

# **A new engineering qualification replacing the B Tech degree**

## **Background**

The Higher Education Qualifications Framework was first published for comment in July 2004 in accordance with the Higher Education Bill of 1997. This new framework was designed to be the road map of qualifications for the future. It contains post Grade 12 qualifications at all levels from a one-year Higher Certificate right through to a PhD.

Technology qualifications in South Africa have a history of change every ten to fifteen years, and in this instance it was to be no different. The B Tech as we know it, with the diploma as basis containing an industry component, topped up with an extra academic year to grant the degree, was afforded no place in the Framework, and will therefore be terminated.

At the time of publication of the Framework for comment, a number of professions and industries, like the tourism industry, health, financial and engineering professions, all petitioned the Minister, but the B Tech was to be discontinued. The National Diploma, however, was allowed to stay, but some changes were introduced there as well.

## **Debating the Change**

There was great debate at the universities of technology about the accommodation of the present qualifications in the new Framework. If a diploma and advanced diploma were decided on, candidates would end up without a degree and this would not be acceptable, and the universities did not have the resources to offer both a diploma and a degree. The industry had gotten used to a technology degree, and the universities as well as their students and parents insisted on a degree. When the idea of a three-year degree was mooted to the Department, they adamantly insisted that it had to be a totally academic degree with no “practical” or “industry” component. The engineering industry favoured a practical component, but this was refused. A delegation went all the way to the Minister, where they were afforded a very friendly reception but nevertheless received a negative answer. The reason for this was that great numbers of diploma students were not able to find sponsors for their industry year and hence could not receive their diploma despite having completed all their academic subjects. Therefore, if an industry component was required in a new qualification, it would have to be added after attainment of the qualification.

## **Introducing the new three-year degree.**

The only logical way to introduce a new qualification was to glean from the four-year degree model that proved successful at the traditional universities, and introduce a three year academic degree, with no industry component. This new qualification, which is being introduced from 2017 onwards, will be called the Bachelor of Engineering Technology (BET) degree.

Many people in industry maintain that the practical or industry component is absolutely essential for technology qualifications, that it is the hallmark of technology qualifications, and that graduates would not be able to function in industry without it. This hails from the time that the technology qualifications were introduced in the late fifties and early sixties as the “sandwich courses,” with the student doing alternate academic and practical semesters in class and in industry. When I took over a Civil Engineering Technology Department in 2007, the rule still was that the student had to do his industry year before being allowed to do his final academic semester. This model worked well for the construction industry, but it was found that the consulting engineers preferred students who had completed all their academic subjects. We had to conform with most other people in academia who allowed the industry year either during or after the academic semesters. This situation proved that students who gained industry experience *after* their academic semesters were not inferior to those who gained industry experience *during* their academic tour. The argument that the industry experience was an essential component of technology qualifications therefore does not hold water, and technology graduates are well able to hold their own having gained their industry experience after completion of their academic subjects.

### The New Bachelor of Engineering Technology (BET) Degree.

The question arose how to design the new Bachelor of Engineering Technology degree. Was it to be a four-year BSc Eng “light” or a National Diploma on steroids? This would be an easy trap to fall into. However, much thought was given to the development of a unique qualification, catering for both the requirements for accreditation of the qualification as set up by the statutory Engineering Council of South Africa (ECSA) for registration of Engineering Technologists, and the needs of industry. To achieve this ECSA requirement, the minimum guidelines as set out in Table 1 had to be satisfied.

Table 1			
<b>Comparison of Engineering Qualifications</b>			
Minimum ECSA required credits in knowledge areas			
	Diploma	BET	BSc Eng
Mathematical Sciences	35	42	56
Natural Sciences	28	28	56
Engineering Sciences	126	140	180
Computing and IT	21	21	-
Complementary Studies	14	28	56
Work Integrated learning	30	-	-
<b>Sub Total</b>	<b>282</b>	<b>308</b>	<b>420</b>
Re-allocation of the above areas	78	112	140
<b>Total Credits</b>	<b>360</b>	<b>420</b>	<b>560</b>

The nature of the work done in practice by the engineer, technologist and technician also had to be taken into account. This can best be illustrated by Figure 1 describing the *construction-product-process-system* life cycle profile on the *conceive- design-implement-operate* continuum.

