Engineering Standards Generating Body

HEQF-COMPLIANT GENERIC ENGINEERING QUALIFICATIONS:

Advanced Diploma - type Programme (NQF 7)

FIELD: Manufacturing, Engineering and Technology

SUBFIELD: Engineering and Related Design

NQF LEVEL: 7

CREDITS: 140

Minimum Credits at Exit Level 7: 120

SAQA Qual. Id. No:

TITLE: Advanced Diploma in Engineering

Qualification Qualifiers

The qualification may have a disciplinary or cross-disciplinary qualifier (discipline, branch, option or endorsement) defined in the provider's rules for the advanced diploma and reflected on the academic transcript and Advanced Diploma certificate, subject to the following:

1. There must be at least one qualifier which contains the word engineering together with a disciplinary description such as: Agricultural, Aeronautical, Chemical, Civil, Computer, Electrical, Electro-mechanical, Electronic, Environmental, Industrial, Extractive Metallurgical, Mechanical, Mechatronics, Metallurgical, Mineral(s) Processing, Physical Metallurgical and Mining. Qualifiers are not restricted to this list.

2. A second qualifier, if present, must indicate a focus area within the field of the first qualifier.

3. The qualifier(s) must:

   - clearly indicate the nature and purpose of the programme.
   - be consistent with the fundamental engineering science content on the programme.
   - be comparable with typical programmes within the Sydney Accord Signatories.

4. The target market indicated by the qualifier(s) may be a traditional discipline of engineering or a branch of engineering or a substantial industrial sector. Formal education for niche markets should be satisfied by broad undergraduate programmes such as specified in this standard followed by specialized course-based programmes.

Examples of acceptable designations in accordance with HEQF policy are:

- Advanced Diploma in Civil Engineering in Structures, abbreviated Adv.Dip. (Civil) (Structures)
- Advanced Diploma in Civil Engineering, Environmental Engineering abbreviated Adv. Dip. (Civil Engineering) (Environmental)

RATIONALE FOR THE QUALIFICATION

Engineering is an activity that is defined by the following distinguishing characteristics:

1. It encompasses initiatives, services and the solution of problems that are of importance to society and the economy.

2. Engineering work falls within the scope of any of the following types of works: Transportation systems, civil and structural works, mechanical systems, works for the harnessing of energy, electrical power systems, electronic systems, process systems, mining operations and activities for the purposes of mining minerals, treatment of substances, building services, lightning protection measures, overseeing the planning design and delivery in regard to accredited education and training programmes and the mentoring of candidate engineering practitioners.

3. The following engineering functions and auditing thereof are performed in the engineering works referred to in 2. above: Design of materials, components, systems, plant or processes; planning the capacity and location of infrastructure; investigating, advising, costing and reporting on engineering problems and auditing thereof; improvement or optimisation of materials, components, systems or processes; management of, procurement within or the implementation of engineering projects and maintenance of engineering infrastructure; implementation of engineering designs and solutions; application of the results of research and development, and the engineering contribution to the commercialization of projects and products; management of the risk associated with engineering processes, systems, equipment, plant and infrastructure; communication of the impacts and outcomes of engineering analysis, design solutions, systems and processes to a wide range of stakeholders; and the education, training and mentoring of engineering personnel, including candidates and students at higher education institutions in programmes that have been accredited by ECSA.

4. Engineering work involves in its execution one or more of the following characteristics: Investigation and solving of problems and design solutions; application of knowledge and technology engineering based on mathematics, natural sciences and engineering sciences, information technology as well as specialist and contextual knowledge; management of engineering works; the addressing of the impacts of engineering work including the application of engineering principles and methods in the identification, analysis, evaluation, treatment and monitoring of risk; or the exercising of judgment and the taking of responsibility for engineering work. The management of engineering works require the coordination of the following risk-related activities: Direct and control everything that is constructed or results from construction or manufacturing operations; operate engineering works safely and in the manner intended; return engineering works, plant and equipment to an acceptable condition by the renewal, replacement or mending of worn, damaged or decayed parts; direct and control engineering processes, systems, commissioning, operation and decommissioning of equipment; maintain engineering works or equipment in a state in which it can perform its required function; or mitigate risks relating to health, safety and the environment and the functioning of such works.

