

Evaluation Report for the Accreditation of the Master Programme on “Integrated Sanitation Management” (University of Dar es Sa- laam, College of Engineering and Technology/CoET, Tanzania)

AZ 1211

Name of the Course	Degree	Starting Date	ECTS-credits ¹	Program duration	Fulltime – part time	Capacity each year	Master A = Applica- tion oriented R = Re- search ori- ented
Integrated Sanitation Management	M.Sc.	September 2010	90	3 sem	Full-time	25	A

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¹ The actual credit units provided are 15, but this is based on contact hours only. Please compare Chapter 1.2.

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1st Part: Evaluation Report

Introduction

This report is one of three reports resulting out of a series of on-site visits as part of an accreditation procedure at the Kenyatta University (Nairobi, Kenya), the Makerere University (Kampala, Uganda) and the University of Dar es Salaam (Tanzania). At the Kenyatta University and at the Makerere University, it was the Masters Programme on Integrated Watershed Management (IWM) which was evaluated and at the University of Dar es Salaam it was the Masters Programme on Integrated Sanitation Management (ISM).

The two masters programmes mentioned above were established and implemented through funding from the IWMNet, which is a network of universities in Germany and Eastern Africa which collaborates in the field of "Integrated Watershed Management". The Centre for International Capacity Development at University of Siegen launched the project titled "Capacity Building for Integrated Watershed Management in Eastern Africa (IWMNet)" in September 2007. This project was funded within the EU Water Facility Programme. The development of a master programme is the major activity at regional level (implying the East African Region) among other activities which focus at the national and the local level. The programme on IWM was set up in collaboration with relevant institutions such as the International Water Management Institute (IWMI)², the Applied Training Programme (ATP) of the Nile Basin Initiative (NBI) and Water Resources Management Authorities of the partner countries.

Based on the masters programme (MSc) on "Integrated Watershed Management" (IWM) established at Kenyatta University (KU) in 2006 (the first batch of students started in 2007), this project is designed to enhance capacity building in IWM and strengthen the on-going water sector reform processes in Kenya, Tanzania, Uganda and Ethiopia (please see project leaflet on www.iwmnet.eu).

After the IWMNet had already started, the Department of Water Resources Engineering of the University of Dar es Salaam (UDSM) together with the Kenyatta University in Kenya, Makerere University (MAK) in Uganda, the University of Zambia (UNZA) and the German University of Siegen (US) also raised funds/grants (ACP-Europe Cooperation Programme in Higher Education, EDULINK – 9th European Development Fund) which is an EU funded project to establish a new Masters Degree programme in Integrated Sanitation Management (MISM) at the University of Dar es Salaam. The overall objective is to strengthen training and research capacity of universities in Eastern and Southern African region to improve water and sanitation governance. The first batch of students in the programme for ISM started in November 2010.

The evaluation reports are all based on information provided in the documentation for accreditation of the university in question, additional documents provided during the on-site visit

² The IWMI is organised as a non-profit organisation and is one of 15 international research centres supported by the network of 60 governments, private foundations and international and regional organisations collectively known as the Consultative Group on International Agricultural Research (CGIAR).

or shortly thereafter on request, oral information during discussions with the representatives of the university management, including university governance quality assurance, the executives of the respective schools and departments as well the person(s) in charge of the study programme, a group of student representatives and at the end also lecturers of the programme. Additionally, the expert group visited facilities such as seminar rooms, the computer laboratories and in particular those providing GIS, and the laboratories where analyses in relation to water and/or sanitation management are conducted.

It must be mentioned that both programmes at the three universities cannot as yet claim to offer a Joint Degree Programme among the partner universities involved, as originally intended (see leaflet IWMnet). This level of cooperation has not yet been realised. Also intended at the beginning was an accreditation by the Inter-University Council for East Africa (IUCEA) supported by the German Academic Exchange Service, DAAD. Within this cooperation of IUCEA and the DAAD "Guidelines for Program Self-Assessment" and "Guidelines for External Assessment at Program Level" were developed. However, at the point in time that the accreditation was scheduled to be conducted, the IUCEA was not yet ready to carry out accreditations. Nevertheless, it was the intention from the beginning of the project that the degree programmes should be based on the Bologna Principles to guarantee quality at all partner universities and to secure credit transfer in the region which will be evaluated in the following chapters.

For all three universities the expert group noted that the marketing is highlighting the exchange among the universities and the involvement of the University of Siegen in the programme. The partnership with the University of Siegen may still continue, but in no case is the university still actively involved in the implementation of the programmes. Therefore, it is requested by the expert group to no longer mention the University of Siegen as a partner of the programmes on marketing brochures and leaflets because otherwise expectations of students will be raised that cannot be fulfilled. An international orientation of the three programmes is nevertheless recognisable, e.g. by staff and student exchange and is highlighted by a Memorandum of Understanding among the three universities.

The evaluation as such is based on the demands of the European Standards and Guidelines for Quality Assurance in Higher Education (ESG, 2005) and as well the ECTS-User's Guide. According to the demands of the ESG, which require "established processes, criteria and procedures that are used by agencies which should be also pre-defined and publicly available" (ESG 2005, p. 25), the ZEvA therefore uses its standardised procedure that operates according to the guidelines of the German accreditation council, but with the guidelines adapted to the specific needs of this accreditation procedure. This specific framework was made available to the universities in form of a report template well in advance. Also the ESG and the ECTS User's Guide were made available.

1 „Integrated Sanitation Management“

1.1 University Governance and Management

The criterion is fulfilled.

The University of Dar es Salaam comprises 6 colleges and 4 schools. In 2007/2008 5775 students were admitted at graduate level and around 2552 students were enrolled at post-graduate level of which 28 % were women (University website: facts and figures, http://www.udsm.ac.tz/about_us/facts.php). According to the information given on the website the total academic staff available in 2008 is 1127 of which 25,5 % are female. It was mentioned that nowadays the academic staff is around 1200 academic and the administrative staff around 1400. Altogether 150 academic programmes at undergraduate and post-graduate level are offered.

