



AGENTUR FÜR
QUALITÄTSSICHERUNG DURCH
AKKREDITIERUNG VON
STUDIENGÄNGEN E.V.

EXPERTS' REPORT

WATER MANAGEMENT (MASTER OF SCIENCE)

WATER MANAGEMENT (PHD)

Addis Ababa University (Ethiopia) / African Centre of
Excellence for Water Management (ACEWM)

December 2021



HEI	Addis Ababa University (Ethiopia) / African Centre of Excellence for Water Management (ACEWM)
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Programme	Water Management (with specialisations in “Hydrology and Water Resources”, “Water Quality Management”, “Aquatic Ecosystems Management”, “Water Supply and Sanitation”, and “Water and Wastewater Treatment Technology”)
Degree	Master of Science
Extent	100 CP
Length of studies	4 semesters
Language	English

Programme	Water Management (with specialisations in “Hydrology and Water Resources Management”, “Aquatic Ecosystems and Environmental Management”, and “Water Science and Technology”)
Degree	PhD
Extent	56 CP
Length of studies	4-6 semesters
Language	English

Concept accreditation	<input type="checkbox"/>
First-time international accreditation	<input checked="" type="checkbox"/>
No. reaccreditation	

Responsible agency	AQAS e.V.
Responsible consultant(s)	Patrick Heinzer & Annette Büning

Content

I. Decision of the Accreditation Commission of AQAS	4
II. Preamble	7
a. Criteria.....	7
b. Approach and methodology	7
III. General Information on the University	9
IV. Assessment of the study programme(s)	11
1. Quality of the Curriculum/ Aims and structure of the doctoral programme	11
1.1. Master programme “Water Management” (with five specialisations).....	11
1.2 PhD programme “Water Management” (with three specializations)	16
2. Procedures for Quality Assurance	18
3. Learning, Teaching and Assessment of Students / Learning and Assessment of Students	20
4. Student Admission, Progression, Recognition and Certification / Legal Status, Admission and Certification	22
5. Teaching Staff / Academic Level of Supervisory Staff	24
6. Learning Resources and Student Support / Support and Research Environment	25
7. Public Information	28
V. Findings.....	29

Decision of the AQAS Commission

on the Master's programme

"Water Management" (Master of Science)

(with specialisations in "Hydrology and Water Resources", "Water Quality Management", "Aquatic Ecosystems Management", "Water Supply and Sanitation", and "Water and Wastewater Treatment Technology")

and the PhD programme

"Water Management" (PhD)

(with specialisations in "Hydrology and Water Resources Management", "Aquatic Ecosystems and Environmental Management", and "Water Science and Technology")

offered by

Addis Ababa University, Ethiopia

Based on the report of the expert panel and the discussions of the AQAS Commission in its 11th meeting on 6 December 2021, the AQAS Commission decides:

1. The study programme **"Water Management" (Master of Science)** (with specialisation in "Hydrology and Water Resources", "Water Quality Management", "Aquatic Ecosystems Management", "Water Supply and Sanitation", and "Water and Wastewater Treatment Technology") within the **African Centre of Excellence for Water Management** and offered by **Addis Ababa University (Ethiopia)** is accredited according to the AQAS criteria for Programme Accreditation.

The PhD programme **"Water Management" (PhD)** (with specialisations in "Hydrology and Water Resources Management", "Aquatic Ecosystems and Environmental Management", and "Water Science and Technology") within the **African Centre of Excellence for Water Management** and offered by **Addis Ababa University (Ethiopia)** is accredited according to the AQAS criteria for PhD programmes.

The accreditations are conditional.

The study programmes essentially comply with the requirements defined by the criteria and thus the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) and the European Qualifications Framework (EQF) in their current version. The required adjustments can be implemented within a time period of twelve months.

2. The conditions have to be fulfilled. The fulfilment of the conditions has to be documented and reported to AQAS no later than **31 December 2022**.
3. The accreditation is given for the period of **six years** and is valid until **30 September 2027**.

Conditions:

1. It must be demonstrated that students of the specialisation track "Hydrology and Water Resources" acquire the following essential Water Management related aspects:

- a. Modelling competencies including the four aspects of modelling;
 - b. transboundary river management competencies.
2. The course descriptions must be revised. Special attention must be paid to the following:
 - a. A clarification on the course responsibilities within the ACEWM is required;
 - b. the literature used in the courses must be systematically updated.
 - c. Where applicable, an indication of methodical competencies in the description of the courses is needed.
3. Systematic validation of the workload of courses and the reflection on the workload basis per credit hour is required.
4. A document (e.g. Diploma Supplement) for graduates has to be drafted explaining the position of the awarded degree in the Ethiopian higher education system and the academic degree structure in Ethiopia.
5. It must be conceptualised how ACEWM will cover all elective courses offered in both programmes with full-time staff to get more independent from external lectures on a medium-term.
6. It must be assured that all relevant and up-to-date information on the programmes is published to external stakeholders, such as prospective students.

The following **recommendations** are given for further improvement of the programmes:

1. It is recommended to integrate more methodological competencies within relevant courses to foster practical skills of graduates in the Master's programme.
2. A tracer study of Master's and PhD alumni should be implemented to follow potential career paths and detect more easily which changes in the needs of the labour market.
3. It should be assured that the admission criteria for Master's students cover specialisation-specific elements to ensure that the common Master's courses fit entirely to the skills and competencies of all students.
4. In further developing the curricula, it might be wise to expand the elective possibilities for Master's and PhD students.
5. The exchange with the private sector and enterprises should be fostered to detect easier changes in the needs of the labour market.
6. The interdependence of sanitation topics including water supply, urban drainage and wastewater management should be conveyed clearer in the specialisations "Water Supply and Sanitation" and "Water and Wastewater Treatment Technology" of the Master's programme to underline the proximity of both specialisations.
7. It should be assured that fieldwork remains an essential part of the Master's programme, especially in the specialisation modules, as it is essential to the graduate's profile.
8. It might be wise to implement additional regulation that is Centre-specific, and which needs to be followed by all ACEWM students.
9. The common PhD courses should systematically integrate leadership competencies.

EXPERTS' REPORT**ON THE MASTER PROGRAMME**

WATER MANAGEMENT (M.SC.) (WITH THE SPECIALISATIONS IN “HYDROLOGY AND WATER RESOURCES”, “WATER QUALITY MANAGEMENT”, “AQUATIC ECOSYSTEMS MANAGEMENT”, “WATER SUPPLY AND SANITATION”, AND “WATER AND WASTEWATER TREATMENT TECHNOLOGY”)

AND THE DOCTORAL DEGREE PROGRAMME

WATER MANAGEMENT (PHD) (WITH SPECIALISATIONS IN “HYDROLOGY AND WATER RESOURCES MANAGEMENT”, “AQUATIC ECOSYSTEMS AND ENVIRONMENTAL MANAGEMENT”, AND “WATER SCIENCE AND TECHNOLOGY”)

OFFERED BY ADDIS ABABA UNIVERSITY (ETHIOPIA)

Digital Site visit to the university: 11 – 14 October 2021

Panel of Experts:

Prof. Dr. Markus Disse	Technical University Munich (Germany), School of Engineering and Design, Department of Civil and Environmental Engineering, Chair of Hydrology and River Basin Management
Prof. Dr. Jörg Londong	Bauhaus-Universität Weimar (Germany), Chair of Urban Water Management and Sanitation
Prof. Dr. Hendrik Schubert	Rostock University (Germany), Faculty of Mathematics and Natural Sciences, Institute for Biosciences, Chair of Aquatic Ecology
Prof. Dr. Martin Socher	Dresden University of Applied Sciences (Germany), Faculty of Agriculture/Environment/Chemistry, Professor “Environmental Technologies in the Water Sector”
Dr. Georg Petersen	HYDROC GmbH (Germany), Hydraulic engineer (Labour market representative)
Carsten Schiffer	Student at RWTH Aachen University (Student representative)

Coordinators:

Patrick Heinzer & Annette Büning AQAS, Cologne, Germany

II. Preamble

AQAS – Agency for Quality Assurance through Accreditation of Study Programmes – is an independent non-profit organisation, supported by more than 90 member institutions, both higher education institutions (HEIs) and academic associations. Since 2002, the agency has been accredited by the German Accreditation Council (GAC). It is therefore a notified body for accreditation of higher education institutions and programmes in Germany.

AQAS is a full member of ENQA and also listed in the European Quality Assurance Register for Higher Education (EQAR) which confirms that our procedures comply with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), on which all Bologna countries agreed as a basis for internal and external quality assurance.

AQAS is an institution founded by and working for higher education institutions and academic associations. The agency is devoted to quality assurance and quality development of both academic studies and teaching in Higher Education Institutions. The activities of AQAS in accreditation are neither restrained to specific academic disciplines or degrees nor to a certain type of Higher Education Institution.