5. Engineering activity requires a minimum body of knowledge and distinctive competencies. The body of knowledge is based on mathematics, natural sciences, engineering sciences, information technology and contextual knowledge including legal, socio-economic, financial and regulatory aspects at the appropriate exit level. Distinctive competencies include identifying problems and designing solutions,

managing activities, addressing impacts of solutions and activities, acting ethically, applying judgement and taking responsibility.

6. The practice of engineering activities at professional level involves a number of roles, recognized in categories of registration under the Engineering Profession Act: Professional Engineer, Professional Engineering Technologist, Professional Engineering Technician, and Professional Certificated Engineer.

CHARACTERISTIC PROFILES FOR PROFESSIONAL ENGINEERING PRACTITIONERS

Technologist

Professional Engineering Technologists are characterized by the ability to apply established and newly developed engineering technology to solve broadly- defined problems, develop components, systems, services and processes.

They provide leadership in the application of technology in safety, health, technical and commercially effective operations and have well-developed interpersonal skills.

They work independently and responsibly, applying judgement to decisions arising in the application of technology and health and safety considerations to problems and associated risks.

Professional Engineering Technologists have a specialized understanding of engineering sciences underlying a deep knowledge of specific technologies together with financial, commercial, legal, social and economic, health, safety and environmental matters.

Certificated Engineer

Professional Certificated Engineers are characterized by the ability to apply established and newly developed engineering technology to solve broadly defined problems, develop components, systems, services and processes in specific areas where a legal appointment is required in terms of either the Occupational Health and Safety Act, the Mines Health and Safety Act, or the Merchant Shipping Act, e.g. large factories, mines and marine environments.

They provide leadership in safety, health, technical and commercially effective operations and have well-developed management skills.

They work independently and responsibly, applying judgement to decisions arising in the application of technology and health and safety considerations to problems and associated risks.

Professional Certificated Engineers have a specialized understanding of engineering sciences underlying a manufacturing, marine, mining, plant and operations, together with financial, commercial, legal, social and economic, health, safety and environmental methodologies, procedures and best practices.

PURPOSE

The process of professional development in engineering has three principal phases: education, training and experience leading to registration and continuing development during practice. Phases are separated by important stages. At Stage 1, educational requirements are met. During employment, training is completed and experience is gained to attain the competencies for Stage 2, namely professional competence at the point of registration. Holding a qualification attached to a programme accredited for the category of registration is the normal way of meeting the Stage 1 educational requirements.

The purpose of educational programmes designed to meet this standard is:

To build the necessary knowledge, understanding, abilities and skills required for further learning towards becoming a competent practicing engineering technologist or certificated engineer. Specifically, the qualification provides graduates with:

Comment [ELD1]: Why this qualification should be available to the engineering profession is very well hidden. It has taken over 2 pages and 915 words, starting with the **Rationale for the Qualification**, to state who would require such a qualification!!!

1. Preparation for careers in engineering and areas that potentially benefit from engineering skills, for achieving technological proficiency and to make a contribution to the economy and national development;

2. The educational base required for registration as a Professional Engineering Technologist or Professional Certificated Engineer with ECSA.

Comment [ELD2]: Surely the **Rationale** should give a valid reason why it is deemed necessary to provide two different engineering qualifications (i.e. the Adv Dip and the B Eng Tech) to meet the Stage 1 requirements for technologists and certificated engineers.

The engineering profession need not provide an engineering qualification for every qualification listed on the HEQF.

3. An appropriate level of achievement, the ability to enter NQF level 8 programmes e.g. Honours, Post Graduate and B Eng Programmes and then proceed to masters degrees.

For certificated engineers, the education base for achieving proficiency in mining / factory plant operations and occupational health and safety.

