

No. 877

22 August 2008

**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

In accordance with Regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

Radiography and Clinical Technology

registered by Organising Field 09 – Health Sciences and Social Services, publishes the following Qualification for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification. The full Qualification can be accessed via the SAQA web-site at www.saqqa.org.za. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification should reach SAQA at the address below and **no later than 22 September 2008**. All correspondence should be marked **Standards Setting – Radiography and Clinical Technology** and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION: *Bachelor of Radiography: Ultrasound*

SAQA QUAL ID	QUALIFICATION TITLE		
63449	Bachelor of Radiography: Ultrasound		
ORIGINATOR			PROVIDER
TT - Radiography and Clinical Technology			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National First Degree	9 - Health Sciences and Social Services	Curative Health	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	480	Level 7	Regular-ELOAC

This qualification does not replace any other qualification and is not replaced by another qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

The purpose of the qualification is to develop a professional competent in the knowledge and skills required for the profession of Sonography, a professional who has gained experience in applying such knowledge and skills in the appropriate workplace context. Skills in management, problem solving and research will also be demonstrated allowing the holder of this qualification to work independently and in a supervisory capacity within the health care team.

Successful completion of this qualification will enable the learner to be registered by the relevant Statutory Health Council as a graduate in the field of Diagnostic Ultrasound. The outcomes achieved will allow the learner to practice his/her skills to the benefit of the community and to share their skills and knowledge with other learners and peers. Registration will be assurance to the community and society that the professional will practice at all times within the relevant scope as determined by the Statutory Health Council.

Rationale:

There is a national shortage of qualified sonographers to operate Ultrasound equipment in order to provide a safe and accessible service to the public. Many hospitals and clinics, especially in the Government sector, have ultrasound machines but lack operators with the necessary skills to provide a safe and meaningful service or are using personnel to operate these units who have not undergone formal training and assessment. The field of Medical Imaging is undergoing rapid advancement in both the technology and in the areas in which it can be applied. As more emphasis is placed on preventive rather than curative medicine, Ultrasound is a cost effective means of screening for, and determining a wide range of disorders at a relatively early stage, thus helping improve the treatment and prognosis. There is scope for use at all health care levels, especially in Primary Health Care, where it is particularly useful in the assessment of the pregnant patient and foetal well-being.

The qualification carries a minimum of 480 credits and, once registered with the relevant Professional Board, allows the holder to practise in both the public and private sectors and in private practice.

The Exit-Level Outcomes of this qualification describe the foundational, practical and reflexive competencies, which constitute the applied competencies required to provide a safe diagnostic sonographic service to the public. The holder of the Bachelors Degree may register for a Masters Degree and may then proceed to a Doctoral qualification. Horizontal articulation may be into a Bachelors degree in another radiographic discipline.

All learners for this qualification are required to be registered as learners by the relevant Statutory Health Council for the duration of the period of study in an accredited clinical training centre.

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED IN PLACE

This qualification is based on the specific knowledge from the Natural and Biomedical Sciences as well as Social Sciences. Knowledge of human anatomy, communication, information technology and sciences at NQF Level 4 is assumed. In order to enter this programme the learner should have the competencies of either:

- > Grade 12 certificate with exemption/National senior certificate for degree purposes.
- > Communication at NQF Level 4.
- > Life Sciences at NQF Level 4.
- > Physical Sciences at NQF Level 4.
- > Mathematics Literacy at NQF Level 4.
- > Life orientation at NQF Level 4.

RPL (e.g. a radiography qualification in another category) would be recognized on submission of a portfolio as evidence in accordance with the Institutions RPL policy.

Recognition of Prior Learning:

This qualification may be achieved in part through the recognition of relevant prior learning and/or through prior experience as a practitioner in another field of radiography. Providers are required to develop structured and accredited means of the assessment of learners against exit level outcomes of the qualification on an individual basis and in accordance with the institutions' accredited RPL policy. Such procedures and the assessment of individual cases are subject to moderation by independent assessors.

Access to the Qualification:

Access to this qualification is dependent on successful completion of a grade 12 education in line with the National Senior Certificate for degree purposes.

QUALIFICATION RULES

This qualification is competency based. Notional hours will include theory and clinical components in order to achieve competency.

