No. 410 **11 May 2007**

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

Engineering

registered by Organising Field 06 – Manufacturing, Engineering and Technology, 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.saqa.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 11 June 2007.*** All correspondence should be marked **Standards Setting – Engineering** and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Forensic Engineering

SAQA QUAL ID	***QUALIFICATION TITLE***		
58494	National Certificate: Forensic Engineering		
SGB		***PROVIDER***	
SGB Engineering			
ETQA			
QUALIFICATION TYPE	***FIELD***	***SUBFIELD***	
National Certificate	6 - Manufacturing, Engineering and Technology	Engineering and Related Design	
ABET BAND	***MINIMUM CREDITS***	***NQF LEVEL***	***QUAL CLASS***
Undefined	160	Level 7	Regular-ELOAC

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of the qualification is to build the necessary knowledge, understanding, abilities and skills required towards becoming a competent Forensic Engineer. The outcomes of this qualification are stated generically and may be assessed in various engineering disciplinary or cross-disciplinary contexts in a provider-based or simulated practice environment.

The recognised purpose of this certificate in Forensic Engineering is to provide graduates with:

- Requirements towards recognition as a competent Forensic Engineer or part of the requirements for registration as a Professional Engineer with the Engineering Council of South Africa, as well as to allow the graduate to enter careers in Forensic Engineering and related fields.
- A grounding in legal subjects, relating to principles and procedures of the investigation and reconstruction of incidents.
- A grounding in a specialised field of engineering.
- The ability to practise in an interdisciplinary environment.
- The ability to accurately reconstruct incidents/accidents for litigation, insurance and preventative purposes.
- Preparation for careers in Forensic Engineering and related areas, for achieving technical leadership and to make a contribution to the economy and national development.
- An increased potential for further postgraduate studies in research masters programmes.

Rationale:

Forensic Engineering is an area of practice within the Engineering profession that serves the needs of society and the economy. The South African legal system requires that experts should provide assistance in investigations where the evidence is of such a technical nature that a conclusion cannot be reached without the appropriate engineering competence.

This Certificate in Forensic Engineering is designed to contribute to the post graduate development of engineering competence and is the starting point of a more specialised career path in one of many areas of engineering through structured development and lifelong learning. The broad base of the BEng qualification that this qualification is built on allows for flexibility and mobility for the holder to adjust to changing needs.

Skills, knowledge, values and attitudes reflected in this qualification are building blocks for the development of candidate engineers towards becoming competent Forensic Engineers to ultimately assist the courts and their clients in understanding some aspects of the complex engineering activities and solve complex engineering problems. This qualification therefore provides the holder with the skills and knowledge to be able to assist the court and other clients in understanding technical aspects relating to a specific case and may be seen as part of the requirements towards registration as a professional Engineer.

RECOGNIZE PREVIOUS LEARNING?
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LEARNING ASSUMED TO BE IN PLACE
Persons wishing to pursue this qualification should have:

• An engineering discipline related qualification (B.Eng or B.Sc.(Engineering)) at NQF Level 7 or an equivalent qualification.

Recognition of Prior Learning:

This qualification may be obtained through the recognition of prior learning and/or experience. For the purposes of recognising prior learning, assessors are required to develop structured means for the assessment of individual candidates on a case by case basis. Such procedures, and the assessment of individual candidates must be subject to moderation.

Access to Qualification:

There is an open access to this qualification bearing in mind the learning assumed to be in place.

EXIT LEVEL OUTCOMES
The competencies defined in the exit level outcomes may be demonstrated in a simulated or workplace context and must focus on engineering fundamentals and knowledge of the various processes. Competencies stated generically may be assessed in various engineering disciplinary or cross-disciplinary contexts. Learners will be assessed in the context with which they are familiar.

1. Investigate a scene.

2. Prepare information for analysis.

3. Analyse information using fundamental engineering principles and advanced analysis techniques.

4. Reconstruct the most probable sequence of events leading to the incident.

5. Document findings of the investigation and analysis.

6. Testify about the findings of the investigation in legal proceedings.

Consistency of Exit Level Outcomes with Critical Cross-Field Outcomes:

• Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made.
o Evident in Exit Level Outcome/s 1, 2, 3, 4.

