

**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

Environmental Science and Waste Management

registered by Organising Field 10, Physical, Mathematical, Computer and Life Sciences, publishes the following Qualification and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standards. The full Qualification and Unit Standards can be accessed via the SAQA web-site at www.saga.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 and Unit Standards should reach SAQA at the address below and **no later than 13 August 2007**. All correspondence should be marked **Standards Setting – Environmental Science and Waste Management** and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

Further Education and Training Certificate: Environmental Noise

SAQA QUAL ID	QUALIFICATION TITLE		
58801	Further Education and Training Certificate: Environmental Noise		
ORIGINATOR		PROVIDER	
SGB Environmental Sc/Mgt & Waste Mgt			
QUALIFICATION TYPE	FIELD	SUBFIELD	
Further Ed and Training Cert	10 - Physical, Mathematical, Computer and Life Sciences	Environmental Sciences	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	120	Level 4	Regular-Unit Stds Based

PURPOSE OF THE QUALIFICATION

Purpose:

This qualification is an entry-level qualification for those who are already working in environmental health, and wish to specialise in noise management. All Environmental Health Practitioners are registered with the Professional Board, and this qualification will contribute to ongoing professional development of Environmental Health Practitioners. It will provide career development opportunities, and opportunities for specialisation in the specific field of noise.

There is a scarcity of skills in this area in the country as a whole, with a reliance on expert consultants. In many cases, Environmental Health Practitioners lack the expertise to evaluate the quality of the reports they receive, and make judgements in this regard. There is a huge case load at present, with many investigations required, and too few people qualified to process them. This qualification will compliment the existing professional expertise, and allow for greater focus and efficiency in the field.

The qualification will also provide for a variety of learning pathways - some Environmental Health Practitioners will be able to achieve this qualification as part of their tertiary study, delivered by institutions. Some will be able to have their practical skills, developed on the job, recognised through an RPL (Recognition of Prior Learning) process.

In particular, this qualification will be useful for:

- Environmental Health Practitioners working in municipalities.
- Noise control officers (who are not qualified EHP's).

Recipients of this qualification will be able to:

- Communicate in a variety of ways.
- Use mathematics in real life and education, training and development situations.
- Demonstrate an understanding of sound and noise.
- Demonstrate understanding of the impact of noise on communities.
- Deal with noise infringements.
- Provide noise-related input to municipal planning processes.

Environmental Field Workers will carry out their role at all times:

- Under the supervision of an available, qualified supervisor (Noise Control Officer).

They will not take full responsibility for measurement and issuing of notices.

Environmental Health Practitioners will carry out their role:

- Under the broad direction of senior management.
- In response to directives by senior management to investigate complaints.
- As part of a specialist unit responsible for measuring, and reporting.

Rationale:

Currently Environmental Health Practitioners do not receive adequate training in noise management as part of their initial training in environmental health. Degree programmes have traditionally not looked at noise. With rapid urbanization, noise is becoming an issue, and municipalities are faced with a growing challenge in this regard. A significant part of the challenge is the lack of suitably qualified people.

Noise pollution is about why noise has an effect on humans. People in Local Authorities who work in The Noise Control Division of Integrated Pollution Control Departments are involved in the well-being of people and the internal and external environment. There are three main work roles in Noise Pollution and Assessment within Local Government:

- Field Workers (Assistant Environmental Health Practitioners).
- Environmental Health Practitioners - the focus of this qualification. These skills would be added on to the Environmental Health Practitioner qualification which should already be in place.
- Noise Control Officers.

Field workers (Assistant Environmental Health Practitioners Level 3):

There is a need for officers at the level of field workers within the local authority to assist in the handling of noise nuisances within the communities and to report to the noise officers.

They apply the by-laws and facilitate issues between complainants and offenders where there is a noise nuisance. They are not involved in planning. They may issue an instruction for an investigation to be done by an expert. They need negotiation and conflict resolution skills, and good interpersonal skills. They work in response to complaints.

Environmental Health Practitioners (Level 4):

Historically Environmental Health Practitioners require a diploma or degree for appointment by the Local Authority, without, or with minimal qualifications or recognized competence in noise management. They were required to follow instructions and report to Noise Control Officers.

Currently they identify problems that are in contravention to regulations including external pollution in the Local Authority, execute Noise Control Regulations and may give input into Local Government Policy. It was agreed that an FETC: Environmental Noise would be an appropriate qualification to provide the necessary specialisation for the work in Noise Control Divisions of Integrated Pollution Control Departments.