The qualification has been structured as follows:

Fundamental (156):

- > Demonstrate knowledge of natural and life sciences and pathology at a level suitable for application in the clinical field (80).
- > Assess and perform patient care in a manner which ensures that the patient's welfare is maintained (60).

> Apply the principles of human rights, ethics and medical law which ensure the well-being of the patient (26).

Core (300):

> Foundations of Professional Practice:

> Apply the ultrasound specific measures which ensure that the health and safety of patients, self and colleagues is maintained (40).

> Plan, develop and apply total quality management appropriate to the sonographic context (40).

> Scientific knowledge:

> Demonstrate research skills and foster a research climate in Ultrasound imaging (40).

> Ultrasound practice:

> Perform the sonographic protocols and procedures to produce optimum quality images in the specified areas of diagnostic ultrasound (100).

> Critically assess the sonographic images and apply pattern recognition to determine aberrant appearances in keeping with pathology (80).

Electives (24 credits):

Electives offered are at the discretion of the provider. The student must select one or more of the electives according to the credits allocated to the specific elective.

> Possible electives:

> Advanced computer skills.

> Didactics/Education Principles.

> Obstetric management.

> Applied Psychology.

> Small and medium business enterprises.

EXIT LEVEL OUTCOMES

1. Demonstrate knowledge of natural and life sciences and pathology at a level suitable for application in the clinical field.

2. Assess and perform patient care in a manner which ensures that the patient's welfare is maintained.

3. Apply the principles of human rights, ethics and medical law which ensure the well-being of the patient.

4. Perform the sonographic protocols and procedures to produce optimum quality images in the specified areas of diagnostic ultrasound.

5. Critically assess the sonographic images and apply pattern recognition to determine aberrant appearances in keeping with pathology.

6. Apply the ultrasound specific measures which ensure that the health and safety of patients, self and colleagues is maintained.

7. Plan, develop and apply total quality management appropriate to the sonographic context.

8. Demonstrate research skills and foster a research climate in Ultrasound imaging.

Electives:

Electives offered are at the discretion of the provider. The student must select one or more of the electives according to the credits allocated to the specific elective.

Possible electives:

- > Advanced computer skills.
- > Didactics/Education Principles.
- > Obstetric management.
- > Applied Psychology.
- > Small and medium business enterprises.

The qualification promotes the critical cross-field outcomes in the following manner:

- > Identifying and solving problems in which the responses display that responsible decisions, are made within the health care context using creative and critical thinking will be evident in the way that the patient's welfare is maintained.
- > Information literacy which includes the resourcing, organising and critical evaluation of data with particular emphasis on health issues through the development, planning and application of quality management principles.
- > Working effectively with all levels of co-workers in the health care team and educational environment for the well being of the patients and the society.
- > Evaluating and implementing strategies for effective learning in the academic or clinical environment, through the utilisation of natural and life sciences as well as pathology necessary to provide quality ultrasound service.
- > Responsible self management and development for the provision of life long learning through research in the field of ultrasound and healthcare in general.
- > Effective communication through verbal, non-verbal and technological equipment to ensure a collaborative and effective healthcare service delivery for the benefit of patients.
- > Knowledge and use of advanced science and technology in the health care environment will contribute to effective communication among healthcare workers and ensure that ultrasound services can be provided to communities through the use of teleradiology and other technological advancements.
- > Identify health problems in the context of ultrasound, suggest and implement a solution or plan of action in order to solve the problem professionally will be promoted through effective and safe patient care practices in accordance with the patient's needs by taking into consideration ethical principles as well as human rights and medical law requirements.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

- > Knowledge of natural and life sciences and pathology supports the range of routine and advanced techniques utilised in the clinical context.
- > Knowledge of natural sciences helps the learners build knowledge and skills necessary for the choice of equipment and manipulation of controls necessary for patient management and healthcare service delivery.

Associated Assessment Criteria for Exit Level Outcome 2:

- > Relevant patient care is identified and correctly applied before, during and after the examination in a manner which ensures that patient well-being and needs are met.
- > Procedures and requirements are communicated effectively to allow informed consent to be given either verbally or in writing as appropriate.
- > Decision-making and accountability demonstrates an understanding of the ethical requirements of a professional medical environment.

Associated Assessment Criteria for Exit Level Outcome 3:

- > Psychological, cultural and ethical considerations of the patient and their families are recognized and acted upon in a professional manner.
- > Rights of the patient, as entrenched in the Human Rights Bill, the Patients Charter and medical law are protected and confidentiality maintained.