The university has developed its own understanding of quality in teaching and learning in order to create a basis for the quality-oriented development and realisation of study programmes which is documented in the Quality Assurance Policy (December, 2007) in which a mission, its objectives and as well the implementation strategies are elaborated upon.

This is documented by the fact that regular student, employer and alumni satisfaction surveys constitute a defined part of quality assurance. It is foreseen in the policy that programmes undergo even a programme accreditation – if applicable. The quality assurance bureau is in charge of coordinating the necessary activities of the concerned units.

Study programmes at the University of Dar es Salaam undergo an internal quality check every five years by the Quality Assurance Bureau. The initial approval of a programme is conducted by the senate of the university and in addition the Tanzania Commission for Universities (TCU) will give its final approval. Universities as such must be also accredited by the TCU. Two years ago the university had to re-register as university including all required documentation for the procedure. This procedure involves that at the end of examinations all external examiners/experts are invited to discuss their reports in senate. As one of the activities that marks the 50 years anniversary of the University of Dar es Salaam an International panel of experts has been appointed to assess it, its programmes and delivery processes against its official mission and goals, and to recommend ways in which the University of Dar Es Salaam ought to realign itself so as to ensure optimal performance in the changing circumstances of the 21st century. The final report is not yet published.

The University of Dar es Salaam is also member of the Inter-University Council for Eastern Africa (IUCEA) which facilitates the admission of students coming from member states as Kenya and Uganda. In 2009 the East African Legislative Assembly (EALA) enacted the IUCEA Act 2009, thus effectively integrating IUCEA into the Eastern African Community (EAC) operational framework. The act spells out the objectives, functions, institutional set up and systems of governance and management of IUCEA. The IUCEA Act 2009 also mandates the institution to advise the EAC Partner States on higher education matters, and to contribute towards (among others) meeting national and regional developmental needs as well as developing quality assurance processes in order to ensure that teaching, learning and research in the region achieve and maintain international standards.

Whereas state policies recognise aspects as ethnicity, gender was not given adequate attention at an early stage. A gender centre was established under the office of the vice chancellor but the university admits that it is a problem to hold qualified female staff because often they

become more attractive job offers in particular by international organisations and also ministries. During the on-site discussions the university mentioned that nowadays a policy exists that for new staff positions female candidates are preferred even if they are ranked second place. Also a scholarship programme for female postgraduate students is offered and for undergraduate level the required grade point average (GPA) for female admissions is lower. The gender centre does not have yet a web presentation which is highly recommended. Despite a well elaborated quality assurance system the aspects of gender balance and equal opportunities did not enter the respective policy. It is recommended to further develop appropriate measures to not only increase female academic staff but also to take care that the percentage of female students enrolled at graduate and postgraduate level will increase.

The university is well suited to host the programme Integrated Sanitation Management which is also supposed to cater for regional needs because already well-established programmes in the water sector are offered as e.g. a Master in Integrated Water Resources Management. Co-operations in the water sector further strengthen the hosting department of water resources engineering. An example is the United Nations Environment Programme (UNEP) which cooperated to develop water related research programs. The World Bank Science supports the University of Dar es Salaam (UDES) in general and the Department of Water Resources Engineering in particular within the scope of the "Technology Higher Education Program in Tanzania" with the provision of laboratory infrastructure (as e.g. environmental monitoring equipment, weather observation and soil measuring devices, hydraulic laboratory physical models/equipment, etc. cc procurement note on: <http://www.devex.com/en/projects/261638/print>). The bidding procedure for the supply has just closed.

During the development of the programme the Millennium Development Goals (MDGs) - in particular those in relation to water supply and sanitation - were taken into consideration. Accordingly the main objective of the programme tallies with those of the University of Dar es Salaam and the MDGs. That is

- strengthening training and research capacity at universities in Eastern and Southern African regions to improve water and sanitation governance.

Specifically the Programme aims at:

- providing the country and the region with sufficient high level human power in integrated sanitation management as agents of development and change, thus contributing to the attainment and achieving the MDGs;
- conducting research in the interest of suitable exploitation of human waste resources in Tanzania and the region, ultimately leading to innovation of technical products and production processes for the resources re-use and
- providing expert professional services in the form of consultancy to the society around.

As major unique feature of the programme is mentioned the collaboration within the region, in terms of students and academic inputs (staff from the collaborating institutions) as well as the curriculum which involves students' hands on training in the field.

To verify in how far local needs are reflected in the designed programme, a market survey was carried out regionally by circulating the proposed curriculum in the countries of Tanzania, Kenya and Uganda from July to September 2009. The targeted groups were: students, professionals working in the sanitation sector and future employers of the graduates. From the total respondents 74% agreed that ISM principles are well reflected in the curriculum content and 82% accepted the relevance of the programme for the region.

The Water Resources Engineering Department has links with several international research and academic institutions including universities in Europe, US and Asia, e.g. Imperial College, London, NTNU-Norway, Technical University Dortmund-Germany, Technical University Munich-Germany, University of Kyoto-Japan, University of Khartoum-Sudan, University of Cape town-SA, University of Pretoria-SA, and Technical University Kassel-Germany, Technical University, Innsbruck-Austria, Tampere-Finland. International conferences are also held at UDSM to facilitate further progress on the common projects carried out with WREM's international affiliates. The university participated and participates in *Summer Schools funded by DAAD*. The international character of the Summer Schools adds to the desired international profile of the study programme. But to further improve the international component of the programme international and "regional" students are required. According to UDES the study programme already accessed scholarships from the Tanzania Integrated Water, Sanitation and Hygiene (iWASH) Program which is run by CARE³. Also applications at the UNDP sponsored Cap-Net/WaterNet-project are encouraged. To a certain extent the IUCEA (see p.4) provides funds to support the exchange of staff and students in the Eastern African Region. Nevertheless, it is recommended to intensify the activities seeking scholarships for international and regional students and to improve and intensify local and regional marketing activities. The networking with international organisations must be improved as well as the visibility of the programme on the website. The marketing must be generally improved; the enforcement of marketing activities should especially cover the neighbouring countries. The intensification of attracting more international students, in particular from the region, to the programme is of special importance because despite the classification of the programme as international, right now, very few international students are enrolled in the ISM programme.