Accreditation procedure

This report results from the external review of the programmes in “Hydrology and Water resources” (Master of Science), “Water Quality Management” (Master of Science), “Aquatic Ecosystems Management” (Master of Science), “Water and Wastewater Treatment Technology” (Master of Science), and “Water management” (PhD; with the specialisations in “Hydrology and Water resources management”, “Aquatic Ecosystems and Environmental management”, and “Water Science and Technology”) offered by Addis Ababa University (Ethiopia).

a. Criteria

The programme is assessed against a set of criteria for accreditation developed by AQAS. The criteria are based on the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) 2015. To facilitate the review each criterion features a set of indicators that can be used to demonstrate the fulfilment of the criteria. However, if single indicators are not fulfilled this does not automatically mean that a criterion is not met. The indicators need to be discussed in the context of the programme since not all indicators necessarily can be applied to a programme.

b. Approach and methodology

The initialisation

The university mandated AQAS to perform the accreditation procedure in December 2021.

The Addis Ababa University produced a Self-evaluation report (SER). In May 2021, the institution handed in a draft of the SER together with the relevant documentation of the programmes and an appendix and statistical data on the programmes.

The appendix included e.g.:

- Overview over statistical data of the student body (e.g. number of applications, beginners, students, graduates, student drop outs).
- CVs of the teaching staff/supervisors
- Information on student services
- Core information on the main library

- academic regulations

AQAS checked the SER regarding completeness, comprehensibility and transparency. The final version of the SER was handed in August 2021.

The accreditation procedure was officially initialised by a decision of the AQAS Standing Commission on 31 May 2021.

The nomination of the panel of expert

The composition of the panel of experts follows the stakeholder principle. Consequently, representatives from the respective discipline/s, the labour market and students are involved. Furthermore, AQAS follows principles for the selection of experts of the European Consortium for Accreditation (ECA).

The Standing Commission nominated in August 2021 the before mentioned expert panel. AQAS informed the university about the members of the expert panel and the University did not raise any concerns against the composition of the panel.

The preparation of the site visit

Prior to the site visit, the experts reviewed the SER and submitted a short preliminary statement including open questions and potential needs for additional information. AQAS forwarded these preliminary statements to the University and to the panel members in order to increase transparency in the process and the upcoming discussions during the site visit.

The site visit

After a review of the Self Evaluation Report, a digital site visit to the University took place from 11 – 14 October 2021. The experts interviewed different stakeholders, e.g. the management of the HEI, the programme management, teaching and other staff, as well as students and graduates, in separate discussions and consulted additional documentation as well as student work. The visit concluded by the presentation of the preliminary findings of the group of experts to the University's representatives.

The report writing

After the site visit had taken place, the expert group drafted the following report, assessing the fulfilment of the AQAS criteria for the programme accreditation. The report included a recommendation to the Accreditation Commission. The report was sent to the University for comments.

The decision

The report, together with the comments of the department, forms the basis for the AQAS Standing Commission to take a decision regarding the accreditation of the programmes. Based on these two documents, on 6 December 2021 the Standing Commission took its decision on the accreditation. AQAS forwarded the decision to the university. The university had the right to appeal against the decision or any of the imposed conditions.

In January 2022, AQAS published the report and the result of the accreditation as well as the names of the panel of experts.

III. General Information on the University

Addis Ababa University (AAU), located in Addis Ababa (Ethiopia), is a higher education institution with a long tradition established in 1950. The university has 46,873 students and 8,762 staff members (2,987 academic staff, 138 technical assistants, 4,497 administrative staff, and 1,202 health professionals). AAU offers a total of 73 undergraduate and 366 graduate programmes (210 Master's programmes, 96 PhD programmes, and 60 speciality and sub-speciality programmes). Following the SER, AAU has ten colleges, two technical institutes, and eleven research and teaching institutes. The university outlines that learning-teaching, community engagement, and research are three pillars that the university strives to institutionalize. Lately, AAU has introduced research grants and focused on this pillar. As of 2021, the university ranks among the top five universities in Ethiopia and has been granted to become a PhD awarding university since 2011. Being a public university, the central resource of funding is based on the Government. In addition to that, AAU uses internal revenues and grants to finance their programmes. The vice president administers budgetary allocations for administration and student services. These allocations consider prior identify core issues and re-allocate funding if needed.

The Africa Centre of Excellence for Water Management (ACEWM) has been established to address specific development challenges of Eastern and Southern African countries. ACEWM was established in 2016 and is hosted under the College of Natural and Computational Sciences (CNCS) at AAU. The Centre is autonomous with the support from AAU and partners to provide training and supervision of the postgraduate study and managed by the ACEWM Management team. All activities are monitored and guided by the ACEWM Project Management Steering Committee (PMSC), which the Centre leader coordinates. The Committee includes representatives from each AAU's five core departments and representatives from academic and sector national partners.

As outlined in the SER, all agreements and activities are jointly administered by the Centre leader in cooperation with the dean of the College of Natural and Computational Sciences, the scientific director of Addis Ababa Institute of Technology, the director of Ethiopian Institute of Water Resources, the vice president for academic affairs of AAU, the vice president for research and technology transfer of AAU, the vice president for institutional development, the director of finance of AAU, legal services of AAU and the director of international relations of AAU. Academic matters are managed by the Centre Graduate Committee (CGC), in line with the Senate Legislation at Addis Ababa University.

The mission of ACEWM is to enhance the quality of life by ensuring water management through teaching, research and development inputs. In the development phase of the programmes, the Centre has identified the need to develop highly skilled human resources capable of handling complex water management problems. It is stated that the output factors of the programmes cover teaching, research, internships, job training, or community outreach projects.

Following the SER, ACEWM offers interdisciplinary programmes to develop new capacities to collaborate with long-term programmes and projects. The Centre has five specialized units and one core laboratory (Aquatic Ecosystem Management, Hydrology, Water Resources Management, Water supply and Sanitation, Water Quality Management, Water and Wastewater Technology, and the Core Water laboratory).

Since its establishment, ACEWM had planned with 51 PhD students, 100 Master students, and 100 short-term trainees in water management for the ACE II project period (2016-2021). In addition, the Centre planned to publish at least 70 journal articles in the said period. As of the academic year 2020/21, the Centre has enrolled 82 Master students and 55 PhD students with cohorts from different origins (Ethiopia, Eritrea, Sudan, Kenya, Rwanda, Malawi, Tanzania, Uganda, Eswatini, Botswana, and Somalia), and has carried out 241 trainees from governmental organizations and private institutions within the region. Furthermore, ACEWM has published 67 research output papers.

During the ACE II project period, ACEWM has started cooperating with national and international institutions in water management. On the national level, ACEWM cooperates closely with national partner universities (Bahir Dar, Jimma, and Arbaminch University), or international higher education institutions (such as Imperial College of London, Waseda University (Japan), or Oklahoma University (USA)) and has signed partnership agreements with public and private organizations, such as other ACE II project universities (e.g. WISE-Futures in Tanzania, AQUAFISH in Malawi or the Ministry of Water Irrigation and Energy, the Ethiopian Water Technology Institute, Indian Institute of Technology (IIT) Delhi or IIT Roorkee).

IV. Assessment of the study programme(s)

1. Quality of the Curriculum/ Aims and structure of the doctoral programme

Master Degree	Doctoral Degree
<p><i>The intended learning outcomes of the programme are defined and available in published form. They reflect both academic and labour-market requirements and are up-to-date with relation to the relevant field. The design of the programme supports achievement of the intended learning outcomes. The academic level of graduates corresponds to the requirements of the appropriate level of the European Qualifications Framework.</i></p> <p><i>The curriculum’s design is readily available and transparently formulated.</i></p> <p><i>[ESG 1.2]</i></p>	<p><i>The intended learning outcomes of the programme are defined and available in published form. They reflect both academic and labour-market requirements and are up-to-date with relation to the relevant field. The design of the programme supports the achievement of the intended learning outcomes. The academic level of graduates corresponds to with the requirements of the appropriate level of the national qualifications framework or the European Qualifications Framework.</i></p> <p><i>The curriculum’s design is readily available and transparently formulated.</i></p>

Description

1.1. Master programme “Water Management” (with five specialisations)

General aspects to all Master programme

The Master’s study programme in general works on the basis of educational goals, striving to provide competencies, skills, and knowledge for applied water management professionals. It also provides sound knowledge and skill for graduates continuing in the PhD programme, who aim at a career in science and higher education, or elevated positions in government institutions or the private sector. The SER outlines four general intended learning outcomes on programme level for all four Master’s study programmes. Graduates shall have theoretical and practical skills for the scientific and optimum use of available water resources, have the availability to design and operate water, wastewater and sanitation systems, and develop skills in analysis, interpretation, planning and understanding of water requirements, water availability, as well as water quality and water policies. The curricula also strive to enable knowledge about possible scenarios on water utilisation and water resources considering socio-environmental aspects. It is said that all curricula follow a combination of subject-centred and problem-centred approaches.