The recipient of this Level 4 qualification will be equipped to: conduct noise measurements, issue notices, look at town planning schemes and developments and request assessments by experts.

The Certificate: Environmental Noise (Level 4) will provide the necessary specialisation for Noise Control Officers in Noise Control Divisions of Integrated Pollution Control Departments.

Noise Control Officers:

The Level 5 certificate will build on the Level 4 certificate. Noise Control Officers in management positions who hold the Level 5 certificate also require a related tertiary qualification and registration with a professional council. They typically operate in Local Authorities as planners, supervisors and/or managers. Noise control is one of the core functions (KPA) for local government as defined in the new Health Act.

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED IN PLACE

It is also assumed that practitioners are already competent in:

- Communications at NQF level 3 or equivalent.
- Mathematical Literacy at NQF level 3 or equivalent.
- Unit Standard: NLRD242891 - Apply communication, interpersonal and conflict management principles in Ward Committee functions, processes or similar competence.

Recognition of Prior Learning:

At present there are short courses offered by consultants and acoustic engineers, usually contracted by recognised institutions to do training in specific areas (measurement, for example). Apart from these short courses, Noise Control Officers learn from one another and from practical experience.

This qualification provides for the formal recognition of skills that have been gained by short courses and/or experience of those already operational in the field.

Access to the qualification:

- Open.

QUALIFICATION RULES

Fundamental:

- Communication.
 - Candidates are required to achieve all 20 credits for Communications from the available credits.
 - In terms of the requirements for an FETC, candidates are required to achieve 20 credits obtained in a second official language at a minimum of level 3.
- Mathematical Literacy - Candidates are required to demonstrate achievement of the 16 credits for the Mathematics unit standards within the context of education, training and development situations.

Core:

- Candidates must achieve all 52 CORE credits listed in Exit Level Outcomes.

Elective:

- Candidates must achieve at least 12 credits of their choice from any of the available ELECTIVE credits in Exit Level Outcomes.

EXIT LEVEL OUTCOMES

1. Demonstrate an understanding of sound and noise.
2. Demonstrate understanding of the impact of noise on communities.
3. Deal with noise infringements.
4. Provide noise-related input to municipal planning processes.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

- Explanations provided of both sound and noise comply with scientific usage, and general understanding in the field.
- The approach to dealing with noise nuisances is consistent with regulations and local municipal policy.

Associated Assessment Criteria for Exit Level Outcome 2:

- The description of the impact of different types and classifications of noise accurately reflects an understanding of its impact on wellbeing in a variety of contexts.

Associated Assessment Criteria for Exit Level Outcome 3:

- A range of noise infringements is investigated and managed in accordance with regulations and policy.
- All procedures are thorough and meet requirements for valid evidence and processes under law.

Associated Assessment Criteria for Exit Level Outcome 4:

- Input promotes noise as an issue in planning considerations.

Integrated Assessment:

Assessment should take place within the context of:

- Given Quality Assurance policies, procedures and processes.
- A guided and supported learning environment.

Assessment will take place according to the detailed specifications indicated in the unit standards above.

Over and above the achievement of the specified unit standards, evidence of integration will be required as per the following broad criteria, all within the context of an active learning environment.

Assessors should note that the evidence of integration (as below) could well be presented by candidates when being assessed against the unit standards - thus there should not necessarily be separate assessments for each unit standard and then further assessment for integration. Well designed assessments should make it possible to gain evidence against each unit standard while at the same time gain evidence of integration.

Assessment should be in accordance with the following general and specific principles:

- The initial assessment activities should focus on gathering evidence in terms of the main outcomes expressed in the titles of the unit standards to ensure assessment is integrated rather than fragmented. Where assessment at title level is unmanageable, then the assessment can focus on each specific outcome, or groups of specific outcomes. Take special note of the need for integrated assessment.
- Evidence must be gathered across the entire range specified in each unit standard, as applicable. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to prove that the candidate is able to perform in the real situation.
- All assessments should be conducted in accordance with the following universally accepted principles of assessment:
 - Use appropriate, fair and manageable methods that are integrated into real work-related or learning situations.
 - Judge evidence on the basis of its validity, currency, authenticity and sufficiency.
 - Ensure assessment processes are systematic, open and consistent.

INTERNATIONAL COMPARABILITY

The following information indicates international involvement in and commitment to noise control and noise management.

The World Health Organisation.