One more important role to improve international relations and attract international students could be played by the "Cooperation, Links and Projects Office" which constitutes one of the sections under the office of the Deputy Vice Chancellor (Academic Research and Consultancy) of the University of Dar es Salaam. The section handles all matters related to cooperation and linkages such as handling matters related to student and staff exchanges, assisting link visitors and foreign exchange students with immigration formalities, organises programmes and coordinates admission and registration of foreign students who apply to enrol as under-

³ CARE International is one of the world's largest private international humanitarian organisations, committed to helping families in poor communities and to improve their lives.

graduate and post-graduate students under the links arrangements. The university explained that it is intended to upgrade the link office into a directorate.

The expert group was informed that at undergraduate level around 100-150 students from the US and Europe study annually one semester at the university. Around 300 students from the Eastern African region are annually enrolled as full-time students. Unfortunately, the staff mobility could be higher. Actually, only five members of staff are of foreign origin but several lecturers come to teach for one semester or for short courses. It is common that PhD students go abroad on sandwich mode – meaning half of their studies abroad and half at the University of Dar es Salaam.

Concerning the integration of students with a handicap the university already integrated the “support for students with disabilities” into its regular monitoring process (cc Report on Monitoring the Quality of Teaching and Learning at the University of Dar es Salaam for First Semester 2009/10, May 2010, p. 8).



Figure 1: “Wisdom is Freedom” - the university logo

1.2 The Study Programme's Conceptual Classification and its Underlying Qualification Objectives

The criterion is partially fulfilled.

The study programme concept focusses on disciplinary and trans-disciplinary qualification objectives that correspond to the aspired scientific educational goal and the degree level of a Master of Science. As already mentioned in the preceding chapter, this programme focuses on sanitation issues, which are governed by the environmental policies and Environment Act of Tanzania. The requirements of the act are included in the curriculum and students have to be conversant with the same. Synergies with the Masters in Integrated Environmental Management programme (MIEM) has been sought starting with the use of the staff members for laboratory, teaching and project supervision exercises. The also existing Masters in Integrated Water Resources Management prepares water managers while the proposed programme prepares sanitation managers which includes the management of both solid waste and dry and wet sanitation technologies. It is envisaged that the programme will involve a combination of the following elements:

- (i) Training in integrated sanitation management
- (ii) Acquisition of advanced knowledge and understanding in the selected specialist areas of sanitation management
- (iii) Broadening the knowledge of managers in areas of integrated sanitation management.

On completion of the training programme, the expected outputs are:

- (i) More than 40 students would be trained during the first four years to serve the sanitation sector in Eastern and Southern Africa (including foreign students), at a rate of 10 per year.
- (ii) Capacity building in physical and human resources at the College of Engineering and the University of Dar es Salaam in general.
- (iii) Competence would have been enhanced at the institutions to enable future running of the programme in terms of research and consultancy.
- (iv) Contribute solutions to problems related to sanitation in the Eastern and Southern African region.

As in the programme on Integrated Watershed Management the issue of integration and interdisciplinary work are also high on the agenda of this programme. This is reflected by the modules ISM 600 "Principles of integrated sanitation management, ISM 602 "Ecological Sanitation " and ISM 608 "Socio-Economic Aspects of Sanitation Management".

The modules altogether reflect in an appropriate manner the defined qualification and educational goals. The taught contents include besides technical aspects as e.g. in ISM 601 and laboratory work in ISM 604 also disciplines from social science ((ISM 608), law (ISM 605), planning (ISM 609 and 613) to GIS (WM 658). The resulting competences comprise e.g. the appropriate utilisation of education tools in sanitation and hygiene education (ISM 606) and the development of an integrated sanitation plan (ISM 607) (cc also next chapter).

The general entry qualifications to Master programmes in Dar es Salaam include

- The possession of an honours bachelor's degree or equivalent qualifications.
- Applicants who hold unclassified degrees (e.g. B.V. Sc. M.D. etc.) should have a credit or
- distinction in the subject of the intended Master's programme.
- Candidates with pass degree classification will also be considered if:
 - (i) Their undergraduate performance in the proposed subject of study was a „B“ grade or above.
 - (ii) They have satisfied the relevant College/School/Institute that they have exhibited potential through subsequent research experience and/or additional training.

For admission into the Master of Integrated Sanitation Management holders of Lower Second Bachelor Degrees in any Engineering discipline will be considered. Apparently also social science degrees are accepted but the students have to prove that they have obtained relevant working experience after having finished their Bachelor's degree. It is strongly recommended to make these requirements transparent and clear to students in the admission regulations.

As in the programmes of Integrated Watershed Management the challenge is here that students with different qualifications and backgrounds are enabled to follow the courses and eventually achieve a common understanding of the different subjects taught. To guarantee that a common understanding is achieved by all students the modules ISM 600 and ISM 607 are essential. Additionally, the use of group work fosters such a development of a common understanding and helps levelling out differences in understanding subject matters.

The Masters programme on ISM generally leads to the degree of a Master of Science which is considered as adequate form of degree for that programme. The degree awarded is according to the qualification gained at a Masters level taking the Dublin descriptors as basis:

- They have to demonstrate knowledge, e.g. in Module 607, which enhances the Bachelor's level, and which provides a basis for further developing ideas adapted to a particular situation.
- Students are trained, e.g. in module 609, to communicate their conclusions, and the knowledge and rationale underpinning these during the presentations and group work. These skills will eventually be proved during the defence of their Master Thesis.