The general structure for all Master’s study programmes consists of joint courses for all programmes (33 CP), study programme specific core courses (29 CP), one programme-specific course (6 CP), and a thesis seminar (2 CP), the final thesis (30 CP). The joint courses cover courses on “Water Law, Economics and Governance” (6 CP), “Aquatic Chemistry and Water Pollution” (6 CP), “Water Resources Management Approaches” (6 CP), “Hydrology” (6 CP), “Computational Methods” (4 CP), and “Remote Sensing and GIS” (5 CP). In general, it is stated that international, regional (Eastern and Southern African), and national stakeholders were engaged in the drafting process of the curricula.

Graduation profiles for all Master’s programmes are outlined in the SER and establish the intended learning outcomes on the programme level. They differentiate between “Knowledge and theory”, “Methods, techniques, and tools”, “Analysis, synthesis, and integration”, “Research”, and “General academic skills”.



Hydrology and Water Resources (M.Sc.)

Following the graduation profile for the Hydrology and Water Resources Master's programme, students of this programme will get to know a deeper understanding of current theories and concepts in surface and subsurface hydrology with the relevant process interactions between the hydrosphere, the lithosphere, the biosphere, and the atmosphere. They will apply relevant principles and concepts of natural sciences and shall use them in the hydrological context. On the methodical side, graduates will be able to perform water quantity and quality methodologies and applications. This methodical side includes data collection, processing and analysis, GIS and hydrological modelling/ground water modelling techniques. The programme aims to impart within the curriculum courses that students will be able to analyse the link between water resources, planning, development, and management to evaluate different water resources management strategies. The programme's curriculum shall also enable students to conduct research covering the whole research cycle (research questions, methodologies and techniques, conclusions). Furthermore, the programme strives to teach general academic skills, such as communication skills, multidisciplinary approaches, and independent application of knowledge.

The curriculum comprises 100 CP within four semesters. The first semester covers the above-mentioned joint courses for all Master's programmes. Starting in the second semester, students will take study programme specific courses, such as "Water Resources Assessment, Evaluation and Allocation", "Groundwater Hydrology in River Basins", "Hydrologic Hazards and River Basin Processes", "Hydrologic Modeling and Remote Sensing Hydrology". Furthermore, "Research methods" and an elective course are included in the second semester. The third and fourth semesters are assigned for the thesis seminar and thesis writing. Following the documentation of the SER, it is outlined that the courses have a range between 4-6 CP each, excluding the thesis seminar (2 CP) and the thesis itself (30 CP).

Water Quality Management (M.Sc.)

In addition to the overarching intended learning outcomes that apply to all Master's programmes, the SER clarifies that the study programme specific intended learning outcomes will equip students with knowledge on hydrological, chemical and biological processes linked with aquatic ecosystems and determining factors such as land and water use pollution. The curriculum includes main concepts and instruments for analysing arrangements for water quality management and key concepts for an integrated, multi- and interdisciplinary analysis of aquatic ecosystems. Furthermore, graduates will be able to work methodically with water quality assessment tools and translate these into governance frameworks. The SER enlists the ability to define water resources systems and compose water and pollution flows and interdependencies. In addition, research skills and general academic skills are also included in the curriculum.

Students have to take 100 CP within four semesters. Following the overall structure, the first semester covers the joint core courses. In contrast, the second semester has five compulsory courses ("Water Quality Analysis and Monitoring", "Surface Water Quality Modelling", "Water and Wastewater Treatment", "Applied Environmental Microbiology", and "Research Methods") and an elective course. The third and fourth semesters focus on the Master's thesis and the thesis seminar. Following the overall structure of ACEWM, the courses have a credit range between 4-6 CP, whereas the thesis seminar (2 CP) and the Master's thesis itself (30 CP) differ from that structure.

Aquatic Ecosystems Management (M.Sc.)

Following the SER, ACEWM has designed a graduation profile covering programme-specific knowledge, theoretical components, and methodical, analytical, research, and general academic skills. Translating this graduation profile into eleven intended learning outcomes on programme level, it is stated that graduates will be able to understand the physical, chemical and biological structure and processes of inland aquatic ecosystems.

Analysis capacities will be taught concerning the social dynamics and the utilisation of aquatic resources and the physiology, ecology, and management of aquatic resources. Furthermore, graduates shall be enabled to design strategies for cost-effective monitoring of aquatic ecosystems and understand how aquatic systems depend on several factors, such as catchment land use, invasive species, or fisheries exploitation. The curriculum outlined that research competencies will be broadened that Master's students can design a research plan with adequate methods and techniques. Additionally, students will learn to work in interdisciplinary teams while striving to enhance their communication skills.

The curriculum consists of six joint courses (33 CP), five compulsory programme-specific core courses (29 CP), one elective programme-specific course (6 CP), the thesis seminar (2 CP), and the Master's thesis (30 CP). Thus, the programme has a total credit amount of 100 CP and must be studied within four semesters. Starting with the joint courses in the first semester, students take courses, such as "Ecohydrology", "Aquatic Ecology and Food Webs", "Wetland Ecology", "Aquaculture and Fisheries", and "Research methods" plus the elective course in the second semester. The second year includes the Master's thesis and the associated Master's seminar.

Water Supply and Sanitation (M.Sc.)

The SER enlists thirteen intended learning outcomes on programme level based on a programme-specific graduation profile. Graduates of the programme shall understand the structure of drinking water supply systems, water quality criteria and standards, the interdependence of physical, chemical and biological phenomena, water quality concepts, the effect of water quality, and hydraulic concepts. Furthermore, they will get to know different systems (urban, rural, centralised or decentralised water systems) and will be able to design water abstraction, transport, treatment and distribution processes and systems and use simulations tools. Furthermore, they will be enabled to communicate with specific and non-specific audiences.

As per all Master's programmes, the study programme "Water Supply and Sanitation" has a total of 100 CP, comprised of the joint courses in the first semester and five programme-specific compulsory courses (29 CP) and only one programme-specific elective course (6 CP). Students have to take the Master's seminar (2 CP) and the Master's thesis (30 CP) in the second year. The programme-specific compulsory courses cover "Water and Sanitation Engineering and Management", "Water and Sanitation Systems Planning", "Wastewater and Storm Water Systems Engineering and Management", "Water Quality Control", and "Research Methods". Except for the Master's seminar and thesis, all courses have a 5-6 CP credit range.

Water and Wastewater Treatment Technology

Based on the graduation profile, the study programme enlists 16 intended learning outcomes on the programme level, covering components such as understanding water and wastewater impurities, solid-liquid separation processes, or biological and chemical principles. In addition, graduates shall be able to identify water and wastewater treatment processes to remove impurities and inactivate organisms or evaluate water reuse opportunities. Furthermore, the ability to carry out wastewater analyses is integrated within the curriculum.

The curriculum comprises 100 CP out of which 33 CP are joint courses (first semester), 29 CP are programme-specific compulsory courses (second semester), only one programme-specific elective course (6 CP), and the Master's thesis starting in the second year (30 CP) with the associated thesis seminar (2 CP) at the beginning of the second year. The programme-specific compulsory courses are "Physical & Chemical Water Wastewater Treatment Processes", "Biological Wastewater Treatment Processes", "Wastewater Reuse and Resource Recovery", "Water and Wastewater Treatment Plant Design and Economics", and "Research methods".

Experts' Evaluation

Given the evidence during the site visit, the experts conclude that the learning outcomes on the programme level are in good line with the specified intended learning outcomes on the course level. The basic curriculum provides students with a solid understanding of the Master's level of water management, and the respective courses of the five specializations add up to a sensible profile of knowledge, skills, and competencies of the graduates. Additionally, the graduation profile focuses on the societal demand and contextualizes to the region's demand and beyond. It became clear to the experts that the development challenges outlined in the self-evaluation report are clearly translated into the curriculum. The courses are subject-specific and cross-subject and focus on substantial elements for developing methodological and general skills. The curriculum for the Master programme offers courses, which are specially designed for the African Centre of Excellence for Water Management (ACEWM). From the expert's perspective, this is surely a strength, allowing for a streamlined curriculum and giving a sufficient degree of flexibility to react to new developments and further develop the curriculum according to feedback by stakeholders and alumni.