The WHO provides the following guidelines on noise and noise management:

- Stages in Noise Management.
- Noise Exposure Mapping.
- Noise Exposure Modelling.
- Noise Control Approaches:
 - Mitigation measures (Road traffic noise, Railway noise and noise from trams, Aircraft noise, Machines and Equipment, Noise control within the sound transmission path, Noise protection at the receiver's site).
 - Precautionary measures (Land use planning, Education and public awareness).
- Evaluation of Control Options.
- Management of Indoor Noise:
 - Government policy on indoor noise.
 - Design considerations.
 - Indoor noise level control.
 - Resolving indoor noise problems.
- Priority Setting in Noise Management:
 - Noise policy and legislation.
 - Examples of noise policies.
 - Noise emission standards have proven to be inadequate.
 - Unsustainable trends in noise pollution future policy planning.
 - Analysis of the impact of environmental noise.
 - Cost-benefit analysis.
 - Review of standard setting.
 - Enforcement of noise standards: Low-noise implementation plans.
- Conclusions on Noise Management.

International Associations:

The International Institute of Noise Control Engineering (I-INCE) was founded in 1974. It is a worldwide consortium of organizations concerned with noise control, acoustics and vibration. The primary focus of the Institute is on unwanted sounds and on vibrations producing such sounds when transduced. I-INCE is the sponsor of the INTER-NOISE Series of International

Congresses on Noise Control Engineering held annually in leading cities of the world. I-INCE also co-sponsors symposia on specialized topics within the I-INCE field of interest. The quarterly magazine Noise/News International is jointly published by I-INCE and the Institute of Noise Control Engineering of the USA (INCE/USA). In 1992, I-INCE instituted a program to undertake technical initiatives on critically-important issues of international concern within the I-INCE field of interest. This initiative has resulted in three reports and six ongoing Technical Study Groups.

Draft Guidelines and Codes of Practice:

What is evident is that many nations are confronting the issue of noise and noise management. This is supported from the number of national guidelines being published, as well as codes of practice issued. The following are samples, and is not intended to be comprehensive.

Draft Scottish Noise Management Guide (October 24, 2005).

Chapter headings in the Guide include:

- Chapter 3: Local authority noise management framework.
- Chapter 4: Delivering the noise service.
- Chapter 5: Public awareness and education initiatives.
- Chapter 6: Review of noise service.

New Zealand: "Noise in the Workplace - Approved Code of Practice for the Management of".

The purpose of this code is to provide practical guidance in meeting the requirements of the Health and Safety in Employment Act 1992 and the Health and Safety in Employment Regulations 1995. This process involves the identification and the management of noise hazards in the workplace. A consequence of proper control and management of the problem of excessive noise will be a reduction in the incidence of hearing loss arising from noise exposure in workplaces.

Chapter headings in the Guide include:

- Part 2: Noise Hazard Identification.
- Part 3: Noise Hazard Assessment.
- Part 4: Control of Noise Hazards.
- Part 5: Protection Against Noise Hazards.
- Part 6: Training and Education.
- Part 7: Audiometry.
- Part 8: Designers, Manufacturers and Suppliers Of Plant.
- Part 9: Designers, Manufacturers and Suppliers Of Hearing Protectors.

United States of America:

Title: Examination of Noise Management Approaches in the United States.

Abstract: This report is intended to serve as a reference document on noise management approaches used in the United States. Emphasis has been placed on identifying and evaluating the full range of techniques and measures which are available when selecting a noise management strategy.

Broadening the range of choice is a first step in moving toward the resolution and prevention of noise/land use conflicts. Awareness of the available options is of critical importance when individual actors in an issue have limited unilateral power to achieve objectives.

The first three chapters of the report provide background material designed to aid in the understanding of noise management issues. A brief description of the noise problem in the U.S. is given, followed by a discussion on conceptual approaches to noise/land use issues. Some basic concepts of sound and the measurement and assessment of noise are reviewed. In addition, the management application of noise descriptors, relating human responses to noise exposure levels, is examined. In Chapter III, a change is made from describing the noise environment, to describe the legal framework of statutory and cause law that shapes management policy. Chapters 4 through 6 are devoted to identifying and evaluating management approaches.

International conference on noise:

The INTER-NOISE Congresses are the largest international gathering of experts in noise control engineering each year. The INTER-NOISE Congresses have been held each year since 1972 at venues around the world. The Congresses include a large technical program consisting of papers and posters on all topics of noise control engineering. Papers summarizing these presentations are collected into a Proceedings document that is available for reference after the Congress. The Congresses also include an exhibition of the latest products and instrumentation for noise control engineering.

