TO HIS/HER NOTICE IN CONNECTION WITH THE ASSESSMENT, INsofar AS SUCH CONFIDENTIALITY CAN REASONABLY BE CLAIMED BY THE PROGRAMME, THE INSTITUTION OR NVAQ.


HEREBY CERTIFIES TO BEING ACQUAINTED WITH THE NVAQ CODE OF CONDUCT.

PLACE: Bad Neuenahr DATE: 26 April 2012

SIGNATURE: [Signature]

2

Q 387


DECLARATION OF INDEPENDENCE AND CONFIDENTIALITY
 TO BE SUBMITTED PRIOR TO THE ASSESSMENT OF THE PROGRAMME

THE UNDERSIGNED

NAME: DIPAK GYAWALI

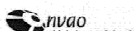
HOME ADDRESS: 1 KOTHULA CHHI, PATAN DHOKA,
LALITPUR-21, GPO Box 3371, KATHMANDU
NEPAL

HAS BEEN ASKED TO ASSESS THE FOLLOWING PROGRAMME AS AN EXPERT / SECRETARY:
UNESCO-IHE INSTITUTE FOR WATER
EDUCATION

APPLICATION SUBMITTED BY THE FOLLOWING INSTITUTION:
QANU

HEREBY CERTIFIES TO NOT MAINTAINING ANY (FAMILY) CONNECTIONS OR TIES OF A PERSONAL NATURE OR AS A RESEARCHER / TEACHER, PROFESSIONAL OR CONSULTANT WITH THE ABOVE INSTITUTION, WHICH COULD AFFECT A FULLY INDEPENDENT JUDGEMENT REGARDING THE QUALITY OF THE PROGRAMME IN EITHER A POSITIVE OR A NEGATIVE SENSE.

1


 HEREBY CERTIFIES TO NOT HAVING MAINTAINED SUCH CONNECTIONS OR TIES WITH THE INSTITUTION DURING THE PAST FIVE YEARS.

CERTIFIES TO OBSERVING STRICT CONFIDENTIALITY WITH REGARD TO ALL THAT HAS COME AND WILL COME TO HIS/HER NOTICE IN CONNECTION WITH THE ASSESSMENT, INsofar AS SUCH CONFIDENTIALITY CAN REASONABLY BE CLAIMED BY THE PROGRAMME, THE INSTITUTION OR NVAQ.

HEREBY CERTIFIES TO BEING ACQUAINTED WITH THE NVAQ CODE OF CONDUCT.

PLACE: KATHMANDU DATE: 14 Sept. 2012

SIGNATURE: Dipak Gyawali

2



DECLARATION OF INDEPENDENCE AND CONFIDENTIALITY
TO BE SUBMITTED PRIOR TO THE ASSESSMENT OF THE PROGRAMME
THE UNDERSIGNED

NAME: Grietje Zeeman

HOME ADDRESS: Geertjesweg 108, 6706EE Wageningen, The Netherlands

HAS BEEN ASKED TO ASSESS THE FOLLOWING PROGRAMME AS AN EXPERT /
The four MSc programmes of UNESCO-IHE

APPLICATION SUBMITTED BY THE FOLLOWING INSTITUTION:
QANU

HEREBY CERTIFIES TO NOT MAINTAINING ANY (FAMILY) CONNECTIONS OR TIES
OF A PERSONAL NATURE OR AS A RESEARCHER / TEACHER, PROFESSIONAL OR
CONSULTANT WITH THE ABOVE INSTITUTION, WHICH COULD AFFECT A FULLY
INDEPENDENT JUDGEMENT REGARDING THE QUALITY OF THE PROGRAMME IN
EITHER A POSITIVE OR A NEGATIVE SENSE.

HEREBY CERTIFIES TO NOT HAVING MAINTAINED SUCH CONNECTIONS OR TIES
WITH THE INSTITUTION DURING THE PAST FIVE YEARS.