The common courses for all specializations are designed so that the curriculum strives to homogenize the different backgrounds of students at the beginning. It became evident that Ethiopian and regional students are attracted to the programme, a hallmark for East Africa's Water Management. In addition, it has been stated that the programme aims to an even broader attraction of students in the future. Realized in a good way, this will be very beneficial for the Water Management sector of the continent. However, these challenges will lie ahead for the Centre when it comes to the homogenizing process of new students at the beginning of their studies, which will be even more necessary in the future. There seems to be a need for practitioners acting directly in the field by guiding management activities and gathering field data and for administrative experts responsible for strategic planning and supervision of management measures. Given this context, the experts conclude that the balance of theory-driven and applied-oriented content within the programme should be carefully followed, and a strategic decision must be taken on the future orientation of the Master's programme (**Finding 1**).

The current curriculum lays a solid foundation of theory-driven courses that are meaningful for the sector and provide students with good competencies and knowledge. The specialization tracks of the Master's programme are built on these common courses, which creates a clear progression towards the final thesis. However, the labour market for Water Management in Africa requires also graduates with very high methodological skills to strengthen the sector in the future. The experts have seen that currently, the courses are dominated by theory. Nonetheless, it might be wise to foster students' practical skills within the relevant courses by focusing stronger on methods and the theory. An effort should be spent utilizing various tools already during the studies (GIS, Python, Matlab, models, and alike). The above mentioned should also include field experience gathered by, e.g., periods of internships or at least practice-oriented Master thesis themes in cooperation with the industry (**Finding 2**).

The curriculum covers the respective specializations relevant areas of water management relevant to academia and the labour market sector in East Africa. The composition of compulsory and elective courses follows a clear structure, starting with common courses for all students as mentioned above and differentiation between track specific compulsory courses and one elective course. Students can select one elective course in the second semester of year 1 to further specialize according to the student's needs. These electives are focused on track-specific courses, which can be seen as an add-on to the actual specialization track. These elective courses cover interesting topics which are relevant for the sector. However, the experts believe that the limitation to only one elective course within the curriculum narrows students' opportunities. Thus, it might be wise to expand elective possibilities throughout the curriculum when further developing the curriculum in the future (**Finding 3**).

Based on this general structure of the curriculum, it became visible to the experts that aspects of modelling competencies and transboundary river management competencies are currently integrated into the curriculum

either in electives (being the case for modelling in the track-specific courses “Hydro Informatics”, “Watershed Hydrology, soil and water conservation” and “Modelling wastewater treatment processes”) or from a limiting perspective in the case of transboundary river competencies (with related content in the common course “Water law, economics and governance”), the latter being an issue of exceptional importance for administrative experts in the region. Therefore, the experts believe that it must be assured that aspects of modelling are acquired by all students independent of the specialization they have chosen and that all four aspects of modelling must be integrated into the common courses of the Master’s programme to a reasonable extent (**Finding 4**). This topic is of particular interest for the Master students who choose a specialization in “Hydrology”. Currently, this topic is covered as an elective course (“Hydrologic Models and Hydrologic Modelling”). Given the relevance, a shift will be required to take this elective course, a track-specific compulsory course.

The specialization offered in the Master’s programme is carefully designed to enable students to specialize in certain areas while considering the interrelation of topics in Water Management. By nature, some specializations are closer than other specializations offered at the ACEWM. In general, these interrelations are clearly visible for the experts, and these are outlined appropriately. The specializations in “Water Supply and Sanitation” and “Water and Wastewater Treatment Technology” cover by nature topics of sanitation which includes water supply, urban drainage and wastewater management. The experts believe that these relevant topics and their interdependence should be clearer in both specializations (**Finding 5**). This will help produce graduates who are even more competent in these specializations and have a more holistic approach to tackling current issues in the sector.

In addition, the current curriculum indicates that field studies are integrated into some core modules for all programmes (e.g., “Aquatic Chemistry and Water Pollution” or “Hydrology”). Also, some track electives outline that field studies are included in teaching. During the site visit, it became evident that there is a notable tendency of students who are less interested in field studies (however, current graduates have sufficient field trip experience). This, together with the fact that only a few compulsory courses include field study trips, might create a scenario that future graduates lack this valuable experience. Therefore, it should be assured that fieldwork remains an essential component of the Master’s programme, being essential for the graduate’s profile (**Finding 6**).

The documentation about the Master programme supports the learner’s progression in general terms. All curricular elements and functions are documented, and the order lined up clearly supports the learner’s progression. Compulsory and elective elements are defined, the distribution of contents between them is reasonable and fit to the respective target of the Master’s programme. The course descriptions indicate the relevant number of credits for each course and the intended learning outcomes on the course level, the teaching methods, and individual components of the courses. Based on the evidence in the self-evaluation report, the experts conclude that the course descriptions currently lack up-to-date information concerning the literature in the courses, and, where applicable, an indication of methodical competencies in the description of the courses is needed. Besides, it has to be clarified who in the Centre has the responsibility for the course content. Despite that the experts are fully aware that the actual situation in the courses at ACEWM is different, this situation does not reflect in the course descriptions and hinders the external perspective from having a fully transparent picture about the courses and the responsibilities (**Finding 7**).

Conclusion

The criterion is partially fulfilled.

1.2 PhD programme “Water Management” (with three specializations)

All PhD specialisations in ACEWM follow the same structure of 56 CP and a maximal length of eight semesters. The structure includes specific core compulsory courses in line with the three PhD specialisations (“Hydrology and Water Resources Management”, “Aquatic Ecosystems and Environmental Management”, and “Water Science and Technology”). These specific compulsory courses have a total of 20 CP. In addition, the students have to take one specialisation-specific elective course (4 CP) and two dissertation associated seminars in the third semester. The dissertation writing will start at the beginning of the second year for three years. The total amount of the PhD thesis is 28 CP.

The intended learning outcomes on the programme level for all three specialisations cover knowledge, skills, and values. As outlined in the SER, graduates of the programme will be able to understand principles, concepts, and tools of water management in line with their respective specialisations. They will have a broad, multidisciplinary knowledge in water science, technology and management, interdisciplinary understanding of issues in the discipline. Furthermore, they will have the skills to put their knowledge into practice considering multi- and interdisciplinary settings and further develop this knowledge by applying different approaches in the water sector.

It is outlined that PhD graduates for potential fields of employment cover sectors in water quality, water resources management, water and wastewater treatment, water resources development and hydro-politics. In addition, they can be active in research or teaching in the respective discipline.

The PhD programme “Water Management” offers three specialisations, which are composed as follows:

Specialisation in Hydrology and Water Resources Management

The curriculum indicates that the specialisation-specific courses cover courses in “Hydrologic Models and Hydrologic Modelling” (6 CP), “Advances in Water Resources Management” (6 CP), “Remote Sensing Hydrology” (4 CP), and “Special Topic in Hydrology and Water Resources” (4 CP). In contrast, the elective course covers one of the following courses: “Water Resources System Analysis” (4 CP), East African Climate & Water Resources (4CP), Arid Zone Hydrology (4 CP), Hydrogeochemistry and Isotope Hydrology (4 CP), Water and Urban Metabolism (4 CP).

Specialisation in Aquatic Ecosystems and Environmental Management

In addition to the above-mentioned general structure, students of the specialisation “Aquatic Ecosystems and Environmental Management” have to take courses in “Ecosystem Analysis and Climate Change” (6 CP), “Wetlands and Watershed Management” (6 CP), “Fish Nutrition and Feed Technology” (4 CP), and “Special Topic & Advances in Aquatic Environment Management” (4 CP). As the elective course, the documentation indicates a course in “Ecotoxicology” (4 CP).

Specialisation in Water Science and Technology

The third specialisation cover courses in “Advanced Oxidation Processes” (6 CP), “Advances in Desalination Processes” (6 CP), “Biological Wastewater Treatment for Nutrient Control” (4 CP), and “Special Topic in Geogenic-water pollution and Control” (4 CP), and the elective course in “Advances in Urban Water Management” (4 CP).

Experts’ Evaluation

The PhD programme with the three specialisations can be assessed as a programme with high academic standing, with a clear set of intended learning outcomes and a careful integration of the specialisations into the curriculum. Based on the evidence during the site visit, the experts conclude that the aim of the programme to produce graduates with a very high academic foundation is fulfilled. It has been demonstrated that graduates

of the programme can take outstanding positions and are very quickly consumed by the labour market and academia. The structure of the programme is meaningful to the needs of the discipline and in light of the needs of East Africa. Starting with compulsory core courses, PhD students are equipped with courses competencies, knowledge and skills in hydrologic modelling and remoting sensing. Besides, the room is given to current discipline topics with two compulsory courses enabling the ACEWM to react efficiently to new developments in the sector.