Associated Assessment Criteria for Exit Level Outcome 4:

- > The merits of each technique can be evaluated, in relation to other diagnostic procedures.
- > Images demonstrate the anatomy, pathology and measurements relevant to the sonographic protocol.
- > The choice of equipment and control settings demonstrates the knowledge of ultrasound physics and Doppler required for quality image production.
- > Advanced recording and imaging principles are understood in order to be applied appropriately in the clinical context.
- > Image artefacts are recognized and minimized, where possible, to avoid misdiagnosis.
- > Relevant clinical information is understood and utilised to allow for the correct interpretation of the images.
- > Understanding of the clinical information and pathology which influence and modify scanning protocols is demonstrated theoretically and practically.
- > Appreciation of the role of ultrasound in the holistic management of the patient is demonstrated in the practical context when other investigations may be required.
- > Invasive procedures are performed with the assistance of the sonographer/medical practitioner.

Associated Assessment Criteria for Exit Level Outcome 5:

- > Correct scanning planes for each organ are demonstrated to ensure an optimal examination is performed.
- > Images show the correct patient and technical information to comply with medico-legal requirements.
- > Required technical information is demonstrated to aid in the interpretation of the image.
- > Appropriate modifications made during the examination show that technical problems are correctly identified.
- > Normal sonographic appearances of each specified examination are recognized.
- > Variations to the above are recognized which allows for the detection of abnormalities.
- > Normal and abnormal appearances are accurately described (verbally and in written format) and the information acted upon to the benefit of the patient.
- > Information is made available to the relevant personnel to allow for diagnosis and improved patient management.

Associated Assessment Criteria for Exit Level Outcome 6:

- > Relevant legislature is known for general health and safety principles to be applied in the working environment.
- > Knowledge of ultrasound bio-effects and their potential for harm is demonstrated in the performance of scanning protocols in keeping with the ALARA principle.
- > Manipulation of the safety indices shows a knowledge of their relevance.
- > A hygienic and neat work environment is maintained in order to eliminate the possibility of cross infection.
- > Knowledge of the special precautions required in specific examinations is demonstrated which ensures the safety of patients, colleagues and self.
- > Equipment is maintained in order to comply with national and international safety standards.

Associated Assessment Criteria for Exit Level Outcome 7:

- > Principles of quality assurance and quality control are demonstrated in the development of departmental protocols.
- > Equipment and accessories are selected, purchased and maintained within an available budget to provide a cost-effective service.
- > Communication and co-operation between all role players is effectively developed and maintained in order to provide an optimal service.
- > Performance management strategies are developed in a manner which shows an understanding of management principles and current legislation.
- > Departmental records and statistics are accurately maintained in accordance with the departmental and Statutory Health Council requirements.
- > Integrated knowledge of management, technology and legislation is demonstrated in the ability to design and equip a new, or alter an existing, ultrasound facility.

Associated Assessment Criteria for Exit Level Outcome 8:

- > Research principles and methodology in the field of Ultrasound research are demonstrated in the form of a research proposal and project.
- > Relevance of the research is in line with national needs and ethical policies and procedures.
- > Suitable resources are critically evaluated and used to facilitate the research project.
- > Information is critically assessed in order to be presented in a professional manner.
- > Written work submitted reflects a knowledge and appropriate use of information sources.
- > Computer literacy of an adequate knowledge and use is demonstrated.

Integrated Assessment:

Integrated assessment takes the form of an appropriate variety of assessments methods for example: written and oral examinations, problem-solving assignments, projects, presentations, case studies, portfolios, log books, clinical reports, assessment of clinical competence through simulated and clinical assessment in situ, objective structure clinical examinations (OSCE) and the successful completion of a mini-dissertation.

The qualification will be awarded to a learner who has provided evidence, to the satisfaction of the assessors, that the competence of the qualification, as detailed in the stated outcomes, has been achieved, either through education and training in a single provider's learning programme or through experience that complies with the stated specific outcomes i.e. RPL is recognized.

However, the integrated assessment needs to have the following characteristics:

- > It should assess the extent to which learners can practice competently, effectively and safely in any clinical context nationally and internationally.
- > It should measure the extent to which learners have integrated the professional roles, knowledge and skills delivered through the different outcomes reflected in the relevant programme.
- > It should provide opportunities for reflection-in-action and reflection-on-action to develop reflexive competence.