Countries have responded with their own legislation and guidelines for noise management. This in turn has led to education and training with respect to noise.

United Kingdom:

In 1974 the UK established The Institute of Acoustics as a professional body for those working in acoustics, noise and vibration. It amalgamated the Acoustics Group of the Institute of Physics and the British Acoustical Society. The Institute of Acoustics is a nominated body of the Engineering Council, offering registration at Chartered and Incorporated Engineer levels.

The range of interests of members within the world of acoustics embraces aerodynamics, architectural acoustics, building acoustics, electroacoustics, engineering dynamics, noise and vibration, hearing, speech, underwater acoustics, together with a variety of environmental aspects.

The Institute works closely with other professional bodies in related fields, including CIEH, REHIS and IOSH and the Association of Noise Consultants.

The Institute offers an education programme, comprising a postgraduate Diploma in Acoustics and Noise Control and several Certificate of Competence courses.

Through specialist Institute of Acoustics working groups, support is given to the development of legislation in these areas, and in UK, European and International Standards development. The Institute is a founding member of the European Acoustics Association (EAA), a member society of the International Institute of Noise Control Engineering (I-INCE) and a member of the International Commission for Acoustics (ICA).

Certificate of Competence in Environmental Noise Measurement:

A five-day course which provides delegates with a basic knowledge of the methodology of environmental noise measurement, including the use and accuracy requirements of sound level meters and analysers. It enables them to be aware of the significance of measurement data against the framework of standards and legislation for environmental noise.

Certificate of Competence in Workplace Noise Risk Assessment:

This Certificate course aims to provide a recognised course of education and training to enable persons to carry out workplace noise assessments in a competent manner, as required by the Control of Noise at Work Regulations 2005. It is designed to provide a background of basic acoustics combined with 'hands on' practical experience of industrial noise measurements and associated assessment of workplace noise exposure.

Diploma in Acoustics and Noise Control:

The Institute of Acoustics' postgraduate Diploma in Acoustics and Noise Control has been run since 1975. It is usually studied on a part-time basis, over one year. The Diploma course was set up to provide specialist academic training for membership of the Institute of Acoustics and over the years the course has become well established as providing high level training in real-world practical acoustics. As a result, the Diploma is widely recognised as the leading specialist qualification for the professional practitioner in acoustics. It is recognised by a number of UK universities as providing partial exemption from their requirements for the award of MSc degrees.

The normal minimum requirement for admission to the Diploma course is a degree in a science, engineering or construction-related subject or an Environmental Health Officer's Diploma.

The elements making up the programme (as trained by the universities) are:

- The General Principles of Acoustics Module.
- Two Specialist Option Modules.
- A Project.

These elements may be taken individually, e.g. over a period of two years, but to gain the Diploma, students must pass all of them.

The two Specialist Option Modules are chosen from:

- Architectural & Building Acoustics.
- Law & Administration.
- Noise Control Engineering.
- Transportation Noise.
- Sound Reproduction.
- Measurement & Instrumentation.
- Vibration Control.

Which options run depend upon the choices made by the students and the availability of suitable staff. However, the first four options are usually available.

MSc in Acoustics and Noise Control:

The MSc is designed to provide graduates with the knowledge and skills to work in environmental acoustics, whether in consultancy, local / central government or in research. The course also aims to provide employers with a supply of suitably qualified graduates.

The programme is designed to take graduates with an engineering or numerate science degree and give them specialist skills and knowledge in environmental acoustics. Acoustics is currently a skills shortage area, so good graduates will be in a very strong position in the jobs market. Students have the option to transfer between MSc Environmental Acoustics and MSc Audio Acoustics after completing the first four modules, which for full time students will be at the end of Semester 1.