In comparison to graduates of the Master's programme, PhD graduates are likely to take rather administrative positions at higher ranks. In these positions, leadership skills are essential, and the experts believe these skills should be fostered within the curriculum because they do not come automatically yet are very important for graduates. Therefore, the experts suggest strengthening the leadership skills of graduates within the curriculum (**Finding 8**).

Students of this programme can specialise in three specialisations with one elective course. Although one would expect the track-specific specialisation courses to cover more than one course, this setup is based on the restriction within the Ethiopian higher education system and the university regulations. However, the experts suggest that the Master's programme reconsider possibilities to expand the number of track-specific elective courses (**see Finding 3**).

PhD students are equipped with course descriptions outlining the character of the courses and documenting the number of credits, the intended learning outcomes on course level, the differentiation between theoretical and practical work, and examination and teaching methods. Therefore, the experts command good transparency and documentation of the programme components. However, the descriptions lack additional valuable information concerning the course responsibilities of the respective courses and the methodological competencies used in the courses. Also, the literature indicated in the course description does not reflect the status quo of the literature used in the courses. Each course must be clearly dedicated to a responsible person and clearly indicate who will be the lecturer. As a responsible person on the course level only scientists performing an active role in the respective course and being responsible for the development of contents. This person will also be responsible for continuously updating the literature used for the courses, urgently required (**see Finding 7**).

The evidence collected during the site visit clearly indicates that the PhD topics are relevant to the Water Management sector. The level of programme, in consequence, corresponds to level 8 of the European Qualifications Framework (EQF). The composition of the programme with the combination of compulsory courses and one elective fits the requirements when entering the PhD programme and creates a clear progression of students' knowledge, skills, and competencies. Clear milestones are set for the PhD students, and the academic advisors support and provide guidance to students to reach these milestones. Students have the opportunity to have a monograph or a cumulative dissertation (although the latter has so far only been chosen by a small number of students). The Centre leadership stated that they plan to shift towards a cumulative format (with a minimum of two publications and at least one with a first authorship denomination) in the nearer future. The theory-driven curriculum enables graduates of this programme to enter academia and administrative positions, as mentioned above. It became clear that topics of PhD theses cover national relevant, and regional topics. In the light of the strategic discussion which should be done in the future, it might be wise to expand the topics and broaden the focus on the specific needs of the African continent (**Finding 9**).

Conclusion

The criterion is partially fulfilled.

2. Procedures for Quality Assurance

Master degree	Doctoral Degree
<p><i>The programme is subject to the higher education institution’s policy and associated procedures for quality assurance, including procedures for the design, approval, monitoring, and revision of the programmes.</i></p> <p><i>A quality-oriented culture, focusing on continuous quality enhancement, is in place. This includes regular feedback mechanisms involving both internal and external stakeholders.</i></p> <p><i>The strategy, policies, and procedures have a formal status and are made available in published form to all those concerned. They also include roles for students and other stakeholders.</i></p> <p><i>Data is collected from relevant sources and stakeholders, analysed, and used for the effective management and continuous enhancement of the programme.</i></p> <p><i>[ESG 1.1, 1.7 & 1.9]</i></p>	<p><i>The programme is subject to the higher education institution’s policy and associated procedures for quality assurance, including procedures for the design, approval, monitoring, and revision of the programmes.</i></p> <p><i>A quality-oriented culture, focusing on continuous quality enhancement, is in place. This includes regular feedback mechanisms involving both internal and external stakeholders.</i></p> <p><i>The strategy, policies, and procedures have a formal status and are made available in published form to all those concerned. They also include roles for students and other stakeholders.</i></p> <p><i>Data is collected from relevant sources and stakeholders, analysed, and used for the effective management and continuous enhancement of the programme.</i></p> <p><i>[ESG 1.1, 1.7 & 1.9]</i></p>

Description

The SER explains that several instruments on different levels (national, university, and centre) are used to ensure the quality of the programmes to be accredited. Following AAU's quality management plan, the Ethiopian Education Quality Assurance and Relevance Agency (HERQAA) set clear standards and principles that the AAU quality assurance units are transferring into practice. Therefore, the responsibility of quality assurance activities lies with the respective centre or faculty, which means the ACEWM director oversees together with the ACEWM's graduate committee to coordinate regular reviews of curricula and maintain academic standards the quality of the programmes or changes within the curricula. The SER describes that the ACEWM's student affairs office and the graduate committee ensure that a revision of the modules (every two years), continuous assessment of the educational processes, transparent implementation of enrolment and admission requirements, updates on course descriptions (including updated on literature), a fit for purpose examination of students, and the constant teaching staff evaluation is carried out.

It is said that external and internal stakeholders have been involved at different stages of the programmes (development, status quo situation, and further development). The discussions have been conducted through meetings, questionnaires, and focus group discussions. Following the SER, this instrument encompasses four areas (programme development, approval and review, student recruitment and admission, programme management and delivery, and graduation and certification). This means that e.g. first area focuses on the feasibility of the respective study programme, the graduate profile and the labour market needs. The quality assurance system comprises questionnaires to students, stakeholders, and faculty members. The questionnaires include course evaluations, programmes evaluations, student workload, student progression, student completion rate, student learning environment, or student support services. These evaluations are carried out every semester.

As of May 2021, it is stated that current data have not been considered yet for the further development of the study programmes. However, the available instruments for the career progression of graduates will be followed

by the Monitoring and Evaluation team of ACEWM. Furthermore, quality assurance instruments cover an annual programme monitoring and review, teaching staff and course evaluations, further training ACEWM staff, and exchanging with academic partners.

The information management of ACEWM comprises several steps at different stages of the study programme cycle, as indicated in the SER. When developing the programmes' curricula, the ACEWM had assessed the labour market needs by focusing on the situation in the country concerning the discipline and their future development. As a significant contributor to this feedback, it is said that governmental and non-governmental institutions play an essential role for graduates of ACEWM. Within the management structure of ACEWM, several committees have been established to gather information from different stakeholders, such as the labour market, graduates, current teaching staff, students, and other faculties. Furthermore, students' feedback is collected and evaluated regularly.

Experts' Evaluation

The discussion with the Centre leadership and everybody involved clearly showed that organisational responsibilities for the programmes are clear and transparent. The programmes adhere to the quality assurance regulation implemented by AAU and prescribed by the national accreditation body. The documentation provided evidence that the Ethiopian higher education system shifted in 2013 towards the European Credit Accumulation and Transfer System (ECTS). A guideline on how to modularise courses has been developed and implemented for the programmes in this cluster. The documentation indicated that a workload of 50 hours per week is expected from students with 32 weeks per academic year, which adds up to 1600 hours per year. It has been explained to the experts that technical related Bachelor programmes in the Ethiopian higher education system last five years and are comparable to a Bachelor's degree in academic university education. The programmes to be assessed in this cluster have to move within this given framework, which, in consequence, limits opportunities for ACEWM to expand the programmes since Master's programmes can only be two years' programmes if the Bachelor's is five years. In addition, the legislations impede that Master theses cannot be larger than 30 ECTS. In the light of this context, it is particularly crucial to have a consistent application of ECTS within the programmes.

In general, every student has to submit evaluations on the courses at the end of each semester. This happens on the course level and directly with the course instructors. The documentation presented indicates that the workload of students is not covered in the processes. Therefore, the experts believe that a systematic validation of student workload and a reflection of the workload basis of 50 hours per week will enable the ACEWM to see where time can be set free for some important topics within a specific course while lowering other topics within the course. Carefully administered, this might lead to more flexibility within the curriculum (**Finding 10**).

Evaluations on various aspects beyond the courses are carried out involving students and faculty members of ACEWM. The results of these evaluations are accumulated and put into an evaluation of ACEWM. Documents were provided during the site visit that showed the regular elicitation. The indicators cover aspects such as the curriculum, teaching and learning, research or institutional support. The data management of the cohorts is sufficient and covers all relevant aspects (gender, background, completion rates, progression of students).

Following the explanations in the self-evaluation report, the ACEWM plans to implement tracer studies for graduates. This has been confirmed during the site visit by the Centre. The upcoming challenges for the ACEWM, as explained in chapter IV.1, and the aspiration of the Centre to become even more relevant for East Africa will require a close following of graduates to quickly detect new development coming the labour market and potential employment fields. Carried out carefully, this might be an opportunity to collect evidence that can be used for public information (see chapter IV.7 on public information of this report). Therefore, the experts believe that the planned tracer study must be implemented sooner rather than later to follow career paths and detect easier changes in the labour market needs (**Finding 11**). In addition, the site visit evidenced that the

ACEWM is in contact with external stakeholders. However, in many instances, it focuses rather on the public sector, with administrators of water management being one of the employment fields, especially for PhD graduates. The interaction with this sector can be testified as fit for purpose and well established. On the other hand, Master graduates will be employed in the private sector and at smaller enterprises in the sector. Therefore, it might be wise if the ACEWM intensifies the exchange with the private sector to cover both sides of employment in a satisfactory manner (**Finding 12**).