NQF Level, Credits, Minimum Credits in the Knowledge Areas:

The programme leading to the qualification shall contain a minimum of 140 SAQA credits. Not less than 120 Credits shall be at NQF level 7. Credits shall be distributed in order to create a coherent progression of learning toward the exit level. Preparatory or remedial courses are not included in the 140 credits.

A programme to achieve this qualification typically requires one or more years of academic study.

Exit Level 7 and Credits

Total	140
Mathematical Sciences	14
Natural Sciences	7
Engineering Sciences	28
Engineering Design	21
Computing and IT	0
Complementary Studies	14
For re-allocation	56
Work Integrated Learning	Optional

Comment [ELD3]: This document does not give the entry requirements for qualifications based on this standard. However, from the HEQF, the entry qualification will be a 360 credit Diploma. Thus those who choose this route to become technologists or certificated engineers will be required to obtain 500 credits compared to those who choose the 420 credit B Eng Tech route. Who would want to do this? So why have such a qualification standard in the engineering profession?

Comment [ELD4]: If one adds the 263 minimum credits specified in the Diploma for Mathematical Sciences, Natural Sciences, Engineering Sciences and Engineering Design to the 70 minimum credits specified in these Knowledge Areas for the Advanced Diploma, the learner will be required to obtain a minimum of 333 credits in these Knowledge Areas compared with the minimum of 259 credits required to obtain a B Eng Tech. Again, who would want to do this??

Core and specialist requirements

The programme shall have a coherent core of mathematics, natural sciences and fundamental engineering sciences that provides a viable platform for further studies and lifelong learning. The coherent core must enable development in a traditional discipline or in an emerging field. The coherent core embraces both fundamental and core elements as defined by SAQA

A programme shall contain specialist engineering study at the exit level. Specialist study may lead to elective or compulsory credits. Specialist study may take on many forms including further deepening of a theme in the core, a new sub-discipline, or a specialist topic building on the core. It is recognized that the extent of specialist study is of necessity limited in view of the need to provide a substantial coherent core. Specialist study may take the form of compulsory or elective credits.

In the Complementary Studies area, it covers those disciplines outside of engineering sciences, natural sciences and mathematics which are relevant to the practice of engineering in 2 ways: (a) principles, results and method are applied in the practice of engineering, including engineering economics, the impact of technology on society and effective communication; and (b) study broadens the student's perspective in the humanities or social sciences to support an understanding of the world. Underpinning Complementary Studies knowledge of type (b) must be sufficient and appropriate to support the student in satisfying Exit Level Outcomes 7 and 10 in the graduates specialized practice area.

Curriculum Content
This standard does not specify detailed curriculum content. The fundamental and specialist engineering science content must be consistent with the designation of the degree.

Work Integrated Learning

If the provider chooses to include work integrated learning (WIL) in the programme, credits must only be included in the knowledge breakdown if:

1. the work is quality assured by the provider,
2. the provider comprehensively assesses student’s performance against defined outcomes (that are relevant to the discipline); and
3. the learning is documented and presented in the accreditation process.

EXIT LEVEL OUTCOMES

Exit level outcomes defined below are stated generically and may be assessed in various engineering disciplinary or cross-disciplinary contexts in a provider-based or simulated practice environment. Words shown italicized have specific meaning defined in ECSA Document E-01.

General Range Statement: The competencies defined in the ten exit level outcomes may be demonstrated in a university-based and / or simulated workplace context. Competencies stated generically may be assessed in various engineering disciplinary or cross-disciplinary contexts.

Exit Level Outcome 1: Apply engineering principles to systematically diagnose and solve broadly defined engineering problems.

Associated Assessment Criteria:

The problem is analysed and defined and criteria are identified for an acceptable solution.

1. Relevant information and engineering knowledge and skills are identified and used for solving the problem.
2. Possible approaches are generated and formulated that would lead to a workable solution for the problem.
3. Possible solutions are modelled and analysed.