The content focuses on Environmental Noise Measurement where candidates will learn how to take reliable measurements of environmental noise, how to apply acoustic theory and knowledge of standard practice to work out what, where and how to measure. They will be given a practical test with a sound level meter as part of the assessment, and will be given the opportunity to obtain the Institute of Acoustics Certificate of Competence in Environmental Noise Measurement. Details on content include:

- Noise control:
 - Knowledge to select appropriate noise control options for realistic environmental noise scenarios, and to justify their selections.
- Mathematics and Vibrations:
 - Competency at mathematics to understand how audio systems work.
- Acoustics:
 - Fundamental understanding of the physics behind the behaviour of sound - sound; vibration; sound generation and propagation; measurement (time and frequency).
- Transducers and sound reinforcement:
 - Design of appropriate transducers to transform electronic signals to acoustic waves; behaviour of these waves in rooms and outdoors; appropriate application of loudspeakers for music reproduction, sound reinforcement and public address.
- Psychoacoustics:
 - Human auditory perception: pitch perception, localisation and masking and how these are used in perceptual coding and spatial audio; measuring human response to audio signals.
- Digital signal processing:
 - Digital systems: transforming signals from analogue to digital representations and vice versa; manipulation of digital signals by filtering; exploration of convolution, Fourier transformation and filter design.
- Numerical techniques:
 - Use of numerical techniques to understand complex mathematical systems; techniques including Boundary Element, Finite Element, Statistical Energy Analysis and geometric room acoustic models.
- Room Acoustics:
 - Correct acoustical design to make the space comfortable to use and reproduced sound audible and intelligible; design of spaces for non-electronic sound sources.

NEBOSH qualifications:

The National Examination Board in Occupational Safety and Health is an independent awarding body attracting more than 20,000 candidates each year. NEBOSH was founded in 1979. Noise and noise management is treated as an aspect of Occupational Safety and Health.

The NEBOSH Specialist Diploma in Environmental Management is a professional level qualification designed to develop the environmental management skills of health, safety and environmental practitioners and other suitable candidates. Candidates are required to hold the IEMA Certificate in Environmental Management (or equivalent qualification) and would benefit from relevant Health and Safety qualifications and would ideally have environmental experience in industry. Upon completion of the course, candidates are assessed by written examination and will also need to submit an environmental audit report within an agreed time limit.

Topics Include:

- Understanding of techniques for monitoring air, water, waste and noise emissions.
- Understanding of environmental auditing in effective pollution control management.
- Detailed knowledge of air pollution control, effluent treatment and disposal of hazardous waste and environmental noise control.
- Selection of the best practicable environmental options using dispersion modelling.
- Environmental impact assessment.

- Risk assessment and cost benefit analysis.

The Open University (UK)-T308:

Environmental monitoring, modelling and control: This course is about strategies for controlling environmental pollution. By the end of the course learners are able to define and describe:

- The principles and concepts of solid wastes management, noise control, air quality management and water treatment.
- The computer modelling of environmental situations.
- The economic assessment of projects.

Noise, one of the course components, begins by reviewing basic concepts such as units, criteria and indices, legal and social control and planning. The technical aspects of noise control including prediction schemes and sound insulation of buildings, are important topics. There are case studies of public enquiries and of industrial noise.

T308 is a Level 3 course, which makes intellectual demands appropriate to the final year of an honours degree. T308 is a compulsory course in the:

- Diploma in Pollution Control.

T308 is a specified course in the:

- BA (Hons) or BSc (Hons) Environmental Studies.
- BSc (Hons) Technology.
- BSc (Hons) Natural Sciences.
- Advanced Diploma in Environmental Decision-Making.

Switzerland:

Swiss Acoustical Society: Schweizerische Gesellschaft für Akustik/Société Suisse d'Acoustique (SGA/SSA).

The Swiss Acoustical Society was established in 1971. The majority of the members are consultant engineers and practitioners, mostly in the field of environmental noise protection; only a small minority is doing research.

The aim of the society is the promotion of acoustics in Switzerland by supporting studies and research in the area of acoustics, by exchange of experience between experts, by taking positions on questions of noise control legislation, and by strengthening the cooperation of acousticians over the language borders in this multilingual country.

Four to five times a year the society's newsletter - bilingual in French and German - informs the members about news and topics on acoustics in Switzerland and abroad and covers lectures, courses, congresses, new publications, interesting web pages, and job offers. There is no formal education in Acoustics in Switzerland. Therefore the society offers to its individual members the possibility to pass an examination for the title "Akustiker SGA" and thereby provides proof of their qualifications in acoustics.

Regarding the fields of acoustics SGA's members are interested in, noise control leads with building acoustics and room acoustics coming second. A majority of the members is interested in measuring technique, one third of the members list physical acoustics among their interests and one quarter name musical acoustics and electroacoustics. This priority is reflected in the choice of subjects treated at the society's events.

SGA/SSA is member of the European Acoustics Association EAA, the International Commission of Acoustics ICA and the International Institute of Noise Control Engineering I-INCE.