The AAU legislation includes policies to safeguard academic integrity and prevent academic fraud. The programmes follow these regulations fully, which could be verified during the site visit. However, when screening the documentation, it became evident that this legislation allows up to 20% of incidental plagiarism for the Master programme and up to 25% for the PhD programme. The ACEWM, being a hallmark in the water management sector and with a high reputation in the field, should establish a mechanism to be even stricter than that due to the relevance of the Centre in East Africa. Therefore, it might be wise to implement additional regulation that is Centre specific, and which needs to be followed by all ACEWM students (**Finding 13**).

Conclusion

This criterion is partially fulfilled.

3. Learning, Teaching and Assessment of Students / Learning and Assessment of Students

Master degree	Doctoral Degree
<p><i>The delivery of material encourages students to take an active role in the learning process.</i></p> <p><i>Students are assessed using accessible criteria, regulations, and procedures, which are made readily available to all participants and which are applied consistently.</i></p> <p><i>Assessment procedures are designed to measure the achievement of the intended learning outcomes.</i></p> <p>[ESG 1.3]</p>	<p><i>The form of supervision and/or course structure is adequate and corresponds with the intended learning outcomes.</i></p> <p><i>Students are assessed using accessible criteria, regulations, and procedures, which are made readily available to all participants and which are applied consistently.</i></p> <p><i>Assessment procedures are designed to measure the achievement of the intended learning outcomes.</i></p> <p>[ESG 1.3]</p>

Description

The SER explains that the teaching and learning methods at ACEWM can be differentiated into three components: interactive teaching and learning, self-learning, and collaborative learning. The teaching methods include class lectures, presentations, tutorials, assignments, seminars, demonstrations, or group work according to the module handbook of the respective programme.

The curricula include practical and professional skills taught as lectures, with practical components integrated into fieldwork or group activities. Through the link of ACEWM to the industry, students will get to know current problems of the relevant discipline within the practical courses. These practical courses are designed so that students' theoretical knowledge can be translated into practice. Furthermore, the Centre's experience shows that the diversity of students can be taken into consideration when theoretical content is applied to the different contexts of the cohorts. Laboratory courses at ACEM focus more on testing and analysis techniques, whereas practical sessions might also include numerical and computational modelling skills. It is said that the curricula focus on theoretical and practical contents, but both strive to enhance the active participation of students. By integrating tutorials, students can also address individual questions that enhance the holistic understanding of



the whole cohort. In addition, and to respond to the pandemic, ACEWM aims to increase the number of online lectures. Furthermore, an e-learning platform was introduced in 2020.

The Centre outlines that students have access to an institutionalized process for complaints of students. Apart from the regular course evaluation, which is carried out at the end of each semester, students have access to an online grievance redressing mechanism. The results of both instruments are compiled at the end of each semester and used for internal development.

The supervisory of Master's and PhD students concerning the Master's thesis and the PhD dissertation follows a principle that after the coursework in the respective programme, supervisor(s) is/are assigned to the student. The supervisor should have at least the rank of an associate professor. The prime responsibility of the supervisor is to support the student methodically and in the light of the agreed timeframe. It is outlined that the supervisor follows the progress of the candidate.

Following the university-wide legislation, ACEWM follows a procedure for assessing courses, presentations, and defences. These procedures are published in written form, and students have access to these documents. Each course has several continuous assessments during the semester, such as quizzes, tests, assignments, presentations or field and laboratory reports, in addition to the final examination at the end of the semester. At the beginning of each semester, students will be informed about the assessment methods used for the courses. The assessment results are submitted online via a student information management system.

The examination regulations, in general, are described in the senate legislation of AAU, which also applies to ACEWM. Students who are not satisfied with the grade received can apply for re-marking sessions, which can be initiated two weeks after the grades are officially published. Furthermore, students can take re-sit sessions following the university's regulations. If students have failed more courses in one semester, they are forced to withdraw from the university. The process to submit the final thesis/dissertation follow a precise regulation. Master students have to submit their thesis at least one month before their defence, whereas PhD students have to submit their dissertation two months before their defence.

Furthermore, PhD students have to present two articles published in reputable journals when submitting their dissertation. In all cases, ACEWM checks the thesis/dissertation for plagiarism using the software. The PhD defence procedure states that at least three and a maximum of five members (including the advisor who is not allowed to take part in the grading of students) and at least one external examiner will form the defence board committee.

Experts' Evaluation

The experts have had access to the documentation on courses during the site visit and evaluate that the teaching and learning methods are fit for purpose and correspond to the intended learning outcomes on the course level. Each course has clear and transparently outlined teaching methods, which are up to date and enable students to participate in the learning process. Also, the ACEWM mastered the shift towards online teaching during the pandemic in an outstanding manner. The online platform supports students in this regard. The general structure of the curricula with common courses at the beginning and track specialisation allows students to have different learning paths. However, as stated in chapter IV.1, the ACEWM should consider providing students with more opportunities. The materials used in the courses focus on problem-solving tasks that can be either structured or unstructured. While the first strives to impart knowledge that can be transferred into various contexts in Eastern and Southern Africa, the latter focuses on water-related problems from multiple perspectives. AAU and the Centre aim to equip teaching staff regularly with didactical methods. It has been demonstrated that the teaching staff can attend workshops regarding these topics.

Following the AAU senate legislation, assessment methods can either be oral, written or practical. The Centre follows an assessment model of continuous assessment throughout the semester and a final exam for the

course at the end. The examination dates are transparently announced at the beginning of each course and in the academic calendar. Grading scales are also provided in said legislation. In addition, the legislation states that 50% of the final grade will come from the final examination, while the other half lies in the responsibility of the respective teachers in the courses. In case students disagree with the received final grade, there are clear regulations regarding this matter. Students can file an appeal within two weeks after the results have been published. The experts see that these clear regulations are fit for purpose and consistently applied for the programmes. The comprehensive data management at the ACEWM could also provide the experts with data concerning the student’s progression, indicating whether the respective cohorts have finished the course work, the status of the research proposal or defence of the Master or PhD thesis.

The procedure to initiate the research work of Master and PhD students was explained based on the self-evaluation report and the discussions during the site visit. In both programmes, students are assigned to a research supervisor, who has at least the rank of an assistant professor for the Master students and at least at associate professor rank for PhD students. During the site visit, it was also discussed whether fast track possibilities could be implemented in the future. The mandatory agreements between the student and the supervisor formalise the research procedure and clarify transparently the steps to follow. The experts command this framework which clarifies the tasks but also the responsibilities for both sides.

Conclusion

This criterion is fulfilled.

4. Student Admission, Progression, Recognition and Certification / Legal Status, Admission and Certification

Master degree	Doctoral Degree
<p><i>Consistently applied, pre-defined, and published regulations are in place which cover student admission, progression, recognition, and certification.</i> [ESG 1.4]</p>	<p><i>The institution is entitled to award a doctorate. Consistently applied, pre-defined, and published regulations are in place which cover student admission, progression, recognition, and certification.</i> [ESG 1.4]</p>

Description

Admission

Operational matters concerning the admission of students are administered by the University Registrar Office in coordination with the ACEWM Graduate Committee. This includes student intake, admission, placement, enrolment, class and exam schedules, academic records and graduation.

Both Master’s and PhD students have to apply online before starting the academic year, as announced on the ACEWM homepage. All applicants must provide a copy of their academic credentials, recommendation letters, and other testimonials, such as the applicant’s career goals or research interests. In addition, there are specific admission requirements concerning the Master’s study programme and the PhD specialization tracks. For Master and PhD students, the admission regulations include completing a Bachelor’s degree (Master’s degree, respectively) of a college or a university in a relevant discipline. Following AAU’s general admission regulations, all applicants must pass a general aptitude test (GAT), followed by an entrance exam (in addition, international students will have an extra interview). The ACEWM’s student affairs office and the Centre’s graduation committee will administer the entrance exam and the interview. Following an internal regulation, it must be assured that at least 20% of the cohort are regional students (thus, students from Eastern and Southern Africa).



Progression

For Master's students, the progression is measured at the semester level. ACEWM uses the university grading system for progression analysis. In general, it is stated that a minimum of a B grade is required from the students with exemptions for specific reasons. To complete the programme, a student must have a minimum CGPA of 3.00 (Grade B). It is also said that for students who need an advanced research environment or additional expertise, ACEWM can support students in finding suitable partner institutions. ACEWM can also facilitate financial and administrative support with this matter. PhD students' progression will be measured at semester level, following the same structure as for Master's students.