The module descriptions distinguish well between content and learning outcomes, i.e. the knowledge, skills and competences gained in a particular context. The competences described are all relevant and support the educational goals. Nevertheless, the expert group criticises the lack of an appointed person who is in charge of the respective modules. Also methodological competences could be further enhanced e.g. by making it an obligation that GIS is used as an instrument in the context to sanitation to analyse case studies and present later on the results. In this context it is also recommended to increase the proportion of practical experiences gained e.g. during field days and in the laboratory. The literature provided for module WM 658 on GIS is rather general; it is desirable to also give literature on GIS that

discusses its application in particular to sanitation-related problems.

The overall employability of graduates - if competences are successfully attained as described in the module catalogue - must be judged as positive. This is also supported by the overall development of the programme within the context of the IWMnet project which included the integration of external expertise into the development of the programme. Graduates could work in the public sector, e.g. in water authorities, but equally well in the private sector especially in NGOs intervening in the water and sanitation and/or health sector. The team work that is promoted and the group assignments add up to the personal and professional development of the students. It is envisaged that at the end of the training programme, graduates will work in the following areas of sanitation:

- i) Water utilities,
- ii) River Basins,
- iii) Mining Sector, and
- iv) Municipalities.

The university explains in how far the graduates of the three different water-related Master programmes are educated for different job opportunities. Whereas often municipalities do have the personnel with the background to construct sanitation facilities, often an integrated planning perspective is missing. This is what ISM trains the students for and where graduates are supposed to find employment opportunities.

The overall duration of the programme is 18 months. The programme is composed of 12 core modules that are offered as compulsory (12) or elective (3) modules. Six core modules are studied in the first and six are studied in the second semester. Most of the modules offered consist out of 3 units. One unit corresponds to 15 contact hours. The accreditation documentation stipulates that a minimum of 35 units shall be obtained to satisfy the coursework requirements but the postgraduate prospectus 2010/11 – 2011/12 defines a minimum of 30 units to satisfy the coursework requirements. This inconsistency must be solved by adapting the prospectus or the examination regulations of the study programme.

Taking 30 units as basis, it means that students study in two semesters around 450 contact hours and in addition around 1050 hours as time for self study. This is based on the assumption that 25 hours are the workload for one ECTS. As the last semester is devoted to the Master Thesis, it is further assumed that it corresponds to 30 ECTS – meaning the degree programme corresponds overall to 90 ECTS in three semesters.

The programme offers only three elective modules although at least two Master programmes exist that are highly connected to ISM. The expert group recommends towards the university to reflect which modules from neighbouring programmes can be additionally offered for ISM students as electives to better allow students the development of their personal specialisation and profile.

After successful graduation students receive their Masters certificate and a postgraduate academic transcript per year. The transcript depicts the modules/courses taken by the student and the grades achieved. As the transcript does not provide the credit units and it does not show how many hours make up one unit, it is not possible to evaluate the transcript and

certificate at a European or International level. Here, two solutions to the problem are most obvious. Future transcripts could provide a footnote explaining that one unit implies 15 contact hours or a diploma supplement that details out contact hours and time for self study is handed out to the students in addition to the certificate and the transcript. These measures could ease acceptance of graduates on the international market because a better comparability of their certificates is guaranteed.

The University of Dar es Salaam already rules out the recognition of credits obtained at other universities. The "Regulations on Student Credit Transfer at the University of Dar es Salaam" rule out that students will be required to undertake at least $\frac{2}{3}$ of a degree programme credit units at UDSM. Maximum credit allowable for transfer, therefore, is $\frac{1}{3}$ of the required credit units of a UDSM degree programme.

1.3 Study Programme Concept

The criterion is fulfilled

The study programme is well thought of and coherent in terms of structure and content. The individual modules support – also in their logical order – the qualification and educational goals of the programme. This is also due to the development of the programme in cooperation with the IWMNet project including several stakeholders. A market study was conducted and its results considered fine-tuning the programme (cc chapter 1).

The envisaged programme capacity is 25. The programme started in October 2010 with 11 students. In the following year already 14 students were admitted. The plan of the university is that in year 4 the full capacity of 25 students can be admitted. Around 50 % of the students are on a granted (partly paid) job leave. It is envisaged that the number of government and privately sponsored candidates will further increase.

At the commencement of the programme no female students enrolled in the programme. Now, out of the 43 students ten are female. The lack of women is considered a general problem especially at the Masters level of programmes in engineering and natural sciences (cf. Chapter 1).

In contrary to the programmes at Kenyatta and Makerere at UDSM the modules are taught in block and not over the semester. This is one of the obstacles to improve student and lecturer mobility between the three universities. The expert group welcomes the fact that despite these difficulties staff exchange takes place which – if possible – should be at least maintained if not further increased. Another disadvantage of the block courses is that apparently it requires more organisation to offer students a clear time schedule that can be followed which also leaves clear space identifiable for holidays or off-campus work. Here, improvements should be considered to increase the reliability of time schedules for the students.

The study programme concept covers the delivery of disciplinary and cross-disciplinary knowledge, covers the delivery of methodological and generic competencies, builds on educational/didactic concepts, and is fit for purpose in respect of the defined qualification objectives. Disciplinary and cross-disciplinary knowledge is covered, for example, by ISM 611 "Restoration and Remediation of Polluted Sites" and ISM 603 "Decentralised Water Supply

and Sanitation" which are rather disciplinary while ISM 600 on "Principles of Integrated Sanitation Management" and as well the modules 607, 608 and 612 are rather cross-disciplinary.

The delivery of methodological competencies is, for example, covered by ISM 604 "Field and Laboratory Techniques", by WM 658 "Geographical Information Systems and Database Management" and by ISM 610 "Research Methodology". Generic competences are developed, for example, by ISM 609 the "Sanitation Evaluation Project". Here, an existing sanitation project is evaluated and the results that were elaborated in group work are presented and defended in front of an expert panel. Nevertheless, the expert group likes to recommend increasing the number of field days to enhance the practical experiences of the students.

Teaching is often conducted in form of seminars – demanding homework and presentations - which is complemented by lectures, fieldwork, group and laboratory work. Accordingly the form of examinations varies from essays, presentations, group assignments to oral and written exams. Typically the module grade is made up by an exam (60% of final grade) and coursework (40% of final grade) which is composed of assignments and tests. The project work is assessed by a project report of the team with clearly identifiable individual contributions (60% of grade) and a presentation and defence of the report (40% of final grade) before a panel consisting of academics and practitioners.