4. Possible solutions are evaluated and the best solution is selected.
5. The solution is formulated and presented in an appropriate form.

Range Statement: Broadly-defined engineering problems are characterised by some or all of the following attributes:

- Problems require identification and analysis may be concrete or ill-posed and have a degree of uncertainty.
- Problems may be unfamiliar, but are capable of interpretation for solution by technologies in practice area.
- Approach to solution involves using structured analysis techniques in well-accepted, creative and innovative ways.
- Information is complex and possibly incomplete, requires validation and supplementation and compilation into the information base.
- Solutions may be partially outside standards and codes, may require judgement, and may operate outside standards and codes with justification.
- Involves a variety of factors which may impose conflicting constraint, premises, assumptions and or restrictions.

Comment [ELD5]: The listed Exit Level Outcomes with their associated Assessment Criteria and Range Statements are virtually identical to those of the B Tech Eng (allowing for minor grammatical and formatting changes).

This again begs the question – Why have two different qualifications with identical outcomes, assessment criteria and range statements??

Comment [ELD6]: This should be part of the numbered list. Thus list should include 6 items.

Exit Level Outcome 2: Apply knowledge of mathematics, natural science and engineering sciences to defined and applied engineering procedures, processes, systems and methodologies to solve broadly-defined engineering problems.

Associated Assessment Criteria

1. An appropriate mix of knowledge of mathematics, numerical analysis, statistics, natural science and engineering science at a fundamental level and in a specialist area is brought to bear on the solution of broadly-defined engineering problems.
2. Theories, principles and laws are used.
3. Formal analysis and modelling is performed on engineering materials, components, systems or processes
4. Concepts, ideas and theories are communicated.
5. Reasoning about and conceptualising engineering materials, components, systems or processes is performed.
6. Uncertainty and risk is handled through the use of probability and statistics.
7. Work is performed within the boundaries of the practice area.

Range Statement: Knowledge of mathematics, natural science and engineering science is characterized by:

- a knowledge of mathematics using formalism and oriented toward engineering analysis and modelling; fundamental knowledge of natural science: both as relevant to a sub-discipline or recognised practice area.

- a coherent range of fundamental principles in engineering science and technology underlying an engineering sub-discipline or recognised practice area.

- a systematic body of established and emerging knowledge in a specialist area or recognized practice area.

- the use of mathematics, Natural science and engineering science, supported by established models, to aid solving broadly-defined engineering problems.

- the use of knowledge of

    - the engineer in society
    - engineering impacts
    - economics
    - other knowledge areas
    - professionalism

to guide and moderate solutions to broadly-defined engineering problems.

Note: Problems or projects used for assessment may provide evidence in the application of one or more categories of knowledge listed above.

Exit Level Outcome 3: Perform procedural and non-procedural design of broadly defined components, systems, works, products or processes to meet desired needs normally within applicable standards, codes of practice and legislation.

Associated Assessment Criteria:

1. The design problem is formulated to satisfy user needs, applicable standards, codes of practice and legislation.
2. The design process is planned and managed to focus on important issues and recognises and deals with constraints.
3. Knowledge, information and resources are acquired and evaluated in order to apply appropriate principles and design tools are evaluated and used to provide a workable solution.
4. Design tasks are performed including analysis, quantitative modelling and optimisation of the product, system or process subject to the relevant premises, assumptions, constraints and restrictions.
5. Alternatives are evaluated for implementation and a preferred solution is selected based on techno-economic analysis, judgement and implementability.
6. The selected design is assessed in terms of the impact and benefits.

   Range: Social, economic, legal, health, safety, and environmental

7. The design logic and relevant information is communicated in a technical report.

Range Statement: Design problems used in assessment must conform to the definition of broadly-defined engineering problems.

- A major design project must be used to provide a body of evidence that demonstrates this outcome.

- The project would be typical of that which the graduate would participate in a typical employment situation shortly after graduation.

The selection of components, systems, engineering works, products or processes to be designed is dependent on the sub-discipline.