• Working effectively with others as a member of a team, group, organization and community.
o Evident in Exit Level Outcome/s 1, 2, 4.

• Organising and managing oneself and one's activities responsibly and effectively.
○ Evident in Exit Level Outcome/s 1, 2, 3, 4, 5.

• Collecting, analyzing, organizing and critically evaluating information.
○ Evident in Exit Level Outcome/s 1, 2, 3, 4.

• Communicating effectively using visual, mathematical and/or language skills.
○ Evident in Exit Level Outcome/s 1, 2, 5, 6.

• Using science and technology effectively and critically, showing responsibility toward the environment and health of others.
○ Evident in Exit Level Outcome/s 1, 2, 3, 4.

• Demonstrating an understanding of the world as a set of related systems by recognizing that problem contexts do not exist in isolation.
○ Evident in Exit Level Outcome/s 1, 2, 3, 4, 5, 6.

• Contributing to the full personal development of each learner and the social and economic development of society at large, by making it an underlying intention of the programme of learning to make an individual aware of:
○ Reflecting on and exploring a variety of strategies to learn more effectively.
○ Participating as responsible citizens in the life of local, national and global communities.
○ Being culturally and aesthetically sensitive across a range of contexts.
○ Exploring education and career opportunities.
○ Developing entrepreneurial opportunities.
○ Evident in Exit Level Outcome/s 1, 4, 5, 6.

ASSOCIATED ASSESSMENT CRITERIA

1.
• The investigation is planned in accordance with information provided.
• Alternative approaches to the investigation of the scene are identified in situations where procedural difficulties may arise.
• The scene is examined for evidence in accordance with accepted protocols and scene requirements.
○ Range: Protocols are based on engineering fundamentals and relevant subject knowledge.
• Evidence is recorded in accordance with accepted protocols and scene requirements.
• Evidence and exhibits are safeguarded from possible deterioration, contamination and access for further analysis in accordance with legal requirements.
• Consequences of not safeguarding exhibits are explained in terms of the effect on evidence and findings.

2.
• The incident is classified according to the specific engineering disciples and the various sub-fields of such disciplines.
• Additional sub-field specific information required is identified for the analysis of the incident.
• The information is classified and arranged into initial groupings, indicating possibilities and probabilities concerning the possible cause of the incident.
• Additional information required is identified from the information at hand.
• Additional information is obtained from applicable sources.
• Information that cannot accurately be analysed due to a limited field of expertise is identified and referred to other suitable experts.

3.
• Circumstances leading up to the incident are identified through an analysis of the general features and characteristics of the scene or records.

• The information and samples obtained from the scene are analysed and tested according to generally accepted engineering procedures and relevant statutory provisions.
○ Range: Engineering procedures and statutory provisions include at least one or a combination of the following, depending on the relevance to the situation: Legislation, Regulations, Local and international standards, codes of practices, generally accepted best practices and guidelines.
• Additional external evidence is categorised in terms of its relation to the incident.
• The probable causes of failure are determined through use of acceptable engineering analysis techniques.
○ Range: The analysis is based on engineering fundamentals and relevant subject knowledge.
• The design and fitness for service of the failed component are compared against the actual conditions of use at the time of failure.

4.
• Information is categorised according to engineering systems and subsystems in relation to the incident.
• Information is categorised according to the probable level of contribution to the incident.
• Possible scenarios are identified from the analysed data.
• The most probable sequence of events is determined from all available information.
• The root cause and contributing factors are identified in terms of their effect on the incident.
• The reconstructed sequence of events is verified through the application of engineering principles in relation to the physical evidence.

5.
• The original information from the scene and other sources are documented in accordance with specified requirements.
• Analysis techniques used are documented to verify the techniques and procedures used.
• Findings are documented in accordance with specified requirements.
• Recommendations are made concerning corrective and/or preventative measures that will reduce the potential for similar incidents in the future.

6.
• The reconstructed sequence of events is presented in such a manner that the inter-relations between the aspects are referenced to fundamental engineering principles.
• Final findings concerning the root cause of the incident and all the contributory factors are presented, detailing all criteria in accordance with legal requirements.
• The evidence presented is in a format suited to the target audience.
○ Range: Format includes structure, logic, language and terminology.
• Findings are defended under rigorous cross-examination performed by peers and legal council.