INTERNATIONAL COMPARABILITY

The primary objective of designing these qualifications was to meet the needs of the SA community as identified by the National Department of Health and also to be compatible with international standards. The proposed qualifications have been compared with the qualifications from various international states, commencing with those which are leaders in the field of Ultrasound.

Introduction:

Ultrasound qualifications in South Africa are currently registered as a National Diploma and B Tech with Health Professions Council of South Africa. The B Tech may be obtained as a vertical qualification from the National Diploma or as a second category qualification from a National Diploma in another radiographic qualification. The restructuring of both the education and healthcare systems has identified the need to have both a professional degree and a post graduate qualification to provide services in different healthcare situations according to requirements. There is also at the need to bring ultrasound education and training on par with international standards. In comparing this professional degree with other international states/countries, most offer Ultrasound as an additional qualification. In investigating international comparability for an ultrasound qualification the following countries have a "stand alone" ultrasound qualification in some format resembling that of South Africa.

USA:

It should be borne in mind when assessing qualifications from the USA that the registration of competencies is different to those of South Africa. Here we have a more holistic qualification which encompasses echocardiography, vascular Sonography and musculo-skeletal sonography within the proposed 480 credit qualification, hence the need for 4 years of study. In the USA these are separate qualifications and can be studied separately via shorter courses.

St Louis Community College in Missouri:

The college offers a 16month ultrasound program which is offered at Forest park campus only. Successful completion of the course is awarded with the Certificate in Diagnostic medical Imaging. The course is made of the theoretical and practical components. For the practical component, the student is expected to complete 1300 hours. This qualification compares fairly with the SA one in terms of how it is offered, theory and practice as well as stipulated hours. The St Louis Community College program is however too short as compared to the 480 credit proposed for SA. Even the qualification that is awarded at the end, SA will award the successful candidate with the professional degree which will allow the students to enrol for the masters program. The college on the other hand only awards certificates.

Entrance requirements:

Graduation with the minimum of an associate degree will ensure acceptance into the Ultrasound program. Accreditation of the program is through the Commission for Accreditation of Allied Health Education programs. Successful completion of the Medical Sonography program allows the candidates to challenge the American Registry of Diagnostic Medical Sonographers Examinations. The fact that this course needs accreditation relates well to the SA requirements as stipulated by the HPCSA. The only major difference is course duration and the entrance requirements. For the SA qualification, those who have completed the required secondary certificate at grade 12 with Maths, Physical Science or Biology and the pre-requisite M-score or APS score may apply to study for the four year degree in ultrasound. St Louis Community has the following addition entrance requirements on top of the associate degree:

- > BIO 207: Anatomy and Physiology 1.
- > BIO 280: Anatomy and Physiology 11.
- > PHY 111: College Physics.
- > MTH 160: College Algebra or higher.
- > ENG 101: College Comprehension.
- > COM 101: Oral Communication.
- > IS 205: Medical Terminology.

Learners who apply to study at St Louis Community College are expected to have a valid certificate in CPR healthcare provider level certificate and they should keep this current

throughout their study years. A First Aid Certificate is also a pre-requisite to qualification in the SA context.

Clinical training facilities requirement evidence or background check for criminal records as well as drug dependency. These specific requirements are not stipulated for the SA qualification. In case of the CPR or First Aid training, most education institutions organise these for their learners and it is a requirement that every learner completes this successfully before they can be awarded their qualifications. In SA, learners registering for the course are required to register with HPCSA for the duration of their studies as well as after completion. Registration after completion of studies confers to each practitioner, the professional status and the right to practice within the scope for which they received education and training.

The other requirement for entry into the Diagnostic Medical Sonography program at St Louis Community college is evidence of experience or observation of what sonographers do, as well as an overview of the tasks performed. Learners should submit a form which has been completed by a sonographer as evidence of their visit and exposure to the sonography environment. This has been a requirement for most education institutions in SA as well.

Course content:

The course is spread over a three year period as followed:

1st year: Medical Ultrasound option:

- > Clinical foundations of Ultrasound.
- > Medical Ethics and Professional issues 1.
- > Ultrasound Physics and Instrumentation, 1, 2 and 3.
- > Medical sonography 1, 2, 3 and 4.
- > Medical sonography scanning techniques.
- > Medical Sonography practical's 1, 2, 3 and 4.