Exit Level Outcome 4: Define and conduct investigations and experiments of broadly-defined problems.

Associated Assessment Criteria:

1. Investigations and experiments are planned, designed and conducted within an appropriate discipline.
2. Relevant literature including codes is searched and material is critically evaluated for suitability to the investigation.
3. Analysis is performed as necessary to the investigation.
4. Equipment or software is selected and used as appropriate in the investigations.
5. Information from relevant data is derived, analysed and interpreted.
6. Conclusions are drawn from an analysis of all relevant evidence.
7. The purpose, process and outcomes of the investigation are recorded in a technical report.

Range Statement: The balance of investigation and experiment should be appropriate to the discipline. An investigation or experimental study should be typical of those in which the graduate would participate in an employment situation shortly after graduation.

Note: An investigation differs from a design in that the objective is to produce knowledge and understanding of a phenomenon.

Exit Level Outcome 5: Use appropriate techniques, resources, and modern engineering tools, including information technology, prediction and modelling, for the solution of broadly-defined engineering problems, with an understanding of the limitations, restrictions, premises, assumptions and constraints.

Associated Assessment Criteria:

1. The method, skill or tool is selected and assessed for applicability and limitations against the required result.
2. The method, skill or tool is applied correctly to achieve the required result.
3. Results produced by the method, skill or tool are critically tested and assessed against required results.
4. Computer applications are created, selected and used as required by the discipline

Range Statement: A range of methods, skills and tools appropriate to the sub-discipline of the program including:

- Sub-discipline-specific tools, processes or procedures;
- Computer packages for computation, modelling, simulation, and information handling;
- Computers and networks and information infra-structures for accessing, processing, managing, and storing information to enhance personal productivity and teamwork;
- Techniques from economics, management, and health, safety and environmental protection.

Exit Level Outcome 6: Communicate effectively, both orally and in writing, with engineering audiences and the affected parties.

Associated Assessment Criteria:

1. The structure, style and language of written and oral communication is appropriate for the purpose of the communication and the target audience.
2. Graphics used are appropriate and effective in enhancing the meaning of text.
3. Visual materials used enhance oral communications.
4. Accepted methods are used for providing information to others involved in the engineering activity.
5. Oral communication is delivered fluently with the intended meaning being apparent.
6. Written communications meet the requirement of the intended audience

Range Statement: Material to be communicated is in an academic or simulated professional context.

- Audiences range from engineering peers, related engineering personnel and lay persons.
- Appropriate academic or professional discourse is used.
- Written reports range from short (300-1000 words plus tables and diagrams) to long (10 000 to 15 000 words plus tables, diagrams and appendices), covering material at exit level.
- Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

Exit Level Outcome 7: Demonstrate knowledge and understanding of the impact of engineering activity on the society, economy, industrial and physical environment, and address issues by analysis and evaluation and the need to act professionally within own limits of competency.

Associated Assessment Criteria:

1. The impact of technology is identified and dealt with in terms of the benefits and limitations to society.
2. The engineering activity is analysed in terms of the impact on occupational and public health and safety.
3. The engineering activity is analysed in terms of the impact on the physical environment.
4. Personal, social, economic, cultural values and requirements of those who are affected by the engineering activity are taken into consideration.

Range Statement: The combination of social, workplace (industrial) and physical environmental factors must be appropriate to the sub-discipline of the qualification. Evidence may include case studies typical of the technological practice situations in which the graduate is likely to participate.

Issues and impacts to be addressed:

- Are generally within, but may be partially outside of standards and code of practice;
- Involve several groups of stakeholders with differing and conflicting needs;
- Have consequences that are locally important but may extend more widely;
- Are broadly-defined and maybe part of, or a system within a wider engineering system

Exit Level Outcome 8: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a diverse team and to manage projects

Associated Assessment Criteria:

1. The principles of planning, organising, leading and controlling are explained.
2. Individual work is carried out effectively, strategically and on time.
3. Contributions to team activities support the output of the team as a whole.
4. Functioning as a team leader is demonstrated.
5. A design or research project is organised and managed.
6. Effective communication is carried out in the context of individual and team work.
7. Critical functions in the team are performed and work is completed on time

Range Statement

- The ability to manage a project should be demonstrated in the form of the project indicated in ELO 3.