Integrated Assessment:

The attainment of the qualification requires a holistic approach to achieving all the exit level outcomes within a specified category of work and includes demonstrated achievement of the critical cross field outcomes.

Assessment of the reflective competencies within the qualification is essential. If competence against the critical cross field outcomes is not clear from initial assessments, then oral or written questioning or a case study can also be used to determine the learner's development and integration of applied knowledge and skills.

Applicable assessments tools must be used to establish the foundational, reflective and embedded knowledge of problem solving and application of the world as a set of related systems within the Forensic Engineering environment. A detailed portfolio of evidence may be required to prove the practical, applied and foundational competencies of the learner.

Assessors and moderators should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

INTERNATIONAL COMPARABILITY

Forensic Engineering specialists function independently in South Africa, but a number of the experts in this field are affiliated with International Societies in, specifically, the United States, United Kingdom and Australia. Work standards are benchmarked against international best practices, and these practices were used as the basis for compiling this qualification. Although there are no formal standards for these qualifications presented internationally, there is general consensus regarding the level and standard of training. At the least, honours degree studies are proposed, with a large proportion of the bodies and institutes advocating a level equal to a Masters degree. Major global industry players have contributed to the process of establishing appropriate standards and international comparability.

This qualification was compared to similar outcomes-based qualifications in various countries as follow:

- United States of America.
- United Kingdom.
- Australia.
- Eastern Europe.

As Forensic Engineering is a new and developing field, there are a limited amount of courses presented by a number of universities in the respective countries. At this stage formal degrees appear to be limited to the United States of America and to a number of universities in the United Kingdom. Australia and some other countries mention Forensic Engineering in discussion documents and also address the standards in these documents, but the standards have not been formalised, nor has progress been made in the establishment of formalised standards.

The Forensic Engineering industries in South Africa, the USA, the UK and Australia are similar. In all these countries there is a general consensus regarding the standards and the level of the standards. Although standards are agreed upon in an informal manner, no standards are formalised in any of these countries. There is however a formal guideline document in the USA, with accompanying Accreditation Board for Engineering and Technology (ABET) course outlines.

United States of America:

America was chosen because the industry in the USA is the world's biggest user of Forensic Engineering services at this stage. The information related to Forensic Engineering in the USA is also the most detailed and complete in terms of standards and possible qualifications and accurately describes the minimum requirements for Forensic Engineers. The USA Accreditation Board for Education and Technology is also one of the signatories of the Washington Accord, which means the basis for the entry-level degree would be similar to South Africa.

There are no mandated national standards for training of Forensic Engineers in the USA, however the National Academy of Forensic Engineers, (NAFE) appointed a committee in 1997 to develop guidelines for university courses in Forensic Engineering. The NAFE Board of Directors approved the final report in January 2000. The report discusses the basic contents of a Forensic Engineering Programme and suggests some courses, which would be suitable for Forensic Engineering students. It is also suggested that the courses should be selected to fall within existing graduate programmes already in place. The document further discusses the level of the qualification and some possible combinations in detail.

A number of courses presented by some universities are listed in the document and include the following:

- The University of Texas at Tyler [Advanced topics in engineering. (Introduction to Forensic Engineering.)].
- The University of Colorado at Denver (Failure Analysis and Condition Assessment in Civil and mechanical Engineering).
- Purdue University, West Lafayette, Indiana (Medical Device Accidents and their Engineering analysis AND Applications in Forensic Engineering Technology).

A number of other Universities also present related short-course programmes in subjects related to Forensic Engineering. This includes Northwestern University in Illinois and Texas A&M University, College Station, Texas. This includes a number of courses related to Accident reconstruction.

Reference is also made to a number of proposed courses for the training of Forensic Engineers, which include various specialised fields within engineering, related to law and the assessment of engineered systems in terms of law and legislation. It therefore includes aspects from engineering, law and human factors relating to law and engineering.

There are also a number of references to standard practices in terms of "Reporting of Opinion", "Examining and Testing", "Collection and Preservation of Exhibits". This is similar in principle, to the South African Criminal Procedure Act, Act 51 of 1977, and the requirements of the Act. The requirements of the Act are however not formalised in the form of standards, but the guidelines are set by reported cases in South Africa.