New Zealand:

The NZQA has one unit standard related directly to noise control, at Level 3: "Demonstrate knowledge of hearing conservation in the workplace".

There is a Diploma qualification offered at Level 6.

NZIM Diploma in Health and Safety Management - Level 6.

The Diploma in Health and Safety Management aims to provide current practical and realistic health and safety information.

The course is designed for people whose area of responsibility within industry or government includes health and safety. This may include, but are not restricted to, safety coordinators, risk advisers, occupational health nurses, human resource managers, training officers, engineers, production supervisors, union officials and insurance personnel.

Programme content includes Management Integrating Health and Safety; Safety and other relevant Compliance Legislation; Employee Health, Welfare and Wellbeing; Employee Development through Training and Involvement; Specialised Workplace Health and Safety Management (of which Noise Management is a part); Hazard Risk Management; and Accident and Incident Management.

The stated Learning Outcomes of the Diploma indicate that successful learners will be able to apply their Noise Management competence:

- Critically assess the effectiveness and value of workplace health and safety within their own organisation.
- Identify and prioritise health and safety training to facilitate responsibility fulfilment within their organisation.
- Use essential 'minimum standard' concepts to respond strategically to workplace health and safety management.
- Develop skills and behaviours which add value to existing skills and knowledge.
- Work openly and positively toward the evaluation and development of workplace health and safety projects.
- Initiate practical systems management and strategies to address health and safety issues.
- Generate positive attitudes towards health and safety and its management within the organisation.

Australia:

In Australia, there appear to be few courses devoted entirely to acoustics; rather it is seen as complementing a wide range of subjects. Advice to those at school is to have a broad range of background subjects at secondary school with a knowledge of basic mathematics and some skills in computing essential (computers are used in all aspects of the design, measurement, and data analysis in acoustics).

While not all people working in acoustics have extensive formal qualifications, some basic training is necessary. Projections in Australia suggest that there will be an increasing demand for people with formal qualifications in the acoustics work force, rather than the "self-trained" workers who have only done a few short courses during their career. Learning should place an emphasis on basic physics and mathematics and include an understanding of wave-motion, basic computing and some electronics and instrumentation. Courses which include a study of

optics and electromagnetic theory are useful, as many of the basic ideas and laws developed in these areas are directly transferable to acoustics. Individuals may wish to complement these studies with areas such as architecture, the life sciences including biology or psychology and/or an arts subject like music.

Candidates are advised to extend their studies after obtaining a basic degree and undertake additional work towards a Masters or even a Doctoral degree in acoustics. A number of Universities include acoustics among the areas offered for such training. The following list indicates some types of Faculties and the kind of research topics which may be undertaken.

Mechanical Engineering: Research into the effects of vibration in various structures, production of turbulent sound from flowing fluids, active noise control.

Physics: Interaction of sound with materials, basic properties of acoustic materials, behaviour of musical instruments.

Biology: Communication between living organisms by means of sound, effects of noise on the behaviour of marine and land-based animals - including man.

Psychology: Problems of speech and hearing and the intelligibility of communication.

Africa:

There is little or no published evidence of comprehensive approaches in Africa to noise control and noise management, apart from South Africa. The isolated examples that appear are in relation to international airports.

South African legislation provides clear guidelines for noise management, and this is reflected in the different municipalities and their policies and regulations. There is a move to develop unified national strategies and approaches to the management of noise in South Africa.

Existing education and training initiatives:

OAITC and UNISA have developed short certificate courses, centering on environmental science and environmental management, to provide tuition for persons who have an interest in the environment. These short courses will be useful for:

- People whose function in the workplace is to undertake environmental audits and or assessments.
- Engineers who wish to include environmental considerations in their development planning.
- People practicing waste management.
- Environmental impact assessors.
- Occupational and environmental hygienists.
- Environmental, health and safety officers.
- Any person whose work involves environmental and ecological assessments.

Learners successfully completing the short courses will gain credits towards UNISA's National Diploma in Environmental Science and Environmental Management.

Environmental Science & Environmental Management: NQF Level 5.

Companies and individuals may elect to choose individual modules or the entire learning programme.

Module 1: Environmental management systems.

Module 2: Environmental aspects and impacts.

- Module 3: Waste disposal and waste management.
 Module 4: Occupational and environmental noise.
 Module 5: Environmental chemistry and industrial ecology.
 Module 6: Environmental legislation.
 Module 7: Toxicology.
 Module 8: The Kyoto Protocol and the Clean Development Mechanism.