- Tasks are discipline specific and within the technical competence of the graduate.

- Management principles include:
  - ❖ Planning: set objectives, select strategies, implement strategies and review achievement.
  - ❖ Organising: set operational model, identify and assign tasks, identify inputs, delegate responsibility and authority.
  - ❖ Leading: give directions, set example, communicate, motivate.
  - ❖ Controlling: monitor performance, check against standards, identify variations and take remedial action.

Exit Level Outcome 9: Engage in independent and life-long learning through well developed learning skills.

Associated Assessment Criteria:

1. Learning tasks are managed autonomously and ethically, individually and in learning groups.
2. Learning undertaken is reflected on and own learning requirements and strategies are determined to suit personal learning style and preferences.
3. Relevant information is sourced, organised and evaluated
4. Knowledge acquired outside of formal instruction is comprehended and applied.
5. Assumptions are challenged critically and new thinking is embraced

Range Statement: The learning context is broadly-defined, varying and sometimes unfamiliar. Some information is drawn from the technological literature.

Exit Level Outcome 10: Comprehend and apply ethical principles and commit to professional ethics, responsibilities and norms of engineering practice within own limits of competence.

Associated Assessment Criteria:

1. The nature and complexity of ethical dilemmas are described.
2. The ethical implications of decisions made are described.
3. Ethical reasoning is applied to evaluate engineering solutions.
4. Awareness is displayed of the need to maintain continued competence through keeping abreast of up to date tools and techniques available in the workplace.
5. The system of continuing professional development is understood and embraced as an ongoing process.
6. Responsibility is accepted for consequences stemming from own actions.
7. Judgements are made in decision making during problem solving and design.
8. Decision making is limited to area of current competence.

Range Statement: Evidence includes case studies typical of engineering practice situations in which the graduate is likely to participate.

The range of the candidates' activity;

- is generally within, but may be partially outside of standards and codes of practice
- involves several groups of stakeholders with differing and conflicting needs
- has consequences that are locally important but may extend more widely.
- is broadly-defined and is part of, or a system within complex engineering systems.

Additional Comments

As can be seen from my comments, one of the major problems associated with this draft qualification standard is the minimum credits that will be allocated to the various Knowledge Areas.

When the proposed qualification standards for the *Higher Diploma*, the *Advanced Diploma* and the *B Eng Tech* were about to be published for comment by the Engineering ESGB Technology Standard Generating Group, I raised strong objections in a number of memoranda to the proposed augmenting of the minimum credits per year to 140 compared to the 120 shown on the HEQF.

The Technology SGG Task Team rejected my comments. Part of their response is reproduced below:

We do not agree that engineering students work different amounts of time compared to earn a credit. In fact, they work harder overall and thus deserve more credits. We do not accept that engineering programmes must have the same credits as other programmes. We believe that problems of student success and progression are not solved merely by reducing the total credits required. Having removed the idea that a programme has an exact duration, adjusting the rate at which credits are tackled and adding remedial credits is in the hands of the providers.

On the question of actual number of credits. ECSA's formula incorporates the principles embodied in the SAQA definition, based on the idea that one credit equals 10 notional hours of learning, that is the learning time that it would take an **average** learner to meet the outcomes defined. It includes contact time, time spent in structured learning in the workplace, individual learning and assessment. The 140 hours per year corresponds to 17.5 weeks per semester and 40 hours total work. The debate is whether this effort ensures success for to the good, average or poor students. The BEng experience is that it is for **good** students who complete in four years. Average students should be regarded as five year students and should average 112 credits per year and poor students should average 95 credits a year for six years - and lower in earlier years with added remedial credits.

I have highlighted an inconsistency in the above argument in that notional hours are based on the performance of an average student, whereas the task team admits that only good students complete the B Eng qualification in the time allowed!