The proposed National Certificate is similar to the USA standards in that it:

- Does not specify the specifics of the training requirements, but identify assessment criteria for competent performance as a Forensic Engineer.
- Complies to the requirements of the applicable legislation for the specific country.
- There are clear guidelines regarding the minimum level of expertise.

The proposed National Certificates differ from the USA standards in that the USA standards:

- Do not have registered qualification standards, but give broad requirements of competence, which are set by industry (The guideline is not yet implemented).
- Have no clear guidelines for progression from one qualification to another.
- The employers are responsible for determining levels of competence.
- Have no formal certification and only rely on best practices.

United Kingdom:

The United Kingdom was chosen, because with America and Australia, they are the biggest users of Forensic Engineering Services. The Engineering Council UK is also signatory to the Washington, Dublin and Sydney Accords, similar to the Engineering Council of South Africa indicating a similar basis for the entry-level degree in Engineering.

There are no mandated national standards for training of Forensic Engineers in the UK. There are however a number of individual universities that offer formal post-graduate degree programmes in Forensic Engineering. This includes the Sheffield Hallam University in Sheffield, the University of Teesside in Middlesborough, Cranfield University and others.

The qualifications offered vary between honours degree courses offered by Sheffield Hallam University to the Masters degree programmes offered by the other universities. The courses are structured to include most of the aspects covered by the proposed contents in the USA standards. The standards are also based on best practices in the Forensic Engineering industry

and are closely related to the legal system/s in the UK. Legal aspect therefore addressed as a major part of the degree programmes.

The proposed National Certificate is similar to the UK standards in that it:

- Determines the level of competence for the Forensic Engineer.
- Complies to the requirements of the applicable legislation for the specific country.
- There are guidelines regarding the minimum level of expertise.

The proposed National Certificates differ from the UK standards in that the UK standards:

- Do not utilise formalised standards, but give broad requirements of competence, which are set by industry.
- Have no clear guidelines for progression from one qualification to another.
- They have no formal certification and only rely on best practices incorporated in a number of isolated university programmes.

Australia:

Australia was chosen, because their Forensic Engineering industry is similar to South Africa at this stage. Although Forensic Engineers are used in judicial matters there are currently no formalised qualifications. The industry in Australia currently relies on the judicial system to determine the level of expertise on a "per case" basis. This is problematic, as the legal experts were initially misled into accepting under-qualified individuals as experts in some engineering related fields. Recent developments however include a post-graduate programme developed by Monash University Law faculty, with the assistance of the Engineering faculty. There are some pre-requisites regarding the admission of learners to the programme, although not similar to the entry-level requirements in the USA or UK.

The proposed National Certificate is similar to the Australian standards in that it:

- Determines the level of competence for the Forensic Engineer as accepted by the legal system.
- Complies to the requirements of the applicable legislation for the specific country.

The proposed National Certificates differ from the Australian standards in that the Australian standards:

- Do not utilise formalised standards, but give broad requirements of competence, which are set by industry and the courts.
- Have no clear guidelines for progression from one qualification to another.
- Have no formal certification and only rely on best practices in the industry and rely heavily on the court system.
- There are no clear guidelines in Australia regarding the minimum level of expertise for the qualified Forensic Engineer.

Other countries are similar to Australia, as Forensic Engineers are used in their various engineering related industries, but no formalised standards exist. There are a number seminars presented in other countries, including seminars presented by the University of Singapore. The Forensic Engineering industries in these countries are not formalised.

Eastern Europe/Europe:

Eastern Europe was chosen, as the Forensic Institutes affiliated to their governments, are similar to the Forensic Sciences Laboratory of the South African Police Services. Government mainly controlled the engineering industries in these countries and government therefore also determined the standards. The governments in these countries also used Forensic Engineering

to investigate incidents and accidents that occurred within these nationalised industries. The advantages to such a system include clear pathways within the profession and strict rules for the progression from one qualification to another. Currently these institutes are in a process of change in order to comply with the requirements of the European Union.