CERTIFIES TO OBSERVING STRICT CONFIDENTIALITY WITH REGARD TO ALL
THAT HAS COME AND WILL COME TO HIS/HER NOTICE IN CONNECTION WITH
THE ASSESSMENT, IN SO FAR AS SUCH CONFIDENTIALITY CAN REASONABLY BE
CLAIMED BY THE PROGRAMME, THE INSTITUTION OR NVAO.

HEREBY CERTIFIES TO BEING ACQUAINTED WITH THE NVAO CODE OF
CONDUCT.

PLACE: Wageningen

DATE: 13-11-2012

SIGNATURE:

20369



DECLARATION OF INDEPENDENCE AND CONFIDENTIALITY
TO BE SUBMITTED PRIOR TO THE ASSESSMENT OF THE PROGRAMME
THE UNDERSIGNED

THE UNDERSIGNED

NAME:
FRANCA KRAMER

HOME ADDRESS:
CLOUWENSTRAAT 10
2611 RD Delft

HAS BEEN ASKED TO ASSESS THE FOLLOWING PROGRAMME AS AN EXPERT /
SECRETARY:

4 MSc's UNESCO-IHE

APPLICATION SUBMITTED BY THE FOLLOWING INSTITUTION:

Unesco-IHE

HEREBY CERTIFIES TO NOT MAINTAINING ANY (FAMILY) CONNECTIONS OR TIES
OF A PERSONAL NATURE OR AS A RESEARCHER / TEACHER, PROFESSIONAL OR
CONSULTANT WITH THE ABOVE INSTITUTION, WHICH COULD AFFECT A FULLY
INDEPENDENT JUDGEMENT REGARDING THE QUALITY OF THE PROGRAMME IN
EITHER A POSITIVE OR A NEGATIVE SENSE.



HEREBY CERTIFIES TO NOT HAVING MAINTAINED SUCH CONNECTIONS OR TIES
WITH THE INSTITUTION DURING THE PAST FIVE YEARS.

CERTIFIES TO OBSERVING STRICT CONFIDENTIALITY WITH REGARD TO ALL
THAT HAS COME AND WILL COME TO HIS/HER NOTICE IN CONNECTION WITH
THE ASSESSMENT, IN SO FAR AS SUCH CONFIDENTIALITY CAN REASONABLY BE
CLAIMED BY THE PROGRAMME, THE INSTITUTION OR NVAO.

HEREBY CERTIFIES TO BEING ACQUAINTED WITH THE NVAO CODE OF
CONDUCT.

PLACE:
Delft

DATE:
13-11-2012

SIGNATURE:

Q307



ONAFHANKELIJKHEIDS- EN GEHEIMHOUDINGSVERKLARING
INDIENEN VOORAFGAAND AAN DE OPLEIDINGSBEOORDELING

ONDERGETEKENDE

NAAM: Marianne van der Weijden

PRIVE ADRES: Hamerwijk 62
3581 NJ Utrecht

IS ALS DESKUNDIGE / SECRETARIS GEVRAAGD VOOR HET BEOORDELEN VAN DE OPLEIDING:
UNESCO-IHE

AANGEVRAAGD DOOR DE INSTELLING:
QANU

VERKLAART HIERBIJ GEEN (FAMILIE)RELATIES OF BANDEN MET BOVENGENOEMDE INSTELLING TE ONDERHOUDEN, ALS PRIVÉPERSOON, ONDERZOEKER / DOCENT, BEROEPSBEOEFENAAR OF ALS ADVISEUR, DIE EEN VOLSTREKT ONAFHANKELIJKE OORDELSVORMING OVER DE KWALITEIT VAN DE OPLEIDING TEN POSITIEVE OF TEN NEGATIEVE ZOUDE KUNNEN BEÏNVLOEDEN.

1



VERKLAART HIERBIJ ZODANIGE RELATIES OF BANDEN MET DE INSTELLING DE AFGELOPEN VIJF JAAR NIET GEHAD TE HEBBEN;

VERKLAART STRIKTE GEHEIMHOUDING TE BETRACHTEN VAN AL HETGEEN IN VERBAND MET DE BEOORDELING AAN HEM/HAAR BEKEND IS GEWORDEN EN WORDT, VOOR ZOVER DE OPLEIDING, DE INSTELLING OF DE NVAO HIER REDELIJKERWIJS AANSPRAAK OP KUNNEN MAKEN

VERKLAART HIERBIJ OP DE HOOGTE TE ZIJN VAN DE NVAO GEDRAGSCODE.