Bearing in mind that I represent the University of Technology sector, most of our intake of learners do not meet the entry requirements of the traditional universities, or have been rejected by the traditional universities in favour of students with better prospects. Thus there are few good students. Why add to the burden of average or poor students by requiring them to complete more credits in order to obtain a qualification?

The Task Team argues that **engineering students work harder than those in other faculties and therefore should be given more credit**. Although this argument sounds plausible, I know from recent personal experience, as a Head of Department and Programme Developer, that it is flawed.

In the past year, (and thus after the correspondence relating to the above arguments), I requested the Senate of my university of technology to correct an anomaly. We offer both the *ND: Eng: Electrical* and the *ND: Eng: Computer Systems* in our department. These qualifications were initiated by two different convener technikons in the past. This resulted in the Electrical qualification requiring 20 academic subjects with an average credit rating of 0.1 each, while the Computer Systems qualification required 24 subjects with an average credit rating of 0.083 each. However learners registered for these qualifications were sitting in the same classes!! Thus a student registered for the Electrical qualification would receive a credit of 0.1 for Mathematics 1, while his peer, sitting right next to him and doing the same assessments would receive a credit of 0.083.

I initially followed the same argument as the Task Team above. I accepted that Computer Systems students are required to do 4 subjects more than Electrical students. All I asked was that they received full credit for doing so. I asked that the average credit for Computer Systems subjects be raised to 0.1 each, to match the Electrical subjects. Thus a Computer Systems graduate would now receive a total of 2.4 academic credits compared to the 2.0 academic credits of the Electrical students.

This sound and fair argument was approved by our Senate.

I was shocked, therefore, to receive a message from our HEMIS (Higher Education Management Information Systems) department to inform me that the Department of Education ignores, or rather adjusts credits for subjects to a total of 1.0 per year. If a university submits a curriculum of 4 subjects per year, the average credit per subject is 0.25. The ND in Electrical Engineering required 10 subjects per year, thus their average credit was 0.1, whereas the 12 subjects per year required for the ND in Computer Systems resulted in an average credit of 0/083 per subject.

Thus, regardless of the fact that our university now gives Computer Systems students a total credit of 2.4 for two years academic work, the DoE simply adjusts those credits back down to a total of 2.0.!!

Every additional required credit means extra work for the learners with no additional reward in terms of the qualification obtained. A diploma is a diploma, a degree is a degree regardless of the faculty or discipline in which it is obtained.

Every additional required credit means extra work for the lecturers and extra resources such as rooms, furniture and equipment. As far as most institutions are concerned, a lecturer is a lecturer regardless of the faculty or department within which she operates. Engineering lecturers do not receive higher pay or better service benefits because they work harder to provide the teaching required for the additional engineering credits per qualification.

Maybe this has been the case all along over the years. Let's not perpetuate this injustice now that we have a *National Qualifications Framework* that is designed to give fair comparisons between qualifications.

We will be doing the engineering profession – practioners, providers and learners a disservice by augmenting the minimum credits per Stage 1 qualification.

If, to meet international benchmarks for registered practitioners, learners will have to obtain additional academic credits, these can be obtained while the learner is working in industry as part of the Stage 2 qualification, and as part of continuous professional development.

To "cut" the credits for Stage 1 qualifications down to the SAQA minima, providers will probably have to offer more generic Stage 1 qualifications with fewer electives. Specialisation will take place via short courses offered for learners busy with their Stage 2 qualifications and professional development.

Thus, **as opposed to the argument that engineering students have to work harder and therefore should be given more credits per qualification, I passionately appeal to all decision makers that engineering students work no harder than students in other faculties and disciplines to achieve the equivalent qualifications on the respective levels of the NQF.**

Regardless of the credits that we allocate to our engineering qualifications, the general public will only see the qualification name, and not the associated credits, or in other words **– A diploma is a diploma, and a degree is a degree, regardless of the discipline.**