Initially Forensic Engineering in South Africa was similar to Eastern Europe, is it was mostly utilised for criminal investigations and government investigations into Health and Safety issues. In the past few decades the South African Forensic Engineering industry however moved away from such a strong government controlled environment, as the need for Forensic Engineering as a specialist field expanded into the engineering industry. This was to ensure proper investigations, risk assessments and accident reconstructions in the private industry. The guidelines set by these government institutes however give a good guideline concerning standards and qualifications of the personnel tasked with the investigations and the reconstruction of incidents.

The proposed National Certificate is similar to the Eastern European standards in that it:

- Determines the level of competence for the Forensic Engineer on a basis with strict guidelines for progression.
- Complies to the requirements of the applicable legislation for the specific country.
- has clear guidelines for progression from one qualification to another.
- There are clear guidelines in Eastern Europe regarding the minimum level of expertise for the qualified "Forensic Engineer".

The proposed National Certificates differ from the Eastern European standards in that the Eastern European standards:

- The accepted standards in these countries are mostly utilised for progression of individuals within the institute.
- Have no formal certification for Forensic Engineers and rely on post-graduate qualifications combined with experience in the forensic field.

ARTICULATION OPTIONS

The qualification allows for both horizontal and vertical articulation. This means that learners with qualifications at the same NQF Level can pursue this qualification for career orientation, and that learners completing this qualification may be allowed to proceed to a relevant Masters qualification.

The exit level outcomes ensure that a graduate of a programme meeting these standards would meet requirements for entry to a number of programmes including:

- A Learnership programme directed at becoming registered as a Professional Engineer or meeting other industry requirements.
- A postgraduate Bachelor of Laws (LLB) programme.
- Research masters programmes leading to the MSc (Eng).
- The Master of Business Administration.

MODERATION OPTIONS

- Moderation must include internal and external moderation of assessments. Internal and external moderation systems must ensure that all assessors produce assessments that are credible, fair, reliable and practicable.

- Moderation systems must provide assessment opportunities that are transparent, affordable and enhance development in the field and sub-field of the National Qualifications Framework.

• The accredited provider with the relevant ETQA must be able to provide internal moderation. Any institution offering learning that will enable achievement of this qualification or parts of this qualification must be accredited as a provider through the relevant ETQA by SAQA.

• External moderation will be done by the relevant ETQA according to the particular ETQA's policies and guidelines for assessment and moderation.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Anyone assessing a learner must be registered as an assessor with the relevant ETQA. Accredited higher education providers may use their own qualified staff as assessors.

Assessors should be subject matter experts with an Engineering Degree (or equivalent) and a minimum of 5 years relevant experience in Forensic Engineering.

Assessors should keep the following general principles in mind when designing and conducting assessments against outcomes based qualifications:

• Assessment activities should focus on gathering evidence in terms of the main outcome expressed in the exit level outcome to ensure assessment is integrated rather than fragmented.

• Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

• Ensure evidence is gathered across the entire range, wherever it applies. 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 show the candidate is able to perform in the real situation.

• The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

• The task of the assessor is to gather sufficient evidence as specified in this qualification in order for the candidate to achieve the outcomes repeatedly. This means assessors will have to judge how many repeat performances are required before they are confident that the performance is reproducible.

• Assessment should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

NOTES

Definition of Knowledge Areas:

This section describes the knowledge areas relating to Forensic Engineering. The purpose of this section is to accurately describe the level at which the technical subject matter is to be presented, by giving examples of specific specialised fields within Forensic Engineering. Training providers and students should have the ability to structure the courses and material according to the changing needs of the industry and the individual.

Law related (Core):

These are the areas of practice that distinguish the Forensic Engineer from other engineers trained at an equivalent level of post-graduate specialisation. As the engineers have to relay

highly specialised technical information to non-technical persons at a level at which the layperson would have to understand, he/she needs to understand the process and the field in which he/she operates. He/she needs to understand the principles and procedures to effectively communicate relevant evidence, so that the evidence complies with statutory requirements. This is information that all Forensic Engineers need to know.

• Criminal Law: Includes the application of legality as a general principle of the law. Includes conduct, unlawfulness, culpability as principles of criminal law. The categories of participants to the commission of offences.

• Criminal Procedure Law: A selection of general principles of the law of criminal procedure including basic principles, values and consitutionalism. The courts of South Africa; the prosecution of crime and the most fundamental rights of the accused. Pre-trial criminal procedure, including questioning, interrogation and search and seizure.