Conclusion:

It is clear that noise and noise management is viewed as an increasingly important part of planning and development in the future. There are many examples of qualifications at tertiary level, but an obvious need also for access to these qualifications.

This qualification will provide access to the field, and enable people in local government in particular, to play a vital and informed role in noise management. It provides for immediate skills needs in the sector, as well as progression into more specialist roles.

ARTICULATION OPTIONS

The following information shows the location of this qualification in terms of other qualifications within the field:

- The first steps to qualifications in noise control include unit standards at Level 3. The intention is to progress up the career path to a Degree at Level 6.
- Candidates working in noise control are required to hold a Diploma or Degree: Environmental Health. The first noise related qualification is the FETC: Environmental Noise. This qualification can be used by persons in other areas of environmental health to extend or further their careers.
- Successful learners can then progress to a National Certificate: Environmental Noise Level 5 to provide the specialised knowledge and skill necessary to work in Noise Control Divisions of Integrated Pollution Control Departments.
- There are horizontal articulation possibilities with Occupational Health qualifications at Level 5.

MODERATION OPTIONS

- Providers offering learning towards this qualification or the component unit standards must be accredited by the relevant ETQA.
- Moderation of assessment will be overseen by the relevant ETQA according to moderation principles and the agreed ETQA procedures.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors must be registered in terms of the requirements of SAQA and the relevant ETQA. Assessors are assumed to have competence in environmental noise equivalent to this qualification, or above.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Core	244590	Describe and explain sound generation and propagation	Level 3	3
Core	244593	Identify and deal with a noise nuisance	Level 3	4
Core	244602	Apply processes and procedures for dealing with alleged noise infringement in a specific Local Authority	Level 4	8
Core	244615	Conduct noise measurements to validate a complaint	Level 4	10
Core	244614	Describe and explain the physical, emotional and psychological impact of noise on social well being	Level 4	5
Core	244597	Distinguish between and classify different types of occupational and environmental noise	Level 4	6
Core	244598	Investigate and approve applications for public events from an environmental noise perspective	Level 4	6
Core	244601	Provide input and guidance to local government	Level 4	10

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
		departments with respect to noise, and noise-related planning requirements		
Elective	116492	Interact ethically in multicultural contexts	Level 3	6
Elective	9533	Use communication skills to handle and resolve conflict in the workplace	Level 3	3
Elective	14927	Apply problem solving strategies	Level 4	4
Elective	119676	Apply the skills of customer care in a specific work environment	Level 4	4
Elective	110000	Generate information and reports for internal and external use	Level 4	10
Elective	110023	Present information in report format	Level 4	6
Elective	119342	Apply knowledge of ethical principles, standards and professional conduct in public sector management and administration	Level 5	8
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Fundamental	12154	Apply comprehension skills to engage oral texts in a business environment	Level 4	5
Fundamental	12155	Apply comprehension skills to engage written texts in a business environment	Level 4	5
Fundamental	9015	Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	6
Fundamental	12417	Measure, estimate & calculate physical quantities & explore, critique & prove geometrical relationships in 2 and 3 dimensional space in the life and workplace of adult with increasing responsibilities	Level 4	4
Fundamental	119469	Read/view, analyse and respond to a variety of texts	Level 4	5
Fundamental	7468	Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	6
Fundamental	12153	Use the writing process to compose texts required in the business environment	Level 4	5



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:*Describe and explain sound generation and propagation*

SAQA US ID	UNIT STANDARD TITLE		
244590	Describe and explain sound generation and propagation		
ORIGINATOR		PROVIDER	
SGB Environmental Sc/Mgt & Waste Mgt			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Environmental Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	3

SPECIFIC OUTCOME 1

Define sound and noise.

SPECIFIC OUTCOME 2

Describe and explain how sound is generated.

SPECIFIC OUTCOME 3

Describe and explain how sound is propagated.

SPECIFIC OUTCOME 4

Identify and explain provisions for dealing with noise nuisance.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:*Identify and deal with a noise nuisance*

SAQA US ID	UNIT STANDARD TITLE		
244593	Identify and deal with a noise nuisance		
ORIGINATOR		PROVIDER	
SGB Environmental Sc/Mgt & Waste Mgt			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Environmental Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	4

SPECIFIC OUTCOME 1

Distinguish between noise nuisance and disturbing noise.