2nd year: Cardiac Sonography Option:

- > Clinical foundation of Ultrasound.
- > Medical Ethics and professional issues 2.
- > Ultrasound physics and Instrumentation 1, 2 and 3.
- > Cardiac Sonography 1, 2, 3 and 4.
- > Cardiac sonography techniques.
- > Cardiac sonography practical 1, 2, 3 and 4.
- > Cardiac sonography clinical application 1, 2 and 3.

3rd Year: Vascular Technology Option:

- > Clinical foundation of Ultrasound.
- > Medical Ethics and professional issues.
- > Ultrasound physics and Instrumentation 1, 2 and 3.
- > Vascular technology 1, 2, 3 and 4.
- > Vascular technology scanning technique 1, 2, 3 and 4.
- > Vascular technology clinical application 1, 2 and 3.
- > Vascular technology practical 1, 2 and 3.

The way the course content is structured and distributed over the 3 years is in line with the way the SA qualification has been developed. In radiography or specifically ultrasound, learners are introduced to concepts at the lower level and they tend to grow or venture into more complex practices as the course progresses. The fact that a subjects medical ethics and professional

issues is offered over a three year period, is in line with the new requirements of the relevant Statutory Health Council.

Canada:

Michener Institute offers an Ultrasound Graduate diploma which is offered as a full-time study over a period of 18 months. The course is offered to registered healthcare professionals with a minimum of three years degree or diploma. There was no other qualification from Canada which had a close resemblance to the four year Bachelors degree proposed for SA.

Uganda:

The education and training that is taking place in Africa as far as ultrasound is concerned is limited, with SA emerging as the leader in this field. Prof Michael Kawooya, from Makerere University in Kampala has a post course training for sonographers. Makerere University in Uganda is offering a two year post degree qualification for radiography practitioners as well as other healthcare professionals interested in the course. Due to the population increase and shortage of skilled practitioners or radiologists to provide reports on ultrasound examinations, the institution has initiated a role extension program for registered sonographers.

This could be viewed as an extension of the current programs where sonographers are given the opportunity to gain additional skills and take on the role of reporting. The radiographers are trained in producing reports which would contribute to the management of the patient. Report writing as it is taught in Makerere, takes place in four steps, namely:

- > Observation.
- > Analysis.
- > Interpretation.
- > Report writing.

How do the international qualifications compare with the SA qualification?

Comparing this with the course that is currently offered in SA (two year post graduate or three year diplomas at other institutions) and the newly developed four year professional degree, sonographers are taught to report on their images as part of their training. This has also been formalized in the HPCSA register that sonographers write reports on what they have observed while performing the examinations. Uganda might be on the way of extending the study years for their ultrasound practitioners, only time will tell. This only confirms that the proposed professional degree in ultrasound is essential in ensuring that the community will be served by fully qualified practitioners capable of safely performing examinations on any part of the body and for various clinical conditions.

Conclusion:

Based on the information presented from the various states, SA maybe the first state to offer a full four year programme in Ultrasound. This however is not totally new as USA has a three year programme already. The major difference between the USA three year programme and the proposed four programme in SA, is the research component. SA qualification has included the need for the learners to complete a mini research project before they can be awarded a professional degree. Based on the specific needs of the SA society and the transformation both in the education and healthcare setting, this four year professional degree together with the 120 post course certificates, with adequately address the needs of both the SA public and the practitioners who enter the ultrasound profession.

ARTICULATION OPTIONS

Vertical articulation:

> Masters Degree in Diagnostic Ultrasound.

Horizontal articulation:

> Articulation with other qualifications in the field of Radiography or other related qualifications.

MODERATION OPTIONS

Internal and external moderation of learner achievement should be undertaken by those who have qualifications at or above the level of qualification.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessments are conducted by one or more internal assessors/examiners employed by the relevant provider as well as an external moderator appointed from industry/other academic institution.

Practising practitioner, registered with the relevant Statutory Health Council, with a Bachelor of Diagnostic Ultrasound, or equivalent, or higher, or appropriate research/teaching/academic/clinical experience in the category is appointed.

NOTES

Evaluation of Programme:

> The provider will be evaluated by members of ETQA at their discretion, during which time the facilities and programmes are accredited.

UNIT STANDARDS

This qualification is not based on Unit Standards.

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION

None