The practical laboratory work involves students taking the sanitation related samples to laboratory and analyse them according to the standard methods of analysis of water and wastewater. The expert group likes to recommend at this point considering the integration of the determination of Escherichia Coli into the (waste) water analyses. Samples are e.g. taken during field work in pilot catchments that offer real sanitation management related problems.

Overall the study programme concept seems to be academically feasible, especially under consideration of the expected entry qualifications, student workload (compare preceding chapter), examination organisation, and the overall support and assistance offered to the students.

1.4 Realisation of the Study Programme

The criterion is fulfilled.

The expert group visited – among others - the computer lab, the GIS lab, and several laboratories serving for different types of analysis.

According to the "Annual Report 2010 – 2011" of the College of Engineering and Technology, the Department of Water Resources Engineering disposes of three computer labs and three experimental laboratories. The physical infrastructure is considered as still adequate but could be further improved and modernised. As already mentioned in the first chapter the World Bank finances new laboratory equipment which will upgrade the existing facilities.

It is recommended that material provided to students as e.g. semester readers will be more regularly updated. A learning platform can be accessed under <http://lms.udsm.ac.tz/login/index.php>.

It is recognised that first e-learning modules are already developed based on Moodle. The further elaboration of online modules that can be shared among the three universities is a chance of improving the knowledge base for the students and it should be followed up by the universities with increased emphasis.

The interdisciplinary character of the ISM programme is documented by the fact that in many cases the supervisors of the Master thesis come from different departments and co-supervisors come from different disciplines. Teaching methods vary from seminars to practical trainings in the field and in the laboratory. In certain cases team teaching is established as new method to better comply with modern teaching needs.

The infrastructure for students is also adequate and the opening hours of the general library are considered sufficient. The library also serves as room for group work among students. The organisation of studies will provide for appropriate support instruments, in particular, tutorials as well as academic and non-academic student advisory service. The supervision by staff is considered as adequate; students report quick responses of lecturers on email based questions. The workload is demanding but still feasible. Altogether the computer labs and the access possibilities are considered as adequate concerning the quantity and quality of hardware and available software as e.g. ARC GIS 3.1 licenses and Arc View. Wifi points are in the classrooms and the library offers besides regular equipment relevant e-journals.

As mentioned in the monitoring report of the university too, the infrastructure for students got still its flaws but measures are already defined for its improvement. IT support is provided to a certain extent also to students by the UDSM ICT Services (<http://support.udsm.ac.tz/index.html>). Microsoft office is provided for free – students receive a CD that even includes Arc GIS for use on their personal computers.



Figure 2: Rainfall Simulator

To further improve existing resources, lecturers in the ISM programme who studied for at least 3 months at a German university are highly encouraged to make use of the possibility to apply to the DAAD once a year for a grant up to a maximum value of € 200 for scientific books and journals to help them advance their academic knowledge. These books could be and should be made available in the resource centre. Further opportunities exist for direct DAAD-alumni. More detailed information can be obtained on www.daad.de. A registration on the website of the German Alumni Water Network (GAWN) should be promoted to all students of the programme also to stay informed on water-related topics.



Figure 3: Water Analysis Laboratory

The programme is housed in the Department of Water Resources Engineering of which eleven professors and senior lecturers are appointed to teach in the programme. In addition the university depicted six external lecturers coming from Kenya, Uganda and Zambia. The quality of teaching is assured by different measures:

- 1) the university regulation on teaching staff ensures that non PhD holders cannot teach in postgraduate programmes and
- 2) the centre for continuing education runs pedagogical programmes for teaching staff which are mandatory for all staff to attend.

Additionally, the procedure of recruitment is described in the Staff Appointments policy booklet. The quantity and quality of available staff is considered as adequate. In contrary to the partner universities in Nairobi and Kampala in Dar es Salaam the time spent on supervising thesis work is considered as regular workload of the lecturers. As a rule full professors have to supervise around five theses at undergraduate level. The occupation of academic staff is approximately divided into 40% teaching, 30% research and 30% consultancy. It would be appreciated to increase the proportion of teaching to become at least 50% of the overall workload.

Although the College established the new ISM programme as an addition to current programmes, the students to staff ratio has decreased from 17% to 15%; a total of 25 new em-

ployees were hired ("Annual Report 2010 – 2011" of the College of Engineering and Technology, p.iii).

For international students admission procedures are established and they receive support from the "link office" (cc chapter 1). Foreign students generally get accommodation on campus to ease their integration; also are rooms for postgraduate students and foreigners better equipped and there is no need to share a room. Nevertheless accommodation remains a problem for postgraduate students because the facilities are in number not sufficient. Even if accommodation is provided by the university some facilities require long time for commuting which should be avoided.

To facilitate integration of foreigners, the university runs special orientation programmes for foreign students. But a general orientation is provided at the beginning of the programme. Students explained that a lecturer has shown them around and they received the prospectus. All students are encouraged to work and learn in groups. It supports the integration of foreigners. Students report that almost every evening after lectures they sit together to discuss and summarise the outputs of the day. Reading instructions for modules are given in time and on a regular basis.

The students' workload seems to be appropriate. There were no indices that students are overburdened. But the means of verification of the workload could be further elaborated and integrated into the existing evaluation system for a more regular verification.

Programmes to improve the quality of teaching are in place. These courses are obligatory for all staff members and participants are not charged for their attendance. This pedagogical training is offered by the Center for Continuing Education which is under the roof of the UDES. For teaching at postgraduate level a PhD is defined as minimum requirement.

As the offered modules only overlap with other programmes in the case of the electives, there is no risk that delays of studies occur because of parallel lectures.