• Law of Evidence: Concepts of the law of evidence. The sources of the law of evidence, Relevance, Admissibility, admissions, confessions, privilege and unconstitutionally obtained evidence.

• On-Scene Investigation: Accepted Procedure for on-scene investigation taking into account legal requirements. Techniques used to investigate the scene. Acceptable techniques to record evidence on scene. Legal requirements for notes, sketches and photographs.

Discipline Specific:

This section indicates the level of the discipline specific material the Forensic Engineer need to know as a minimum, in order to effectively communicate specialised expertise to courts and other laypersons.

The summary below gives guidelines of the level of expertise in discipline specific aspects. Even though Forensic Engineering relies on a very high level of expertise, it is interdisciplinary in nature, and the student should therefore be able to structure a graduate program of special interest, within two or more engineering departments. This is specifically required as the Forensic Engineer would be responsible to reconstruct the incident/accident and should take into account the interdisciplinary nature of any such event. The main purpose of the Forensic Engineer is therefore "incident/accident reconstruction" in order to determine sequences, causes, factors, and to address these aspects in detail for litigation, insurance or preventative purposes.

Specialisation can take place in one or more of the accepted engineering disciplines or sub-disciplines, for example:

- Mechanical.
- Electrical.
- Aeronautical.
- Civil.
- Metallurgical and materials.
- Chemical.
- Mining.

Method of Calculation of SAQA Credits and Allocation to Knowledge Area:

The method of calculation assumes that certain activities are scheduled on a regular weekly basis while others can only be quantified as a total activity over the duration of a course or module. This calculation makes the following assumptions:

- Classroom or other scheduled contact activity generates notional hours of the student's own time for each hour of scheduled contact. The total is given by a multiplier applied to the contact time.
- Two weeks of full time activity accounts for assessment in a semester.
- Assigned work is generates only the notional hours judged to be necessary for completion of the work and is not multiplied.

The resulting credit for a course or value may be divided between more than one knowledge area. In allocating the credit for a course to multiple knowledge areas, only new knowledge or skills in a particular area may be counted. Knowledge and skills developed in other courses and used in the course in question shall not be counted. Such knowledge is classified by the nature of the area in which it is applied. In summary, no knowledge is counted more than once as being new.

The calculation of credit for workplace training is as follows:

There will be approximately 48hrs of "lecture contact hours" for every subject of 32 credits. In each subject, the student will have to do approximately 3 assignments where a time of approximately 20 hours will be required for each assignment.

This qualification is the equivalent of 5 X 32 credits subjects approximately. This means total lecture contact time is 5 X 48 = 240 hrs. The number of weeks were then adjusted according to that to be 12 weeks with 20 contact hours per week, which would give 12 X 20 = 240.

Multiplied with the multiplier of 4, this gives 960 hours. An additional 2 weeks are included for examinations, which would change the "12" to "14" as it is in the included calculation. This is then 14 X 20 X 4 = 1120 hrs in total.

The second aspect is the assignments, which would be 5 subjects X 3 assignments per subject = 15 X 20 hours per assignment = a total of 300 hrs.

In total the above two aspects already amount to 1120 + 300 = 1420 hours or 142 credits.

The practical and the "extra contact hours" include all consultations with the lecturer which is a large part of the post-graduate studies. This can be consultations relating to the lectures or the assignments. These figures are approximate and can include 4 consultations per subject per year with the lecturer for each subject.

The "practical" includes one practical per subject per year of 4 hours, although some of the subjects may have more practical sessions depending on the course itself (for example; the scene investigation may have one practical session of 8 hours, or two sessions of 4 hours, maybe even more).

The hours for the "extra contact hours" and the "practical" may be interchangeable, depending on the subject material. The example shown is just based on averages.

The last two aspects make up the remaining 180 hours (18 credits).

Tutorials are usually NOT used on post-graduate level, so were given a default value of "0".

Calculation of credits:

- C = {14(20*1*4 + 0*0*0) + 5*4*3 + 20*2*3 + 300}/10.
- C = {14(80) + 60 + 120 + 300}/10.
- C = {1120 + 60 + 120 + 300}/10.
- C = {1600}/10.
- C = 160.

UNIT STANDARDS

This qualification is not based on Unit Standards.