Certification

Upon completing the Master's or the PhD programme, graduates receive a certificate with the correspondent denomination of the programme/specialization. Furthermore, they will receive a transcript of records outlining the courses and the grades of the individual student.

Experts' Evaluation

The Master's and PhD programmes' admission requirements are clearly defined and accessible to externals via the homepage and the ACEWM administration centre. In general, the admission requirements cover the Bachelor's degree for the Master's programme and the Bachelor's and Master's degree for the PhD programme. In addition, a motivation letter and previous work experiences have to be added to the application. Next to students' background, the admission criteria focus on language competencies in English, a cumulative GPA, and a graduate admission test. If international students apply for the programmes, the national accreditation body (Ethiopian Higher Education Relevance and Quality Agency; HERQA) will issue an equivalent certificate. The admission criteria focus on track-specific requirements covering Bachelor's degrees in, e.g., chemistry, civil engineering, fisheries, environmental engineering, hydrogeology, water resources and alike. These rather broad requirements are somehow fit for purpose given the broad background of students from different countries. During the site visit, it was discussed that in some instances, it was challenging to uplift the skills to the required level at which the Master and the PhD programme starts with the common courses. In the light of the challenges as mentioned above when opening the programmes in the future and, in consequence, with even more heterogenic student bodies (see chapter IV.1 on quality of the curriculum of this report), the experts think that the Centre has to find a suitable solution to assure that skills and competencies of all students fit entirely to the common Master courses (**Finding 14**).

Nevertheless, the experts believe that a simple narrowing of the admission requirements might not be helpful because it might limit prospective students too much. However, one way could be to define a set of skills, knowledge, and competencies that apply to all programmes' students. As explained in chapter IV.2 on procedures for quality assurance, the tracer study might give essential insights into current labour market needs. Alternatively, another option might be to offer bridging courses to students to approach this issue.

The Centre provided the experts with data of the past cohorts differentiating between gender, local and regional students, and the status of the students (coursework completed, defence of the research proposal, or completion of the Master or PhD thesis). This comprehensive data enables the Centre to have a good overview of current student bodies and detect current enrolment trends. The experts commend this good data management.

Students receive upon completion of the programme a certificate which is supplemented by the transcript of records. Within the documentation for the procedures, examples were provided to the experts for evaluation. It became evident that the documentation of graduates is fit for purpose when it comes to the Ethiopian employment field. Potential employers directly understand the skills, competencies, and knowledge that graduates of this programme will bring to their companies. However, the experts believe that a document (e.g., a

Diploma Supplement) for graduates must be drafted. This document has to explain the position of the awarded degree in the Ethiopian higher education system and the academic degree structure in Ethiopia. This will help ACEWM to develop further international cooperation and recognition procedures in the future (**Finding 15**).

Conclusion

The criterion is partially fulfilled.

5. Teaching Staff / Academic Level of Supervisory Staff

Master degree	Doctoral Degree
<p><i>The composition (quantity, qualifications, professional and international experience, etc.) of the staff is appropriate for the achievement of the intended learning outcomes.</i></p> <p><i>Staff involved with teaching is qualified and competent to do so.</i></p> <p><i>Transparent procedures are in place for the recruitment and development of staff.</i></p> <p><i>[ESG 1.5]</i></p>	<p><i>The composition (quantity, qualifications, professional and international experience, etc.) of the staff is appropriate for the achievement of the intended learning outcomes.</i></p> <p><i>Staff involved with teaching is qualified and competent to do so.</i></p> <p><i>Transparent procedures are in place for the recruitment and development of staff.</i></p> <p><i>[ESG 1.5]</i></p>

Description

When submitting the SER, ACEWM has around 50 national, regional and international academic staff covering the respective specializations (seven full professors, 26 associated professors and seven assistant professors). All of them have at least an associate professor rank or above. The workload of teaching staff is expected to be 39 hours per week and twelve lecture equivalent hours (LEH) per semester (one LEH being equivalent to 1.7 CP). The teaching load differentiates into teaching hours (36 hours per week) and supervisory hours (three hours per week). Following the SER, it is outlined that the teaching staff is engaged in three hours of community service per week. Consequently, ACEWM estimates that 62.5% of teaching staff workload is allocated to teaching, whereas 25% is allocated to research and 12.5% to community services.

As part of AAU, ACEWM follows the university’s recruitment procedures published in the senate’s legislation. The Senate Standing Committee oversees the implementation of this legislation and can intervene if needed. The recruitment process itself is initiated by ACEWM and has to be approved at the college level (in the case of associate professors or lower) or the vice president level (for full professors). Part-time teaching staff from partner institutions is recruited based on academic experiences and merits. However, ACEWM supports part-time staff in integrating into the Centre’s system. The teacher’s capacity is regularly monitored based on the student evaluation results and pedagogical training, the so-called Higher Diploma Programme (HDP).

Furthermore, the Centre offers fellowship opportunities for staff members and faculty exchange opportunities. The Centre also provides funding for research projects, which strives to support the research productivity of staff and has an incentive programme for publications. At the university level, administrative and technical staff members can get short-term training and career advancement opportunities.

Experts’ Evaluation

The documentation provided to the experts clarified the composition of staff, their background and the field of expertise to the programmes. The experts command a good and adequate research background which are meaningful to the discipline. In many cases, the staff members did their PhDs in other countries abroad;



however, their research focused on Ethiopia and the region. This is mainly a plus for the programme because it combines different teaching and learning methods (acquired abroad) focusing on Water Management in East Africa. Also, staff continuity is assured with a solid mix of experienced and new staff members within the Centre. Currently, the resources in terms of staff are adequate to carry out the programmes. Following the plans of the Centre of expanding the student intake in the future, it must be stated that already at the moment the workload of staff is very high. The Centre tackles this issue with external lecturers from other Ethiopian universities of high rank, which is a good way to deal with the matter and import additional perspectives. However, many of the elective courses are supposed to be given by external lecturers from international universities. Based on the site visit, the experts believe that the level of commitment of international staff members differs in some instances. In consequence, the Centre might take a risk here because it might be the case that elective courses cannot be offered due to a lack of continuous availability. Given this fact and in combination with the need mentioned above to expand the electives, it must be conceptualised how ACEWM will cover on a medium-term all elective courses offered in both programmes to get more independent from (international) external lectures (**Finding 16**).

While being independent of AAU in many instances, the Centre adheres to the Addis Ababa University senate legislation regarding the hiring process of new staff. The self-evaluation report includes the current version of the Senate legislation, which outlines transparent requirements for new staff members. In addition, clear indications are given concerning the duties and rights of teaching staff (e.g. concerning the expected workload) or the promotion to higher ranks. The human resource management unit administers this procedure by AAU. Another task of this unit is to organise short-term training of staff or career advancement opportunities, which can either be administrative or discipline-specific in cooperation with the Centre management.

Centre staff members (at least associate professor ranks) in charge of the PhD programme have clearly defined responsibilities for the supervision process. The primary responsibilities are to assist students and advise concerning the conduction of research according to the intended academic standards and assure that the PhD dissertation stays within the timeframe. The experts conclude that a PhD supervisory committee including a senior expert and three to five members are fit for the purpose.

Conclusion

This criterion is partially fulfilled.

6. Learning Resources and Student Support / Support and Research Environment

Master degree	Doctoral Degree
<p><i>Appropriate facilities and resources are available for learning and teaching activities.</i></p> <p><i>Guidance and support is available for students which includes advice on achieving a successful completion of their studies.</i></p> <p>[ESG 1.6]</p>	<p><i>Guidance and support are available for students which include advice on achieving a successful completion of their studies.</i></p> <p><i>Appropriate facilities and resources are available for learning and research activities.</i></p> <p>[ESG 1.6]</p>

Description

Resources

As outlined, the Master’s programmes of ACEWM benefit from various laboratories within AAU and partner institutions. However, as part of the World Bank funding, ACEWM has established a new wet and instrumentation laboratory for teaching and research, equipped with relevant facilities. In general, new equipment is usually secured by supported governmental procurement or financial support from other institutions. It is said



that AAU regularly replenishes the laboratories, and a maintenance plan for the equipment is in place. The equipment of the facilities includes significant equipment, such as a spectrophotometer, an incubator, centrifuges, photometers, greenhouse facilities, radiometers, gas chromatography and others. Some of these facilities are jointly shared with AAU's School of Chemical and Bio-Engineering, School of Earth Sciences or the Department of Zoological Sciences. Furthermore, the SER outlines that the programmes have access to classrooms equipped with whiteboards, digital boards or LCD projectors. Practical work courses can be conducted at different research stations, water and wastewater treatment facilities, well fields, reservoirs, watersheds, lakes, and rivers.