The Technology Development and Transfer Centre (TDTC) is one of the pillars of College of Engineering. Here, students and alumni have the opportunity to promote their ideas and outputs if there is a chance of selling it outside. TDTC plays the role of coordinating technology development and transfer activities in the College. The College of Engineering and Technology outreach programmes are also coordinated by TDTC.

The Objective of the Centre is to develop and disseminate technologies that have direct relevance to the Tanzanian community and which will directly impact on the development of SMEs and the lives of the general public including:

- Development of indigenous and adopted technologies;
- Accelerated promotion and commercialisation of technologies;
- Initiation, coordination, and supervision of product/production innovation projects;
- Facilitate technology procurement from within and outside the country; and
- Provision of service to the industry through the Bureau for Industrial Cooperation (BI-CO/ which provides as a non-for-profit organisation based on the College of Engineering and Technology and the University of Dar es Salaam consultancy services).

Nevertheless it is desirable that students have more possibilities to become better prepared for the job market and that the university becomes active as a broker between employers and potential employees.

For the sake of continuing research and accessing external funds the university is continuing the cooperation with the University of Siegen by writing joint proposals. Students are partly integrated into research by using them as research assistants. Recent research activities are e.g. in the field of environmental sanitation/education: here students test e.g. their modified and adapted approaches of environmental education in slum areas. Other activities are in the field of microbiological exposition of compost – the effectiveness of biodigesters is assessed also in terms of the hygienically standard of their outputs. The research outputs of the neighbour IWRM Master programme was partly presented conferences and some also published.

The Department of Water Resources Engineering is partner in Cap-Net which is an international network for capacity building in sustainable water management. It is an UNDP project funded by several sources. The EU water facility is among the donors. Activities by the Department of Water Resources Engineering include the development of rainfall-runoff model for selected river basins and as well the development of a wetland water allocation model. Further activities include the development of a flood warning model and the Integrated Water Resources Management of the Pangani basin. The dissemination of research results to the students and the integration of research results into teaching should be enhanced.

1.5 Examination System

The criterion is partly fulfilled.

The rules and regulations on Postgraduate studies of the University of Dar es Salaam and their interpretations at the College of Engineering and Technology shall apply to this program. These include the general admissions requirements, assessments and examinations as well as dissertation work which is approved by the university Senate and Quality Assurance Bureau.

The examinations conducted seem to be module- and competence-related and serve to test and verify the achievement of defined educational goals. The form of assessments is adequate and known by the students in advance because they are provided in the module catalogue and because lecturers give this information at the beginning of their courses. If students fail in an examination, under normal circumstances the exam is repeated in the following semester. The form of assessments varies according to the different competences tested. Communication skills are provided and assessed, for example, by presentations (individual and in groups). Essays and written exams prove in how far students are capable of expressing their ideas and of summarising knowledge and they have to prove their in-depth knowledge of a certain topic. Oral examinations serve to verify in how far students are capable of expressing and explaining certain issues to experts. The frequency of examinations and the related workload is appropriate. Altogether students confirm this statement because they do not consider the number of exams as too demanding, but as quite manageable. Students also confirm that they know in advance how their final grade is composed. E.g. in

module 606 the percentage for the written exam is 60 % and for the coursework (assignments and tests) is 40 % which is stated in the module catalogue and according to the students is discussed at the beginning of the course.

The registration for examinations is already linked to the admission process that students have only to produce their IDs for entrance at exams. The repetition of exams in case of failure is offered in the following semester or directly after the semester as supplementary exam depending on the achieved GPA. It is ensured that handicapped students' can claim for disadvantage reconciliation with regard to chronological and formal study requirements as well as all final or study accompanying performance records and within the scope of aptitude assessment test.

The academic progress of students is reported in a structured way on developed forms. Guidelines exist also for examiners according to which criteria a thesis is supposed to be graded.

The expert group noticed that in some cases the grading of exams took several months. It is highly recommended to improve the existing measures to avoid such delays. This delay of the grading of exams – that partly happens – is related to the (likely) delay of the grading of the final thesis. According to the proposed ISM programme description, the programme duration is 18 months. Under chapter 4.4. of this description it is written that "...students will take 19 months to complete". Nevertheless the expert group is not convinced that students can always finish their Master Degree on time because (cc general regulations and guidelines for postgraduate study programmes)

- 1) Every thesis shall be examined by at least three specialists (including one external examiner).
- 2) All CVs of examiners have to be accepted by the senate which is a large body.
- 3) New examiners for the thesis review will be searched for only once an examiner has not submitted the report after 4 months.
- 4) The maximum duration after which the defence or viva voce is to be scheduled after the thesis is graded as satisfactory is not defined.
- 5) The viva voce examination shall comprise a minimum of five examiners which makes it difficult to identify suitable dates for all parties involved and may cause additional delay.

The aspects mentioned before may all lead in combination or as single event to an overall delay of graduation.

For the sake of guaranteeing a compatibility of the program in the region and suit the demands of scholarship donors and holders to finish the programme in time, measures are recommended to better guarantee a graduation not later than 3 months after submission of the thesis at latest.

The expert team recommends that during the re-accreditation the future external expert team is advised to verify in how far the university has succeeded in guaranteeing the graduation of students after 18 month.

The University of Dar es Salaam provides online the Admission Requirements of all Post-graduate Degree Programmes for 2012/2013.

1.6 Quality Assurance

The criterion is fulfilled.

It must be highlighted that the system of quality assurance at the University of Dar es Salaam is already at an advanced level – especially in comparison with the other universities visited in the context of this accreditation. One example is the “Report on Monitoring the Quality of Teaching and Learning at the University of Dar es Salaam for First Semester 2009/10 (May 2010). The report is based on a random sampling technique covering all teaching units of the university. At the College of Engineering and Technology 11% of all classes were covered. These monitoring and evaluation activities are core activities of the Quality Assurance Bureau. The evaluation carried out covered topics from punctuality and attendance of lecturers and students, procedure and adequacy of exams and as well the quality and availability of infrastructure. Part of the monitoring is that during lectures other senior lecturers attend and go around and eventually write reports on the quality of teaching. To check in how far examination regulations are followed, special teams are composed who attend the examinations. This results in reports on the conduct of exams. Every semester students evaluate their lecturers: the evaluation is distributed to the different units in paper and another person than the lecturer is distributing and collecting the evaluation forms whereas the lecturer is absent. The data is centrally collected and reports are produced. According to the university some average performance grades are developed and if lecturers perform below a defined threshold, the report is send to the respective unit and results and measures are to be discussed with the director of the unit. Reports can only be accessed by academic staff but students are informed about the actions taken. Additionally students report of evaluations that were conducted online.