PLAATS: Utrecht DATUM: 14-9-2012

HANDTEKENING:

2



ONAFHANKELIJKHEIDS- EN GEHEIMHOUDINGSVERKLARING
INDIENEN VOORAFGAAND AAN DE OPLEIDINGSBEOORDELING

ONDERGETEKENDE

NAAM: Adrienne Wieldraaijer-Huizer

PRIVE ADRES: Jupiter 116
1188 EJ Amstelveen

IS ALS DESKUNDIGE / SECRETARIS GEVRAAGD VOOR HET BEOORDELEN VAN DE OPLEIDING:
projectleider
4 masteropleidingen Unesco-IHE

AANGEVRAAGD DOOR DE INSTELLING:
Unesco-IHE

VERKLAART HIERBIJ GEEN (FAMILIE)RELATIES OF BANDEN MET BOVENGENOEMDE INSTELLING TE ONDERHOUDEN, ALS PRIVÉPERSOON, ONDERZOEKER / DOCENT, BEROEPSBEOEFENAAR OF ALS ADVISEUR, DIE EEN VOLSTREKT ONAFHANKELIJKE OORDELSVORMING OVER DE KWALITEIT VAN DE OPLEIDING TEN POSITIEVE OF TEN NEGATIEVE ZOUDE KUNNEN BEÏNVLOEDEN.

1



VERKLAART HIERBIJ ZODANIGE RELATIES OF BANDEN MET DE INSTELLING DE AFGELOPEN VIJF JAAR NIET GEHAD TE HEBBEN;

VERKLAART STRIKTE GEHEIMHOUDING TE BETRACHTEN VAN AL HETGEEN IN VERBAND MET DE BEOORDELING AAN HEM/HAAR BEKEND IS GEWORDEN EN WORDT, VOOR ZOVER DE OPLEIDING, DE INSTELLING OF DE NVAO HIER REDELIJKERWIJS AANSPRAAK OP KUNNEN MAKEN.

VERKLAART HIERBIJ OP DE HOOGTE TE ZIJN VAN DE NVAO GEDRAGSCODE.

PLAATS: Amstelveen DATUM: 2-9-2012

HANDTEKENING:

2

Appendix 13: List of abbreviations

AIT	Asian Institute of Technology, Bangkok
BOKU	Universität für Bodenkultur, Austria
EC	European Credit
EPM	Environmental Planning & Management
ES	Environmental Science
EST	Environmental Science and Technology
ETSuD	Environmental Technologies for Sustainable Development
FRM	Flood Risk Management
fte	full-time equivalent
HECEPD	Hydraulic Engineering Coastal Engineering and Port Development
HELWD	Hydraulic Engineering Land and Water Development
HERBD	Hydraulic Engineering River Basin Development
HI	Hydroinformatics
HWR	Hydrology and Water Resources
ICT Prague	Institute of Chemical Technology Prague
IMETE	International Masters in Environmental Technology and Engineering
IWRM	Integrated Water Resources Management
KNUST	Kwame Nkrumah University of Science and Technology, Ghana
LWE	Limnology and Wetland Ecosystems
LWM	Limnology and Wetland Management
MSc	Master of Science
MWI	Municipal Water and Infrastructure
NVAO	Nederlands-Vlaamse Accreditatie Organisatie (Accreditation Organisation of the Netherlands and Flanders)
QANU	Quality Assurance Netherlands Universities
SE	Sanitary Engineering
UniValle	Universidad del Valle, Colombia
UWEM	Urban Water Engineering and Management
WCM	Water Conflict Management
WM	Water Management
WQM	Water Quality Management
WRM	Water Resources Management
WSE	Water Science and Engineering
WSE	Water Supply Engineering