SPECIFIC OUTCOME 2

Identify noise nuisance.

SPECIFIC OUTCOME 3

Deal with noise nuisance.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Distinguish between and classify different types of occupational and environmental noise

SAQA US ID	UNIT STANDARD TITLE		
244597	Distinguish between and classify different types of occupational and environmental noise		
ORIGINATOR		PROVIDER	
SGB Environmental Sc/Mgt & Waste Mgt			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Environmental Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	6

SPECIFIC OUTCOME 1

Demonstrate an understanding of ambient noise, industrial noise and noise measurement.

SPECIFIC OUTCOME 2

Describe the characteristics of occupational noise.

SPECIFIC OUTCOME 3

Describe the characteristics of environmental noise.

SPECIFIC OUTCOME 4

Identify the regulations and standards that govern the limits and responses to different noise types.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Investigate and approve applications for public events from an environmental noise perspective

SAQA US ID	UNIT STANDARD TITLE		
244598	Investigate and approve applications for public events from an environmental noise perspective		
ORIGINATOR		PROVIDER	
SGB Environmental Sc/Mgt & Waste Mgt			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Environmental Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	6

SPECIFIC OUTCOME 1

Process the application.

SPECIFIC OUTCOME 2

Investigate the application.

SPECIFIC OUTCOME 3

Provide an approval certificate for the event.

SPECIFIC OUTCOME 4

Handle queries or complaints with respect to the event.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Provide input and guidance to local government departments with respect to noise, and noise-related planning requirements

SAQA US ID	UNIT STANDARD TITLE		
244601	Provide input and guidance to local government departments with respect to noise, and noise-related planning requirements		
ORIGINATOR			PROVIDER
SGB Environmental Sc/Mgt & Waste Mgt			
FIELD			SUBFIELD
10 - Physical, Mathematical, Computer and Life Sciences			Environmental Sciences
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	10

SPECIFIC OUTCOME 1

Demonstrate knowledge of legislation and strategic policy documents dealing with noise control.

SPECIFIC OUTCOME 2

Demonstrate an understanding of noise management systems.

SPECIFIC OUTCOME 3

Demonstrate knowledge of the importance of planning around sound and noise.

SPECIFIC OUTCOME 4

Provide input to planning from a noise perspective.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Apply processes and procedures for dealing with alleged noise infringement in a specific Local Authority

SAQA US ID	UNIT STANDARD TITLE		
244602	Apply processes and procedures for dealing with alleged noise infringement in a specific Local Authority		
ORIGINATOR		PROVIDER	
SGB Environmental Sc/Mgt & Waste Mgt			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Environmental Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	8

SPECIFIC OUTCOME 1

Demonstrate understanding of the regulations that apply to noise infringements.

SPECIFIC OUTCOME 2

Demonstrate understanding of municipal office protocols and procedures.

SPECIFIC OUTCOME 3

Demonstrate understanding of the limitations of own authority with respect to noise management.

SPECIFIC OUTCOME 4

Contribute to the development of policy in response to noise legislation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Describe and explain the physical, emotional and psychological impact of noise on social well being

SAQA US ID	UNIT STANDARD TITLE		
244614	Describe and explain the physical, emotional and psychological impact of noise on social well being		
ORIGINATOR	PROVIDER		
SGB Environmental Sc/Mgt & Waste Mgt			
FIELD	SUBFIELD		
10 - Physical, Mathematical, Computer and Life Sciences	Environmental Sciences		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	5

SPECIFIC OUTCOME 1

Describe and explain how the ear perceives sound.

SPECIFIC OUTCOME 2

Describe and explain the physical health issues associated with noise.

SPECIFIC OUTCOME 3

Describe and explain the emotional and/or psychological issues associated with noise nuisance and disturbing noise.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Conduct noise measurements to validate a complaint**

SAQA US ID	UNIT STANDARD TITLE		
244615	Conduct noise measurements to validate a complaint		
ORIGINATOR		PROVIDER	
SGB Environmental Sc/Mgt & Waste Mgt			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Environmental Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	10

SPECIFIC OUTCOME 1

Demonstrate an understanding of the principles of sound level measurement equipment.

SPECIFIC OUTCOME 2

Prepare to conduct a noise measurement.

SPECIFIC OUTCOME 3

Conduct the noise measurement.

SPECIFIC OUTCOME 4

Analyse and interpret measurements.

SPECIFIC OUTCOME 5

Report measurement results.