ACEWM students have free access to AAU's library system. This system has 18 branch libraries organized into technical and public services divisions. It is said that AAU constantly subscribes to hard copies of journals and books but also has subscriptions to all journals such as AGORA, HINARI, American Chemical Society, or Royal Society Publications. Information Communication Technology (ICT) is one of the technical services provided by AAU. This system includes automation, web page development, database generation or digital library facilitation. ACEWM has established its ICT infrastructure for the programmes and strives to establish, as of May 2021, a knowledge management and hydro-informatics unit to provide water-related information to stakeholders and researchers. In addition, a newly constructed Digital Library Building gives access to all learning-teaching services.

Student support

ACEWM students can use the AAU platform for student support and guidance. New students will get to know all support instruments and facilities via a guided tour at the beginning of their studies. Specific information for the respective programme will be demonstrated within that tour, including living conditions and working environment. The student affair's office is mainly responsible for informing students on the academic matter, such as the schedule, workload, academic calendars, internship placements and research interests of instructors. Furthermore, students can approach the teaching staff within consultation hours. Regional students will receive housing support, e.g., documentation authentication, visa processing, residence permit, or air ticket supports. Highly qualified students can apply for scholarships, including living expenses, round trip tickets, registration fees, tuition fees, and research expenses. Moreover, ACEWM provides scholarships for national women in science.

Research Environment

Being a big part of the Master's programmes and the PhD programme, research is an essential part of ACEWM. The SER outlines that the Centre director will coordinate all research proposals of staff and PhD candidates. The supervisory committee regularly monitors the activities concerning research in order to see the constant progress of students. PhD candidates are expected to present annual progress reports, to which they will receive feedback from the supervisory committee. ACEWM also supports PhD candidates in presenting their findings at conferences and workshops on national, regional, or international levels. If needed, the Centre can provide funding for exchange programmes or internships at partner institutions. ACEWM strives to foster the teaching abilities of PhD students involving them in teaching activities in undergraduate or Master's programmes or public lectures given monthly by the Ethiopian Academy of Sciences.

Experts' Evaluation

The panel of experts checked the resources that are available to students during their time at the ACEWM. The experts command the possibility to provide helpful information in an online live streaming mode. Consequently, evidence was created that the Centre offers rooms, equipment and laboratories to a sufficient degree. The resources enable the Centre to provide teaching and research at a high level. On the one hand, the Centre procured standalone laboratories with the World Bank funding scheme (Water Core Laboratory).

On the other hand, the Centre has access to resources of other departments (e.g., spectrophotometers, centrifuges, greenhouse facilities, radiometers, and alike). With this mix of specific acquired resources and resources coming from departments with a long-standing tradition at AAU, the panel concludes that the resources can be evaluated as good based on the information collected during the online site visit. The Centre also provided information on support by technical staff, which, in consequence, provides a very solid impression. Classrooms are seen to be sufficient for the number of students in the programmes. The experts command that the Centre has specific rooms for the student autonomous from other departments within AAU. Students of the ACEWM programmes have full access to the databases of AAU, which comprises a total of 18 branch libraries. Also, AAU provides students with several e-journals and open resources, selected e-books, and Master and PhD theses. Besides all that, the Centre's students have access to the technical services provided by AAU. This includes computer facilities at the college of natural and computational sciences or the main campus. As of 2021, it is planned to improve the knowledge management within the Centre by setting up a system that includes information for stakeholders and researchers, digital library components and additional databases. These plans are very good from the perspective of the experts, and it might be wise in the future to integrate students' progression into that system to digitalise the management of the cohorts.

Student support for Master and PhD students is primarily administered by the Vice President for Administration and student support at AAU, who also checks overlaps of courses. However, the Centre provides orientations and guidance at the beginning of their studies to students and the administrative task covered by AAU. The Centre's office advises students on housing opportunities, document authentication, visa processing, residence permits, or air tickets for regional students. Another major part for students is the topic of scholarship. The site visit and the documentation evidenced different scholarship and tuition fees for local and regional students. This follows the national and AAU legislations.

Based on the site visit, the experts conclude that the Centre carefully strives to establish a beneficial research environment for the students and the Centre's research lines. The ACEWM management coordinates and approves the research proposals as well as promote their research findings to externals. It has been said that Master and PhD students are at instances integrated into current larger research projects where they can contribute to the main findings of the bigger project. PhD students are encouraged to present their findings at national, regional or even international conferences and workshops. In addition, the funding schemes for students include short term exchange opportunities at partner organisations abroad, which are 30% funded for Master students and 100% funded for PhD students. This way, students can gain international experience, which the experts especially command.

Conclusion

The criterion is fulfilled.

7. Public Information

Master degree	Doctoral Degree
<i>Impartial and objective, up-to-date information regarding the programme and its qualifications is published regularly. This published information is appropriate for and available to relevant stakeholders.</i> [ESG 1.8]	<i>Impartial and objective, up-to-date information regarding the programme and its qualifications is published regularly. This published information is appropriate for and available to relevant stakeholders.</i> [ESG 1.8]

Description

As a leading source of information, ACEWM uses its homepage to provide relevant information to external stakeholders. This information includes general information on the study programmes, admission requirements, academic documents, financial documents, research activities, and a FAQ. In addition, ACEWM uses social media channels to amplify their external communication. As part of the public information, it is said that the centre organizes regular meetings between students, academic teaching staff, support staff, and regional and national partners. In addition, ACEWM informs the public about community services, partnership agreements, seminars, current publications, short-term training, student support services or any special events.

Whereas communication between staff, students, and stakeholders happen primarily with an electronic mail system, other activities, such as proposal or dissertation defences and graduation ceremonies, are announced on the homepage. ACEWM yearly announces the call for application, including all relevant, up-to-date information on its homepage.

Experts' Evaluation

The Centre's homepage provides interested parties with the mission of the Centre, facts, and information about the programmes. However, it appears to the experts that the information situation can be described as up-to-date since the last entry on the homepage was posted in September 2021 (as of November 2021). Despite that, the information given includes admission requirements and procedures, the current curricula of the Master's and PhD programmes. Also, information on short courses is available. In addition to this, current students have access to the e-learning page, which AAU administers. Thus, the level of detail is comparable and sufficient concerning the level of depth. The Centre has a Facebook and a Twitter account, but as of November 2021, the activity is relatively scarce. Thus, the public information of the Centre provides a comprehensive overview and access point for the relevant documents. However, it can be concluded that it might be beneficial for the programme's attractiveness that these channels are carefully administered on a more regular basis. This will add value for the Centre and inform the external world about current topics likewise (**Finding 17**).

Conclusion

This criterion is fulfilled.



V. Findings

1. A strategic decision whether the Master programme should move towards more theory-driven or applied-oriented programmes should be carefully considered respecting the labour market needs.
2. It is recommended to integrate methodological competencies within relevant courses to foster practical skills of graduates in the Master programme.
3. In further developing the curricula, it might be wise to expand the elective possibilities for Master and PhD students.
4. It must be assured that students acquire the following essential Water Management related aspects in the common courses:
 - a. Modelling competencies including the four aspects of modelling.
 - b. Transboundary river management competencies.
5. The interdependence of sanitation topics including water supply, urban drainage and wastewater management should be conveyed clearer in the specialisations “Water Supply and Sanitation” and “Water and Wastewater Treatment Technology” of the Master programme.
6. It should be assured that fieldwork remains an essential component of the Master programme, being essential for the graduate’s profile.
7. The course descriptions must be revised for the Master and PhD programmes. Special attention must be paid to the following:
 - a. A clarification on the course responsibilities within the ACEWM is required.
 - b. A systematic update on literature used in the courses.
 - c. Where applicable, an indication of methodical competencies in the description of the courses is needed.
8. The common PhD courses should systematically integrate leadership competencies.
9. An expansion of PhD thesis topics covering topics beyond the region should be aspired by the Centre.
10. Systematic validation of the workload in the courses and the reflection on the workload basis per credit hour is required.
11. A tracer study of Master and PhD alumni has to be implemented to follow potential career paths and detect easier changes in the needs of the labour market.
12. The exchange with the private sector and enterprises should be fostered to detect easier changes in the needs of the labour market.
13. It might be wise to implement additional regulation that is Centre specific, and which needs to be followed by all ACEWM students
14. It must be assured that the admission criteria for Master students cover specialisation specific elements on the Bachelor level to ensure that the common Master courses fit entirely to the skills and competencies of all students.
15. A document (e.g. Diploma Supplement) for graduates has to be drafted explaining the position of the awarded degree in the Ethiopian higher education system and the academic degree structure in Ethiopia.
16. It must be conceptualised how ACEWM will cover all elective courses offered in both programmes with full-time staff to get more independent from external lectures on a medium-term.

17. It must be assured that all relevant and up-to-date information for the programmes is published to external stakeholders, such as prospective students.