Based on the overall report on monitoring it is recommended to include in this report aspects of student’s satisfaction with lectures and modules. According to the university a feedback of evaluation results to students is planned but is not fully realised yet. Also the extent to which conclusions are drawn out of evaluation results and actions emerge out of this cannot be assessed yet. For future re-accreditation it must be mentioned that the issue of the appropriateness of student workload should be considered during evaluations and a feedback of evaluation results to the students should be guaranteed.

Tracer studies were already carried out university wide in the year 2000, but also individual units carried out tracer studies for their specific purposes. It must be highlighted that results of these studies must be taken into consideration for renewal of study programmes. But the tracer studies do capture only partly in how far graduates meet the needs of the job market; to overcome this problem the College of Engineering and Technology is in direct contact with the respective Engineers Registration Board of Tanzania to get first hands information. All senior academic staff are registered with the Engineers Registration Board as professional or consulting engineers, and some are registered by or affiliated with professional institutions

overseas.

As a general recommendation the university is encouraged to include evaluation findings, studies on student workload, study success (graduation) rates and the results of graduate destination surveys into the further development of the programme especially with view on the re-accreditation.

By the means of the WaterNet network in which most graduates are registered, the department of water resources knows the job positions of graduates and job opportunities are posted there too. It therefore serves also as platform for career development. The WaterNet is also used to invite alumni for special occasions.

An Alumni portal can be reached under <http://alumni.udsm.ac.tz>. The mission of the alumni organisation is to "establish a reliable databank, enhance a sustainable relationship with alumni, market the programmes and services of the University of Dar es Salaam, and promote dialogues that are relevant to national concerns". The alumni directorate tries to use alumni as resource for funding but as a rule for a renewal of a programme it must be nowadays proved that alumni are involved in initial states and updates of programmes. The reviewed programme has to be presented for a critical feedback to stakeholder meetings and the updated programme must take into consideration tracer studies.

The university explained that the College of Engineering and Technology got its own alumni organisation which collaborates effectively with the college. Here, the expert group likes to point out that in particular these alumni belonging to the department of water resources engineering should be used as important resource to generate funds and develop stronger bonds for networking.

1.7 Transparency and Documentation

The criterion is fulfilled.

The university generally makes the requirements relating to the study programme, the course of study and examinations accessible at the beginning of the study programme. The university calendar and prospectus are published and updated annually. The information is available in print and uploaded on the university website. The prospectus 2010/11 – 2011/12 provides general information as e.g. on medical services and gives all necessary addresses of relevant institutions/units and person. Additionally, all necessary regulations are included. Admission requirements, application forms and as well the tuition fees are provided under <http://www.coet.udsm.ac.tz/index.php/admissions>. The "Regulations on Student Credit Transfer at the University of Dar es Salaam" can be found online as well.

Registration for modules and courses is done by making use of the online platform ARIS (Academic Registration Information System) which holds all the information relating to students and their studies at the University of Dar es Salaam. Additionally, students can view online their course progress and results. Even accommodation management, payment management and the degree configuration can be partly carried out or looked after by ARIS

<http://aris2.udsm.ac.tz>.

Guidelines for preparing research proposals are developed and made available to the students. Besides other regulations and guidelines the procedure of recruitment is narrated in the Staff Appointments policy.

Unfortunately, many important categories of the main website of the university remain empty and links to the departments are not provided or functional. Here, some improvements must be made. In contrary to the main website of the university, the website of the College of Engineering is quite informative. A weakness is that the module catalogue of the study programme cannot be found online. Some module descriptions, but without any further information on lecturers, methods applied and credit units, are available on the website of IWM-Net. It is indispensable that the complete and updated module catalogue including all required information be made available online (open access also for marketing purposes). The same applies to all complete examination regulations which should be easily accessible on the website.

1.8 Summary Report

The expert group acknowledges the high potential of the Master's Degree Programme on Integrated Sanitation Management and its importance for the Eastern African Region in general and for Tanzania in particular. The programme structure and duration of 18 months allows for student and lecturer mobility between the three universities in Kenya, Uganda and Tanzania. The contents of the programme offer good employment opportunities for the graduates after completion of their Master's degree. Altogether the university meets the recent needs to train integrated sanitation managers for the built environment.

The Quality Assurance of the University of Dar es Salaam is at an already high operational level. This is reflected by the already implemented strategies and measures mentioned in the quality assurance policy.

2nd Part: Final vote of the expert group

1 „Integrated Sanitation Management“

1.1 General Recommendations:

- It is recommended that appropriate measures be developed not only to increase the number of female academic staff but also to take care that the percentage of female students enrolled at graduate and postgraduate level will rise.
- It is highly recommended that the marketing and networking for the program will be improved, and that the contacts with local and regional authorities and with international organisations involved in the water sector will be intensified.
- It is recommended that staff exchange with universities of the region will be further increased.
- It is recommended that the updated and complete module catalogue including the appointed responsible person per module and the course of modules/timetable of the programme should be made available on the website.
- It is recommended that methodological competences should be further enhanced by increasing the number of field days and laboratory work and as well by making it an obligation that GIS is used as an instrument to analyse sanitation-related case studies and present the results later on.
- It is recommended to also provide literature on GIS that is not only general but discusses its application in particular to sanitation-related problems.
- It is recommended to include evaluation findings, studies on student workload, study success (graduation) rates and the results of graduate destination surveys into the further development of the programme especially with view on the re-accreditation.
- It is recommended that during the re-accreditation the external expert team is advised to verify in how far the university has succeeded in guaranteeing the graduation of students after 18 months.