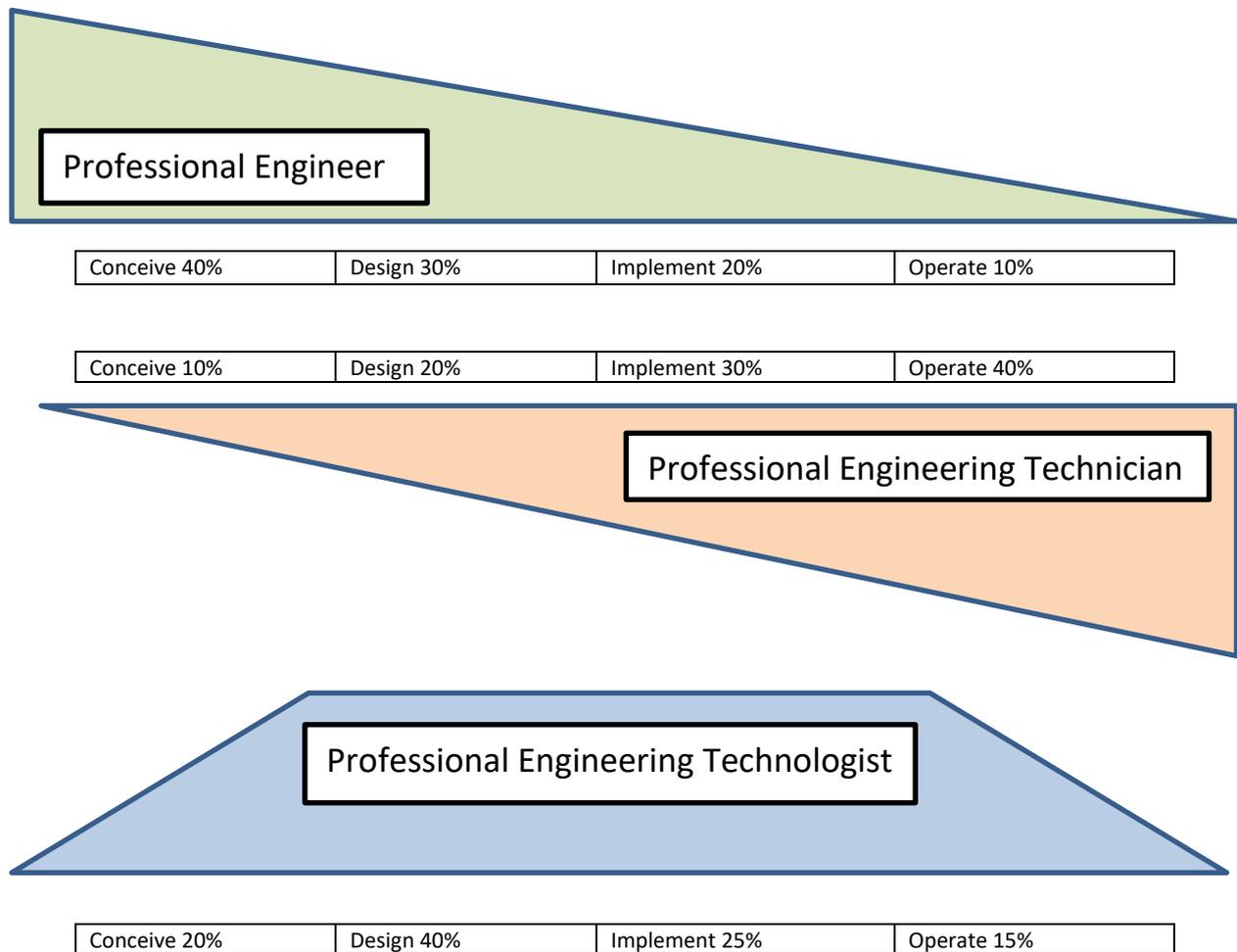


Figure 1: *Construction-product-process-and-system* lifecycle profile on the *conceive-design-implement-and-operate* continuum.

The new Bachelor of Engineering Technology degree was therefore designed with more pure mathematics and science than the old qualifications, with an emphasis on broadly defined problem solving and design, and a fine balance of theoretical and applied knowledge. It teaches the technologist to go beyond established standards and codes in a disciplined and informed manner, and provides a theoretically-based but hands-on and practical focus beyond that of the engineer, and with less front loading of mathematics and science. It is therefore a functionally focused qualification with direct industry application and relevance. It aims to produce the educational base for a well-rounded professional engineering technologist.