1.2 Recommendation for Accreditation Towards the Standing Accreditation Committee (SAK)

The expert group recommends towards the SAK the accreditation of the study programme "Integrated Sanitation Management (MSc) for the accreditation period of five years. The accreditation is subject to the following conditions:

- It is requested that the University refrains from mentioning the University of Siegen as partner of the programme on marketing brochures and leaflets.
- Examination regulations and the prospectus of the university should provide identical requirements in terms of how many credit units must be studied as course work.

- A Diploma supplement or an adapted transcript of records must be provided allowing a comparison of credits at least with the level valid in Europe.
- It must be guaranteed that the defence of the thesis will not take place later than three months after its submission. The University must introduce appropriate measures.

The accreditation is granted for the duration of five years, once the above conditions have been met. They have to be met not later than twelve months at the latest after the university has been notified about the decision of the SAK.

3rd Part: Continuation of procedure

1 Response statement by university

Response to the comments from the Accreditation group of Experts re: UDSM-ISM

Nr	Comment	Page nr	Response from UDSM
1Therefore it is requested... to no longer mention the University of Siegen as a partner of the programme on marketing brochures and leaflets because....	Page 3	<i>This is acceptable and will be implemented</i>
2	...to recommend ways in which the university of Daresalaam ought to realign itself so as to ensure optimalThe final report is not yet out.	Page 4	<i>The report is out and the University management is now operationalizing the recommendations.</i>
3	..It is recommended to further develop measures to not only increase female academic staff but also to take care that the percentage of female students enrolled at graduate and postgraduate level increases.....	Page 5	<i>The university has lowered the entry pass grades for girls from high school to 4 points while boys must have a minimum of 5. At Postgraduate level priority is given to ladies when it comes to scholarship awards. The IWASH and WATER-NET insist on having 50% for ladies. This is currently practiced</i>
4	..the networking with international organizations must be improved as well as the visibility of the programme on the website. ...	Page 6	<i>The college has now employed a systems administrator solely responsible for website and students data updating. The issue of attracting more regional students is real but it depends on the availability of sponsors.</i>
5	...Nevertheless the expert group criticizes the lack of an appointed person who is in charge of the respective modules....	Page 9	<i>All the modules (even those offered by visiting staff) have a local person in charge. The late has to coordinate the communication with the foreign lecturers even to collect him/her from the airport.-Oversee the examinations etc.</i>
6	..The accreditation documentation stipulates that a minimum of 35 units shall be obtained to satisfy the course work requirements but the postgraduate prospectus 2010/11-2011/12 defines minimum of 30 units to satisfy course work requirements.	Page 10	<i>The regulations stipulate that the department presentation to senate for approval supersedes all others. The department recommended and senate approved 35 units. This is what is practiced. (the regulations of the study programme.</i>
7	...the University to reflect which		<i>The university recommends students</i>

	modules from neighbouring programmes can be additionally offered for ISM students as electives.....	Page 10	<i>to select and opt for modules in other programmes provided they don't exceed the number of units stipulated. The idea of fixing the number of electives was dropped because it limits the students' choices (depending on background) and causes a lot of timetabling difficulties.</i>
8	As the transcript does not provide the credit units and it does not show how many hours make up one unit..... ...future transcripts could provide a footnote explaining that one unit.....	Page 10	<i>The recommendation is taken positively and we will strive to include this in future versions of transcripts.</i>
9	..Maximum credit allowable transfer therefore is 1/3 of the required units for s UDSM degree programme..	Page 11	<i>The credit transfer issue is now handled under the IUCEA and new regulations will be binding once it is approved.</i>
10	..The expert group noticed that in some cases the grading of examinations took several months... Students will take 19 months to complete. ..the aspects mentioned may lead to an overall delay in graduation	Page 18	<i>There is a confusion between the Masters by Course work and Dissertation (classroom work) and those who do through Thesis(research) only. The ISM has a course work component and similar to the IWRM programme the examination periods is fixed. The external examiner(s) is normally brought to UDSM and spend a week or two reading and attending the presentations by students. The students are then given a month (19th month) to make corrections and bind for final submission. The rest of the time is for clearing and retuning all university property before they fly back home to their employers. The Masters by research (thesis) only is handled differently because the document has to be sent tot the examiner and this may cause a delay as reported.</i>

2 SAK-Decision

Recommendations:

- It is recommended that appropriate measures be developed not only to increase the number of female academic staff but also to take care that the percentage of female students enrolled at graduate and postgraduate level will rise.

- It is highly recommended that the marketing and networking for the program will be improved, and that the contacts with local and regional authorities and with international organisations involved in the water sector will be intensified.
- It is recommended that the updated and complete module catalogue including the appointed responsible person per module and the course of modules/timetable of the programme should be made available on the website.
- It is recommended that methodological competences should be further enhanced by increasing the number of field days and laboratory work and as well by making it an obligation that GIS is used as an instrument to analyse sanitation-related case studies and present later on the results.
- It is recommended that during the re-accreditation the external expert team is advised to verify in how far the university has succeeded in guaranteeing the graduation of students after 18 months.

The SAK welcomes the planned and implemented measures and activities as explained in the response of the university to the evaluation report. Nevertheless the SAK does not regard all caveats to be sufficiently taken into account.

The SAK grants the accreditation of the study programme "Integrated Sanitation Management" (M.Sc.) for the accreditation period of five years. The accreditation is subject to the following conditions:

Conditions:

1. It is requested that the University refrains from mentioning the University of Siegen as partner of the program on marketing brochures and leaflets.
2. Examination regulations and the prospectus of the university should provide identical requirements in terms of how many credit units must be studied as course work.
3. A Diploma supplement or an adapted transcript of records must be provided allowing a comparison of credits at least with the level valid in Europe.

The accreditation is granted for the duration of five years, once the above conditions have been met. They have to be met not later than twelve months at the latest after the university has been notified about the decision of the SAK.